Document Title

Summary of the ecotoxicological studies
Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L)

Data Requirement(s)

Regulation (EC) No 1107/2009 & Regulation (EU) No 284/2013

Document MCP

Section 10: Ecotoxicological studies

According to the Guidance Document SANCO/10181/2013 for applicants on preparing dossiers for the approval of a chemical active substance

Date

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Version history

Date [yyyy-mm-dd]	Data points containing amendments or additions[1] and brief description	Document identifier and version number

[1] It is suggested that applicants adopt a similar approach to showing revisions and version history as outlined in SANCO/10180/2013 Chapter 4, 'How to revise an Assessment Report'.

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CP 10 ECOTOXICOLOGICAL STUDIES ON THE PLANT PROTECTION PRODUCT

Fluopicolide (AE C638206) was included in Annex I to Council Directive 91/414/EEC in 2010 (Commission Directive 2010/15/EU, Entry into Force on June 1, 2010). The expiration of approval of fluopicolide is May 31, 2023 (Commission Implementing Regulation (EU) 2017/1527). The Supplementary Dossier contains only data which were not submitted at the time of the Annex I inclusion of fluopicolide under Council Directive 91/414/EEC and which were therefore not evaluated during the first EU review. All data which were already submitted by Bayer AG (former Bayer CropScience) for the Annex I inclusion under Council Directive 91/414/EEC are contained in the Draft Assessment Report (DAR) and its Addenda and are included in the Baseline Dossier provided by Bayer AG.

The formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L), abbreviation FLC+PCH SC 687.5, is a suspension concentrate formulation (SC) containing 62.5 g/L of fluopicolide. This formulation is registered throughout Europe under trade names such as Infinito and Volare. FLC+PCH SC 687.5 was already a representative formulation of Bayer AG for the Annex I inclusion of fluopicolide under Council Directive 91/414/EEC.

Fluopicolide is a fungicidal active substance developed by Bayer. It is the only active substance in Europe representing a class of chemistry (pyridinylmethyl-benzamides) with a unique mode of action via delocalization of a spectrin-like protein in the Oomycetes fungi.

Fluopicolide has a long track record of safe use in a large number of targeted crops within horticulture, e.g. cucumbers, lettuce and in arable crops (e.g. potato).

Fluopicolide is active against a wide range of Oomycete fungi, the causal agents of devastating plant diseases of economic importance in EU-27 such as potato late blight (*Phytophthora infestans*) or downy mildew diseases in a broad range of crops.

It provides effective, long lasting protection at low application rates against Oomycetes diseases at different stage of development of the fungi, giving flexibility of use to the farmer.

Fluopicolide can be formulated with other active ingredients in different types of formulations to optimise and complete its activity.

The development of resistances of Oomycetes against existing, well-established fungicide groups represent a threat for European farmers by increasing the complexity of their plant protection programs leading to severe economic impacts. With Fluopicolide, farmers in EU-27 have access to a modern tool for their integrated crop protection programs, contributing to effective and sustainable management of resistance development and preserving high level of protection against Oomycete diseases.

By reducing the Oomycete damages, applications of Fluopicolide + Propamocarb SC 687.5 on target crops contribute to the achievement of optimum yield and quality, thus securing sufficient supply of high-quality potatoes and horticultural produces for European consumer destinations and markets abroad, being it fresh or for the processing industry.

Use pattern considered in this risk assessment

Table 10- 1: Intended application pattern

Crop	BBCH range	Appl. number	Interval (days)	Applicate rate Product (L prod./ha)	Applicate rate active substances (g a.s./ha)
Potato	21-89	4	7	1.6	FLC: 100 PCH: 1000
Potato	21-89	3	7	1.6	FLC: 100 PCH: 1000
Potato	21-89	2	7	1.6	FLC: 100 PCH: 1000
Potato	21-89	1	-	1.6	FLC: 100 PCH: 1000
Lettuce	41-49	2	7	1.6	FLC: 100 PCH: 1000
Lettuce	13-49	1	-	1.6	FLC: 100 PCH: 1000
Cucumber (Greenhouse use)	21-89	3	7	1.6	FLC: 100 PCH: 1000

Definition of the residue for risk assessment

The definition of the residue for risk assessment has been derived in the environmental fate chapter (see MCA 7.4.1). For ecotoxicology only soil, surface water and sediment are relevant environmental compartments. The residue definition for risk assessment is therefore given as:

Soil: Fluopicolide, M-01 (AE C653711), M-02 (AE C678188), M-03 (AE 0608000)

Surface water: Fluopicolide, M-01 (AE C653711), M-02 (AE C657188), M-03 (AE 0608000)

Sediment: Fluopicolide

In June 2019 EFSA issued a Technical Report Outcome of the pesticides Peer Review Meeting on general recurring issues in ecotoxicology. doi:10.2903/sp.efsa.2019.EN-1673

As part of this document guidance and a template were provided to complete the questionnaire for the use of residue data extracted from vol. 3 B.7 to support the ecotoxicological assessment of pesticides.

The completed template is provided below.

Data Point:	KCP Section 10/01
Report Author:	[redacted]
Report Year:	2020
Report Title:	Fluopicolide - Residue information supporting the ecotoxicological assessment of pesticides
Report No:	VC/19/038B
Document No:	M-687286-01-1
Guideline(s) followed in study:	--
Deviations from current test guideline:	Not applicable
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	not applicable
Acceptability/Reliability:	Yes

Metabolism in primary crops

Reference material: Test No. 501: Metabolism in Crops (OECD 2007)

Question 1: Are the provided metabolism studies in primary crops submitted in the residue section sufficient to depict a metabolic pathway of residues? If yes, which are the crop groups covered by the available metabolism studies?

Is a metabolism study available in a crop that belongs to the same metabolism crop group than the GAP(s) under assessment? Please provide an overview of the available information.[1]

The following metabolism studies are available for fluopicolide:

Report reference	Author, Year	Crop Category	Crop	Application	Fluopicolide label
M-241268-02-1	[redacted], 2004	Fruit crop (F)	Grapes	Foliar	[U-^{14}C-phenyl]- and [2,6-^{14}C-pyridyl]-Fluopicolide
M-241267-03-1	[redacted], 2004	Root and tuber crop (R)	Potato	Foliar	[U-^{14}C-phenyl]- and [2,6-^{14}C-pyridyl]-Fluopicolide

[1] The metabolism study should be conducted on a crop which belongs to the crop category representative of the GAP/intended use/representative use (e.g., a metabolism on fruit crops should be provided to support the GAP on pome fruit). It is also relevant to highlight that the metabolism study should be compliant with the GAP in terms of type of application (foliar, soil treatment, etc.), location, covering the dose rate of application, BBCH growth stage at application, PHI.

M-241269-02-1	[redacted] 2004	Leafy crop (L)	Lettuce	Foliar	[U-^{14}C-phenyl]- and [2,6-^{14}C-pyridyl]-Fluopicolide
		Leafy crop (L)	Lettuce	Soil drench	[U-14C-phenyl]-Fluopicolide
M-358357-01-1	[redacted] 2009	Pulses and oilseed (P/O)	Oilseed rape	Seed treatment	[U-^{14}C-phenyl]- and [2,6-^{14}C-pyridyl]-Fluopicolide

Metabolism studies have been conducted in three crop groups with foliar applications, namely fruit (F), root (R) and leafy (L), and since the metabolism is similar in all three crop groups thus all crops are covered. Additional studies are available covering the drench and seed treatment uses. All of the foliar applied metabolism studies have been previously reviewed at the EU level; the following conclusion was made for these studies:

Lettuce, grapes and potatoes (foliar application)
When fluopicolide was applied as a foliar treatment, the quantity of the metabolites formed was extremely low. When fluopicolide reached the soil during application, it was degraded and there was an increased quantity of the metabolites M-01 (AE C653711) and M-02 (AE C657188) taken up into the plant parts. This information is sufficient to cover the proposed representative uses on foliar treated potatoes, lettuce and cucumbers.

Lettuce (soil drench)
Following soil drench application with [U-14C-phenyl]-fluopicolide, the majority of the residue consisted of fluopicolide, with significant amounts of M-01 (AE C653711) and minor amounts of M-06 (AE C643890). No other single metabolite comprised more than 1% of the total residue in any matrix.

Oilseed rape (seed treatment)
The only prominent metabolite observed was M-01 (BAM, AE C653711), when fluopicolide is applied as a seed treatment to oilseed rape seed. All other metabolites were detected in low amounts (≤ 4.1% of TRR and ≤ 0.002 mg/kg). The only observed metabolic reaction is the cleavage of fluopicolide to form M-01. This information is sufficient to cover the proposed representative use on seed treated oilseed rape.

For the lettuce (soil drench) and oilseed rape (seed treatment) metabolism, while these studies have been reviewed by EU Member States, they are only representative of their own respective commodity groupings (‘leafy vegetable’ and ‘pulses / oilseeds’), as there is only one study available for each of these application types, so it would not be possible to infer whether the metabolic pathway would be similar for other crop groups based on this information alone.

Question 2: Which are the plant metabolites recovered in the study(s) in relative amount and absolute amount (greater than 10 (TRR %) and/or 0.05 mg/kg)[2] addressing the metabolic pathway of the representative use(s)[3]?

In the metabolism in primary crop studies and metabolism in rotational crop study conducted with [phenyl-U-^{14}C]-fluopicolide or [2,6-pyridyl-^{14}C]-fluopicolide, a number of plant metabolites were detected in matrices considered as relevant for leafy substrates above the criteria of > 10% of the total radioactive residue (TRR) or present at concentrations ≥ 0.05 mg/kg thus triggering the need to be considered for ecotoxicological assessments.

The matrices available from radiolabelled studies were lettuce, potato foliage (as a substitute for palatable leaves), radish tops, wheat forage and oilseed rape forage.

For lettuce and potato, foliage investigations with both radiolabelled test items were conducted in metabolism in primary crop studies after foliar application and for lettuce further investigations were conducted after soil application with [phenyl-U-^{14}C]-fluopicolide. Additionally, for lettuce, radish tops and wheat forage, seed was sown 29 days, 133 days and 1 year after treating soil with [phenyl-U-^{14}C]-fluopicolide or [2,6-pyridyl-^{14}C]-fluopicolide in the metabolism in rotational crop study.

Finally, for oilseed rape foliage (BBCH 17-19) investigations were conducted in a metabolism in primary crop study with both [phenyl-U-^{14}C]-fluopicolide and [2,6-pyridyl-^{14}C]-fluopicolide after seed treatment. The dose rate in this study was 10 times (nominal 120 g/kg seed) the normal field application rate to aid investigation into the metabolism of fluopicolide in oilseed rape.

The metabolites M-01 (AE C653711), M-02 (AE C657188), M-04 (AE C657378), M-05 (AE 1344122), M-06 (AE C643890) and M-09 (AE B102859) met the criteria of ≥ 10% TRR or > 0.05 mg/kg. It should be noted the maximum overall concentration of each metabolite either as %TRR or as mg/kg did not typically come from the same matrix sample.

Metabolite	Overall Maximum Concentration		
	%TRR	mg/kg (as metabolite)	Comment
M-01	87.5	2.170	Maximum values from different matrices
M-02	43.0	1.087	Maximum values from same matrix
M-04	59.3	0.870	Maximum values from different matrices
M-05	41.0	0.108	Maximum values from different matrices
M-06	2.8	0.068	Maximum values from different matrices
M-09	10.5	0.052	Maximum values from different matrices

Residue data from supervised residue trials and rotational residue trials are available for each of the metabolites listed above for the metabolites M-01 and M-02 in oilseed rape (green material) and for

[2] These trigger values of 0.05 mg/kg or 10%TRR of total radioactive residues are only meant as guidance. In some circumstances, generally governed by toxicological concerns, it may be necessary to identify terminal metabolites, which are present at concentrations lower than 0.05 mg/kg or <10%TRR of total radioactive residues (European Commission, 1997).

[3] For the ecotox section, a selection of the relevant metabolites should reflect only the representative uses. It is not necessary to cover the residue situation for consumer risk assessment but the expected residue situation in the field for the use(s) under assessment. It is recommend consulting whether metabolism studies were summarized following harmonized templates for further assessment (I.e. EFSA/OECD templates).

M-01, M-02, M-04, M-05, M-06 and M-09 in lettuce. The purpose of supervised residue trials is to determine the magnitude of the residues under realistic field conditions and data from these trials should be considered in the ecotoxicological assessments in preference to data from radiolabelled studies. In addition, a number of conjugated metabolites were detected and identified in samples of wheat forage sown 29 days after treating soil with [phenyl-U-^{14}C]-fluopicolide or [2,6-pyridyl-^{14}C]-fluopicolide in an addendum to the metabolism in rotational crop study. These metabolites are reported as %TRR only (and in some cases the %TRR is for a radio-peak subsequently separated into different metabolites). In all cases amounts do not exceed 10% TRR. The metabolite concentration has been calculated from the reported data and exceeds 0.05 mg/kg for M-18, M-23, M-25, M-26, M-27, M-28 and M-32.

Metabolite	Overall Maximum Concentration			
	%TRR	mg/kg (as conjugate)	mg/kg (as free metabolite)	Comment
M-18 (P11)	1.6	0.086	0.071	Animal metabolite observed in hen, cow & rat. Sulfate conjugate of M-06 or its isomer
M-23 (P2a,b)	2.2 A	0.129	0.058	2 malonyl glucoside conjugates of M-04 and its isomer
M-25 (P4a)	6.3 A	0.394	-	Major rat metabolite in bile. Conjugate which contains both phenyl and pyridyl rings
M-26 (P4b)	3.4 A	0.284	-	Conjugate which contains both phenyl and pyridyl rings
M-27 (P4c)	0.7 A	0.052	-	Conjugate which contains both phenyl and pyridyl rings
M-28 (P5)	3.5	0.293	0.180	Malonyl glucoside conjugate of M-06
M-32 (P10)	2.4	0.155	-	Conjugate which contains both phenyl and pyridyl rings

A Individual %TRR for M-23, M-25, M-26 and M-27 (called P2a,b, P4a, P4b and P4c in the report) have been recalculated from reported data.

M-18 and M-25 are known animal metabolites, and M-25 is the main metabolite observed in rat bile (ca. 50% dose).

M-23 is a malonyl glucoside conjugate of M-04 (AE C657378) and its isomer, while M-18 and M-28 are sulfate and malonyl glucoside conjugates of M-06 (AE C643890). If ingested by a small mammal it is presumed malonyl glucoside plant conjugates will be cleaved to their aglycons via glucoside conjugates. When considered in combination with the levels of the free unconjugated metabolite the overall maximum concentrations are as follows.

Metabolite	Overall Maximum Concentration	
	%TRR	mg/kg
M-04	59.3 (59.3)	0.928 (0.870)
M-06	5.6 (2.8)	0.251 (0.068)

Values for unconjugated metabolite are in parentheses

Metabolites seen in the confined rotational crop study are presented within Appendix 1 of this document.

Question 3: Is any translocation of pesticide residues observed in the different parts of the plants? Could it be drawn a general conclusion on translocation of residues based on the available data? I.e. is there any particular distribution of the residues observed in specific plant tissues (leaves, grains, roots, etc)? Is this occurring over time?[4]

Translocation of radioactive residues from the soil was observed (for all crops, at all plant back intervals) in the confined rotational crop study ([redacted] 2003; M-240707-03-1). The relevant information is summarised within the following table. In general, the highest residues were found at the shortest interval, in this case 29 days after soil application.

Total radioactive residues (mg/kg fluopicolide equivalents) in crops (mean values):

Phenyl Label			
Crop	**Total Radioactive Residue (mg/kg fluopicolide equivalents)**		
	29 Day	**133 Day**	**365 Day**
Lettuce	1.01	0.10	0.53
Radish Tops	6.40	0.23	1.75
Radish Roots	0.13	0.02	0.03
Immature Wheat	4.95	0.22	0.86
Wheat Grain	0.16	0.02	0.05
Wheat Straw	13.56	0.84	2.37
Pyridyl Label			
Crop	**Total Radioactive Residue (mg/kg fluopicolide equivalents)**		
	29 Day	133 Day	365 Day
Lettuce	0.27	0.03	0.05
Radish Tops	1.96	0.23	0.40
Radish Roots	0.09	0.02	0.02
Immature Wheat	4.29	0.16	0.24
Wheat Grain	2.60	0.10	0.18
Wheat Straw	7.05	0.35	1.01

The total radioactivity in soil was found to decline steadily over the course of the study. Total radioactive residues in plant matrices declined with longer soil ageing. The mean residues in 29-day (Raw Agricultural Commodities) RACs ranged from 0.09 ppm (radish root) to 13.56 ppm (wheat straw), but residues declined greatly in the 133-day and 365-day ageing periods. The 133-day crop residues ranged from 0.02 ppm (radish root) to 0.84 (wheat straw). The 365-day crop residues were

[4] Special attention must be given to compare results at same BBCH/sampling time; particularly, for avoiding erroneous assessments due to crop growth and dissipation.

observed to increase slightly, ranging from 0.02 ppm (radish root) to 2.37 ppm (wheat straw). This was considered to be a result of seasonal variation. The 133-day plots were planted in October and developed through the winter when formation of soil metabolites from the degradation of parent would be slowest. In contrast, the 365-day plots were planted in March when the plant uptake would be less pronounced, due to the increased degradation.

Metabolism in rotational crops

Reference material: Test No. 502: Metabolism in Rotational Crops (OECD 2007b), Test No. 504: Residues in Rotational Crops (OECD, 2007d)

Question 4: Do results of the rotational crops show any translocation of residues (uptake from soil) from roots to the aerial parts of the plant[5]? If so, which metabolites might be of relevance?

Is there any indication of accumulation of residues over time occurring in the rotational crop scenario? If so, in which crop categories (leafy, roots, cereals)/crop parts is the accumulation observed?

In the confined rotational crop studies ([redacted] 2003; M-240707-03-1), [^{14}C] phenyl and pyridinyl ring labelled fluopicolide was applied to soil at a rate of 0.4 kg a.s./ha. Lettuce, wheat and radish were planted after 29, 133 and 365 days of ageing. The highest total radioactive residue (TRR) levels were observed at a plant back interval (PBI) of 29 days, in wheat straw (up to 13.6 mg eq./kg), radish tops (up to 6.71 mg eq./kg), wheat grain (up to 2.6 mg eq./kg) and lettuce (up to 1.01 mg eq./kg). Although total radioactivity tends to decline over time in the succeeding crops, significant levels were also found at the PBI of 365 days (up to 2 mg eq./kg in radish tops, 1.0 mg eq./kg in wheat straw and 0.62 mg eq./kg in lettuce).

Based on this information, residues tend to accumulate within the leafy (aerial) potions of the crops and cereal grains (for the early PBIs), but lower levels tend accumulate within the roots (based on the data for radishes).

Question 5: If the GAP is for a seed treatment or other pre-emergency[6] treatment, is any information related to the magnitude of residues at early post-emergence (BBCHs<10) for the crop(s) under assessment?

The seed treatment use for winter oilseed rape (product – Scenic Gold®) is included among the representative uses sought for the fluopicolide renewal:

The residues field trials did not cover the magnitude of the residues for early post emergence (BBCH <10). The studies included an initial assessment of the residue adhered to the surface of the treated seed. The first assessment of the residues for the plant was made at BBCH 19 (green material) and for the seed and rest of the plant at commercial harvest (BBCH 89). The residues BBCH 19 and 89 were <LOQ (0.01 mg/kg) for metabolites M-01 and M-02. For the fluopicolide residues, two of the trials showed levels of 0.02 mg/kg at BBCH 19, with the remaining trials showing levels <LOQ (0.01

[5] It must be noted that this information may not only refer specifically to the succeeding crops/crops growing in rotation; but also, it may be useful to give indications on a possible residue situation for the new emerging plants in the crop area after certain uses. For instance, the data can be used to disregard a possible residue situation to non-target organisms originated due to the consumption of contaminated seedlings /residues in weeds.

[6] Consideration for the seedling scenario, relevant for bird & mammals and the guttation water scenario for bees might be necessary.

mg/kg). No residues above the LOQ were found in the seed / rest of the plant at BBCH 89 for fluopicolide.

Study references

Test commodity	Report reference	Author, Year	Dossier reference
Oilseed rape	M-390353-01-1	[redacted] 2010a	M-CA 6.3.5
Oilseed rape	M-396237-02-1	[redacted] 2010a	M-CA 6.3.5
Oilseed rape	M-390357-01-1	[redacted] 2010b	M-CA 6.3.5

Magnitude of the residues in supervised residue trial
Reference material: Test No. 509: Crop Field Trial (OECD, 2009); Guidelines on comparability, extrapolation, group tolerances and data requirements for setting MRLs (European Commission, 2017)

Question 6: From the supervised residue trials, is there any indication of a residue decline over time?[7,8] If so, please indicate the reference to the residue trial and the part of the plants, where the decline was observed.

Were the residue determinations performed at 0 days after the last application or at a given time close to the last application(s)?[9]

Of the representative uses, only lettuce has any residue decline trials which contain meaningful information for the ecotoxicology risk assessment. While some decline trials are available for potatoes, the vast majority of the residue levels at all pre-harvest intervals (PHIs) were <LOQ (<0.01 mg/kg), with only a few of the results being at or slightly above the LOQ. Decline trials were not conducted in the seed treated oilseed rape and (indoor) cucumber residue trial studies.

The supervised residue trials for lettuce are summarised and referenced within Appendix 2 of this document. In the trials, fluopicolide residue levels were typically found to gradually decline in lettuce heads over a 14-day period.

For metabolite M-01, many of the trials showed <LOQ (0.01 m/kg) residue levels. In some cases, residues were observed and some of the trials showed decline from day 0, to day 7 and finally to day 14. In other cases, an upturn in the residue content was observed from day 7 to day 14, which may be explained by an uptake of M-01 from the soil.

Residue levels or metabolite M-02 (which does not form part of the risk assessment residue definition for consumers) were practically <LOQ (<0.01 mg/kg) in all of the trials, with two exceptions (0.012 and 0.015 mg/kg).

[7] Please report if the residue trials were fully validated in terms of storage stability, GAP compliance, etc.
[8] It is mentioned in the EU data requirement that when planning residue trials, it shall be borne in mind that information on the residues in ripe or unripe crops may be of interest with respect of the risk assessment in other areas like ecotoxicology and worker safety. Please include this information if available.
[9] Residue determinations close to the application(s) and/or the last application may provide relevant information for certain non-target taxa that can forage in the crop area at a time close to the application(s).

The residues field trials were conducted according to the guidance in place at the time when they were conducted. All of the trials were conducted at rates and timings comparable to the requested GAPs for the fluopicolide renewal. The residue data are supported by validated methods of analysis and procedural (concurrent) recovery data. The deep-frozen storage stability periods for the samples (from the time of sampling to residue extraction), were covered by separate storage stability studies.

Question 7: On which crops were field residue trials performed? [10] Has an extrapolation been suggested and is it considered appropriate?[11]

Residues trials have been conducted to support the representative uses on potatoes, lettuces, cucumbers (indoor only) and oilseed rape (seed treatment only).

According to the EU 'Guidelines on comparability, extrapolation, group tolerances and data requirements for setting MRLs' (SANCO 7525/VI/95Rev. 10.3), it is possible to extrapolate the data generated on the representative commodities to support other similar crops (those specifically identified within the EU guidance document). However, for the purposes of the renewal, no additional uses for extrapolated commodities have been sought.

Metabolism studies in animals (livestock, fish)
Reference material: Test No. 503: Metabolism in Livestock (OECD, 2007c); Test No. 505: Residues in Livestock (OECD, 2007e); Test No. 305: Bioaccumulation in Fish (OECD, 2012)

Question 8: Is a metabolism study in fish/bioaccumulation study part of the residue section? If the fish metabolism study is available, does it indicate an accumulation of residues in fish tissues? [12]

A fish metabolism study has not been undertaken for fluopicolide. According to the current EU guidance (SANCO/11187/2013 rev. 3) the metabolism in fish is only required where the partition coefficient (Log P_{OW}) is ≥ 3. Based on the partition coefficients available in the physical-chemical properties data package for fluopicolide, neither the parent (fluopicolide) nor the primary metabolite (BAM) are considered to be fat soluble.

However, a fish bioaccumulation study is available ([redacted] 2003; M-241273-01-1). The bioaccumulation of the fluopicolide residues in fish was determined using a continuous flow-through set-up over 45 days (which included a 24-day uptake period and a 21-day depuration period). The study was previously assessed during the original EU inclusion for fluopicolide (DAR, 2006; RMS = UK). A brief summary of the study is described within the following paragraph:

[10] The minimum number of supervised residue trials considers for MRL setting might not be applicable for the ecotox. We might build a residue decline curve with less than 4 residue data points. For this consideration, please do not disregard the residue data only based on the minimum number of residue trials. If the residue trials are compliant with the GAP table, ecotox experts might use them for further refinements.

[11] Ecotox colleagues might need advice on questions such as e.g. can residue decline studies in tomato be used to refine the residues entering throughout diet of frugivorous birds when the representative use is on pome trees? And can we use residue data generated in the SEU for refinements in the NEU zone when the representative use is in whole EU?

[12] If we observe any accumulation in tissues, it might help in case that further assessment of bioaccumulation and/or biomagnification (accumulation throughout trophic chain) are necessary.

The study showed that [2,6-14C-pyridinyl]-fluopicolide accumulates rapidly in fish tissues (bluegill sunfish), principally in the non-edible portions, regardless of the exposure concentration. The steady-state bioconcentration factors (BCFs) for the low treatment (0.8 µg/L) were 48x, 117x and 197x in edible, whole fish, and non-edible, respectively. For the high treatment (8.0 µg/L) were 40x, 104x, and 175x in edible, whole fish and non-edible, respectively. Fluopicolide cleared rapidly from fish tissues regardless of the exposure concentration. The depuration appeared to be biphasic with the "fast" phase as the major component. Based on a one-compartment model with whole fish, the calculated bioconcentration concentration factor's (BCFs) were 121x and 102x for the low and high treatment, respectively. The time to reach 90% of the steady-state was about 2 days for both treatments. The depuration half-life was much shorter at about 0.5 day for both treatments.

The major residue in all fish tissues was unchanged parent fluopicolide:

Treatment	Tissue type	Residue in analysed extracts		Fluopicolide residues		% Identified	Largest single unidentified component	
		mg/kg	%	mg/kg	%		mg/kg	%
Low (0.8 µg/L)	Edible	0.039	87.6	0.039	87.6	100	-	-
	Non-edible	0.158	91.4	0.128	73.8	73.8	0.013	7.8
High (8.0 µg/L)	Edible	0.271	85.5	0.271	85.5	100	-	-
	Non-edible	1.228	91.8	0.908	67.9	67.9	0.169	12.7

While the bioaccumulation study noted that fluopicolide rapidly accumulates within the tissues of fish, the study also shows that the fluopicolide residue levels rapidly clear from the fish tissues during the depuration phase. No metabolites of fluopicolide were identified and only fluopicolide was present within the edible portions of the analysed fish.
As low BCFs were obtained during the study for the low and high treatment rates, it can be concluded there is no indication of any significant accumulation of residues within fish tissues.

Question 9: Can the metabolism in animals (mammals/fish/hens) bring any information on accumulation/exposure[13] to different metabolites in addition to those present in the plants? Is it possible to observe an accumulation of residues in fatty tissues/other animal tissues considering all available metabolism studies?

The following tables summarised the residue levels found within animal tissues / products from the metabolism studies:

Fluopicolide poultry metabolism study (dose level of 10 mg/kg in the diet):

Tissue	Residue level (ppb)	Extracted (ppb)	Total ^{14}C-residue identified/characterised (ppb)						
			FLC	M-06	M-01	Metabolite 1	Unknown	Polar	Non-extracted
Egg white	43	42	1	n.d.	n.d.	22	n.d.	n.d.	1

[13] If there is information of new metabolites in the excreta, it might be relevant for the environment. Non-target organisms might be exposed to these new metabolites if there is a release in the environment after animal metabolization.

Egg yolk	154	126	17	n.d.	n.d.	n.d.	20	69	35
Liver	976	762	n.d.	53	361	n.d.	212	n.d.	214
Skin	69	47	n.d.	10	n.d.	7	n.d.	23	22
Fat	61	46	4	n.d.	n.d.	23	n.d.	12	15
Muscle	39	22	n.d.	n.d.	n.d.	n.d.	n.d.	22	17

n.d. = not detected

M-01 (BAM) poultry metabolism study (dose level of 2 mg/kg in the diet):
Limited metabolism of M-01 (BAM) in the hen was observed with M-01 (BAM) excreted essentially unchanged following 14 days repeated oral administration. There was indication of accumulation of M-01 (BAM) in eggs and in the high proportion of the cumulative dose detected in edible tissues at sacrifice. Only minor metabolites of BAM were detected in the excreta, mainly hydroxylation products.

Metabolite	Liver		Omental Fat		Egg Yolk[a]		Egg White[a]		Muscle	
	% TRR	mg eq./kg	% TRR	mg eq./kg	% TRR	mg eq./kg	% TRR	mg eq./kg	% TRR	mg eq./kg
Chromatographed radioactivity	98.2	10.34	98.3	1.90	98.9	5.20	93.3	2.59	96.5	3.34
Identified metabolites										
M-01 (BAM)	96.4	10.16	96.2	1.86	97.9	5.15	93.3	2.59	96.0	3.32

a) Pool of egg yolks and whites Day 7 – Day 14

Fluopicolide ruminant metabolism study (dose level of 10 mg/kg in the diet):

Tissue	Residue level (ppb)	% Extracted	% Total ^{14}C-residue identified/characterised					
			FLC	M-06	M-07	M-01	Polar§	Non-extracted
Urine		NA	-	39	8.5	-	47	NA
Faeces		21.6	14.0	1.7	0.92	-	1.7	78.4
Milk	19	85.9	36.9	-	-	3.9*	37.8	14.1
Fat	41	84.9	78.4	-	-	-	-	16.8
Muscle	24	28.2	5.1	-	-	-	13.2	74.2
Liver	644	89.9	0.9	1.6	1.2	-	79.7	10.9
Kidney	302	92.4	0.7	6.8	3.3	-	77.5	7.6

NA = Not Applicable
* The presence of this metabolite could not be confirmed in a second system or by HPLC/MS.
§ In most cases there were a number of areas of radioactivity in the polar region, each of which could contain more than one metabolite.

M-01 (BAM) ruminant metabolism study:
There was indication of accumulation of M-01 (BAM) in milk and in the high proportion of the cumulative dose detected in edible tissues at sacrifice. More extensive metabolism was found in the liver and kidneys.

Conventional extraction:

Sample	Skimmed Milk Day 2-4 Pool		Muscle Pool		Fat Pool		Liver		Kidney	
TRR [mg/kg]	**0.104**		**0.690**		**0.238**		**13.977**		**6.249**	
	% of TRR	**mg/kg**	**% of TRR**	**mg/kg**	**% of TRR**	**mg/kg**	**% of TRR**	**mg/kg**	**% of TRR**	**mg/kg**
M-01 (BAM)	82.1	0.085	69.6	0.481	92.4	0.220	16.3	2.278	9.4	0.586
L1, Glutathione conjugate	---	---	---	---	---	---	14.3	2.007	---	---
L2, USHD/9 relation	---	---	---	---	---	---	23.8	3.263	---	---
L3/K4, USHD/6	---	---	---	---	---	---	35.8	5.015	22.8	1.423
L5/K13, FSHD/8	---	---	---	---	---	---	1.3	0.188		
L6							0.8	0.118		
K1/K2 USHD/3									19.2	1.198
K3									11.1	0.693
K7 USHD/10b									9.9	0.615
K13									9.7	0.607
Total identified	**82.1**	**0.085**	**69.6**	**0.481**	**92.4**	**0.220**	**91.9**	**12.869**	**82.1**	**5.122**

References

Test animal (test compound)	Report reference	Author, Year	Dossier reference
Poultry (FLC)	M-233761-02-1	[redacted] 2003	M-CA 6.2.2
Poultry (FLC)	M-233977-03-1	[redacted] 2009	M-CA 6.2.2
Cow (FLC)	M-233391-02-1	[redacted] 2003	M-CA 6.2.3
Cow (FLC)	M-218626-02-1	[redacted] 2008	M-CA 6.2.3
Poultry (M-01)	Not available	[redacted] 2020	Preliminary results provided – report not yet finalised
Goat (M-01)	Not available	[redacted] 2020	Preliminary results provided – report not yet finalised

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OECD (Organisation for Economic Co-operation and Development), 2013. Guidance document on residues in livestock. In: Series on Pesticides No 73. ENV/JM/MONO(2013)8, 04 September 2013/9789264076457-en

CP 10.1 Effects on birds and other terrestrial vertebrates

The risk assessment has been performed according to "European Food Safety Authority; Guidance Document on Risk Assessment for Birds & Mammals on request from EFSA" (EFSA Journal 2009; 7(12):1438. doi:10.2903/j.efsa.2009.1438), referred to in the following as "EFSA GD 2009".

CP 10.1.1 Effects on birds

Table 10.1.1- 1: Endpoints used in risk assessment

Test substance	Risk assessment	Test species	Endpoint	Reference
Fluopicolide	Acute	Mallard duck	LD_{50} > 2250 mg a.s./kg bw	[redacted] 2001; M-240576-01-1 KCA 8.1.1.1/01
			LD_{50} = 4248 mg a.s./kg bw [a)]	Extrapolated acc. to EFSA GD 2009
		Bobwhite quail	LD_{50} > 2250 mg a.s./kg bw	[redacted] 2001; M-240577-01-1 KCA 8.1.1.1/02
			LD_{50} = 4248 mg a.s./kg bw [a)]	Extrapolated acc. to EFSA GD 2009
		Zebra finch	LD_{50} = 1105 mg a.s./kg bw	[redacted] 2015; M-544294-01-1 KCA 8.1.1.1/03
		Bird acute geomean	**LD_{50} = 2711 mg a.s./kg bw** [b)]	Geometric mean acc. EFSA GD 2009
	Short-term	Bobwhite quail	LC_{50} > 5620 ppm LDD_{50} > 1744 mg a.s./kg bw/day	[redacted] 2002; M-240713-01-1 KCA 8.1.1.2/01
		Mallard duck	LC_{50} > 5620 ppm LDD_{50} > 2343 mg a.s./kg bw/day	Gallagher, S.; Beavers, J.; Martin, K.; 2002; M-240714-01-1 KCA 8.1.1.2/02
	Long-term	Bobwhite quail	NOAEC ≥ 1000 ppm NOAEL ≥ 88.9 mg a.s./kg bw/day EC_{10} = 46.7 (29.7 – 89.7) mg a.s./kg bw/d	[redacted] 2003; M-225403-01-2 KCA 8.1.1.3/01 EC_{10} calculation [redacted] 2019; M-660212-01-1 KCA 8.1.1.3/03
		Mallard duck	NOEC ≥ 1000 ppm NOEL ≥ 140.8 mg a.s./kg bw/day **EC_{10} = 32.2 mg a.s./kg bw/d**	[redacted] 2003; M-225404-01-2 KCA 8.1.1.3/02 EC_{10} calculation [redacted] 2019; M-663971-01-1 KCA 8.1.1.3/04
M-01 (2,6-dichloro-benzamide)	Short-term	Bobwhite quail	LC_{50} = 3867 ppm LDD_{50} = 1171 mg a.s./kg bw/day	[redacted] 2003; M-225551-01-2

Test substance	Risk assessment	Test species	Endpoint	Reference
				KCA 8.1.1.2/03
Propamocarb-hydrochloride	Acute	Bobwhite quail/ Mallard duck	LD_{50} > 1842 mg a.s./kg bw	EFSA Scientific Report (2006) 78, 1-80
	Short term	Bobwhite quail	LC_{50} > 5000 mg/kg feed LDD_{50} > 962 mg a.s./kg bw/d	EFSA Scientific Report (2006) 78, 1-80
	Long term	Bobwhite quail	NOEC 1139 mg a.s./kg feed/d NOEL 105 mg a.s./kg bw/d	EFSA Scientific Report (2006) 78, 1-80
Fluopicolide+ Propamocarb-hydrochloride	Acute	Bobwhite quail	$LD_{50\ MIX}$ > **1897** mg total a.s./kg bw	Table 10.1.1- 7

Endpoints in **bold** considered relevant for risk assessment

a) The study endpoint was extrapolated according to EFSA GD 2009. The extrapolation factor of 1.888 was derived from EFSA GD 2009, section 2.1.2, table 1 for studies in which 10 animals were dosed and no mortality occurred.

b) In accordance with EFSA GD 2009, the geometric mean LD_{50} of the three species mallard duck (LD_{50} = 4248 mg a.s./kg bw), bobwhite quail (LD_{50} = 4248 mg a.s./kg bw) and zebra finch (LD_{50} = 1105 mg a.s./kg bw) was used.

Metabolites of fluopicolide

As presented in the section "definition of the residues for risk assessment", the plant metabolites M-01 (AE C653711), M-02 (AE C657188), M-04 (AE C657378), M-05 (AE 1344122), M-06 (AE C643890) and M-09 (AE B102859) met the criteria of > 10% TRR or > 0.05 mg/kg. It should be noted the maximum overall concentration of each metabolite either as %TRR or as mg/kg did not typically come from the same matrix sample. A worst-case screening level risk assessment for birds is presented in Table 10.1.1- 14 for M-01, M-02, M-04 and M-05, based on field residue and rotational crop studies evaluated in 10.1.1.2/01. A quantitative risk assessment for M-06 and M-09 is not conducted since their residues in the field residue and rotational crop studies were < LOQ.

An acute risk assessment is not conducted since this is considered to be covered by the worst-case screening-level long-term risk assessment.

Table 10.1.1- 2: Relevant indicator species for screening risk assessment

Crop	Indicator species	Shortcut value (SV)	
		Acute RA based on RUD_{90}	Long-term RA based on RUD_m
Potatoes, leafy vegetables (lettuce)	Small omnivorous bird	158.8	64.8

Table 10.1.1- 3: Relevant generic focal species for first-tier risk assessment

Crop	Generic focal species	Shortcut value (SV)	
		Acute RA based on RUD_{90}	Long-term RA based on RUD_m
Potatoes BBCH 21-89	Small omnivorous bird "lark" BBCH 10–39	24.0	10.9
	Small omnivorous bird "lark" BBCH ≥ 40	7.2	3.3
	Small insectivorous bird "wagtail" BBCH ≥ 20	25.2	9.7
Leafy vegetables (lettuce) BBCH 13-49	Small granivorous bird "finch" BBCH 10–49	27.4	12.6
	Small omnivorous bird "lark" BBCH 10–49	24.0	10.9
	Medium herbivorous/granivorous bird "pigeon" BBCH 10–19	55.6 a)	22.7 a)
	Small insectivorous bird "wagtail" BBCH 10–19	26.8	11.3
	Small insectivorous bird "wagtail" BBCH ≥ 20	25.2	9.7
Leafy vegetables (lettuce) BBCH 41-49	Small granivorous bird "finch" BBCH 10–49	27.4	12.6
	Small omnivorous bird "lark" BBCH 10–49	24.0	10.9
	Small insectivorous bird "wagtail" BBCH ≥ 20	25.2	9.7

ACUTE DIETARY RISK ASSESSMENT

Screening step

Table 10.1.1- 4: Screening acute risk assessment for birds (fluopicolide)

Crop	Indicator species	DDD			DDD	LD_{50} [mg a.s./ kg bw]	TER_A	Trigger
		Appl. rate [kg a.s./ha]	SV_{90}	MAF_{90}				
Potatoes 4 × 1.6 L prod./ha	Small omnivorous bird	0.1	158.8	1.8	28.6	2711	94.9	10
Potatoes 3 × 1.6 L prod./ha	Small omnivorous bird	0.1	158.8	1.6	25.4	2711	106.7	10
Potatoes 2 × 1.6 L prod./ha	Small omnivorous bird	0.1	158.8	1.4	22.2	2711	121.9	10
Potatoes 1 × 1.6 L prod./ha	Small omnivorous bird	0.1	158.8	1.0	15.9	2711	170.7	10
Lettuce 2 × 1.6 L prod./ha	Small omnivorous bird	0.1	158.8	1.4	22.2	2711	121.9	10
Lettuce 1 × 1.6 L prod./ha	Small omnivorous bird	0.1	158.8	1.0	15.9	2711	170.7	10

Table 10.1.1- 5: Screening acute risk assessment for birds (fluopicolide + propamocarb-hydrochloride)

Crop	Indicator species	DDD			DDD	LD_{50} [mg a.s./ kg bw]	TER_A	Trigger
		Appl. rate [kg prod./ha]	SV_{90}	MAF_{90}				
Potatoes 4 × 1.6 L prod./ha	Small omnivorous bird	1.1	158.8	1.8	314.4	1897	**6.0**	10
Potatoes 3 × 1.6 L prod./ha	Small omnivorous bird	1.1	158.8	1.6	279.5	1897	**6.8**	10
Potatoes 2 × 1.6 L prod./ha	Small omnivorous bird	1.1	158.8	1.4	244.6	1897	**7.8**	10
Potatoes 1 × 1.6 L prod./ha	Small omnivorous bird	1.1	158.8	1.0	174.7	1897	10.9	10
Lettuce 2 × 1.6 L prod./ha	Small omnivorous bird	1.1	158.8	1.4	244.6	1897	**7.8**	10
Lettuce 1 × 1.6 L prod./ha	Small omnivorous bird	1.1	158.8	1.0	174.7	1897	10.9	10

For fluopicolide the TER_A is above the trigger of 10. Therefore, no further risk assessment at Tier 1 is required for fluopicolide. For fluopicolide + propamocarb-hydrochloride the TER_A is below the trigger of 10. Therefore, a risk assessment at Tier 1 is required for fluopicolide + propamocarb-hydrochloride for the 4 × 1.6 L prod./ha, 3 × 1.6 L prod./ha and 2 × 1.6 L prod./ha applications in potatoes and for the 2 × 1.6 L prod./ha application in lettuce.

Tier 1

Table 10.1.1- 6: First-tier acute risk assessment for birds (fluopicolide + propamocarb-hydrochloride)

Crop	Generic focal species	DDD			DDD	LD_{50} [mg a.s./kg bw]	TER_A	Trigger
		Appl. rate [kg/ha]	SV_{90}	MAF_{90}				
Potatoes BBCH 21-89 4 × 1.6 L prod./ha	Small insectivorous bird "wagtail" (BBCH ≥ 20) a)	1.1	25.2	1.8	49.90	1897	38.0	10
Potatoes BBCH 21-89 3 × 1.6 L prod./ha	Small insectivorous bird "wagtail" (BBCH ≥ 20) a)	1.1	25.2	1.6	44.35	1897	42.8	10
Potatoes BBCH 21-89 2 × 1.6 L prod./ha	Small insectivorous bird "wagtail" (BBCH ≥ 20) a)	1.1	25.2	1.4	38.80	1897	48.9	10
Leafy vegetables BBCH 41-49 2 × 1.6 L prod./ha	Small granivorous bird "finch" (BBCH 10–49) a)	1.1	27.4	1.4	42.20	1897	45.0	10

a) Covers all other relevant generic focal species with lower shortcut values

The TER_A values calculated in the acute risk assessment exceed the a-priori-acceptability trigger of 10 for all evaluated scenarios. Thus, the acute risk to birds can be considered as low and acceptable without need for further, more realistic risk assessment.

Combined toxicity risk assessment

According to current requirements when a product contains more than one active substance, an additional assessment on combined toxicity risk of the product has to be done.

For the assessment of acute effects (mortality), a surrogate LD_{50} (mix) can be calculated for the mixture risk assessment. The EFSA GD 2009 indicates that the following equation should be used for deriving a surrogate LD_{50mix} for a mixture of active substances with known toxicity assuming dose additivity:

$$LD_{50}(\text{mix}) = \left(\sum_i \frac{X(a.s._i)}{LD_{50}(a.s._i)} \right)^{-1}$$

where:

$X(a.s._i)$ = fraction of active substance (i) in the formulation mixture

$LD_{50}(a.s._i)$ = acute toxicity for the active substance (i)

The active substance content of the formulation FLC+PCH SC 687.5 addressed in this dossier is 62.5 g fluopicolide/L prod. and 625 g propamocarb-hydrochloride/L prod., making up a total of 687.5 g a.s./L product.

The table below shows the calculation of the predicted LD_{50} (mix) of fluopicolide and propamocarb-hydrochloride when mixed in these proportions (step 1 in Appendix B of EFSA GD 2009).

Table 10.1.1- 7: Avian LD_{50} (mix) for fluopicolide and propamocarb-hydrochloride when combined as FLC+PCH SC 687.5 (step 1 in Appendix B of EFSA GD 2009)

	Fluopicolide	Propamocarb-hydrochloride
Content of a.s. in product [g a.s./L prod.]	62.5	625
Fraction in the a.s. mixture	0.0909	0.9091
LD_{50} of a.s. [mg a.s./kg bw]	2711	> 1842
Fraction / LD_{50}	0.0000335	< 0.0004935
Sum	> 0.0005271	
1/sum = predicted LD_{50} (mix) [mg total a.s./kg bw]	> 1897	

It is obvious from the comparison of the (low) acute oral toxicity of the active substances, and their relative proportions of the formulated product FLC+PCH SC 687.5, that propamocarb has a tox per fraction of > 90% and thus clearly drives the risk assessment.

Table 10.1.1- 8: Avian "tox per fraction" for FLC+PCH SC 687.5 (step 1 in Appendix B of EFSA GD 2009)

	Fluopicolide	Propamocarb-hydrochloride	"mix"
Content of a.s. in product [g a.s./L prod.]	62.5	625	687.5
Fraction in the a.s. mixture	0.0909	0.9091	1
LD_{50} of a.s. [mg a.s./kg bw]	2711	1842	1897
Tox per fraction	29821	2026	31847
Contribution to predicted toxicity	6 %	94 %	100 %

Fluopicolide contributes to 6 % to the predicted acute mixture toxicity, while propamocarb-hydrochloride contributes 94 % to the mixture toxicity. Consequently, according to EFSA GD (2009) the acute risk assessment can be performed only for propamocarb-hydrochloride.

EFSA GD 2009 recommends as next step (2a and 2b in Appendix B) to check the predicted toxicity against measured toxicity from LD_{50} studies conducted with the formulation. However, no study with the formulation was conducted. Therefore, steps 2a and 2 b cannot be conducted.

EFSA GD 2009 recommends not to conduct a combined reproductive risk assessment for compounds not sharing the same mode of action (step 3). Therefore, no combined reproductive risk assessment is required for the FLC+PCH SC 687.5 in this AIR-evaluation but will be conducted post-AIR according to the respective zonal guidance.

EFSA GD 2009 recommends calculation methods to generate MAF values for the exposure assessment appropriate for comparison to the LD_{50} (mix). This is not necessary here since no combined risk assessment is required, only the assessment for the risk driver propamocarb-hydrochloride with 94 % tox per fraction. This risk assessment is presented in Table 10.1.1-6.

Acute risk assessment for birds drinking contaminated water from pools in leaf whorls

The leaf scenario is relevant for leafy vegetables and is therefore considered for the use in lettuce.

Table 10.1.1- 9: Tier 1 acute TER calculation for exposure via drinking water from pools in leaf axils or on leaves

Crop	Compound	DWR [L/kg bw/d]	PEC_{pool} a) [mg/L]	DWR × PEC_{pool} [mg/kg bw/d]	LD_{50} [mg/kg bw]	TER_A	Trigger
Leafy vegetables 1 × 1.6 L prod./ha	Fluopicolide	0.46	100	46	2711	58.9	10
	LD_{50} (mix)	0.46	1100	506	1897	**3.7**	10

a) $PEC_{pool} = C_{spray}/5$ [mg/L] whereas C_{spray} is 500 mg FLC/L and 5500 mg FLC+PCH/L considering a spray solution of 100 g FLC/ha and 1000 PCH/ha dissolved in a minimum of 200 L water/ha as worst-case approach.

The acute TER value is above the trigger of 10 for fluopicolide but below the trigger of 10 with the LD_{50} (mix) for fluopicolide + propamocarb-hydrochloride. As stated before, propamocarb-hydrochloride contributes 94 % to the mixture toxicity, so in order to refine the acute TER for exposure via drinking water from pools in leaf axils or on leaves for the mixture we will focus on the refinement for propamocarb-hydrochloride. The following refined assessment is provided in the AIR submission dossier for propamocarb-hydrochloride, where this scenario was also evaluated:

"The TER value for Propamocarb-HCl for birds drinking from pools in leaf axils or on leaves is still below the trigger of 10 which would indicate an unacceptable risk to birds.

Indeed, according to the EFSA Guidance Document for Birds and Mammals (2009), *'incidents reported in the past confirm that in fact a potential for adverse effects exists that may be realised when several conditions (applications of pesticides followed by rainfall and irrigation in a period of draught) are simultaneously met. In such cases, typical approaches for refining the risk assessment, e.g. the estimation of a PT factor, are not possible…'* and *'as a consequence, a risk identified in a leaf scenario will typically have to be managed'*.

However, in the EFSA Guidance Document for Birds and Mammals (2009), reference is made to a few cases of incidents reported in Germany in between 1980-1990. There are in total 12 incidents reported in Germany from 1983 to 2003. They include acutely toxic substances like methomyl (LD_{50} ca. 17 mg a.s./kg bw; application rates: 150 and 228 g a.s./ha; 7 incidents), methamidophos (LD_{50} ca. 12 mg a.s./kg bw; application rate: 360 g a.s./ha; 2 incidents), dimethoate (LD_{50} ca. 28 mg a.s./kg bw; application rate: 240 g a.s./ha; 1 incident), mevinphos (1 incident), parathion (1 incident), and oxydemeton-methyl (1 incident, in combination with methomyl). These compounds cannot be compared in their profile to low acutely toxic compounds such as Propamocarb-HCl with an LD_{50} higher than 2637 a.s./kg bw.

According to the application rates (with a water volume of 200 L/ha used) and the acute toxicity of methomyl, methamidophos, and dimethoate to birds, the drinking water risk assessment approach envisaged for the leaf scenario in the EFSA Guidance (2009) would lead to TER values in between 0.01 and 0.05. These values are far below the TER value of (>) 5.7 for Propamocarb-HCl and the trigger value of 10, the Propamocarb-HCl being of very low toxicity to birds according to results of the toxicity studies presented in Tables CP 10.1.1-1 to CP 10.1.1-3. Actually, as mentioned in the EFSA Guidance Document for Birds and Mammals (2009), *as regards calculated TER values, the leaf scenario obviously constitutes an extreme worse-case scenario. It can be shown that even substances of moderate to low toxicity (LD_{50} > 1000 mg/kg) will often fail this scenario.'* Consequently, the occurrence of a bird incident with Propamocarb-HCl is unlikely and the drinking water risk to birds for use on cabbage after BBCH 40 (i.e. Development of harvestable vegetative plant part) can be considered as fully acceptable."

Acute risk assessment for birds drinking contaminated water from puddles

Because propamocarb-hydrochloride is the risk driver in the LD_{50}mix, and since propamocarb-hydrochloride belongs to the group of more sorptive substances with a K_{oc} of 516.7, it is appropriate to set the threshold for no concern at 3000 for the combined assessment.

Table 10.1.1- 10: Evaluation of potential concern for exposure of birds from drinking water (escape clause)

Crop	Compound	K_{oc} [L/kg]	AR_{eff} (Appl. rate × MAF) [g a.s./ha]	LD_{50} [mg a.s./ kg bw]	Ratio (AR_{eff} / LD_{50})	"Escape clause" No concern if ratio	Conclusion
Potatoes (4 × 1.6 L prod./ha)	Fluopicolide	267.7	400 a)	2711	0.15	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	4400 a)	1897	2.32	≤ 3000	No concern
Potatoes (3 × 1.6 L prod./ha)	Fluopicolide	267.7	300 a)	2711	0.11	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	3300 a)	1897	1.74	≤ 3000	No concern
Potatoes and lettuce (2 × 1.6 L prod./ha)	Fluopicolide	267.7	200 a)	2711	0.07	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	2200 a)	1897	1.16	≤ 3000	No concern
Potatoes and lettuce (1 × 1.6 L prod./ha)	Fluopicolide	267.7	100 a)	2711	0.04	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	1100 a)	1897	0.58	≤ 3000	No concern

a) Instead of the MAF, the number of applications was used as a worst-case multiplicator.

According to the EFSA Guidance document for risk assessment for bird and mammals (2009) "*no specific calculations of exposure and TER are necessary when the ratio of effective application rate (in g/ha) to relevant endpoint (in mg/kg bw) does not exceed 50 in the case of less sorptive substances (Koc < 500 L/kg) or 3000 in the case of more sorptive substances (Koc > 500 L/kg).*" This is the case for fluopicolide and propamocarb-hydrochloride. Therefore, the acute risk for birds from drinking water that may contain residues from fluopicolide and fluopicolide + propamocarb-hydrochloride is acceptable.

LONG-TERM REPRODUCTIVE ASSESSMENT

EFSA GD 2009 recommends not to conduct a combined reproductive risk assessment for compounds not sharing the same mode of action (step 3). Therefore, no combined reproductive risk assessment is required for the FLC+PCD SC 687.5 in this AIR-evaluation but may be conducted post-AIR according to the respective zonal guidance.

Screening step

Table 10.1.1- 11: Screening long-term reproductive risk assessment for birds (fluopicolide)

Crop	Indicator species	DDD				DDD	EC_{10} [mg a.s./ kg bw/d]	TER_{LT}	Trigger
		Appl. rate [kg a.s./ha]	SV_m	MAF_m	f_{TWA}				
Potatoes 4 × 1.6 L prod./ha	Small omnivorous bird	0.1	64.8	2.2	0.53	7.6	32.2	**4.3**	5
Potatoes 3 × 1.6 L prod./ha	Small omnivorous bird	0.1	64.8	2.0	0.53	6.9	32.2	**4.7**	5
Potatoes 2 × 1.6 L prod./ha	Small omnivorous bird	0.1	64.8	1.6	0.53	5.5	32.2	5.9	5
Potatoes 1 × 1.6 L prod./ha	Small omnivorous bird	0.1	64.8	1.0	0.53	3.4	32.2	9.4	5
Lettuce 2 × 1.6 L prod./ha	Small omnivorous bird	0.1	64.8	1.6	0.53	5.5	32.2	5.9	5
Lettuce 1 × 1.6 L prod./ha	Small omnivorous bird	0.1	64.8	1.0	0.53	3.4	32.2	9.4	5

For the 2 × 1.6 L prod./ha and the 1 × 1.6 L prod./ha applications in potatoes and lettuce the screening level TER_{LT} is above the trigger of 5. Therefore, no further risk assessment at Tier 1 is required. For the 4 × 1.6 L prod./ha and 3 × 1.6 L prod./ha applications in potatoes the TER_{LT} is below the trigger of 5. Therefore, a risk assessment at Tier 1 is required.

Tier 1

Table 10.1.1- 12: First-tier long-term reproductive risk assessment for birds (fluopicolide)

Crop	Generic focal species	DDD				DDD	EC_{10} [mg a.s./ kg bw/d]	TER_{LT}	Trigger
		Appl. rate [kg a.s./ha]	SV_m	MAF_m	f_{TWA}				
Potatoes BBCH 21-89 4 × 1.6 L prod./ha	Small omnivorous bird "lark" (BBCH 10–39) a)	0.1	10.9	2.2	0.53	1.27	32.2	25.3	5
Potatoes BBCH 21-89 3 × 1.6 L prod./ha	Small omnivorous bird "lark" (BBCH 10–39) a)	0.1	10.9	2.0	0.53	1.16	32.2	27.9	5

a) Covers all other relevant generic focal species with lower shortcut values

The TER_{LT} values calculated in the long-term risk assessment exceed the a-priori-acceptability trigger of 5 for all evaluated scenarios. Thus, the long-term risk to birds can be considered as low and acceptable without need for further, more realistic risk assessment.

Long-term risk assessment for birds drinking contaminated water from puddles

Table 10.1.1- 13: Evaluation of potential concern for exposure of birds from drinking water (escape clause)

Crop	Compound	K_{oc} [L/kg]	AR_{eff} (Appl. rate × MAF) [g a.s./ha]	NO(A)EL [mg a.s./ kg bw/d]	Ratio (AR_{eff} / NO(A)EL)	"Escape clause" No concern if ratio	Conclusion
Potatoes (4 × 1.6 L prod./ha)	Fluopicolide	267.7	400 a)	32.2	12.4	≤ 50	No concern
Potatoes (3 × 1.6 L prod./ha)	Fluopicolide	267.7	300 a)	32.2	9.3	≤ 50	No concern
Potatoes and lettuce (2 × 1.6 L prod./ha)	Fluopicolide	267.7	200 a)	32.2	6.2	≤ 50	No concern
Potatoes and lettuce (1 × 1.6 L prod./ha)	Fluopicolide	267.7	100 a)	32.2	3.1	≤ 50	No concern

a) Instead of the MAF, the number of applications was used as a worst-case multiplicator.

According to the EFSA Guidance Document for risk assessment for bird and mammals (2009) "*no specific calculations of exposure and TER are necessary when the ratio of effective application rate (in g/ha) to relevant endpoint (in mg/kg bw/d) does not exceed does not exceed 50 in the case of less sorptive substances (Koc < 500 L/kg) or 3000 in the case of more sorptive substances (Koc > 500 L/kg).*" This is the case for fluopicolide. Therefore, the long-term risk for birds from drinking water that may contain residues from fluopicolide is acceptable.

RISK ASSESSMENT OF SECONDARY POISONING

According to the EFSA GD 2009, substances with a log $P_{OW} \geq 3$ have potential for bioaccumulation and should be assessed for the risk of biomagnification in aquatic and terrestrial food chains.

The log P_{OW} value of fluopicolide is 2.9. Since the log P_{OW} does not exceed the trigger value of 3, fluopicolide is deemed to have a negligible potential to bioaccumulate in animal tissues. No formal risk assessment for secondary poisoning is therefore required.

RISK ASSESSMENT FOR PLANT METABOLITES

A worst case screening level risk assessment for herbivorous bird exposure to plant metabolites can be based on the maximum RUDs determined by [redacted] 2020 (M-686445-01-1, 10.1.1.2/01) for M-01, M-02, M-04 and M-05 in foliage sampled during the course of field residue or rotational crop studies. For that screening level risk assessment, the maximum MAF for the uses under assessment is set to be 4 (number of applications), and no deposition factor is applied. The FIR/bw represents a small omnivorous bird eating foliage at a rate 0.5 times its own bodyweight each day. The toxicity endpoint is set at one tenth of the reproductive risk assessment endpoint for the parent.

Thus this screening level assessment combines worst case elements in a risk-envelope. If needed, more realistic and crop-/use – specific input parameters can be included.

Table 10.1.1- 14: Risk envelope assessment for plant metabolites (birds)

Compound	GFS	FIR/bw	PD	RUD_{max}	AR	MAF	f_{TWA}	f_{DEP}	DDD	NOAEL	TER
M-01	lark	0.5	25% foliage	1.714	0.1	4	0.53	1	0.18	3.22	17.7
M-02	lark	0.5	25% foliage	0.498	0.1	4	0.53	1	0.05	3.22	61.0
M-04	lark	0.5	25% foliage	0.090	0.1	4	0.53	1	0.01	3.22	337.5
M-05	lark	0.5	25% foliage	0.200	0.1	4	0.53	1	0.02	3.22	151.9

CP 10.1.1.1 Acute oral toxicity

For animal welfare reasons, no acute oral toxicity study with the preparation was performed. Such a study is not deemed necessary, given the fact that the formulated product was more toxic to rats than to be expected based on its active substance content.

CP 10.1.1.2 Higher tier data on birds

Data Point:	KCP 10.1.1.2/01
Report Author:	[redacted]
Report Year:	2020
Report Title:	Fluopicolide: Plant metabolite residues for herbivorous bird and mammal risk assessment
Report No:	EnSa-20-0482
Document No:	M-686445-01-1
Guideline(s) followed in study:	EFSA 2009 Guidance document for bird and mammal risk assessment and EFSA 2019 General recurring issues in ecotoxicology
Deviations from current test guideline:	none
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	not applicable
Acceptability/Reliability:	Yes

Executive summary

In this document residue results for the plant metabolites M-01 (AE C653711), M-02 (AE C657188), M04 (AE C657378) and M-05 (AE 1344122) of fluopicolide were compiled.

The objective of this compilation was to establish realistic exposure concentrations for use in the risk assessment for herbivorous birds and mammals. Therefore, only samples from leaves, shoots, or stalks were considered, in order to match the diet categories in the generic focal species scenarios in the EFSA GD 2009 [14]) for risk assessment on birds and mammals.

For this compilation, all available plant metabolism studies were evaluated in order to define the **nature of the residue** (*sensu* EFSA 2019 [15]). For these metabolites, all measured residue concentrations reported in the field residue or rotational crop studies were compiled to evaluate the **level of the residue**

[14] EFSA 2009 Guidance document for bird and mammal risk assessment. doi:10.2903/sp.efsa.2019.EN-1673
[15] EFSA 2019 General recurring issues in ecotoxicology. doi:10.2903/sp.efsa.2019.EN-1673

(*sensu* EFSA 2019). These measured residue concentrations were tabled in Excel spreadsheets, and the corresponding residue per unit doses (RUDs) were calculated to normalize the residue concentrations for the cumulative application rate applied prior to the measurement time point. Thus, the RUDs represent measured concentrations of the metabolite per kg applied of the parent.

With that approach, plant metabolite concentrations can be estimated also for other (untested) exposure scenarios with the equation:

$C_{metabolite}$ [mg metabolite/kg plant] = RUD x cumulative parent application rate [kg a.s./ha]

Table 10.1.1.2-1: Nature and quantity of the metabolite residues in plants for herbivorous bird and mammal risk assessment

	Nature of the residue (metabolism studies)			**Level of the residue** (field residue and rotational crop studies)		
Metabolite	Overall Maximum Concentration			N	RUD	Maximum RUD found in / at
	%TRR	mg/kg	Comment			
M-01 AE C653711 BAM	87.5	2.170	Maximum values from different matrices	479	1.714 (max) 0.159 (90th perc.) 0.076 (mean)	carrot leaves (r) 453d DAFA 453d DALA
M-02 AE C657188 PCA	43.0	1.087	Maximum values from same matrix	479	0.498 (max) 0.038 (90th perc.) 0.022 (mean)	potato leaves (d) 72d DAFA 25d DALA
M-04 AE C657378	59.3	0.870	Maximum values from different matrices	165	0.090 (max) 0.023 (90th perc.) 0.012 (mean)	Spring wheat stalks (r) 376d DAFA 318d DALA
M-05 AE 1344122 P1x	41.0	0.108	Maximum values from different matrices	165	0.200 (max) 0.050 (90th perc.) 0.020 (mean)	Barley green mat. (r) 312d DAFA 257d DALA
M-06 AE C643890	2.8	0.068	Maximum values from different matrices		No data compiled here because M-06 is not considered relevant for risk assessment	
M-09 AE B102859	10.5	0.052	Maximum values from different matrices		No data compiled here because M-09 is not considered relevant for risk assessment	

(d) direct overspray trial DAFA: days after first application
(r) rotational crop DALA: days after last application
RUD: based on total application rate of the parent (e.g., 4 applications with 100 g a.s./ha each = 400 g/ha total rate). The RUD is expressed in metabolite equivalents.

No residue data are compiled for M-06. No experimental toxicity data are available for M-06. However, M-06 is structurally very similar to the parent fluopicolide; being a hydroxylation product (at position 3 of the phenyl ring), which is generally considered as detoxification reaction. Therefore, M-06 is considered to be equally or less toxic compared to fluopicolide. This assumption is substantiated by the results of the QSAR analysis. Furthermore, the rotational crop studies (M-623459-02-1, M-679637-01-1 and M-679662-01-1) show that there is negligible exposure potential, given that the residue of M-06 are <LOQ (<0.01 mg/kg within barley grain and maize fractions). M-06 is therefore not considered to be a relevant metabolite for the risk assessment.

No residue data are compiled here for M-09. M-09 is more acutely toxic than fluopicolide (the LD_{50} for M-09 is 1030 mg/kg bw, while the corresponding value for fluopicolide is >2000 mg/kg bw). While this indicates a potential hazard, the actual exposure expected from M-09 is negligible, as all of the rotational crop studies presented within section MCA 6.6.2 (covering matrices of barley green material, carrot leaves, lettuce, maize green material) show that residues of M-09 do not exceed the LOQ (0.01 mg/kg in all of the tested crop fractions) for any of the tested plant-back scenarios. For this reason, metabolite M-09 is not considered to be relevant for inclusion within the risk assessment.

I. Material and Methods:

For compilation of the measured residue levels in the field and rotational crop studies, the findings were tabled to document the input data for calculating the specific RUD for each data point. The collected information consisted of the trial ID, the application scenario, and the measured residues for each timepoint where foliage samples were taken for chemical analysis.

Where residues were < LOQ, a value of 0.5 x LOQ was included for use in the descriptive statistics.

Afterwards the results were ranked in decreasing order of the RUDs, to facilitate the identification of the trial conditions that resulted in the highest measured RUDs, e.g. the specific plant in which the residues were determined, and the time span between application and residue measurement.

Descriptive statistics (number of data points, maximum RUD, 90th percentile RUD and mean RUD) were calculated for each of the four plant metabolites.

A plot was generated presenting each of the individual metabolite RUDs on the y-axis versus the time since first application on the x-axis, visualising the temporal profile of the metabolite concentrations.

II. Results and Discussion:

M-01 (AE C653711, BAM)

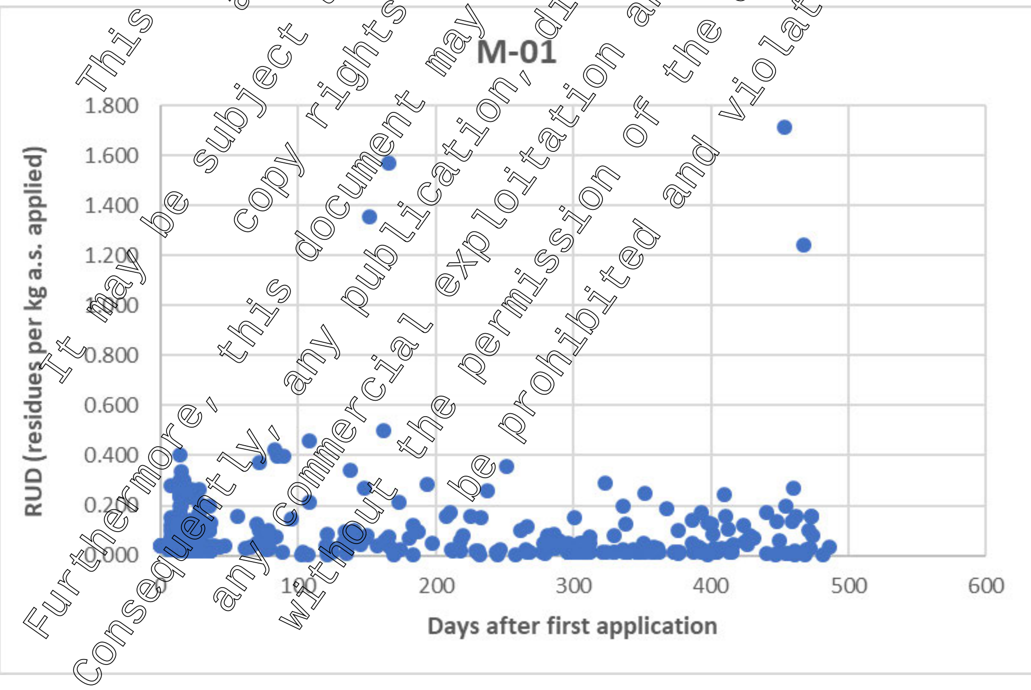
The maximum residues of M-01 were found in carrot leaves 453 days after a single pre-planting application, with a RUD_{max} of 1.714 mg metabolite per 1 kg of parent applied.

The 90th percentile RUD was found at 0.159, and the mean RUD was 0.076 (n = 479).

The data used for these calculations is presented in Appendix 1 of the report.

The distribution of the RUDs in all evaluated trials is presented in the figure below.

RUD for M-01 (AE C653711, BAM) in field residue or rotational crop studies



M-02 (AE C657188, PCA)

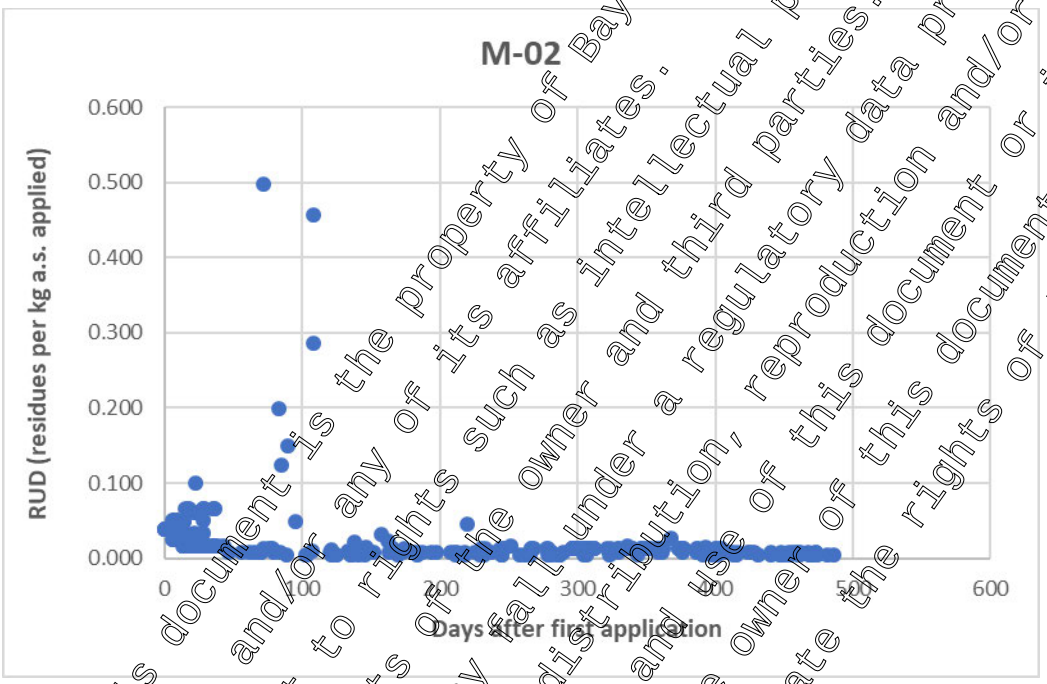
The maximum residues of M-02 were found in directly treated potato leaves 25 days after the last of 4 spray applications (72 days after the first of these applications), with a RUD_{max} of 0.498 mg metabolite per 1 kg of parent applied.

The 90th percentile RUD was found at 0.038 and the mean RUD was 0.022 (n= 479).

The data used for these calculations is presented in Appendix 2 of the report.

The distribution of the RUDs in all evaluated trials is presented in the figure below.

RUD for M-02 (AE C657188, PCA) in field residue or rotational crop studies



M-04 (AE C657378)

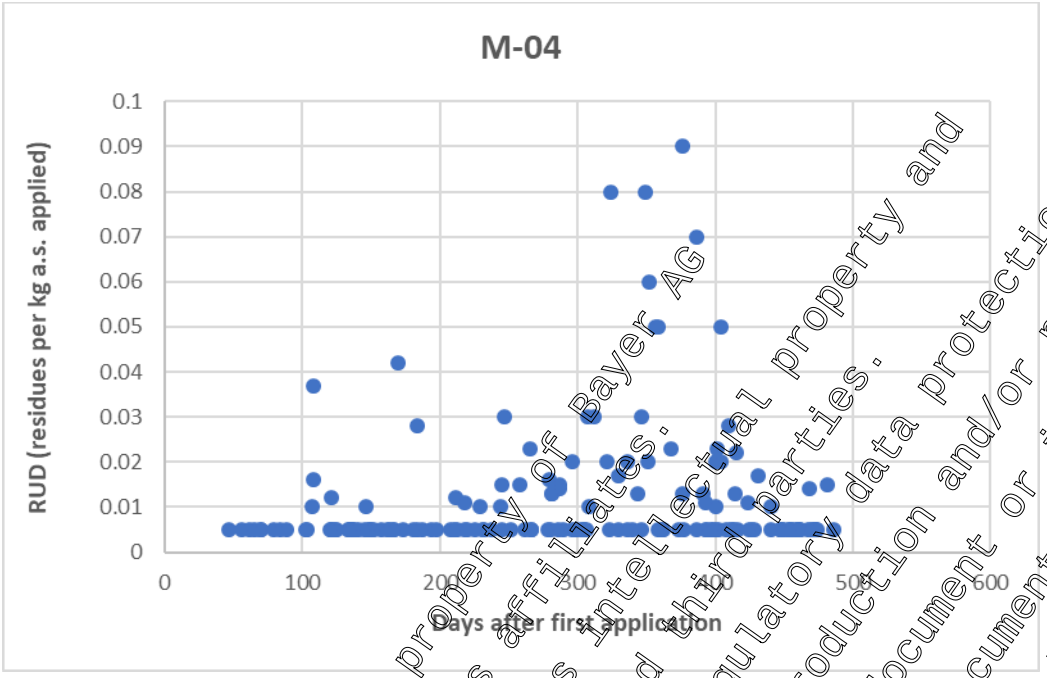
The maximum residues of M-04 were found in spring wheat stalks as succeeding crop in a rotational crop study 318 days after the last of 4 spray applications (376 days after the first of these applications), with a RUD_{max} of 0.090 mg metabolite per 1 kg of parent applied.

The 90th percentile RUD was found at 0.023 and the mean RUD was 0.012 (n= 169).

The data used for these calculations is presented in Appendix 3 of the report.

The distribution of the RUDs in all evaluated trials is presented in the figure below.

RUD for M-04 (AE C657378) in field residue or rotational crop studies



M-05 (AE 1344122, P1x)

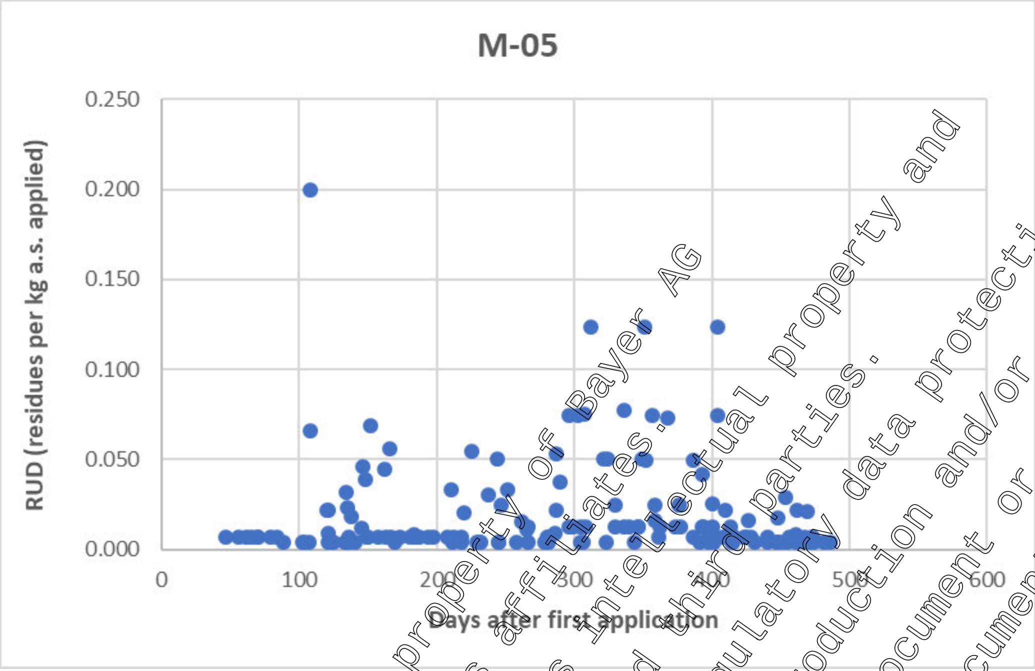
The maximum residues of M-05 were found in barley green material as succeeding crop in a rotational crop study 108 days after a single pre-planting application with a RUD_{max} of 0.200 mg metabolite per 1 kg of parent applied.

The 90th percentile RUD was found at 0.050, and the mean RUD was 0.020 (n=165).

The data used for these calculations is presented in Appendix 4 of the report.

The distribution of the RUDs in all evaluated trials is presented in the figure below.

RUD for M-05 (AE 1344122, P1x) in field residue or rotational crop studies



III. Conclusion:

The samples evaluated in this document were from field studies and were taken after different time points following different application sequences of fluopicolide on different crops (e.g., potato, barley, lettuce, spinach and leek). Residues in the foliage of succeeding crops were also included (e.g., carrots, winter wheat, spring wheat, faba beans and cabbage). These different plants are considered as surrogate for unspecified grasses and weeds that herbivorous birds and mammals may eat when foraging in agricultural fields that are treated with fluopicolide.

The residue concentrations were related to the time between the first application and the sampling time point, in order to account for the time span over which the metabolite could be formed prior to reaching the measured concentration. This is only one of the possible temporal relations between the application sequence and the sampling sequence, but considered suitable for the current purpose, i.e. to visualize the temporal profile of the metabolite concentrations.

In order to account for the different application rates applied in different application sequences in the data set, the residues in each sample are normalised for the total application rate applied in the respective field trial prior to taking this sample, resulting in the so-called RUD (residue-per-unit dose). This RUD is used in bird and mammal risk assessment to establish the expected residue concentration C of an active substance (in mg as/kg) when multiplied with the application rate AR in [kg as/ha]: AR x RUD = C. Here this concept is applied for the metabolites of fluopicolide: the product of the RUD for the metabolite with the application rate of the parent is the expected residue concentration of that metabolite and can be used in the TER-calculation together with the toxicity endpoint of that metabolite.

Based on the available information, the maximum RUDs of M-01, M-04 and M-05 are found after uptake from soil by succeeding crops. The maximum measured RUD for M-02 was found in the foliage of the directly treated plants, which are therefore protective for metabolite concentrations in succeeding plants with residues from soil uptake.

With regard to the main metabolites M-01 and M-02, the available data set contains nearly 500 data points at different time points after application, so that the information can be considered as appropriate to establish realistic worst case RUDs for these metabolites for use in bird and mammal risk assessments. Less data points are available for M-03 and M-05 but these confirm the level of residues to be considerably lower for these metabolites.

The maximum RUD for M-01 from 479 measurements is 1.714 (90th percentile 0.159).

The maximum RUD for M-02 from 479 measurements is 0.498 (90th percentile 0.038).

The maximum RUD for M-04 from 165 measurements is 0.090 (90th percentile 0.023).

The maximum RUD for M-05 from 165 measurements is 0.200 (90th percentile 0.050).

The maximum RUDs for M-01 and M-02 are more than a factor of 10 higher than their respective 90th percentile RUDs. The ratio for M-04 and M-05 is lower, but still a factor of about 4. Using the maximum RUD in the risk assessment for herbivorous birds and mammals would represent a very worst case, and should therefore be considered as conservative, and to account for any remaining uncertainties over the comprehensiveness of the underlying data set.

Assessment and conclusion by applicant:
The study is reliable and can be used in risk assessment. Using the maximum RUD in the risk assessment for herbivorous birds and mammals would represent a very worst case. The maximum RUDs for M-01 and M-02 are more than a factor of 10 higher than their respective 90th percentile RUDs. The ratio for M-04 and M-05 is lower, but still a factor of about 4. Thus, using the 90th percentile instead of the maximum would be numerically less conservative but much more typical and representative.

CP 10.1.2 Effects on terrestrial vertebrates other than birds

Table 10.1.2- 1: Endpoints used in risk assessment

Test substance	Risk assessment	Species	Endpoint		Reference
Fluopicolide	Acute	Rat	**LD_{50}**	**> 5000 mg/kg bw**	[redacted] 2000; M-197224-01-1 KCA 5.2.1/01
	Long-term	Rabbit	**NOAEL**	**= 20 mg/kg bw/day**	[redacted] 2004; M-202513-02-1 KCA 5.6.2/04
M-01 (AE C653711, BAM)	Acute	Rat	LD_{50}	1470 mg/kg bw	[redacted] 1967; M-228905-01-1 KCA 5.8.1/02
	Long-term	Rat	**NOAEL**	**= 7.5 mg/kg bw/day**	[redacted] 1993; M-304025-01-1 KCA 5.8.1/49
Propamocarb-hydrochloride	Acute	Rat	LD_{50}	> 1330 mg /kg bw	EFSA Scientific Report (2006) 78, 1-80
	Long-term	Rat	NOAEL	= 104 mg/kg bw/day	EFSA Scientific Report (2006) 78, 1-80
Fluopicolide+ Propamocarb-hydrochloride	Acute	Rat	$LD_{50 MIX}$	**> 1425 mg total a.s./kg bw**	Table 10.1.2- 7

Endpoints in **bold** considered relevant for risk assessment

Metabolites of fluopicolide

As presented in the section "definition of the residues for risk assessment", the plant metabolites M-01 (AE C653711), M-02 (AE C657188), M-04 (AE C657378), M-05 (AE 1344122), M-06 (AE C643890) and M-09 (AE B102859) met the criteria of > 10% TRR or > 0.05 mg/kg. It should be noted the maximum overall concentration of each metabolite either as %TRR or as mg/kg did not typically come from the same matrix sample. A worst-case screening level long-term risk assessment for mammals is presented in Table 10.1.2- 18 for M-01, M-02, M-04 and M-05, based on field residue and rotational crop studies evaluated in 10.1.1.2/01. A quantitative risk assessment for M-06 and M-09 is not conducted since their residues in the field residue and rotational crop studies were < LOQ.

The screening level risk assessment for M-01 (AE C653711, BAM) is conducted with the NOAEL from the rat reproduction study conducted with this metabolite. For M-02, M-04 and M-05, the screening level risk assessment is conducted with the worst-case NOAEL = 2 mg/kg bw/d (parent NOAEL / 10), although there are toxicological studies with them confirming that they are not 10x more toxic than the parent (please refer to Table 8.1.2.2-3 in MCA).

An acute risk assessment is not conducted since this is considered to be covered by the worst-case screening level long-term risk assessment.

Table 10.1.2- 2: Relevant indicator species for screening risk assessment

Crop	Indicator species	Shortcut value (SV)	
		Acute RA based on RUD_{90}	Long-term RA based on RUD_m
Potatoes	Small herbivorous mammal	118.4	48.3
Leafy vegetables (lettuce)	Small herbivorous mammal	136.4	72.3

Table 10.1.2- 3: Relevant generic focal species for first-tier risk assessment

Crop	Generic focal species	Shortcut value (SV)	
		Acute RA based on RUD_{90}	Long-term RA based on RUD_m
Potatoes BBCH 21-89	Small insectivorous mammal "shrew" BBCH ≥ 20	5.4	1.9
	Small herbivorous mammal "vole" BBCH ≥ 20	40.9	21.7
	Large herbivorous mammal "lagomorph" BBCH 10–40	35.1	14.3
	Large herbivorous mammal "lagomorph" BBCH ≥ 40	10.5	4.3
	Small omnivorous mammal "mouse" BBCH 10–39	17.2	7.8
	Small omnivorous mammal "mouse" BBCH ≥ 40	5.2	2.3
Leafy vegetables (lettuce) BBCH 13-49	Small insectivorous mammal "shrew" BBCH 10–19	7.6	4.2
	Small insectivorous mammal "shrew" BBCH ≥ 20	5.4	1.9
	Small herbivorous mammal "vole" BBCH 40–49	136.4	72.3
	Large herbivorous mammal "lagomorph" All season	35.1	14.3
	Small omnivorous mammal "mouse" BBCH 40–49	17.2	7.8
Leafy vegetables (lettuce) BBCH 41-49	Small insectivorous mammal "shrew" BBCH ≥ 20	5.4	1.9
	Small herbivorous mammal "vole" BBCH 40–49	136.4	72.3
	Large herbivorous mammal "lagomorph" All season	35.1	14.3
	Small omnivorous mammal "mouse" BBCH 40–49	17.2	7.8

ACUTE DIETARY RISK ASSESSMENT

Screening step

Table 10.1.2- 4: Screening acute risk assessment for mammals (fluopicolide)

Crop	Indicator species	DDD			DDD	LD_{50} [mg a.s./kg bw]	TER_A	Trigger
		Appl. rate [kg a.s./ha]	SV_{90}	MAF_{90}				
Potatoes 4 × 1.6 L prod./ha	Small herbivorous mammal	0.1	118.4	1.8	21.31	> 5000	> 234.6	10
Potatoes 3 × 1.6 L prod./ha	Small herbivorous mammal	0.1	118.4	1.6	18.94	> 5000	> 263.9	10
Potatoes 2 × 1.6 L prod./ha	Small herbivorous mammal	0.1	118.4	1.4	16.58	> 5000	> 301.6	10
Potatoes 1 × 1.6 L prod./ha	Small herbivorous mammal	0.1	118.4	1.0	11.84	> 5000	> 422.3	10
Lettuce 2 × 1.6 L prod./ha	Small herbivorous mammal	0.1	136.4	1.4	19.10	> 5000	> 261.8	10
Lettuce 1 × 1.6 L prod./ha	Small herbivorous mammal	0.1	136.4	1.0	13.64	> 5000	> 366.6	10

Table 10.1.2- 5: Screening acute risk assessment for mammals (fluopicolide + propamocarb-hydrochloride)

Crop	Indicator species	DDD			DDD	$LD_{50\ mix}$ [mg a.s./kg bw]	TER_A	Trigger
		Appl. rate [kg./ha]	SV_{90}	MAF_{90}				
Potatoes 4 × 1.6 L prod./ha	Small herbivorous mammal	1.1	118.4	1.8	234.43	> 1425	**> 6.1**	10
Potatoes 3 × 1.6 L prod./ha	Small herbivorous mammal	1.1	118.4	1.6	208.38	> 1425	**> 6.8**	10
Potatoes 2 × 1.6 L prod./ha	Small herbivorous mammal	1.1	118.4	1.4	182.34	> 1425	**> 7.8**	10
Potatoes 1 × 1.6 L prod./ha	Small herbivorous mammal	1.1	118.4	1.0	130.24	> 1425	> 10.9	10
Lettuce 2 × 1.6 L prod./ha	Small herbivorous mammal	1.1	136.4	1.4	210.06	> 1425	**> 6.8**	10
Lettuce 1 × 1.6 L prod./ha	Small herbivorous mammal	1.1	136.4	1.0	150.04	> 1425	**> 9.5**	10

For fluopicolide the TER_A is above the trigger of 10. Therefore, no further risk assessment at Tier 1 is required for fluopicolide. For fluopicolide + propamocarb-hydrochloride the TER_A is below the trigger of 10. Therefore, a risk assessment at Tier 1 is required for fluopicolide + propamocarb-hydrochloride for the 4 × 1.6 L prod./ha, 3 × 1.6 L prod./ha and 2 × 1.6 L prod./ha applications in potatoes and for the 2 × 1.6 L prod./ha and the 1 × 1.6 L prod./ha applications in lettuce.

Tier 1

Table 10.1.2- 6: First-tier acute risk assessment for mammals (fluopicolide + propamocarb-hydrochloride)

Crop	Generic focal species	DDD			DDD	LD_{50} [mg a.s./kg bw]	TER_A	Trigger
		Appl. rate [kg a.s./ha]	SV_{90}	MAF_{90}				
Potatoes BBCH 21-89 4 × 1.6 L prod./ha	Small herbivorous mammal “vole” BBCH ≥ 20 [a)]	1.1	40.9	1.8	81.0	> 1425	> 17.6	10
Potatoes BBCH 21-89 3 × 1.6 L prod./ha	Small herbivorous mammal “vole” BBCH ≥ 20 [a)]	1.1	40.9	1.6	72.0	> 1425	> 19.8	10
Potatoes BBCH 21-89 2 × 1.6 L prod./ha	Small herbivorous mammal “vole” BBCH ≥ 20 [a)]	1.1	40.9	1.4	63.0	> 1425	> 22.6	10
Leafy vegetables BBCH 41-49 2 × 1.6 L prod./ha	Small herbivorous mammal “vole” BBCH 40–49	1.1	136.4	1.4	210.1	> 1425	**> 6.8**	10
	Large herbivorous mammal “lagomorph” All season [a)]	1.1	35.1	1.4	54.1	> 1425	> 26.4	10
Leafy vegetables BBCH 13-49 1 × 1.6 L prod./ha	Small herbivorous mammal “vole” BBCH 40–49	1.1	136.4	1.0	150.0	> 1425	**> 9.5**	10
	Large herbivorous mammal “lagomorph” All season [a)]	1.1	35.1	1.0	38.6	> 1425	> 36.9	10

a) Covers all other relevant generic focal species with lower shortcut values

The TER_A values calculated in the acute risk assessment exceed the a-priori-acceptability trigger of 10 for all evaluated exposure scenarios, except for the generic focal species small herbivorous mammal “vole” in leafy vegetables with the LD_{50} (mix) of fluopicolide + propamocarb-hydrochloride. This failure to reach the TER_A of 10 is due to the contribution of propamocarb-hydrochloride to the LD_{50} (mix). A more detailed evaluation is provided in the next section on the combined toxicity assessment.

Combined toxicity risk assessment

According to current requirements when a product contains more than one active substance, an additional assessment on combined toxicity risk of the product has to be done.

For the assessment of acute effects (mortality), a surrogate LD_{50mix} can be calculated for the mixture risk assessment. The EFSA GD 2009 indicates that the following equation should be used for deriving a surrogate LD_{50mix} for a mixture of active substances with known toxicity assuming dose additivity:

$$\mathrm{LD}_{50}\,(\mathrm{mix}) = \left(\sum_i \frac{\mathrm{X}(a.s._i)}{\mathrm{LD}_{50}(a.s._i)} \right)^{-1}$$

where:

X (a.s.$_i$) = fraction of active substance (i) in the formulation mixture

LD_{50} (a.s.$_i$) = acute toxicity for the active substance (i)

The active substance content of the formulation FLC+PCH SC 687.5 addressed in this dossier is 62.5 g fluopicolide/L prod. and 625 g propamocarb-hydrochloride/L prod., making up a total of 687.5 g a.s./L product.

The table below shows the calculation of the predicted LD_{50} (mix) of fluopicolide and propamocarb-hydrochloride when mixed in these proportions (step 1 in Appendix B of EFSA GD 2009).

Table 10.1.2- 7: Mammalian LD_{50} (mix) for fluopicolide and propamocarb-hydrochloride when combined as FLC+PCH SC 687.5 (step 1 in Appendix B of EFSA GD 2009)

	Fluopicolide	Propamocarb-hydrochloride
Content of a.s. in product [g a.s./L prod.]	62.5	625
Fraction in the a.s. mixture	0.0909	0.9091
LD_{50} of a.s. [mg a.s./kg bw]	>5000	>1330
Fraction / LD_{50}	0.0000182	0.0006835
Sum	0.0007017	
1/sum = predicted LD_{50} (mix) [mg total a.s./kg bw]	>1425	

It is obvious from the comparison of the (low) acute oral toxicity of the active substances, and their relative proportions of the formulated product FLC+PCH SC 687.5, that propamocarb has a tox per fraction of > 90% and thus clearly drives the risk assessment.

Table 10.1.2-8: Mammalian "tox per fraction" for FLC+PCH SC 687.5 (step 1 in EFSA GD 2009, Appendix B)

	Fluopicolide	Propamocarb-hydrochloride	"mix"
Content of a.s. in product [g a.s./L prod.]	62.5	625	687.5
Fraction in the a.s. mixture	0.0909	0.9091	1
LD_{50} of a.s. [mg a.s./kg bw]	>5000	>1330	>1425
Tox per fraction	55006	1463	56463
Contribution to predicted toxicity	3 %	97 %	

Fluopicolide contributes to 3 % to mixture toxicity, while propamocarb-hydrochloride has 97 % impact on the mixture toxicity. Consequently, according to EFSA GD (2009) the acute risk assessment can be performed for propamocarb-hydrochloride only.

EFSA GD 2009 recommends as next step (2a and 2b in Appendix B) to check the predicted toxicity against measured toxicity from LD_{50} studies conducted with the formulation.

According to EFSA GD 2009 the following equation should be used for the comparison:

$$\sum_i \frac{X(a.s._i)}{LD_{50}(a.s._{i.})} = \frac{1}{LD_{50}(mix)}$$

With:

$X(a.s._i)$ = fraction of active substance [i] in the mixture
$LD_{50}(a.s._i)$ = acute toxicity value for active substance [i]
$LD_{50}(mix)$ = measured acute toxicity value for the mixture

Left side of the equation: $\sum_i \frac{X(a.s._i)}{LD_{50}(a.s._{i.})} = \frac{0.0909}{\frac{5000\ mg\ a.s}{kg\ bw}} + \frac{0.9091}{\frac{1463\ mg\ a.s}{kg\ bw}} = 0.00070$

Right side of the equation: $\frac{1}{LD_{50}(mix)} = \frac{1}{\frac{1554\ mg\ total\ a.s.}{kg\ bw}} = 0.00064$

$0.00070 < 0.00064$

A greater value on the left side of the equation indicates that the measured toxicity of a formulation is lower than predicted from the toxicity of the individual components. In such as case, the use of LD_{50} for formulation is recommended for the first-tier assessment. However, as already discussed above, propamocarb-hydrochloride was clearly identified as the risk driver.

The acute Tier 1 risk assessment with the $LD_{50\ mix}$ of >1425 mg/kg bw is conducted in Table 10.1.2- 6, triggering a refined assessment for the scenario of small herbivorous mammals (voles).
Since propamocarb-hydrochloride is the risk driver here, it is appropriate to focus the refined assessment on this compound.

A refined assessment of the acute oral LD_{50} endpoint for propamocarb-hydrochloride has been submitted in the AIR MCA and the stop-the-clock submission (EFSA requests 66/67) for propamocarb-hydrochloride (see below for further information).

Based on that refinement, the LD_{50} is assessed at 2334 mg/kg bw instead of > 1330 mg/kg bw (the value used in Table 10.1.1-7 to calculate the $LD_{50\ mix}$). With the LD_{50} of 2334 mg/kg bw for propamocarb-hydrochloride, an $LD_{50\ mix}$ of >2453 is calculated for fluopicolide + propamocarb-hydrochloride (Table 10.1.2-9).

Table 10.1.2- 9: Refined mammalian LD_{50} (mix) for when combined as FLC+PCH SC 687.5 (step 1 in Appendix B of EFSA GD 2009)

	Fluopicolide	Propamocarb-hydrochloride
Content of a.s. in product [g a.s./L prod.]	62.5	625
Fraction in the a.s. mixture	0.0909	0.9091
LD_{50} of a.s. [mg a.s./kg bw]	>5000	2334
Fraction / LD_{50}	0.000018	0.0003895
Sum	0.000408	
1/sum = predicted LD_{50} (mix) [mg total a.s./kg bw]	>2453	

With the $LD_{50\ mix}$ of > 2453 for fluopicolide + propamocarb-hydrochloride, the refined TER_A for the vole scenarios also exceed the trigger, indicating acceptable risk also for voles (Table 10.1.2-10).

Table 10.1.2- 10: Refined acute risk assessment for mammals (fluopicolide + propamocarb-hydrochloride)

Crop	Generic focal species	DDD			DDD	$LD_{50\ mix}$ [mg a.s./kg bw]	TER_A	Trigger
		Appl. rate [kg a.s./ha]	SV_{90}	MAF_{90}				
Leafy vegetables BBCH 41-49 2 × 1.6 L prod./ha	Small herbivorous mammal "vole" BBCH 40–49	1.1	136.4	1.4	210.1	> 2453	> 11.7	10
Leafy vegetables BBCH 13-49 1 × 1.6 L prod./ha	Small herbivorous mammal "vole" BBCH 40–49	1.1	136.4	1.0	150.0	> 2453	> 16.4	10

Refined assessment of the acute oral LD_{50} endpoint for propamocarb-hydrochloride

As mentioned above, a refined assessment of the acute oral LD_{50} endpoint for propamocarb-hydrochloride has been submitted in the EU renewal process (AIR) in MCA 8 and the stop-the-clock submission (EFSA requests 66/67) for propamocarb-hydrochloride.

The table below was submitted with the AIR MCA for propamocarb-hydrochloride and shows the acute oral toxicity data for mammals:

Table 10.1.2- 11: Acute oral toxicity data for mammals: Table CA 8.1.2.1-1 in the AIR MCA for propamocarb-hydrochloride

Test species	Test design	Ecotoxicological endpoint			Reference
Rat	Acute, oral	LD_{50} male (EFSA 2006)	2928	mg PCH/kg bw	[redacted] (1982) M-157621-01-1 KCA 5.2.1/03 BCS
		LD_{50} male	2900[1]	mg PCH/kg bw	
		LD_{50} female (EFSA 2006)	1730[1*]	mg PCH/kg bw	
		LD_{50} female	2000[1]	mg PCH/kg bw	
	Acute, oral	LD_{50}	> 3444[2]	mg PCH/kg bw	[redacted] (1995) M-310337-01-1 KCA 5.2.1/01 AGR
		LD_{50} (extrapolated)	2032[2]	mg PCH/kg bw	
	Acute, oral	LD_{50}	> 3400 [3]	mg PCH/kg bw	[redacted] (2001) M-205214-01-1 KCA 5.2.1/02 BCS
Rat	Acute, oral	LD_{50}	> 5000 [4]	mg PCH/kg bw	[redacted] (2008) M-480178-01-2 KCA 8.1.2.1/01
Mouse	Acute, oral	LD_{50} male (EFSA 2006)	1762.25[5]	mg PCH/kg bw	[redacted] (1982) A89469 M-164833-01-1 KCA 5.2.1/04 BCS
		LD_{50} male	2650[5]	mg PCH/kg bw	
		LD_{50} female (EFSA 2006)	1862[5]	mg PCH/kg bw	
		LD_{50} female	2800[5]	mg PCH/kg bw	
		LD_{50} (geometric mean)	2724	mg PCH/kg bw	

Test species	Test design	Ecotoxicological endpoint			Reference
-	Acute, oral	**LD_{50}**	**2334**	**mg PCH/kg bw**	Overall calculated "acute $LD_{50\ geomean}$" value (using underlined LD_{50} values from rat and mice data) – see justification below

Bold letters: Values considered relevant for risk assessment

* Endpoint listed in EFSA Scientific Report 78 (2006)

[1] dose-response study where rats were used with 6 doses of Previcur N covering a range of 1300 – 4826 mg/kg bw – Previcur N contained 66.5% of Propamocarb-HCl (SN 66752); The LD_{50} values in this study are 2900 mg/kg bw in males and 2000 mg/kg bw in females. In the past, however, these values were erroneously corrected with a purity factor of 66.5 %, resulting in LD_{50} values of 1928.5 and 1330 mg/kg bw for males and females, respectively leading to determine an LD_{50} value higher than 1330 mg/kg bw used in the risk assessment. As stated in the Kojima, 1982 report, the rat LD_{50} values represent dose levels as active ingredient, so that the LD_{50} values to be used for ecotoxicology are 2900 and 2000 mg/kg bw for males and females, respectively; a geometric mean cannot be used because there is a clear indication of a difference in sensitivity between sexes (refer EFSA Guidance Document 2009).

[2] fixed dose method (OECD 420) study performed with Proplant (Propamocarb-HCl 722 g/L SL) at 2000 ppm with 10 animals; no mortality or clinical signs of toxicity during the study; an extrapolation factor of 1.407 was used to calculate an extrapolated calculated endpoint (ECPA Poster, Extrapolation factors for LD_{50} values from mammal studies conducted at the limit dose, Foudoulakis et al. 2015, SETAC Conference 2015 in Barcelona; report under preparation which can be submitted under request).

[3] the OECD 401 guideline was used; study performed with undiluted Previcur N containing 68% of Propamocarb-HCl at one tested dose (5000 ppm); only two females died four hours after the treatment; this result confirms the low toxicity toxicity of Propamocarb to rats.

[4] the endpoint extracted from the scientific article of Lian et al. 2008 (i.e. acute oral LD_{50} values measured with UDP and Horn's Procedures) confirms the low acute toxicity of Propamocarb to rats.

[5] dose-response study where rats were used with 6 doses of Previcur N covering a range of 1300 – 4826 mg/kg bw – Previcur N contained 66.5% of Propamocarb-HCl (SN 66752); The LD_{50} values in this study are 2900 mg/kg bw in males and 2000 mg/kg bw in females. In the past, however, these values were erroneously corrected with a purity factor of 66.5 %, resulting in LD_{50} values of 1762.25 and 1862 mg/kg bw for males and females, respectively. As stated in the Kojima, 1982 report, the rat LD_{50} values represent dose levels as active ingredient, so that the LD_{50} values to be used for ecotoxicology are 2650 and 2800 mg/kg bw for males and females, respectively; a geometric mean can be calculated because there is no clear indication of a difference in sensitivity between sexes (refer EFSA Guidance Document 2009).

During the stop-the-clock submission (EFSA requests 66/67) for propamocarb-hydrochloride, the following answer was provided by the notifiers:

<u>Answer to EFSA request 66 (Bayer) and 67 (Arysta) during stop the clock for propamocarb</u> ("The applicant is given the opportunity to provide details of studies considered for calculation of the geometric mean LD_{50} for the acute oral toxicity to mammals (e.g. information regarding their equivalence of test design, test item and carrier used). With reference to Reporting table 5(27) - Vol. 3 CA, B 9.1.2.1 Acute oral toxicity to mammals")

As requested by EFSA, details of the studies considered for calculation of the geometric mean LD_{50} for the acute oral toxicity to mammals are provided.

The LD_{50} value listed by EFSA (> 1330 mg Propamocarb-HCl/kg bw; EFSA Scientific Report 2006, 78, 1-80) is not used in the risk assessment. The LD_{50} values in the Kojima et al. (1982) study performed on rat are 2900 mg/kg bw in males and 2000 mg/kg bw in females, respectively. In the past, however, these values were erroneously corrected with a purity factor of 66.5 %, resulting in LD_{50} values of 1928.5 and 1330 mg/kg bw for males and females, respectively leading to determine an LD_{50} value higher than 1330 mg/kg bw used in the risk assessment. The value of 1330 mg Propamocarb-HCl/kg bw should be replaced by the value 2000 mg Propamocarb-HCl/kg bw. As stated in the EFSA Guidance Document for birds and mammals (2009), *'it is proposed that the geometric mean be used unless there is a clear indication of a difference in sensitivity between the sexes (e.g. > 25 % in the LD_{50}; EPCO, 2005) - in*

which case the data from the more sensitive sex should be taken'. Since results of the Kojima et al. (1982) study performed on mice did not show any higher sensitivity between the sexes, a geometric mean value of 2724 mg Propamocarb-HCl/kg bw was calculated with the two LD_{50} values (2650 mg Propamocarb-HCl/kg bw and 2800 values mg Propamocarb-HCl/kg bw) from males and females, respectively. It gave a geometric mean LD_{50} value (mice) of 2724 mg Propamocarb-HCl/kg bw.

According to the EFSA Guidance Document for birds and mammals (2009) (paragraph 2.4.1.), LD_{50} values of different species can be combined to give a multispecies geometric mean value when the studies were performed under an equivalent guideline and in particular with an equivalent vehicle/solvent. This applies to the studies from [redacted] (1982) on rats and mice. Both studies were done with the same active substance, i.e. propamocarb-HCl and with water as solvent. The guidelines used in the studies are the US EPA proposed guideline for pesticide registration (1978) and the Japanese Guideline (1972). Comparable methods were used in both tests and the same endpoints were assessed. A detailed comparison of both studies is presented in in the table below.

Consequently, the LD_{50} value (mice) of 2724 mg Propamocarb-HCl/kg bw was combined with the LD_{50} of 2000 mg/kg bw (rat, female) to give a multispecies geometric mean of 2334 mg Propamocarb-HCl/kg bw as LD_{50} value which is used in the risk assessment. This value of 2334 mg Propamocarb-HCl/kg bw can be considered conservative enough if compared to the LD_{50} of the most recent acute toxicity studies performed on rat by [redacted] (2001) and [redacted] (2008), respectively. In the study by [redacted] (2001) the OECD 401 guideline was used. The study was performed with undiluted Previcur N containing 68% of Propamocarb-HCl at one tested dose (5000 ppm). Only two females died four hours after the treatment. The LD_{50} was calculated to be 3400 mg PCH/kg bw. The endpoint extracted from the scientific article of Lian et al. 2008 (i.e. acute oral LD_{50} values measured with UDP and Horn's Procedures), LD_{50} > 5000 mg PCH/kg bw, confirms the low acute toxicity of Propamocarb to rats.

Table 10.1.2- 12: Comparison of acute studies with mammals conducted with propamocarb-hydrochloride

Parameter	Rat study of [redacted] (1982)	Mice study of [redacted] (1982)
Test substance	Previcur N (Propamocarb HCl); Purity: 66.5 %	Previcur N (Propamocarb HCl); Purity: 66.5 %
Solvent	Water	Water
Species	Rat	Mouse
Age	Approximately 7-week-old rats	7-week old mice
Dose range (mg Propamocarb-HCl (a.s.)/kg bw)	Male 2000, 2300, 2645, 3042, 3498, 4023 Female 1512, 1739, 2000, 2300, 2645, 3042, 3498	Male & Female 1300, 1690, 2197, 2856, 3713, 4826
Number of mammals tested per concentration	10	10
Exposure duration	1 day	1 day
Verification of test substance concentrations	Not performed	Not performed
Photoperiod	12/12 light/dark (artificial lighting)	12/12 light/dark (artificial lighting)
Temperature	22-24°C	22-24°C
Relative humidity	40-60%	40-60%
Endpoints	Observations for mortality and clinical signs (frequently at day 1; twice per day thereafter), body weight (measured shortly before administration, weekly thereafter and at death or end of the test), clinical signs, gross post mortem examination of all test animals	Observations for mortality and clinical signs (frequently at day 1; twice per day thereafter), body weight (measured shortly before administration, weekly thereafter and at death or end of the test), clinical signs, gross post mortem examination of all test animals
Dose responses	Findings: Mortality occurred in all concentrations except in the two lowest test concentrations done with female rats. Dead animals occurred within 24 hours after dosing. A clear dose-response could be observed so that LD_{50} values for female and male rats could be derived. Body weights of surviving animals were not affected at 1 or 2 weeks after dosing. Clinical signs including hypokinesia, clonic convulsion, nasal & mouth haemorrhage, bleeding eyelid, piloerection, sleek, disappearing hair and staggering gait were observed. Symptoms were seen from 3 hours to 3 days after dosing. Surviving animals recovered to normal within 4 hours to 2 days after dosing.	Findings: Mortality occurred in all concentrations. Dead animals occurred within one hour after dosing. A clear dose-response could be observed so that LD_{50} values for female and male mice could be derived. Body weights of surviving animals were not affected at 1 or 2 weeks after dosing. Clinical signs including hypokinesia, clonic convulsion, staggering gait, hearing loss, touch response loss and prone followed.

Conclusion of the refined assessment of the acute oral LD_{50} endpoint for propamocarb-hydrochloride

According to the information provided above, the multispecies geometric mean of 2334 mg/kg bw is the refined LD_{50} value which is used in the acute mammal risk assessment of propamocarb-hydrochloride for the formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5.

Acute risk assessment for mammals drinking contaminated water from puddles

Because propamocarb-hydrochloride is the risk driver in the LD_{50}mix, and since propamocarb-hydrochloride belongs to the group of more sorptive substances with a K_{oc} of 516.7, it is appropriate to set the threshold for no concern at 3000 for the combined assessment.

Table 10.1.2- 13: Evaluation of potential concern for exposure of mammals from drinking water (escape clause)

Crop	Compound	K_{oc} [L/kg]	AR_{eff} (Appl. rate × MAF_m) [g a.s./ha]	LD_{50} [mg a.s./kg bw]	Ratio (AR_{eff} / LD_{50})	"Escape clause" No concern if ratio	Conclusion
Potatoes (4 × 1.6 L prod./ha)	Fluopicolide	267.7	400 a)	>5000	<0.1	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	4400 a)	>1425 b)	<3.1	≤ 3000	No concern
Potatoes (3 × 1.6 L prod./ha)	Fluopicolide	267.7	300 a)	>5000	<0.1	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	3300 a)	>1425 b)	<2.3	≤ 3000	No concern
Potatoes and lettuce (2 × 1.6 L prod./ha)	Fluopicolide	267.7	200 a)	>5000	<0.1	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	2200 a)	>1425 b)	<1.5	≤ 3000	No concern
Potatoes and lettuce (1 × 1.6 L prod./ha)	Fluopicolide	267.7	100 a)	>5000	<0.1	≤ 50	No concern
	Fluopicolide + Propamocarb-hydrochloride	-	1100 a)	>1425 b)	<0.8	≤ 3000	No concern

a) Instead of the MAF, the number of applications was used as a worst-case multiplicator.
b) endpoint as used prior to refinement during AIR PCH

According to the EFSA Guidance document for risk assessment for bird and mammals (2009) "*no specific calculations of exposure and TER are necessary when the ratio of effective application rate (in g/ha) to relevant endpoint (in mg/kg bw) does not exceed does not exceed 50 in the case of less sorptive substances (Koc < 500 L/kg) or 3000 in the case of more sorptive substances (Koc > 500 L/kg).*" This is the case for fluopicolide and propamocarb-hydrochloride. Therefore, the acute risk for mammals from drinking water that may contain residues from fluopicolide and fluopicolide + propamocarb-hydrochloride is acceptable.

LONG-TERM REPRODUCTIVE ASSESSMENT

EFSA GD 2009 recommends not to conduct a combined reproductive risk assessment for compounds not sharing the same mode of action (step 3). Therefore, no combined reproductive risk assessment is required for the FLC+PCH SC 687.5 in this AIR-evaluation but may be conducted post-AIR according to the respective zonal guidance.

Screening step

Table 10.1.2- 14: Screening long-term reproductive risk assessment for mammals (fluopicolide)

Crop	Indicator species	DDD				DDD	NO(A)EL [mg a.s./ kg bw/d]	TER_{LT}	Trigger
		Appl. rate [kg a.s./ha]	SV_m	MAF_m	f_{TWA}				
Potatoes 4 × 1.6 L prod./ha	Small herbivorous mammal	0.1	48.3	2.2	0.53	5.6	20	**3.6**	5
Potatoes 3 × 1.6 L prod./ha	Small herbivorous mammal	0.1	48.3	2.0	0.53	5.1	20	**3.9**	5
Potatoes 2 × 1.6 L prod./ha	Small herbivorous mammal	0.1	48.3	1.6	0.53	4.1	20	**4.9**	5
Potatoes 1 × 1.6 L prod./ha	Small herbivorous mammal	0.1	48.3	1.0	0.53	2.6	20	7.8	5
Lettuce 2 × 1.6 L prod./ha	Small herbivorous mammal	0.1	72.3	1.6	0.53	6.1	20	**3.3**	5
Lettuce 1 × 1.6 L prod./ha	Small herbivorous mammal	0.1	72.3	1.0	0.53	3.8	20	5.2	5

For the 1 × 1.6 L prod./ha application in potatoes and lettuce the TER_{LT} is above the trigger of 5. Therefore, no further risk assessment at Tier 1 is required. For the 4 × 1.6 L prod./ha, 3 × 1.6 L prod./ha and 2 × 1.6 L prod./ha applications in potatoes and for the 2 × 1.6 L prod./ha application in lettuce the TER_{LT} is below the trigger of 5. Therefore, a risk assessment at Tier 1 is required.

Tier 1

Table 10.1.2- 15: First-tier long-term reproductive risk assessment for mammals (fluopicolide)

Crop	Generic focal species	DDD				DDD	NO(A)EL [mg a.s./ kg bw/d]	TER_{LT}	Trigger
		Appl. rate [kg a.s./ha]	SV_m	MAF_m	f_{TWA}				
Potatoes BBCH 21-89 (4 × 1.6 L prod./ha)	Small herbivorous mammal "vole" BBCH ≥ 20 [a]	0.1	21.7	2.2	0.53	2.53	20	7.9	5
Potatoes BBCH 21-89 (3 × 1.6 L prod./ha)	Small herbivorous mammal "vole" BBCH ≥ 20 [a]	0.1	21.7	2.0	0.53	2.30	20	8.7	5
Potatoes BBCH 21-89 (2 × 1.6 L prod./ha)	Small herbivorous mammal "vole" BBCH ≥ 20 [a]	0.1	21.7	1.6	0.53	1.84	20	10.9	5
Leafy vegetables BBCH 41-49 (2 × 1.6 L prod./ha)	Small herbivorous mammal "vole" BBCH ≥ 40–49	0.1	72.3	1.6	0.53	6.13	20	**3.3**	5
	Large herbivorous mammal "lagomorph" All season [a]	0.1	14.3	1.6	0.53	1.21	20	16.5	5

a) Covers all other relevant generic focal species with lower shortcut values

The TER_{LT} values calculated in the long-term risk assessment exceed the a-priori-acceptability trigger of 5 for all applications in potatoes and for the scenario of the large herbivorous mammal ("lagomorph") in the 2 × 1.6 L prod./ha application in lettuce. The TER_{LT} value is below the a-priori-acceptability trigger of 5 for the scenario of small herbivorous mammals ("vole") for the 2 × 1.6 L prod./ha application in lettuce and a refined risk assessment is needed and is provided below.

Refined risk assessment for long-term exposure of mammals

A refined risk assessment is triggered for exposure of small herbivorous mammals ("vole") to fluopicolide in leafy vegetables.

However, it might be pertinent to consider that the Joint Working Group on the Guidance Document on Risk Assessment for Birds & Mammals (SANCO 10997/2009) raised the question on the "need for the vole scenario… given the resilience of the vole populations", i.e. well-known fact that voles are able to recover after large population breakdowns, or despite eradication programs with targeted rodenticide use.

The most straightforward interpretation of the data would be that the failure to meet the a-priori acceptability trigger for small herbivorous mammals is not to consider as problematic as long as the TER trigger for the other wild mammal scenarios reach the TER trigger of 5.

This is the case for the exposure to fluopicolide where all other scenarios pass the TER trigger of 5.

Refined exposure assessment for small herbivorous mammals: generic field study

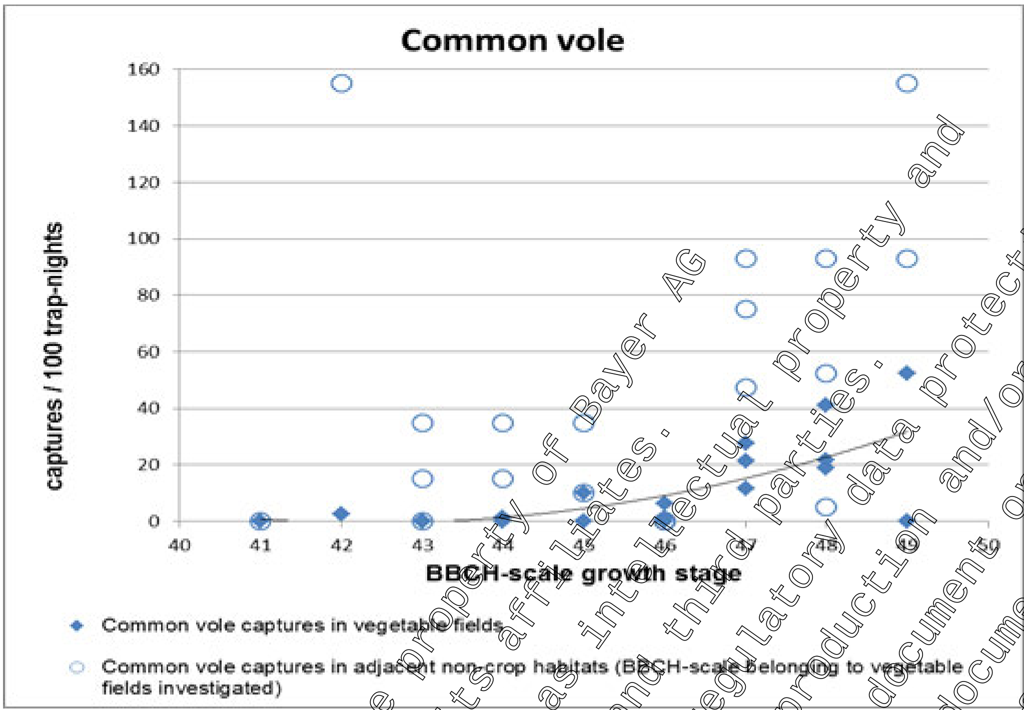
A field monitoring study in leafy vegetables ([redacted] 2013; M-449690-01-1) demonstrates that such fields are not a preferred habitat (systematically lower trapping success than in the surroundings).

Colonisation was not observed before BBCH 45, as can be seen when plotting the vole in-field abundance against the BBCH stage of the vegetable field (see figure below).

Leafy vegetables are typically harvested at BBCH stage 49. Vole populations cannot survive on post-harvest fields that lack cover and food after removal of the crop.

Thus, leafy vegetable fields serve only for a very short time as habitat for voles (i.e. from BBCH 45 to 49) and thus a lower level of protection for voles during that short time before the harvest of the crop plants may be deemed acceptable.

Common voles in fields with leafy vegetables



Refined exposure assessment for small herbivorous mammals: residue decline

Finally, the DT_{50} of fluopicolide in plant foliage is shorter than the default DT_{50} of 10 days employed in the Tier 1 risk assessment.

Based on residue decline trials conducted with fluopicolide in young cereals (as surrogate for the diet of voles; please refer to CP 10.1.2.2), a geometric mean DT_{50} can be proposed for refined risk assessment on small herbivorous mammals as triggered for leafy vegetables (please refer to CP 10.1.2.2 for the derivation of the geometric mean DT_{50} value in M-687818-01-1).

Replacing the generic DT_{50} of 10 days that was employed in the lower Tier assessments by the compound-specific DT_{50} of 4.9 days, a MAF = 1.372 and a 21d-f_{TWA} = 0.444 can be calculated with the moving-time window TWA calculator TREC (Weyers et al. 2019) for 2 × 0.1 kg/ha with a 7d interval.

Fluopicolide residue decline and residue TWA/max for 21 days

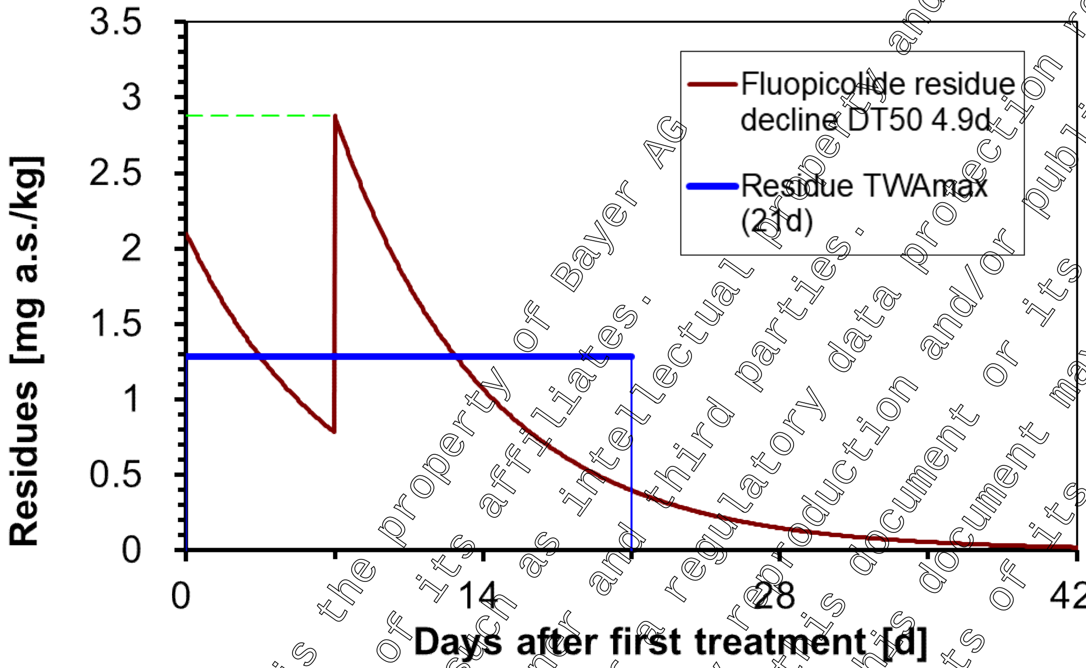


Table 10.1.2- 16: Refined long-term reproductive risk assessment for voles (fluopicolide)

Crop	Generic focal species	DDD				DDD	NO(A)EL [mg a.s./ kg bw/d]	TER$_{LT}$	Trigger
		Appl. rate [kg a.s./ha]	SV$_m$	MAF$_m$	f$_{TWA}$				
Leafy vegetables BBCH 41-49 (2 × 1.6 L prod./ha)	Small herbivorous mammal "vole" BBCH 40–49	0.1	72.3	1.372	0.444	4.404	20	**4.54**	5

Conclusions from the refined exposure assessment for small herbivorous mammals

Lettuce fields are of low relevance for the long-term sustainability of vole populations, because they are less attractive than the surroundings, and are only colonized during a very short time window between BBCH 45 and BBCH 49. Latest at BBCH 49, the lettuce is harvested and the vegetation cover is set back to the status of basically bare soil (where voles were found not to use the lettuce fields, due to the lack of cover).

The TER for that part of the vole population that is using lettuce fields, and for that time window between BBCH 45 and 49, is 4.54 when considering the decline of the fluopicolide residues.

Furthermore, this TER is calculated with the NOAEL of 20 mg/kg bw/d from the rabbit developmental toxicity study. The evaluation of the toxicological profile of fluopicolide clearly shows that the susceptibility of rodents (i.e. the taxon comprising the voles as well as the tested species rat and mouse) is much lower than that of rabbits (i.e. the taxon which provided the NOAEL employed here). Therefore, the level of protection provided for voles is very high when using the endpoint from the rabbit.

Taking these factors together with the known resilience of vole populations it can be concluded that the TER of 4.54 for the small part of the vole population that may be exposed over a short period of time in lettuce fields is sufficiently high and acceptable at the local population level.

Long-term risk assessment for mammals drinking contaminated water from puddles

Table 10.1.2- 17: Evaluation of potential concern for exposure of mammals from drinking water (escape clause)

Crop	Compound	K_{oc} [L/kg]	AR_{eff} (Appl. rate × MAF) [g a.s./ha]	NO(A)EL [mg a.s./ kg bw/d]	Ratio (AR_{eff} / NO(A)EL)	"Escape clause" No concern if ratio	Conclusion
Potatoes (4 × 1.6 L prod./ha)	Fluopicolide	267.7	400 a)	20	20	≤ 50	No concern
Potatoes (3 × 1.6 L prod./ha)	Fluopicolide	267.7	300 a)	20	15	≤ 50	No concern
Potatoes and lettuce (2 × 1.6 L prod./ha)	Fluopicolide	267.7	200 a)	20	10	≤ 50	No concern
Potatoes and lettuce (1 × 1.6 L prod./ha)	Fluopicolide	267.7	100 a)	20	5	≤ 50	No concern

a) Instead of the MAF, the number of applications was used as a worst-case multiplicator.

According to the EFSA Guidance document for risk assessment for bird and mammals (2009) "*no specific calculations of exposure and TER are necessary when the ratio of effective application rate (in g/ha) to relevant endpoint (in mg/kg bw) does not exceed does not exceed 50 in the case of less sorptive substances (Koc < 500 L/kg) or 3000 in the case of more sorptive substances (Koc > 500 L/kg).*" This is the case for fluopicolide. Therefore, the acute risk for mammals from drinking water that may contain residues from fluopicolide is acceptable.

RISK ASSESSMENT OF SECONDARY POISONING

According to the EFSA Guidance Document on Risk Assessment for Birds and Mammals (2009), substances with a log $P_{OW} \geq 3$ have potential for bioaccumulation and should be assessed for the risk of biomagnification in aquatic and terrestrial food chains.

The log P_{OW} value of fluopicolide is 2.9. Since the log P_{OW} does not exceed the trigger value of 3, fluopicolide is deemed to have a negligible potential to bioaccumulate in animal tissues. No formal risk assessment for secondary poisoning is therefore required.

RISK ASSESSMENT FOR PLANT METABOLITES

A worst case, screening level risk assessment for herbivorous mammals exposure to plant metabolites can be based on the maximum RUDs determined by [redacted] 2020 (M-686445-01-1, 10.1.1.2/01) for M-01, M-02, M-04 and M-05 in foliage sampled during the course of field residue or rotational crop studies. For that screening level risk assessment, the maximum MAF for the uses under assessment is set to be 4 (number of applications), and no deposition factor is applied. The FIR/bw represents a small herbivorous mammal eating only contaminated foliage at a rate of 1.33 times its own bodyweight each day. The toxicity endpoint is set at one tenth of the reproductive risk assessment

endpoint for the parent, except for M-01 where the NOAEL of the rat reproduction study with this metabolite is used.

Thus this screening level assessment combines all possible worst case elements in a risk-envelope. If needed, more realistic and crop-/use – specific input parameters can be included.

Table 10.1.2- 18: Risk envelope assessment for plant metabolites (mammals)

Compound	GFS	FIR/bw	PD	RUD_{max}	AR	MAF	f_{TWA}	f_{DEP}	DDD	NOAEL	TER
M-01	Vole	1.33	100% foliage	1.174	0.1	4	0.53	1	0.33	7.50	22.7
M-02	Vole	1.33	100% foliage	0.498	0.1	4	0.53	1	0.14	2.00	14.2
M-04	Vole	1.33	100% foliage	0.090	0.1	4	0.53	1	0.03	2.00	78.8
M-05	Vole	1.33	100% foliage	0.200	0.1	4	0.53	1	0.06	2.00	33.5

CP 10.1.2.1 Acute oral toxicity to mammals

The result from the acute study with the formulated product FLC+PCH SC 687.5 confirms the predicted toxicity of > 1425 mg total a.s./kg bw calculated in Table 10.1.2-7 above.

Table 10.1.2- 19: Mammalian toxicity data of the formulated product FLC+PCH SC 687.5

Test substance	Risk assessment	Species	Endpoint	Reference
FLC+PCH SC 687.5	Acute	Rat	LD_{50} > 2000 mg prod./kg bw (> 1554 mg total a.s./kg bw) [a)]	[redacted] 2004; M-220883-02-1 KCA 7.1.1/01

a) Based on a total a.s. content of 77.7% w/w (FLC: 62.5 g/L, Propamocarb: 625 g/L, product density: 1.13 g/cm³)

CP 10.1.2.2 Higher tier data on mammals

Data Point:	KCP 10.1.2.2/01
Report Author:	[redacted]
Report Year:	2013
Report Title:	Voles in fields with leafy vegetables
Report No:	[redacted]
Document No:	M-449690-01-1
Guideline(s) followed in study:	Commission Directive 96/46EC of 16 July 1996 amending Council Directive 91/414/EEC Concerning the Placing of Plant Protection Compounds on the Market
Deviations from current test guideline:	Not applicable
Previous evaluation:	No, not previously submitted for Propamocarb in RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

According to the EFSA GD on risk assessment for birds and wild mammals, exposure of small herbivorous mammals on fields cropped with leafy vegetables should be considered from growth stage BBCH 40 upwards.
This field study was conducted in order to generate information on the occurrence of Common voles (*Microtus arvalis*) on arable fields cropped with leafy vegetables (lettuce, cabbages) which could be used in more realistic, refined risk assessments.
The findings of the study support the thesis that vegetable fields are no primary habitat for voles.

I. MATERIAL AND METHODS:

The study site selection for the main study was based on the results of pre-trappings (non-GLP) conducted during spring at 9 candidate sites in Germany and one site in the Netherlands. This pre-trapping was conducted in suitable vole prime habitats in the vicinity of vegetable fields, in order to ensure the presence of a source population with the potential for colonisation of the vegetable fields. Only sites where Common voles were identified during spring were selected for the main study.
Based on the results of this pre-trapping, the main study was conducted in 5 different regions of Germany: Gäuboden (Lower Bavaria): 5 sites; Rhineland (North Rhine-Westphalia): 6 sites; Filder (Württemberg): 3 sites; Heilbronner Becken (Württemberg) 3 sites and Dithmarschen (Schleswig-Holstein): 3 sites.
During the main study trapping was conducted during summer, at a time when the vole population development in the source habitats could have induced colonisation of adjacent secondary habitats like the vegetable fields.
In the second year of the study, additional surveys were conducted in late spring in order to complement the information also for vegetable fields in earlier development stages.

Altogether 20 fields with different types of leafy vegetables and different growth stages (BBCH-scale) were studied.

As a standard, 40 Ugglan life traps were placed inside each field. In order to confirm the presence of voles in the landscape, and to estimate their density in potential source habitats, traps were also placed outside the fields in optimal vole habitats in the surrounding up to 500 m distance ("control" traps).

It was originally intended to complement each study field (40 traps) with one "control" with 20 traps each. However, in some areas one set of control traps was able to cover more than one plot. The number of control traps was enlarged for Dithmarschen (32 traps to cover all three sites with one control); for Filder only 14 traps were available as a common control for all plots. In the Heilbronn area some traps were destroyed during the 2^{nd} trapping. This was considered when calculating the trapping rate.

The trapping was carried out on each field or control for two consecutive nights. Species, sex, weight and reproductive state of voles captured were recorded. The traps were equipped with oat flakes as bait.

Dates

Experimental Starting Date: 2011-07-26
Experimental Completion Date: 2012-06-04

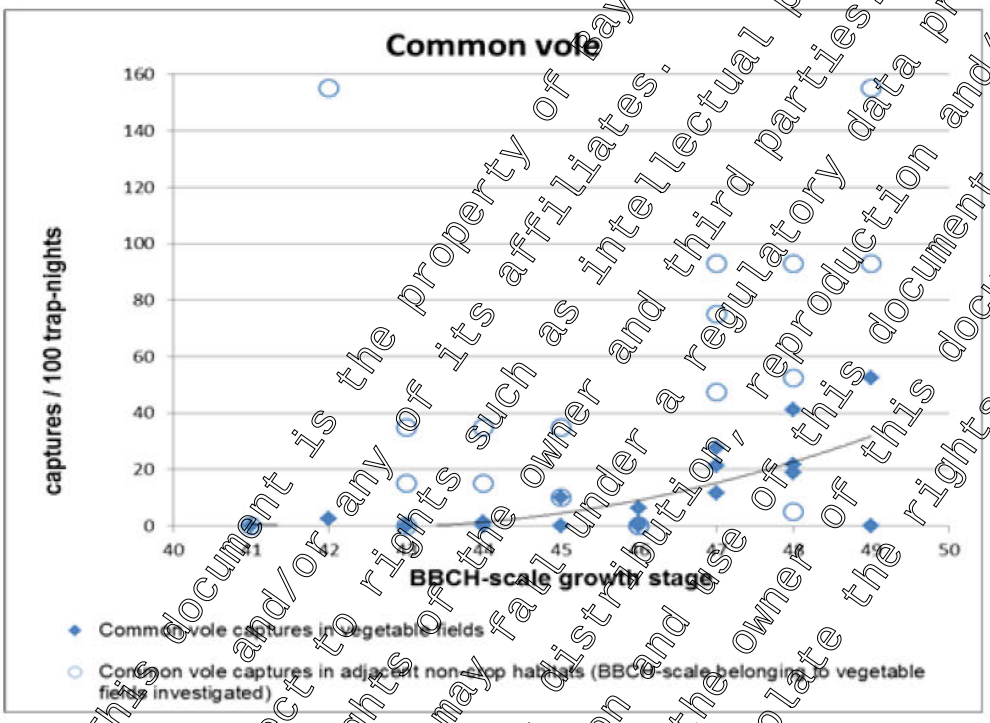
II. RESULTS AND DISCUSSION:

In total, 348 Common voles (*Microtus arvalis*) trappings were recorded over 2045 trap nights. Overall the trapping success in the fields was 10.6 voles/100 trap nights compared to 36.8 voles/100 trap nights in the surroundings ("controls").

Additional to Common voles, other species were trapped on the fields (mainly Wood mice *Apodemus sylvaticus*) or the surroundings (mainly bank voles *Myodes glareolus*). Other species trapped included Yellow-necked mice (Apodemus flavicollis) and Field vole *(Microtus agrestis)*.

Typically, voles were trapped early and more frequently in the surroundings than in the field. However, at later stages or in regions with a vole calamity, voles were also observed within the vegetable fields. Plotting the vole in-field abundance against the BBCH stage of the vegetable field suggests that colonisation is typically not observed before BBCH 45, and secondary to population development in the off-field habitat.

Common voles in fields with leafy vegetables



III. Conclusions:

This finding demonstrates that vegetable fields are no primary habitat for voles. The grassy surroundings serve as base habitat from which vole may migrate to the fields, if the population density increases.

Assessment and conclusion by applicant:

The study is reliable, and the findings demonstrates that vegetable fields are no primary habitat for voles. Colonization of the fields was not found until BBCH 45, shortly before the crop is harvested (BBCH 49). Vole populations cannot survive on post-harvest fields that lack cover and food after removal of the crop.

Data Point:	KCP 10.1.2.2/02
Report Author:	[redacted]
Report Year:	2011
Report Title:	Determination of the residues of deltamethrin and fluopicolide in/on Barley and Barley, spring after spraying of fluopicolide & fosetyl-Al WG 71 and Decis EC 025 in the field in Spain, Germany, Belgium and United Kingdom
Report No:	10-2120
Document No:	M-408272-01-1
Guideline(s) followed in study:	EU-Ref: Council Directive 91/414/EEC of July 15, 1991, Annex II, part A, section 6 and Annex III, part A, section 8 Residues in or on Treated Products, Food and Feed EC guidance working document 7029/VI/95 rev. 5 (1997-07-22)
Deviations from current test guideline:	Not applicable
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

An open field study with four residue trials was conducted in northern Europe (Germany, Belgium and United Kingdom) and southern Europe (Spain) on barley, during the 2010 season. One application of 'Fluopicolide + Fosety-Al WG 71' (a product containing 4.44 % of fluopicolide and 66.67% of fosetyl-Al) and Decis EC 025 (a product containing 25 g/L deltamethrin) was made at a target rate of 0.13 kg a.s. / ha (for fluopicolide). Only the parameters and results relevant to fluopicolide have been reported within this study summary.

The residues of fluopicolide after spray application of the "Fluopicolide + Fosetyl-Al WG 71" on barley barley green material declined markedly during the sampling period. No residues above 0.01 mg/kg for the metabolites M-01 or M-02 were found in / on the green material samples.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test Item: Fluopicolide + Fosetyl-Al WG 71 (4.44% w/w of fluopicolide)
   Batch no.: EV36001110
   Active Ingredient / Purity: Not stated in the report
   Storage: Not stated in the report
   Expiry date: March 2013

2. Test commodity: Barley / spring barley
   Crop part: Green material

B. STUDY DESIGN AND METHODS

1. Test Procedure

The purpose of the study 10-2120 was to determine the magnitude of the relevant residues of fluopicolide in/on barley / spring barley (green material) after one spray application with "Fluopicolide + Fosetyl-Al WG 71", a WG formulation containing 4.44% w/w fluopicolide. This summary focuses only on the residues of fluopicolide.

Field phase

The study included four supervised residue trials conducted in northern Europe (Germany Belgium and the United Kingdom) and southern Europe (Spain) during the 2010 season.

Description of the trial locations and cropping information on treated plots

Trial number	10-2120-01	10-2120-02	10-2120-03	10-2120-04
Trial location	E-08520 Llerona – Les Franqueses del Vallès	D-51399 Burscheid	B-6221 Saint-Amand	CB22 – Little Shelford
Country	Spain	Germany	Belgium	United Kingdom
Area of application	Field	Field	Field	Field
Plot size [m^2]	80	144	45	108
Type of soil	Loam	Sandy loam	Silty loam	Sandy loam
pH-value of soil (in water)	8	6.5	7.9	8.3
Content of organic C [%]	2.7	1	1.6	1.3
Test system	Barley	Spring barley	Spring barley	Spring barley
Variety	Graphic	Quench	Henley	Tipple
Date of sowing	2010-01-03	2010-04-06	2010-03-14	2010-03-10
Date of commercial harvest	2010-06-20 to 2010-07-10	2010-08-01 to 2010-08-15	2010-07-15 to 2010-07-28	2010-08-05 to 2010-08-15

The actual application data are presented in the following table. This data reflects the intended application scheme, or, if minor deviations occurred, these were within the acceptable range:

Application summary of Fluopicolide + Fosetyl-Al WG 71 on barley / spring barley

Trial no. Country	Appl. No.	Plot	Formulation	Appl. mode	Growth stage (BBCH code)	DBH PHI (days)	Test item rate (kg/ha)	Water rate (L/ha)	a.s.	Appl. rate (g a.s./ha)
10-2120-01 Spain	1	T	Fluopicolide + Fosetyl-Al WG 71	SPI	32	-	3.0	600	FLC	0.13
									Fosetyl-AL	2
10-2120-02 Germany	1	T	Fluopicolide + Fosetyl-Al WG 71	SPI	30	-	3.0	300	FLC	0.13
									Fosetyl-AL	2
10-2120-03 Belgium	1	T	Fluopicolide + Fosetyl-Al WG 71	SPI	30	-	3.0	600	FLC	0.13
									Fosetyl-AL	2

Trial no. Country	Appl. No.	Plot	Formulation	Appl. mode	Growth stage (BBCH code)	DBH PHI (days)	Test item rate (kg/ha)	Water rate (L/ha)	a.s.	Appl. rate (g a.s./ha)
10-2120-04 UK	1	T	Fluopicolide + Fosetyl-Al WG 71	SPI	30	-	3.0	200	FLC	0.13
									Fosetyl-AL	2

a.s.: Active substance DBH: Days before harvest

Appl.: Application PHI: Pre-harvest interval

SPI: Spraying

Planned sampling schedule

Trial	Crop	Sample material	Control (C) Treated (T)	DALT
10-2120-01 10-2120-02 10-2120-03 10-2120-04	Barley or spring barley	Green material	C	-0
			T	0
				1
				2
				3
				5
				7
				10

DALT: Days after last treatment "-0": before the last application

Samples were collected in a manner designed to obtain representative samples. They were taken, prepared in the field where necessary, transported and stored according to EC guidance 7029/VI/95 rev.5 (1997-07-22).

Each sample consisted of at least 500 g of green material for samples up to 5 days after the last application and at least 1 kg of green material for samples taken more than 5 days after the last application.

2. Description of Analytical Procedures

Residues of fluopicolide and its metabolites, M-01 and M-02 were, analysed within the residue trials samples according to the following method:

Summary of the analytical method

Method	01209
Extraction	Acetone/water, acidified with formic acid (75/25/1, v/v/v), with centrifugation.
Detection	HPLC-MS/MS
LOQ	0.01 mg/kg (for fluopicolide, M-01 and M-02, in barley green material)

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4.

In order to check the performance of the method, recovery determinations were included in each set of analysis. Control samples from the study were fortified and used as the recovery samples. All the recovery determinations were performed in parallel to the analyses of control and treated samples from the study.

Recoveries were not corrected for apparent residues in the control samples used for these recoveries.

The average recoveries were generally within the acceptable range of 70 – 110%. For fluopicolide, high recoveries were noted for the 10 and 15 mg/kg fortification levels (139 and 144 %, respectively). These results are considered to be acceptable, as they maximise the residue levels, therefore the results from the treated samples would be potentially overestimated, rather than underestimated.

Procedural recoveries for Fluopicolide (AE C638206)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Barley or spring barley green material	0.01	74, 84, 85	81	7.5	0.01
	0.1	76, 80, 83, 86, 93	84	7.7	
	10	139*	139	-	
	15	144	144	-	
		Overall recovery (n=10)	**94**	**26.9**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with fluopicolide, determined as fluopicolide and calculated as fluopicolide

* Recovery was performed on barley. All the other recoveries were performed on spring barley. The results at the 10 and 15 mg/kg fortification levels are higher than the results for the other recovery levels. As they maximise the residue levels, they are considered to be acceptable to support the data generation phase.

Procedural recoveries for M-01 (AE C653711)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Barley or spring barley green material	0.01	73, 75, 76	75	2.0	0.01
	0.1	77, 79, 80, 81, 82	80	2.4	
	10	93*	93	-	
	15	105	105	-	
		Overall recovery (n=3)	**82**	**11.9**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with AE C653711, determined as AE C653711 and calculated as AE C653711

* Recovery was performed on barley. All the other recoveries were performed on spring barley.

Procedural recoveries for M-02 (AE C657188)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Barley or spring barley green material	0.01	66, 72, 74	71	5.9	0.01
	0.1	76, 77, 79, 83, 87	80	5.7	
	10	81*	81	-	
	15	84	84	-	
		Overall recovery (n=10)	**78**	**8.0**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with AE C657188, determined as AE C657188 and calculated as AE C657188

* Recovery was performed on barley. All the other recoveries were performed on spring barley.

3. Storage stability:

The storage period of deep-frozen samples (at -18°C or below) for fluopicolide and its metabolites (M-01 and M-02) ranged between 213 and 311 days.

Acceptable storage stability data are available (presented under point M-CA 6.1) which demonstrate the stability of fluopicolide and its metabolites (M-01 and M-02) when stored in high water matrices (at -18°C or below) for up to 30 months. These available data are sufficient to support the storage period between sampling and extraction.

Regarding the interval between extraction and analysis, the samples used for the procedural recovery determination were prepared at the same time as the field samples and they were analysed as part of the same analytical phase. Based on the acceptable procedural recoveries obtained, it can be concluded that the residues of fluopicolide and its metabolites (M-01 and M-02) were stable within the sample extract solutions.

II. RESULTS AND DISCUSSION

No residues above the LOQ were found in the control samples. Results were not corrected for concurrent recoveries. For fluopicolide and its metabolites (M-01 and M-02), the residues levels in / on barley / spring barley green material are summarised in the following table.

Residue summary of fluopicolide, M-01 and M-02 in/on barley green material

Trial No. Country	Sample material	DALT	Residues [mg/kg] a.s. Fluopicolide		
			Fluopicolide	M-01	M-02
10-2120-01 Spain	Green material	0	6.6	< 0.01	< 0.01
	Green material	1	6.6	< 0.01	< 0.01
	Green material	2	4.6	< 0.01	< 0.01
	Green material	3	2.4	< 0.01	< 0.01
	Green material	5	2.8	< 0.01	< 0.01
	Green material	6	2.7	< 0.01	< 0.01
	Green material	10	1.9	< 0.01	< 0.01
10-2120-02 Germany	Green material	0	8.3	< 0.01	< 0.01
	Green material	1	7.8	< 0.01	< 0.01
	Green material	2	7.0	< 0.01	< 0.01
	Green material	3	6.2	< 0.01	< 0.01
	Green material	5	3.9	< 0.01	< 0.01
	Green material	7	2.7	< 0.01	< 0.01
	Green material	10	0.60	< 0.01	< 0.01
10-2120-03 Belgium	Green material	0	6.4	< 0.01	< 0.01
	Green material	1	6.8	< 0.01	< 0.01
	Green material	2	5.2	< 0.01	< 0.01
	Green material	3	5.7	< 0.01	< 0.01
	Green material	5	3.6	< 0.01	< 0.01
	Green material	7	2.6	< 0.01	< 0.01
	Green material	10	0.88	< 0.01	< 0.01

Trial No. Country	Sample material	DALT	Residues [mg/kg]		
			a.s. Fluopicolide		
			Fluopicolide	M-01	M-02
10-2120-04 UK	Green material	0	13	< 0.01	< 0.01
	Green material	1	11	< 0.01	< 0.01
	Green material	2	9.9	< 0.01	< 0.01
	Green material	3	9.4	< 0.01	< 0.01
	Green material	5	7.1	< 0.01	< 0.01
	Green material	7	4.2	< 0.01	< 0.01
	Green material	9	3.5	< 0.01	< 0.01

DALT = Days after last treatment a.s. = Active substance

Climatic conditions and time course of residue concentrations in/on barley green material

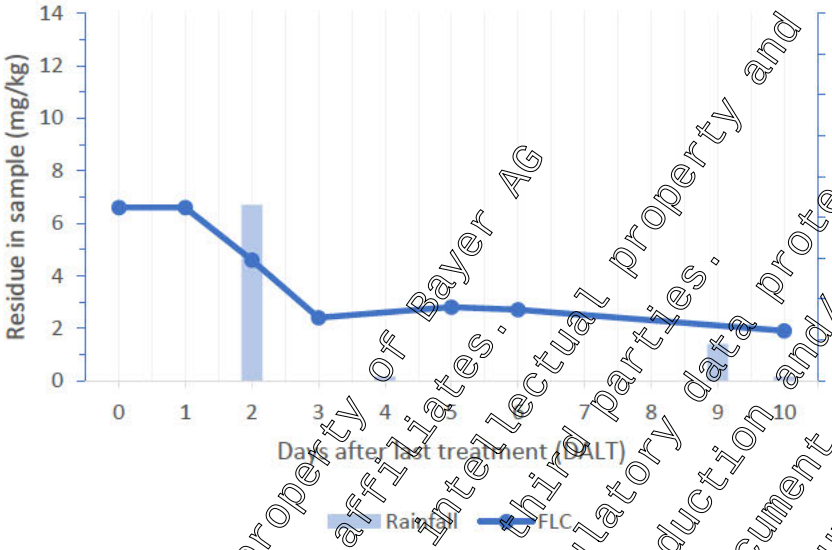
Climatic data recording was not conducted according to GLP.

Trial No.: 10-2120-01
Origin of Data: Weather station, Paret del Valles (10 km away)
Trial Location: E-08520 Llerona – Les Franqueses del Valles

Date/Period of Time (dd/mm/yyyy)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
10/04/2010	0	Treatment, Sampling	14.1	0	6.6
11/04/2010	1	Sampling	14.9	0	6.6
12/04/2010	2	Sampling	10.5	4.3	4.6
13/04/2010	3	Sampling	10.2	0	2.4
14/04/2010	4	-	10.8	0.1	-
15/04/2010	5	Sampling	11.8	0	2.8
16/04/2010	6	Sampling	13.2	0	2.7
17/04/2010	7	-	12.6	0	-
18/04/2010	8	-	13.1	0	-
19/04/2010	9	-	14.3	0.9	-
20/04/2010	10	Sampling	15.6	0.1	1.9

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the barley green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

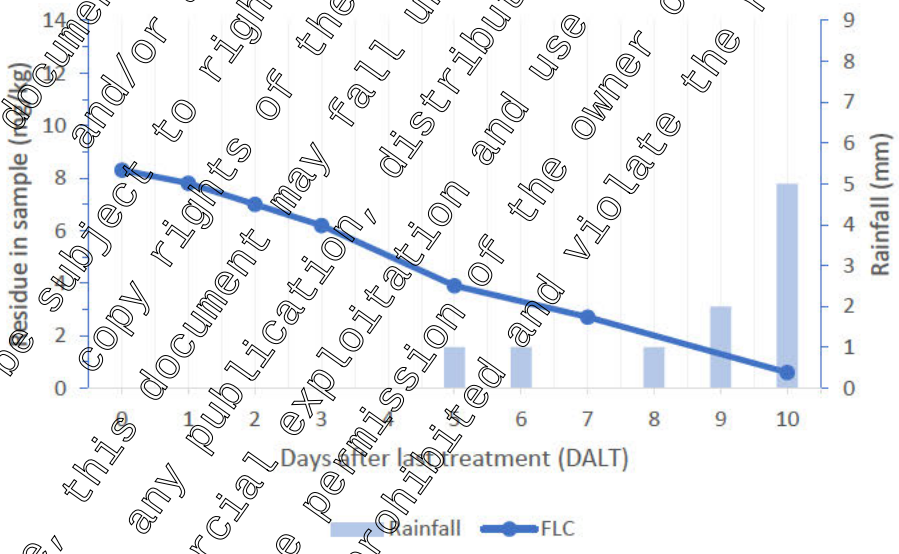
The results show rainfall (4.3 mm) during day 2 and a marked decrease between day 1 and day 3 in the residue levels for fluopicolide. This decline may be partly due to wash off, however the decline was similar over the day before and over the day after the rainfall. Rainfall at day 9 (0.9 mm) and day 10 (0.1 mm) does not appear to have a significant impact on the residue levels.

Trial No.: 10-2120-02
Origin of Data: Weather station, Versuchsgut Höfchen at the test plot
Trial Location: D-51399 Burscheid

Date/Period of Time (dd/mm/yyyy)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
01/06/2010	0	Treatment, Sampling	14	0	8.3
02/06/2010	1	Sampling	16	0	7.8
03/06/2010	2	Sampling	18	0	7.0
04/06/2010	3	Sampling	19	0	6.1
05/06/2010	4	-	21	0	-
06/06/2010	5	Sampling	21	1	3.9
07/06/2010	6	-	17	1	-
08/06/2010	7	Sampling	18	0	2.7
09/06/2010	8	-	20	1	-
10/06/2010	9	-	20	2	-
11/06/2010	10	Sampling	20	5	0.60

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the barley green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

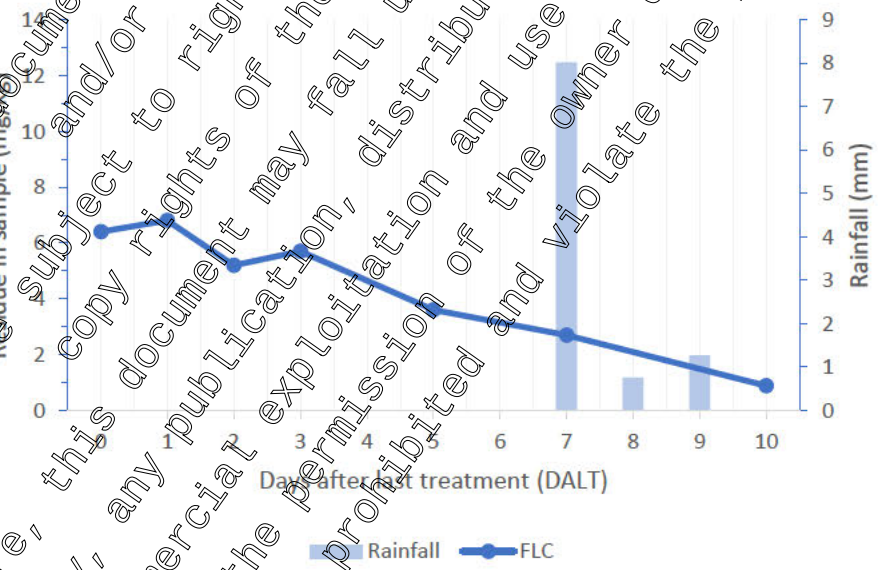
The residue levels generally decline over the 10-day period. Rainfall begins at day 5 (1 mm). Rainfall does not appear to have a significant impact on the residue levels.

Trial No.: 10-2120-03
Origin of Data: Weather station - Redebel (0.5 km away)
Trial Location: B-6221 Saint-Amand

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
2010/05/04	0	Treatment, Sampling	7.3	0	6.4
2010/05/05	1	Sampling	6.9	0	6.8
2010/05/06	2	Sampling	8.0	0	5.2
2010/05/07	3	Sampling	7.8	0	5.7
2010/05/08	4		9.3	0	-
2010/05/09	5	Sampling	9.2	0	3.6
2010/05/10	6		9.2	0	-
2010/05/11	7	Sampling	5.5	8.02	2.7
2010/05/12	8		9.4	0.75	-
2010/05/13	9		6.9	1.27	-
2010/05/14	10	Sampling	8.2	0	0.88

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the barley green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

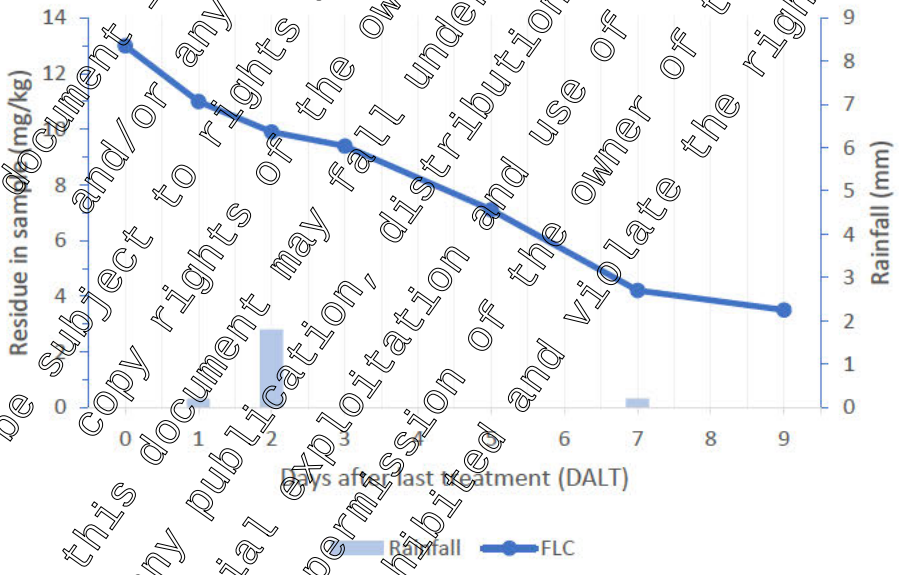
The residue levels generally decline over the 10-day period. Rainfall begins at day 7 (8.02 mm). Rainfall does not appear to have a significant impact on the residue levels.

Trial No.: 10-2120-04
Origin of Data: Weather station, Little Shelford (0.5 km away)
Trial Location: CB22 - Little Shelford

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
17/06/2010	0	Treatment, Sampling	13.9	0.0	13
18/06/2010	1	Sampling	11.0	0.2	11
19/06/2010	2	Sampling	9.2	1.8	9.9
20/06/2010	3	Sampling	12.9	0.0	9.4
21/06/2010	4	-	15.9	0.0	-
22/06/2010	5	Sampling	19.3	0.0	7.1
23/06/2010	6	-	19.0	0.0	-
24/06/2010	7	Sampling	18.0	0.2	4.2
25/06/2010	8	-	18.1	0.0	-
26/06/2010	9	Sampling	17.9	0.0	3.5

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the barley green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

The residue levels generally decline over the 10-day period. Rainfall occurs at days 1 (0.2 mm), 2 (1.8 mm) and 7 (0.2 mm). The rainfall does not appear to significantly impact the residue decline.

III. CONCLUSION

The residues of fluopicolide after spray application of the "Fluopicolide + Fosetyl-Al WG 71" on barley / spring barley green material declined markedly during the sampling period. No residues above 0.01 mg/kg for the metabolites M-0 or M-02 were found in / on the green material samples.

Assessment and conclusion by applicant:

The study is acceptable. Positive residues were found for fluopicolide in barley green material, which markedly declined over the test period. No residues above the LOQ (0.01 mg/kg) were found for BAM (M-01) and M-02.

Data Point:	KCP 10.1.2.2/03
Report Author:	[redacted]
Report Year:	2020
Report Title:	Determination of the residues of fluopicolide and propamocarb hydrochloride in/on wheat/spring after spray application of Fluopicolide & Propamocarb-hydrochloride SC 687.5 in Germany, the Netherlands and Belgium
Report No:	18-2950
Document No:	M-686559-01-1
Guideline(s) followed in study:	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market OECD Guideline for the Testing of Chemicals on Crop Field Trial (TG 509 published in September 2009) US EPA OCSPP 860.1500: Crop Field Trial
Deviations from current test guideline:	Not applicable
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

An open-field study with 4 residue trials was conducted in northern Europe (Germany, Belgium and The Netherlands) on spring wheat, during the 2018 season. One application of "SC 687.5" (a product containing 62.5 g/L fluopicolide and 625 g/L propamocarb hydrochloride) was made at a target rate of 0.10 kg a.s. / ha (for fluopicolide). Only the parameters and results relevant to fluopicolide have been reported within this study summary.

The residues of fluopicolide, M-01 and M-02 after spray application of the "SC 687.5'" on spring wheat green material declined markedly during the sampling period.

I. MATERIALS AND METHODS

A. MATERIALS

1.	Test Item:	SC 687.5
	Batch no.:	EM4L023437
	Active Ingredient / Purity:	Not stated in the report
	Storage:	Not stated in the report
	Expiry date:	March 2021
2.	Test commodity:	Spring wheat
	Crop part:	Green material

B. STUDY DESIGN AND METHODS

1. Test Procedure

The purpose of the study 18-2950 was to determine the magnitude of the relevant residues of fluopicolide in/on wheat (green material) after one spray application with "SC 687.5" (a product containing 62.5 g/L fluopicolide). This summary focuses only on the residues of fluopicolide.

Field phase

The study included four supervised residue trials conducted in northern Europe (Germany Belgium and the Netherlands) during the 2018 season.

Description of the trial locations and cropping information on treated plots

Trial number	18-2950-01	18-2950-02	18-2950-03	18-2950-04
Trial location	51399 Burscheid	49377 Vechta, OT Dendrup	1681 ND Zwaagdijk	6211 Mellet
Country	Germany	Germany	The Netherlands	Belgium
Area of application	Field	Field	Field	Field
Plot size [m²]	144	125	180	65
Type of soil	Sandy Loam	Sandy silt	Clay	Silty loam
pH-value of soil (in water)	-	-	7.1	7.1
Content of organic C [%]	1.05	1.98	3.43	2.15
Test system	Spring wheat	Spring wheat	Spring wheat	Spring wheat
Variety	Tybalt	Tybalt A	Nobless	Mistral
Date of sowing (yyyy/mm/dd)	2018-04-09	2018-04-12	2018-04-13	2018-03-21
Date of commercial harvest	2018-07-31 to 2018-08-31	2018-08-10 to 2018-08-20	2018-07-18 to 2018-08-01	2018-08-07 to 2018-08-15

The actual application data are presented in the following table. This data reflects the intended application scheme, or, if minor deviations occurred, these were within the acceptable range:

Application summary of SC 687.5 on spring wheat

Trial no. Country	Appl. No.	Plot	Formulation	Appl. mode	Growth stage (BBCH code)	DBH PHI (days)	Test item rate (L/ha)	Water rate (L/ha)	a.s.	Appl. rate (kg a.s./ha)
18-2950-01 Germany	1	T	SC 687.5	SPI	30	-	1.56	294	FLC	0.0975
18-2950-02 Germany	1	T	SC 687.5	SPI	30	-	1.60	301	FLC	0.100
18-2950-03 Netherlands	1	T	SC 687.5	SPI	30	-	1.67	261	FLC	0.104
18-2950-04 Belgium	1	T	SC 687.5	SPI	30	-	1.6	250	FLC	0.100

a.s.: Active substance
Appl.: Application
SPI: Spraying
DBH: Days before harvest
PHI: Pre-harvest interval

Planned sampling schedule

Trial	Crop	Sample material	Control (C) Treated (T)	DALT
18-2950-01 18-2950-02 18-2950-03 18-2950-04	Spring wheat	Green material	C	-0
			T	0
				1
				2
				3
				5
				7
				10

DALT: Days after last treatment "-0": before the last application

Samples were collected in a manner designed to obtain representative samples. They were taken, prepared in the field where necessary, transported and stored according to EC guidance 7029/VI/95 rev.5 (1997-07-22).

Each sample consisted of at least 500 g of green material for samples up to 5 days after the last application and at least 1 kg of green material for samples taken more than 5 days after the last application.

2. Description of Analytical Procedures

Residues of fluopicolide and its metabolites, M-01 and M-02 were, analysed within the residue trials samples according to the following method:

Summary of the analytical method

Method	01209/M001
Extraction	Acetone/water, acidified with formic acid (75/25/1, v/v/v), with centrifugation.
Detection	HPLC-MS/MS
LOQ	0.01 mg/kg (for fluopicolide, M-01 and M-02, in cereal green material)

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4.

In order to check the performance of the method, recovery determinations were included in each set of analysis. Control samples from the study were fortified and used as the recovery samples. All the recovery determinations were performed in parallel to the analyses of control and treated samples from the study.

Recoveries were not corrected for apparent residues in the control samples used for these recoveries.

The average recoveries were within the acceptable range of 70 – 110 %.

Procedural recoveries for Fluopicolide (AE C638206)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Spring wheat / green material	0.01	97; 104; 106; 106; 112	105	5.1	0.01
	0.10	94; 96; 97; 97; 103; 107	99	5.0	
	5.0	82; 86; 87; 90; 96	88	5.9	
		Overall recovery (n=16)	**98**	**8.7**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with fluopicolide, determined as fluopicolide and calculated as fluopicolide

Procedural recoveries for M-01 (AE C653711)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Spring wheat / green material	0.01	91; 95; 97; 98; 100	96	3.6	0.01
	0.10	77; 90; 92; 92; 93; 97	90	7.6	
	5.0	88; 93; 93; 94; 96	93	3.2	
		Overall recovery (n=16)	**93**	**5.7**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with AE C653711, determined as AE C653711 and calculated as AE C653711

Procedural recoveries for M-02 (AE C657188)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Spring wheat / green material	0.01	94; 95; 96; 96; 102	97	3.2	0.01
	0.10	92; 94; 98; 99; 101	97	3.8	
	5.0	84; 85; 85; 89; 91	87	3.5	
		Overall recovery (n=15)	**93**	**6.1**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with AE C657188, determined as AE C657188 and calculated as AE C657188

3. Storage stability:

The storage period of deep-frozen samples (at -18°C or below) for fluopicolide and its metabolites (M-01 and M-02) ranged between 245 and 338 days.

Acceptable storage stability data are available (presented under point M-CA 6.1) which demonstrate the stability of fluopicolide and its metabolites (M-01 and M-02) when stored in high water matrices (at -18°C or below) for up to 30 months. These available data are sufficient to support the storage period between sampling and extraction.

Regarding the interval between extraction and analysis, the samples used for the procedural recovery determination were prepared at the same time as the field samples and they were analysed as part of the same analytical phase. Based on the acceptable procedural recoveries obtained, it can be concluded that the residues of fluopicolide and its metabolites (M-01 and M-02) were stable within the sample extract solutions.

II. RESULTS AND DISCUSSION

No residues above the LOQ were found in the control samples. Results were not corrected for concurrent recoveries. For fluopicolide and its metabolites (M-01 and M-02), the residues levels in / on spring wheat green material are summarised in the following table.

Residue summary of fluopicolide, M-01 and M-02 in/on wheat green material

Trial No. Country	Sample material	Growth stage BBCH	DALT	Residues [mg/kg] a.s. Fluopicolide		
				Fluopicolide	M-01	M-02
18-2950-01 Germany	Green material	30	0	2.4	< 0.01	< 0.01
	Green material	30	1	1.6	< 0.01	< 0.01
	Green material	30	2	0.67	< 0.01	< 0.01
	Green material	30	3	0.86	< 0.01	< 0.01
	Green material	31	5	0.76	< 0.01	< 0.01
	Green material	31	7	0.50	< 0.01	< 0.01
	Green material	32	10	0.30	< 0.01	< 0.01
18-2950-02 Germany	Green material	30	0	3.4	< 0.01	< 0.01
	Green material	30	1	2.5	< 0.01	< 0.01
	Green material	30	2	2.4	< 0.01	< 0.01
	Green material	30	3	2.1	< 0.01	< 0.01
	Green material	30	6	1.3	< 0.01	< 0.01
	Green material	30	7	1.2	< 0.01	< 0.01
	Green material	31	10	0.78	< 0.01	< 0.01
18-2950-03 The Netherlands	Green material	30	0	4.2*	0.048*	0.024
	Green material	30	1	3.6	0.085	0.024
	Green material	30	2	1.6	0.030	0.019
	Green material	30	3	1.4	0.022	0.012
	Green material	31	5	0.69	0.015	0.013
	Green material	31	7	0.81	0.011	0.012
	Green material	32	10	0.53	0.019	0.011

Trial No. Country	Sample material	Growth stage BBCH	DALT	Residues [mg/kg] a.s. Fluopicolide		
				Fluopicolide	M-01	M-02
18-2950-04 Belgium	Green material	30	0	5.7	< 0.01	< 0.01
	Green material	30	1	4.5*	< 0.01	< 0.01
	Green material	30	2	3.9*	< 0.01	< 0.01
	Green material	31	3	3.5*	< 0.01	0.011
	Green material	31	6	2.2	< 0.01	< 0.01
	Green material	32	7	1.8	< 0.01	0.012
	Green material	32	10	1.3	< 0.01	< 0.01

DALT = Days after last treatment a.s. = Active substance
* Mean value, this sample has been extracted and analysed multiple times

Climatic conditions and time course of residue concentrations in/on wheat green material

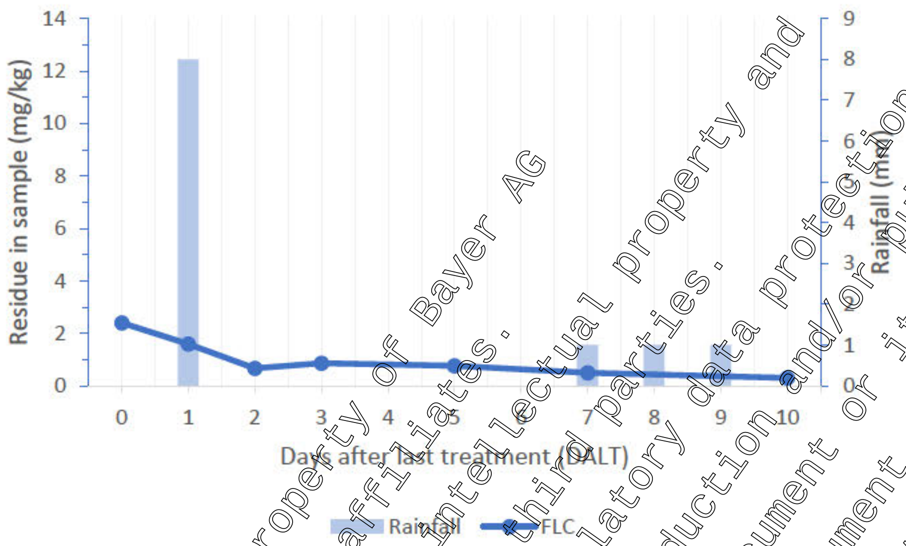
Climatic data recording was not conducted according to GLP.

Trial No.: 18-2950-01
Origin of Data: Weather station, [redacted] (at trial location)
Trial Location: [redacted] (Germany)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
2018-05-15	0	Treatment, Sampling	19	0	2.4
2018-05-16	1	Sampling	16	8	1.6
2018-05-17	2	Sampling	12	0	0.67
2018-05-18	3	Sampling	11	0	0.86
2018-05-19	4	-	13	0	-
2018-05-20	5	Sampling	14	0	0.76
2018-05-21	6	-	20	0	-
2018-05-22	7	Sampling	18	1	0.50
2018-05-23	8	-	18	1	-
2018-05-24	9	-	19	1	-
2018-05-25	10	Sampling	20	0	0.30

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

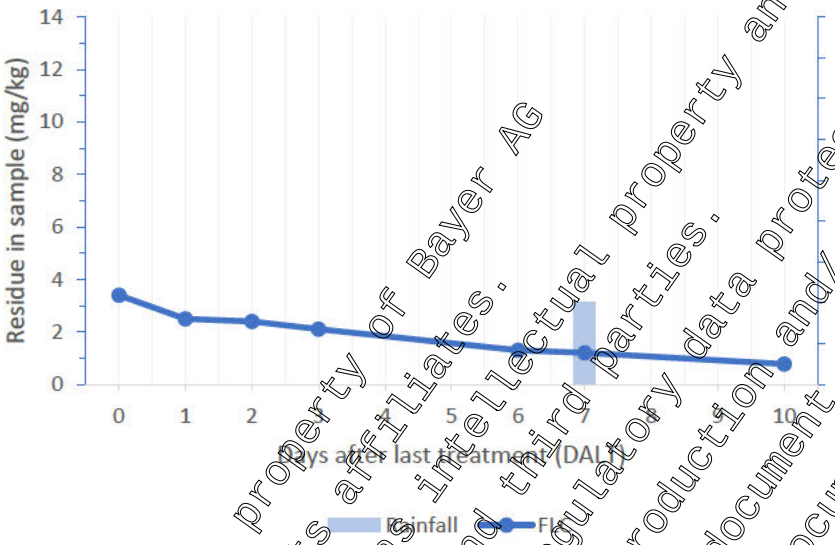
The results show rainfall (8 mm) during day 1 and a marked decline between day 1 and day 3 in the residue levels for fluopicolide. This decline may be partly due to wash off, however the decline was similar over the day before the rainfall and over the day after the rainfall. The residue levels generally decline thereafter. Rainfall at days 7 - 9 (1 mm rainfall for each day) did not appear to have a significant impact on the residue levels.

Trial No.: 18-2950-02
Origin of Data: Weather station, Vechta Langförden (1.4 km away)
Trial Location: 49377 Vechta, OT Deindrup (Germany)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
2018-05-16	0	Treatment, Sampling	17	0	3.4
2018-05-17	1	Sampling	11	0	2.5
2018-05-18	2	Sampling	12	0	2.4
2018-05-19	3	Sampling	13	0	2.1
2018-05-20	4	-	18	0	-
2018-05-21	5	-	19	0	-
2018-05-22	6	Sampling	19	0	1.3
2018-05-23	7	Sampling	21	2	1.2
2018-05-24	8	-	21	0	-
2018-05-25	9	-	22	0	-
2018-05-26	10	Sampling	23	0	0.78

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



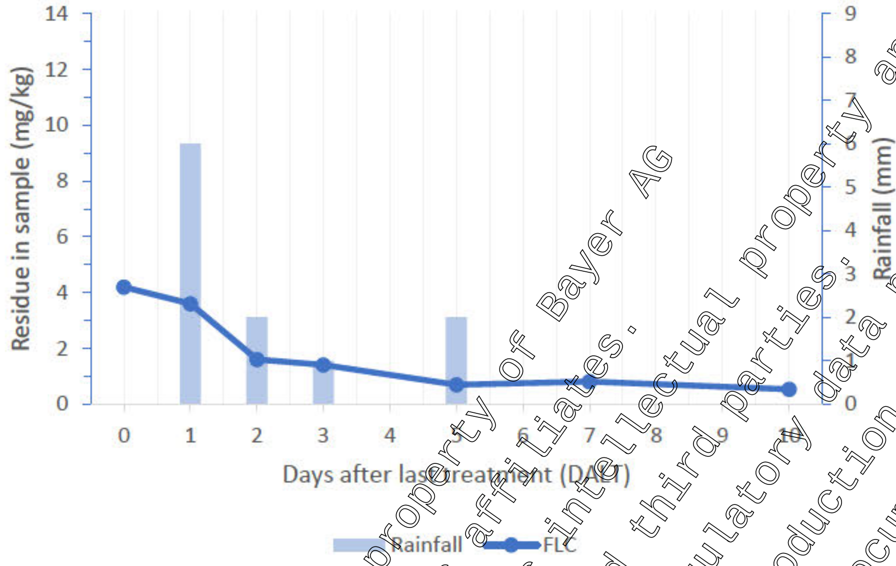
As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.
The residue levels generally decline over the 10-day period. Rainfall occurs at day 7 (2 mm), but does not appear to have a significant impact on the residue levels.

Trial No.: 18-2950-03
Origin of Data: Weather station, Proeftuin Zwaagdijk (0.2 km away)
Trial Location: 1681 ND Zwaagdijk (The Netherlands)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue [mg/kg]		
					FLC	M-01	M-02
2018-05-28	0	Treatment, Sampling	22	0	4.2	0.048	0.024
2018-05-29	1	Sampling	21	6	3.6	0.085	0.024
2018-05-30	2	Sampling	21	2	1.6	0.030	0.019
2018-05-31	3	Sampling	21	1	1.4	0.022	0.012
2018-06-01	4	-	18	0	-	-	-
2018-06-02	5	Sampling	15	2	0.69	0.015	0.013
2018-06-03	6	-	18	0	-	-	-
2018-06-04	7	Sampling	16	0	0.81	0.011	0.012
2018-06-05	8	-	16	0	-	-	-
2018-06-06	9	-	17	0	-	-	-
2018-06-07	10	Sampling	21	0	0.53	0.019	0.011

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at significant levels compared to fluopicolide, these metabolites were not included within the above plot.

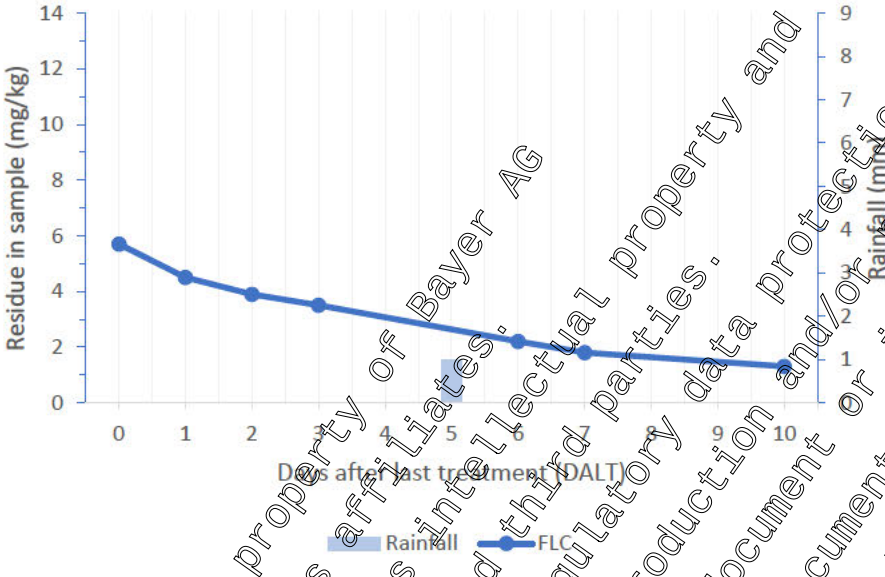
The results show rainfall during day 1 (6 mm), day 2 (2 mm) and day 3 with a marked decrease in the residue levels for fluopicolide within the green material samples over this time. This may be partly due to wash off, however the rainfall on day 5 (2 mm) was not associated with a residue decline.

Trial No.: 18-2950-04
Origin of Data: Weather station, Redebel (2,3 km away)
Trial Location: 6211 Mellet (Belgium)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue [mg/kg]		
					FLC	M-01	M-02
2018-05-08	0	Treatment, Sampling	20	0	5.7	< 0.01	< 0.01
2018-05-09	1	Sampling	18	0	4.5	< 0.01	< 0.01
2018-05-10	2	Sampling	13	0	3.9	< 0.01	< 0.01
2018-05-11	3	Sampling	13	0	3.5	< 0.01	0.011
2018-05-12	4	-	17	0	-	-	-
2018-05-13	5	Sampling	12	1	-	-	-
2018-05-14	6	-	13	0	2.2	< 0.01	< 0.01
2018-05-15	7	Sampling	16	0	1.8	< 0.01	0.012
2018-05-16	8	-	16	0	-	-	-
2018-05-17	9	-	12	0	-	-	-
2018-05-18	10	Sampling	11	0	1.3	< 0.01	< 0.01

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at significant levels compared to fluopicolide, these metabolites were not included within the above plot.

The residue levels generally decline over the 10-day period. Rainfall occurs at day 5 (1 mm), but does not appear to have a significant impact on the residue levels.

III. CONCLUSION

The residues of fluopicolide, M-01 and M-02 after spray application of SC 687.5 on spring wheat green material declined markedly during the sampling period.

Assessment and conclusion by applicant:

The study is acceptable. Positive residues were found for fluopicolide, M-01 and M-02 in wheat green material, which markedly declined over the test period.

Data Point:	KCP 10.1.2.2/04
Report Author:	[redacted]
Report Year:	2020
Report Title:	Determination of the residues of fluopicolide and propamocarb hydrochloride in/on wheat and durum wheat after spray application of fluopicolide & propamocarb-hydrochloride SC 687.5 in Southern France, Italy, Spain and Greece
Report No:	18-2955
Document No:	M-686561-01-1
Guideline(s) followed in study:	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market OECD Guideline for the Testing of Chemicals on Crop Field Trial (TG 509 published in September 2009) US EPA OCSPP 860.1500, Crop Field Trial
Deviations from current test guideline:	Not applicable
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

An open-field study with four residue trials was conducted in southern Europe (south France, Italy, Spain and Greece) on wheat and durum wheat, during the 2018 season. One application of “SC 687.5” (a product containing 62.5 g/L fluopicolide and 625 g/L propamocarb hydrochloride) was made at a target rate of 0.10 kg a.s. / ha (for fluopicolide). Only the parameters and results relevant to fluopicolide have been reported within this study summary.

The residues of fluopicolide after spray application of the “SC 687.5” on wheat and durum wheat green material declined markedly during the sampling period. No significant residues for the metabolites M-01 or M-02 were found in / on the green material samples (i.e. <0.02 mg/kg).

I. MATERIALS AND METHODS

A. MATERIALS

1.	Test Item:	SC 687.5
	Batch no.:	EM4L023437
	Active Ingredient / Purity:	Not stated in the report
	Storage:	Not stated in the report
	Expiry date:	March 2021
2.	Test commodity:	Wheat / durum wheat
	Crop part:	Green material

B. STUDY DESIGN AND METHODS

1. Test Procedure

The purpose of the study 18-2955 was to determine the magnitude of the relevant residues of fluopicolide in/on wheat (green material) after one spray application with "SC 687.5" (a product containing 62.5 g/L fluopicolide). This summary focuses only on the residues of fluopicolide.

Field phase

The study included four supervised residue trials conducted in southern Europe (south France, Italy, Spain and Greece) during the 2018 season.

Description of the trial locations and cropping information on treated plots

Trial number	18-2955-01	18-2955-02	18-2955-03	18-2955-04
Trial location	84840 Lapalud	20090 Settala	18128 Zafarraya	GR 50200, Anatoliko Kozani
Country	France	Italy	Spain	Greece
Area of application	Field	Field	Field	Field
Plot size [m^2]	120	60	90	270
Type of soil	Clayey loam	Silty loam	Loam	Clay
pH-value of soil (in water)	8.3	7.2	7.8	7.1
Content of organic C [%]	2.04	1.45	1.73	1.86
Test system	Wheat	Wheat	Wheat	Wheat, durum
Variety	Oregrain, winter wheat	Illico, winter soft wheat (aestivum)	Marius, soft wheat	Bronde, Triticum durum
Date of sowing	2017-12-07	2017-10-18	2017-11-15	2017-12-20
Date of commercial harvest	2018-07-04 to 2018-07-07	*	*	2018-06-30 to 2018-07-10

* Remark: Last sampling before flowering

The actual application data are presented in the following table. This data reflects the intended application scheme, or, if minor deviations occurred, these were within the acceptable range:

Application summary of SC 687.5 on wheat and durum wheat

Trial no. Country	Appl. No.	Plot	Formulation	Appl. mode	Growth stage (BBCH code)	DBH PHI (days)	Test item rate (kg/ha)	Water rate (L/ha)	a.s.	Appl. rate (g a.s./ha)
18-2955-01 Southern France	1	T	SC 687.5	SPI	30	-	1.62	204	FLC	0.101
18-2955-02 Italy	1	T	SC 687.5	SPI	30	-	1.63	203	FLC	0.102
18-2955-03 Spain	1	T	SC 687.5	SPI	30	-	1.61	227	FLC	0.101
18-2955-04 Greece	1	T	SC 687.5	SPI	30	-	1.59	199	FLC	0.099

a.s.: Active substance DBH: Days before harvest
Appl.: Application PHI: Pre-harvest interval
SPI: Spraying

Planned sampling schedule

Trial	Crop	Sample material	Control (C) Treated (T)	DALT
18-2955-01 18-2955-02 18-2955-03 18-2955-04	Wheat and durum wheat	Green material	C	-0
			T	0
				1
				2
				3
				5
				7
				10

DALT: Days after last treatment "-0": before the last application

Samples were collected in a manner designed to obtain representative samples. They were taken, prepared in the field where necessary, transported and stored according to EC guidance 7029/VI/95 rev.5 (1997-07-22).

Each sample consisted of at least 500 g of green material for samples up to 5 days after the last application and at least 1 kg of green material for samples taken more than 5 days after the last application.

2. Description of Analytical Procedures

Residues of fluopicolide and its metabolites, M-01 and M-02 were, analysed within the residue trials samples according to the following method:

Summary of the analytical method

Method	01209/M001
Extraction	Acetone/water, acidified with formic acid (75/25/1, v/v/v), with centrifugation.
Detection	HPLC-MS/MS
LOQ	0.01 mg/kg (for fluopicolide, M-01 and M-02, in cereal green material)

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4.

In order to check the performance of the method, recovery determinations were included in each set of analysis. Control samples from the study were fortified and used as the recovery samples. All the recovery determinations were performed in parallel to the analyses of control and treated samples from the study.

Recoveries were not corrected for apparent residues in the control samples used for these recoveries.

The average recoveries were within the acceptable range of 70 – 110 %.

Procedural recoveries for Fluopicolide (AE C638206)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Wheat / green material	0.01	97; 115; 115	109	9.5	0.01
	0.10	83; 90; 91; 92; 95; 97	91	5.3	
	5.0	92	-	-	
	10	96	-	-	
		Overall recovery (n=11)	**97**	**10.3**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with fluopicolide, determined as fluopicolide and calculated as fluopicolide

Procedural recoveries for M-01 (AE C653711)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Wheat / green material	0.01	73; 82; 85	80	7.8	0.01
	0.10	72; 75; 82; 87; 94; 100	85	12.8	
	5.0	92	-	-	
		Overall recovery (n=10)	**84**	**11.1**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with AE C653711, determined as AE C653711 and calculated as AE C653711

Procedural recoveries for M-02 (AE C657188)

Sample matrix	Fortification level (mg/kg)	Recovery values (%)	Mean recovery value (%)	RSD (%)	LOQ (mg/kg)
Wheat / green material	0.01	97; 101; 109	102	6.0	0.01
	0.10	80; 80; 80; 82; 82	81	1.4	
	5.0	77	-	-	
		Overall recovery (n=9)	**88**	**13.2**	

RSD = Relative standard deviation, LOQ = Practical limit of quantification

Fortified with AE C657188, determined as AE C657188 and calculated as AE C657188

3. Storage stability:

The storage period of deep-frozen samples (at -18°C or below) for fluopicolide and its metabolites (M-01 and M-02) ranged between 342 and 379 days.

Acceptable storage stability data are available (presented under point M-CA 6.1) which demonstrate the stability of fluopicolide and its metabolites (M-01 and M-02) when stored in high water matrices (at -18°C or below) for up to 30 months. These available data are sufficient to support the storage period between sampling and extraction.

Regarding the interval between extraction and analysis, the samples used for the procedural recovery determination were prepared at the same time as the field samples and they were analysed as part of the same analytical phase. Based on the acceptable procedural recoveries obtained, it can be concluded that the residues of fluopicolide and its metabolites (M-01 and M-02) were stable within the sample extract solutions.

II. RESULTS AND DISCUSSION

No residues above the LOQ were found in the control samples. Results were not corrected for concurrent recoveries. For fluopicolide and its metabolites (M-01 and M-02), the residues levels in / on wheat barley green material are summarised in the following table.

Residue summary of fluopicolide, M-01 and M-02 in/on wheat green material

Trial No. Country	Sample material	Growth stage BBCH	DALT	Residues [mg/kg] a.s. Fluopicolide		
				Fluopicolide	**M-01**	**M-02**
18-2955-01 Southern France	Green material	30	0	3.4	< 0.01	< 0.01
	Green material	30	1	3.4	< 0.01	< 0.01
	Green material	30	2	2.7	< 0.01	< 0.01
	Green material	30	3	2.4	< 0.01	< 0.01
	Green material	30	5	2.5	< 0.01	< 0.01
	Green material	30	7	1.7	< 0.01	< 0.01
	Green material	30	9	1.7	< 0.01	< 0.01
18-2955-02 Italy	Green material	30	0	1.7	< 0.01	< 0.01
	Green material	30	1	1.5	< 0.01	< 0.01
	Green material	30	2	1.9	< 0.01	< 0.01
	Green material	31	3	1.7	< 0.01	< 0.01
	Green material	31	4	1.1	< 0.01	< 0.01
	Green material	32	7	0.85	< 0.01	< 0.01
	Green material	33	10	0.72	< 0.01	< 0.01
18-2955-03 Spain	Green material	30	0	1.3*	< 0.01	< 0.01
	Green material	30	1	1.5*	< 0.01	< 0.01
	Green material	30	2	2.8*	< 0.01	< 0.01
	Green material	30	3	2.1	< 0.01	< 0.01
	Green material	31	6	1.5	< 0.01	< 0.01
	Green material	31	8	0.53	< 0.01	< 0.01
	Green material	31	10	0.18	< 0.01	< 0.01
18-2955-04 Greece	Green material	30	0	6.0*	< 0.01	0.012
	Green material	30	1	6.8*	< 0.01	0.010
	Green material	30	2	4.2	< 0.01	0.012
	Green material	30	3	3.4	< 0.01	< 0.01
	Green material	31	4	3.0	< 0.01	< 0.01
	Green material	31	7	3.0	< 0.01	0.017
	Green material	32	9	2.4	< 0.01	0.018

DALT = Days after last treatment a.s. = Active substance

* Mean value, this sample has been extracted and analysed multiple times

<u>Climatic conditions and time course of residue concentrations in/on wheat green material</u>

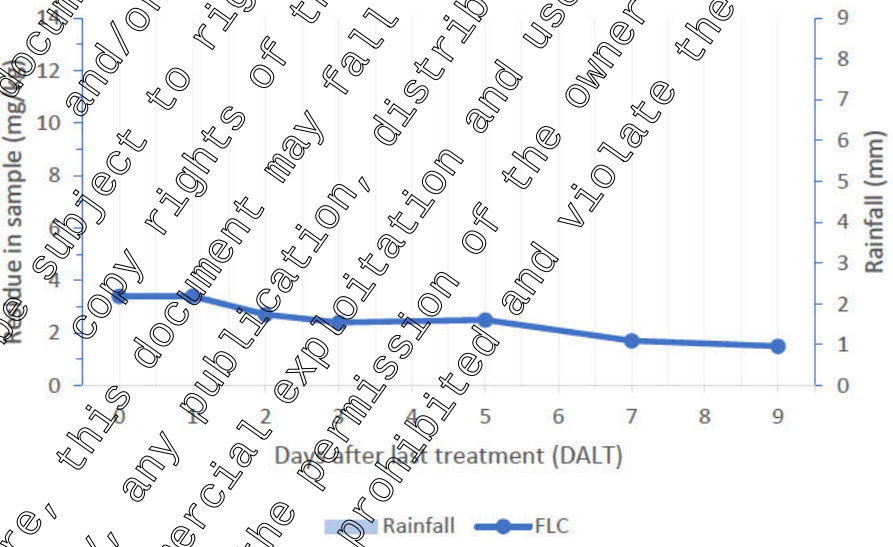
Climatic data recording was not conducted according to GLP.

Trial No.: 18-2955-01
Origin of Data: 30760 Saint Julien de Peyrolas (9.3 km away)
Trial Location: 84840 Lapalud (France)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
2018-04-17	0	treatment, sampling	17.5	0.0 (2018-04-18, 11:03)	3.4
2018-04-18	1	sampling	18.0		3.4
2018-04-19	2	sampling	17.5	0.0 (2018-04-19, 08:45)	2.7
2018-04-20	3	sampling	18.5	0.0 (2018-04-20, 08:50)	2.4
2018-04-21	4	-	19.0	0.0	-
2018-04-22	5	sampling	18.0	(2018-04-22, 17:45)	2.5
2018-04-23	6	-	18.0	0.0	
2018-04-24	7	sampling	19.5	(2018-04-24, 07:50)	1.7
2018-04-25	8	-	19.5	0.0	-
2018-04-26	9	sampling	18.0	(2018-04-26, 12:50)	1.5

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

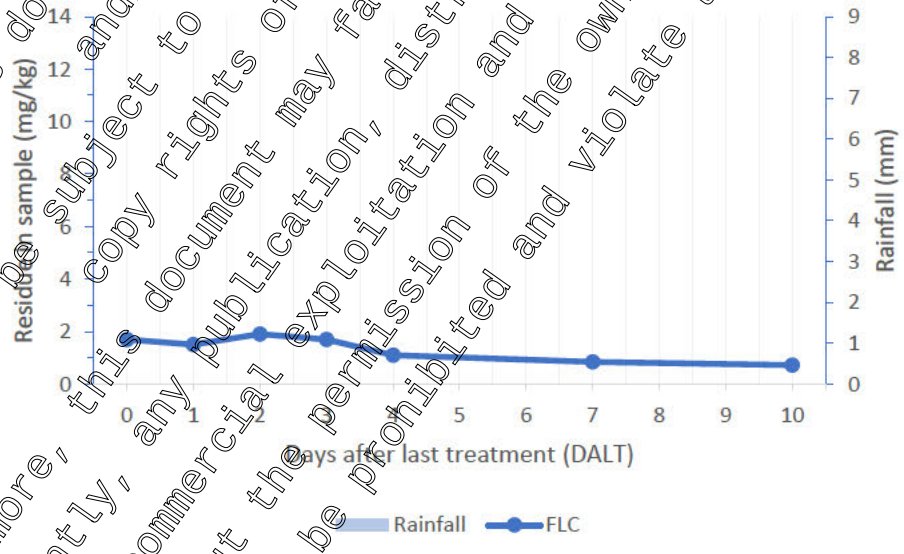
No rainfall occurred during the period of the test. Residues of fluopicolide within the green material sample declined over the 10-day test period.

Trial No.: 18-2955-02
Origin of Data: 20090 Rodano (5 km away)
Trial Location: 20090 Settala (Italy)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
2018-04-16	0	Treatment, sampling	18.2	0.0 (2018-04-17, 12:05)	1.7
2018-04-17	1	sampling	21.7		1.5
2018-04-18	2	sampling	22.5	0.0 (2018-04-18, 16:00)	1.9
2018-04-19	3	sampling	22.0	0.0 (2018-04-19, 14:25)	1.7
2018-04-20	4	sampling	23.5	0.0 (2018-04-20, 11:30)	1.1
2018-04-21	5	-	24.4	0.0 (2018-04-23, 14:15)	-
2018-04-22	6	-	24.0		-
2018-04-23	7	sampling	20.6		0.85
2018-04-24	8	-	23.3	0.0 (2018-04-26, 12:15)	-
2018-04-25	9	-	23.5		-
2018-04-26	10	sampling	23.3		0.72

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

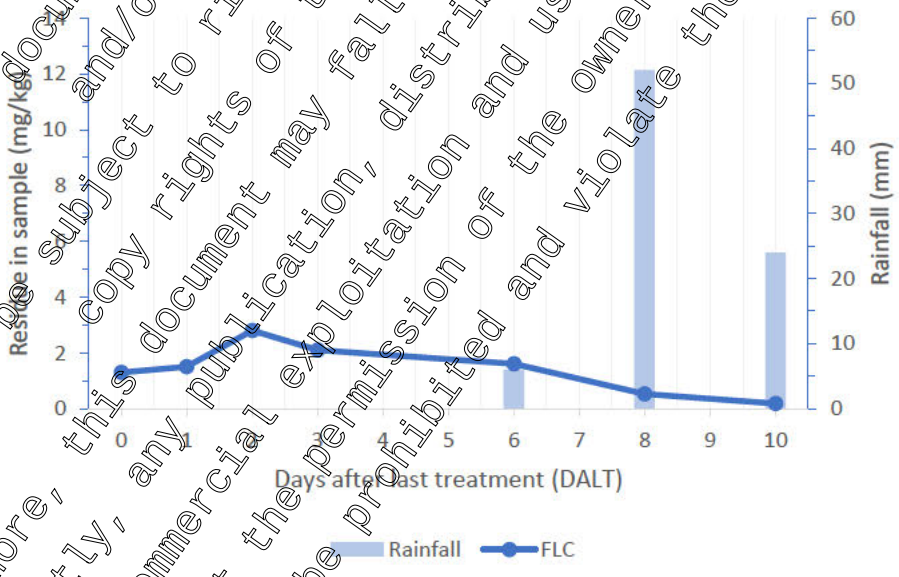
No rainfall occurred during the period of the test. Residues of fluopicolide within the green material sample declined over the 10-day test period.

Trial No.: 18-2955-03
Origin of Data: 18128 Zafarraya (3.9 km away)
Trial Location: 18128 Zafarraya, Spain

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue (FLC) [mg/kg]
2018-04-03	0	Treatment, Sampling	11.0	0.0	1.3
2018-04-04	1	Sampling	10.3	(2018-04-04 11:50)	1.5
2018-04-05	2	Sampling	10.7	0.0 (2018-04-05, 12:00)	2.8
2018-04-06	3	Sampling	13.4	0.0 (2018-04-06, 12:05)	2.1
2018-04-07	4	-	7.8	6	-
2018-04-08	5	-	7.3	(2018-04-09, 12:31)	-
2018-04-09	6	Sampling	6.2		1.6
2018-04-10	7	-	6.0	52	
2018-04-11	8	Sampling	5.5	(2018-04-11, 11:50)	0.53
2018-04-12	9	-	5.7	24	-
2018-04-13	10	Sampling	4.2	(2018-04-13, 12:20)	0.18

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at levels above the LOQ (0.01 mg/kg), these metabolites were not included within the above plot.

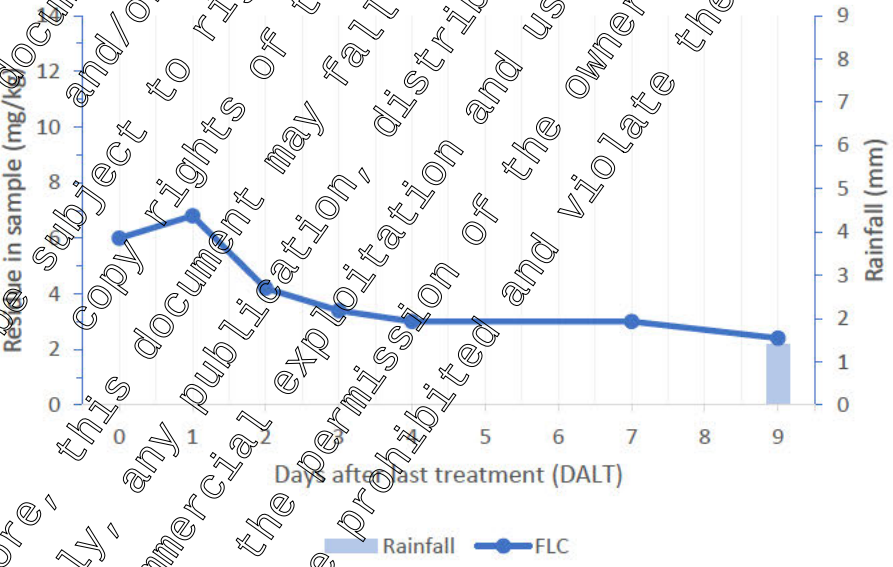
The residue levels slightly increase from day 0 to day 2, but the fluopicolide residues generally decline over the rest of the 10-day period. Rainfall occurs at days 6 (6 mm), 7 (52 mm) and 10 (24 mm). The pronounced rainfall during the later timepoints does not appear to have a significant impact on the residue levels.

Trial No.: 18-2955-04
Origin of Data: Ptolemaida (8 km away)
Trial Location: GR 50200 Anatoliko, Kozani (Greece)

Date/Period of Time (yyyy/mm/dd)	DALT	Activity	Mean Temp. [°C]	Rainfall [mm]	Residue [mg/kg]		
					FLC	M-01	M-02
2018-04-11	0	Treatment, Sampling	12.6	0.0 (2018-04-12, 12:36)	6.0	< 0.01	0.012
2018-04-12	1	Sampling	13.8		6.8	< 0.01	0.010
2018-04-13	2	Sampling	14.7	0.0 (2018-04-13, 13:45)	4.2	< 0.01	0.012
2018-04-14	3	Sampling	16.1	0.0 (2018-04-14, 09:21)	3.4	< 0.01	< 0.01
2018-04-15	4	-	15.6	0.0 (2018-04-15, 10:45)	-	-	-
2018-04-16	5	Sampling	12.5		3.0	< 0.01	< 0.01
2018-04-17	6	-	13.9	0.0 (2018-04-18, 12:09)	-	-	
2018-04-18	7	Sampling	14.9		3.0	< 0.01	0.017
2018-04-19	8	-	13.5	1.4 (2018-04-20, 13:10)	-	-	-
2018-04-20	9	Sampling	15.4		2.4	< 0.01	0.018

Irrigation during sampling period: No irrigation done.

Plot of the fluopicolide (FLC) residues decline with corresponding rainfall, in the days following treatment to the wheat green material



As M-01 and M-02 residues were not detected within the green material samples at significant levels compared to fluopicolide, these metabolites were not included within the above plot.

The residue levels slightly increase from day 0 to day 1 and decline afterwards. Rainfall does not appear to have a significant impact on the residue levels.

III. CONCLUSION

The residues of fluopicolide, M-01 and M-02 after spray application of SC 687.5 on wheat green material declined markedly during the sampling period.

Assessment and conclusion by applicant:
The study is acceptable. Positive residues were found for fluopicolide, M-01 and M-02 in wheat green material, which markedly declined over the test period.

Data Point:	KCP 10.1.2.2/05
Report Author:	[redacted]
Report Year:	2020
Report Title:	Fluopicolide (FLC): Kinetic evaluation of residue dissipation after application in or on cereals
Report No:	VC/19/041M
Document No:	M-687818-01-1
Guideline(s) followed in study:	not applicable
Deviations from current test guideline:	Not applicable
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	No, not conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

This statement provides a kinetic evaluation of the residue decline of fluopicolide in young cereals that may represent food items for leaf-eating herbivorous birds or mammals.

Fluopicolide has been analysed in 3 crop residue decline studies with 4 trials each ([redacted] 2011: 10-2120-01 to -04 (M-408272-01-1); [redacted] 2020: 18-2950-01 to -04 (M-686559-01-1; [redacted] 2020: 18-2955-01 to -04 (M-686561-01-1)). Additional trials (8) conducted in studies E19RP087 and E19RP102 are also evaluated for sake of completeness, although final reports for these studies are not yet available, so that the kinetic analysis was conducted with pre-QA residue results.

The model fits as well as the statistical evaluation of the results were carried out with the software KinGUI, version 2.1.

Acceptable fits were obtained for 17 trials, with an overall geometric mean DT_{50} of 4.9 days.

I. Material and Methods:

The residue decline data reported for fluopicolide in 20 field trials were submitted to kinetic evaluation. The model fit as well as the statistical evaluation of the results was carried out with KinGUI version 2.1 (Meyer and Witt 2014). In this software the fitting algorithms as well as the statistical evaluation of the results is implemented on the basis of the statistical computing language R (http://www.r-project.org/index.html). For the optimisation the implemented algorithm Iteratively Reweighted Nonlinear Least Squares (IRLS) was used.
For all additional calculations a Microsoft EXCEL spreadsheet was used.

The visual fit and distribution of residuals were the principal criteria for deciding if a particular kinetic fit is appropriate or not. However, even moderately good fits can have quite high χ^2 test values (*i.e.*, > 15 %).
It should be remembered that data points beyond the DT_{90} point have much less weight than those before. Hence, the fit to a long, low tail is not as important as the fit to the first part of the curve to the DT_{90} point.
Parameter uncertainty should be tested but only becomes more relevant when model predictions are made beyond the conditions of the experiment from which the parameter was derived. This was not the case here because typically most of the residues had dissipated within the experimental period of 10 days. If a parameter is not considered reliable, reasons for the uncertainty should be examined (t-test alone is not sufficient to judge acceptability or non-acceptability, it is more of a guide). The acceptability of a fit should then be decided case by case, taking into account the reason for the uncertainty, the effect of a parameter on the endpoint, and the use of the endpoint (*e.g.*, will it be used individually or pooled).

FOCUS kinetics gives some further proposals on how to separate between biphasic models:
Residues at study end < 10 %: FOMC might be more appropriate.
Residues at study end > 10 %: DFOP or HS might be more appropriate.

Nevertheless, this should be considered as a proposal only, and the visual fit remains a principal decision criterion.

The evaluation workflow was always started with an SFO fit:

1. If χ^2err < 15 % and all other criteria are acceptable (visual fit, residual distribution), the SFO fit was considered acceptable and selected.
2. If χ^2err for the SFO fit was between 15 and 25 %, and all other criteria are acceptable (visual fit, residual distribution) the SFO fit was not rejected, but biphasic models FOMC, DFOP, HS were also checked. If the FOMC, DFOP or HS fit were superior over the SFO fit, the biphasic fit was selected. If there was no significant improvement with the FOMC, DFOP or HS fit, the SFO fit was selected.
3. If χ^2err > 15 % for the SFO fit and a clear failure on any other criteria (visual fit, residual distribution), the SFO fit was rejected. Biphasic models (FOMC, DFOP, HS) were checked. If a biphasic fit was acceptable it was selected. If the biphasic fits were also not acceptable, a reliable fit cannot be obtained from the data set and the trial was rejected.

II. RESULTS AND DISCUSSION:

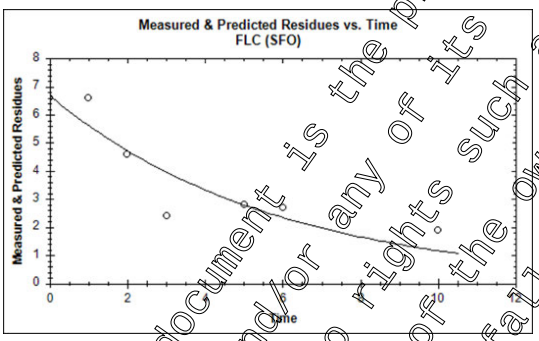
Acceptable fits were obtained for 17 trials, with an overall geometric mean DT_{50} of 4.9 days. SFO was considered acceptable for 16 trials, and for one trial the HS fit was selected. The remaining 3 trials did not allow for an acceptable fit and were rejected.

Trial, country	Model	Visual fit	χ^2err [%]	SFO: DT_{50} (d) HS: $DT_{50,fast}$ (d)	SFO: - HS: $DT_{50,slow}$' (d)	SFO: - HS: t_b (d)	$DT_{50, recalc}$ (d)
vaille10-2120-01, SP	SFO	o	15.41	3.95	-	-	3.95
10-2120-02, DE	SFO	o	9.284	4.13	-	-	4.13
10-2120-03, BE	SFO	o	11.16	4.90	-	-	4.90
10-2120-04, UK	SFO	+	4.722	4.98	-	-	4.98
18-2950-01, DE	HS	+	18.90	0.86	3.89	0.69	3.89[a]
18-2950-02, DE	SFO	+	5.244	4.72	-	-	4.72
18-2950-03, BE	SFO	o	16.02	2.00	-	-	2.00
18-2950-04, NL	SFO	+	3.258	4.46	-	-	4.46

Trial, country	Model	Visual fit	χ^2err [%]	SFO: DT_{50} (d) HS: $DT_{50,fast}$ (d)	SFO: - HS: $DT_{50,slow}$[a](d)	SFO: - HS: t_b (d)	$DT_{50,recalc}$ (d)
18-2955-01, FR	SFO	o	6.259	8.13	-	-	8.13
18-2955-02, SP	SFO	o	12.63	7.65	-	-	7.65
18-2955-03, IT	NR						
18-2955-04, GR	SFO	o	14.73	5.55	-	-	5.55
E19RP102-01	SFO	+	7.179	6.14	-	-	6.14
E19RP102-02	SFO	o	5.39	17.41	-	-	17.41
E19RP102-03	NR						
E19RP102-04	NR						
E19RP087-01	SFO	o	5.876	11.12	-	-	11.12
E19RP087-02	SFO	+	7.007	2.32	-	-	2.32
E19RP087-03	SFO	o	12.08	3.27	-	-	3.27
E19RP087-04	SFO	o	12.75	3.09	-	-	3.09
						Geometric mean	**4.9**

[a]pseudo SFO taken as $DT_{50,slow}=\ln(2)/k_2$ NR : results are not reliable

Trial 10-2120-01, SFO, visual fit:o



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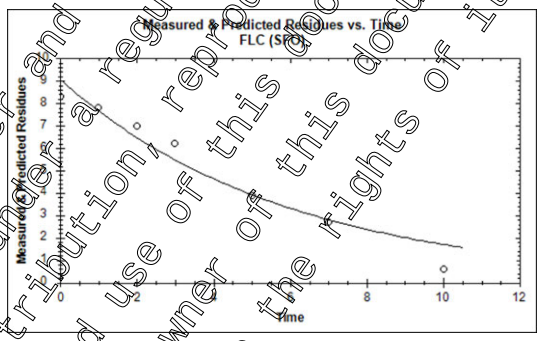
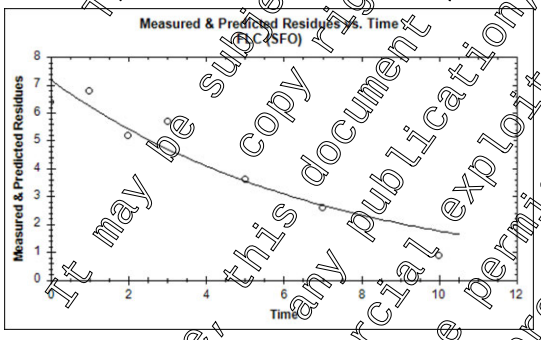
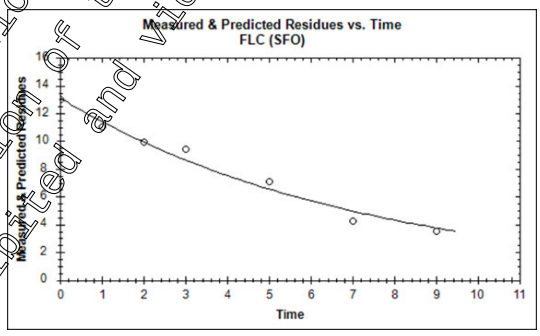


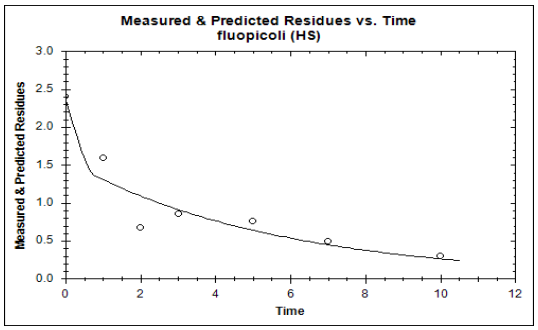
Trial 10-2120-03, SFO, visual fit:o



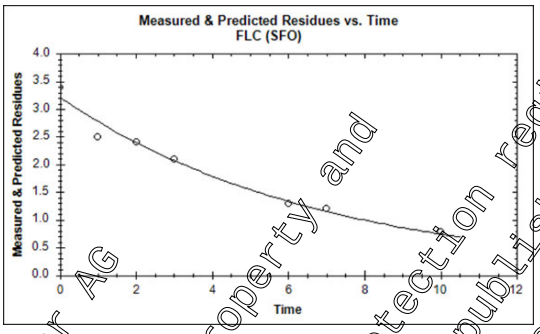
Trial 10-2120-04, SFO, visual fit:+



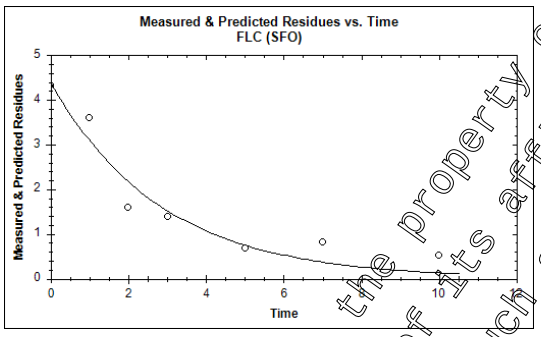
Trial 18-2950-01, HS, visual fit: +



Trial 18-2950-02, SFO, visual fit:+



Trial 18-2950-03, SFO, visual fit: o



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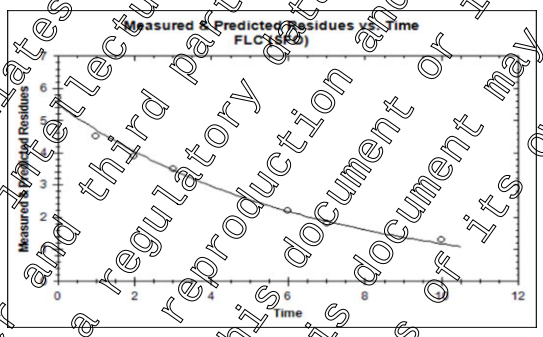

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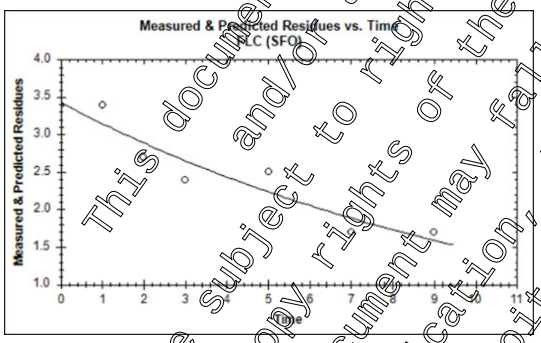

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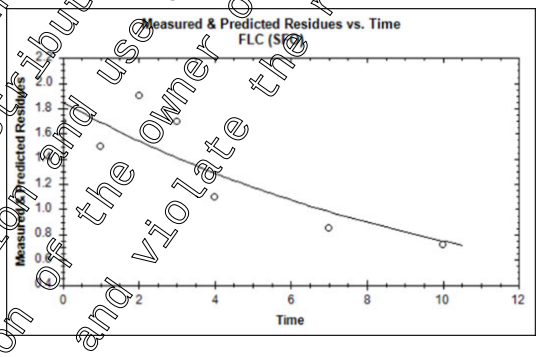

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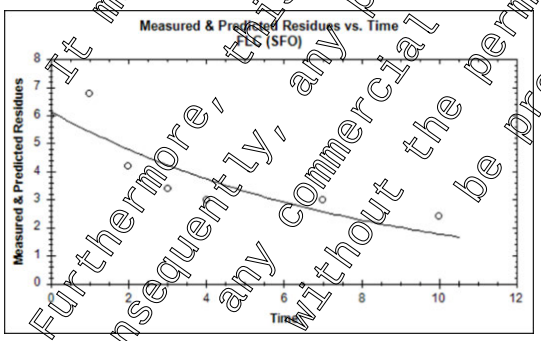
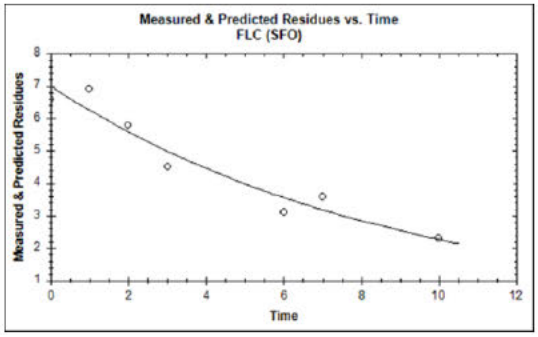
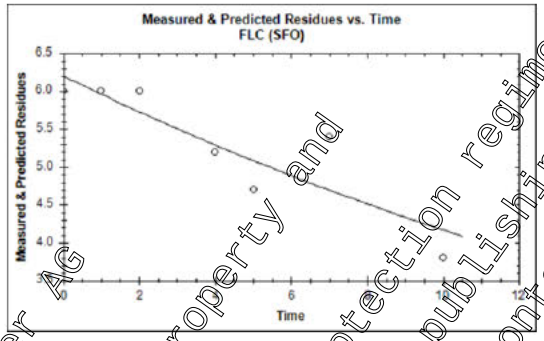


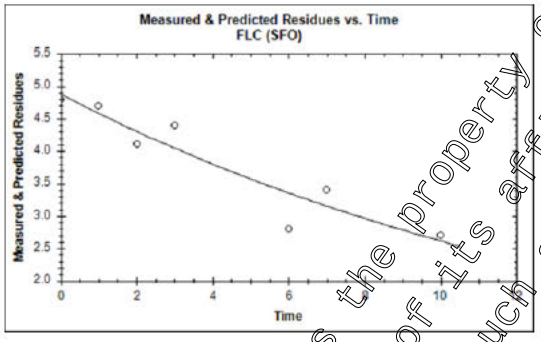
Trial E19RP102-01, SFO, visual fit:+



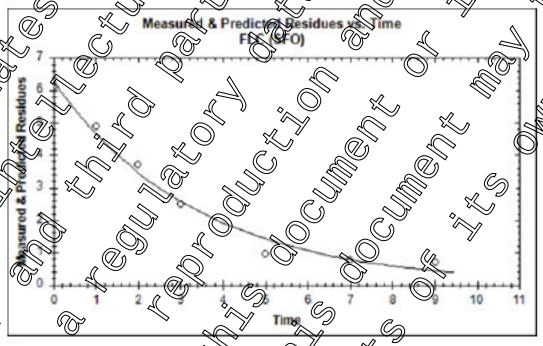
Trial E19RP102-02, SFO, visual fit:o



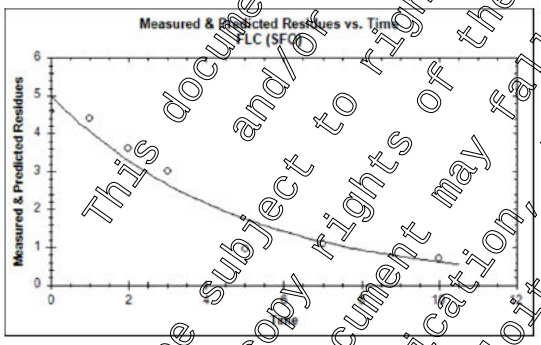
Trial E19RP087-01, SFO, visual fit:o;



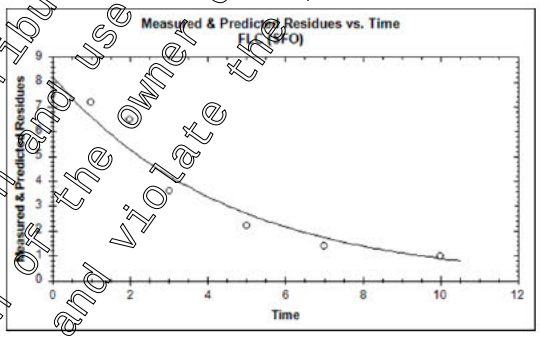
Trial E19RP087-02, SFO, visual fit:+



Trial E19RP087-03, SFO, visual fit:o



Trial E19RP087-04, SFO, visual fit:o



III. CONCLUSION

The geometric mean DT50 of fluopicolide on cereal foliage from 17 trials with acceptable kinetic fits was 4.9 days.

Assessment and conclusion by applicant:

The study is acceptable. The geometric mean DT50 of fluopicolide on foliage was 4.9 days.

CP 10.1.3 Effects on other terrestrial vertebrate wildlife (reptiles and amphibians)

The available and relevant data covering potential effects of fluopicolide and propamocarb-hydrochloride on terrestrial vertebrates are presented under point CP 10.1.1 for birds and CP 10.1.2 for mammals. Regarding assessment of potential effects on reptiles and amphibians neither guidance documents nor testing guidelines are available at present. Therefore, no additional data on terrestrial vertebrate wildlife is presented here.

CP 10.2 Effects on aquatic organisms

The risk assessment is based on the current guidance: EFSA PPR Panel (EFSA Panel on Plant Protection Products and their Residues), 2013. Guidance on tiered risk assessment for plant protection products for aquatic organisms in edge-of-field surface waters. EFSA Journal 2013;11(7):3290.

Table 10.2- 1: Endpoints used in risk assessment

Test substance	Test species	Endpoint		Reference
FLC + PCH SC 687.5	*Oncorhynchus mykiss*	**96 h LC_{50}** NOEC	**6.6 mg prod./L** 2.5 mg prod./L	[redacted] 2003; M-225109-01-1 KCP 10.2.1/01
	Cyprinus carpio	96 h LC_{50} NOEC	18 mg prod./L 12.5 mg prod./L	[redacted] 2003; M-227280-01-1 KCP 10.2.1/02
	Daphnia magna	**48 h EC_{50}** NOEC	**>100 mg prod./L** 100 mg prod./L	[redacted] 2003; M-227283-01-1 KCP 10.2.1/03
	Pseudokirchneriella subcapitata	72 h E_rC_{50} 72 h E_bC_{50} 72 h NOE_rC	>100 mg prod./L 13.8 mg prod./L 4.3 mg prod./L	[redacted] 2003; M-227290-01-1 KCP 10.2.1/04
	Navicula pelliculosa	**72 h E_rC_{50}** 72 h E_bC_{50} 72 h NOE_rC 72 h E_rC_{10}	**0.89 mg prod./L** 0.40 mg prod./L 0.10 mg prod./L 0.35 mg prod./L	[redacted] 2003; M-227284-01-1 KCP 10.2.1/05 [redacted] 2020; M-679538-01-1 Endpoint recalculation. KCP 10.2.1/06
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	**96 h LC_{50}** NOEC	**0.36 mg a.s./L (mm)** 0.16 mg a.s./L (mm)	[redacted] 2003; M-240806-01-1 KCA 8.2.1/01
	Fish, acute *Lepomis macrochirus*	96 h LC_{50} NOEC	0.75 mg a.s./L (mm) 0.56 mg a.s./L (mm)	[redacted] 2003; M-240805-01-1 KCA 8.2.1/02
	Fish, acute *Cyprinus carpio*	96 h LC_{50} NOEC	1.3 mg a.s./L (mm) 0.25 mg a.s./L (mm)	[redacted] 2003; M-219743-01-1 KCA 8.2.1/03
	Fish, acute *Brachydanio rerio*	96 h LC_{50} NOEC	1.8 mg a.s./L (mm) 1.0 mg a.s./L (mm)	[redacted] 2003; M-234508-01-2 KCA 8.2.1/04
	Fish, acute *Oryzias latipes*	96 h LC_{50} NOEC	0.7 mg a.s./L (mm) 0.44 mg a.s./L (mm)	[redacted] 2003; M-234510-01-2 KCA 8.2.1/05
	Fish, acute *Cyprinodon variegatus*	96 h LC_{50} NOEC	0.41 mg a.s./L (mm) 0.20 mg a.s./L (mm)	[redacted] 2003; M-223359-01-2

Test substance	Test species	Endpoint		Reference
				KCA 8.2.1/06
	Fish, acute *Pimephales promelas*	96 h LC_{50} NOEC	1.34 mg a.s./L (nom) 0.313 mg a.s./L (nom)	[redacted] 2015; M-533292-01-1 KCA 8.2.1/10
	Fish, chronic (ELS) *Pimephales promelas*	33 d NOEC **EC_{10}**	0.155 mg a.s./L (mm) **0.278 mg a.s./L (mm)**	[redacted] 2003; M-241190-01-1 KCA 8.2.2.1/01 [redacted] 2018; M-643769-01-1 Calculation of EC_{10} endpoint. KCA 8.2.2.1/02
	Fish, BCF flow through *Lepomis macrochirus*	BCFss, lipid normalised	65 L/kg (whole fish)	[redacted] .; 2003; M-241273-01-1 KCA 8.2.2.3/01
	Invertebrate, acute *Daphnia magna*	**48 h EC_{50}**	**> 1.8 mg a.s./L (mm)**	[redacted] 2003; M-240807-01-1 KCA 8.2.4.1/01
	Invertebrate, acute *Crassostrea virginica*	96 h EC_{50}	>2.6 mg a.s./L (mm)	[redacted] 2003; M-225445-01-1 KCA 8.2.4.2/01
	Invertebrate, acute *Americamysis bahia*	96 h LC_{50}	3.2 mg a.s./L (mm)	[redacted] 2003; M-220513-01-2 KCA 8.2.4.2/02
	Invertebrate, chronic *Daphnia magna*	21 d NOEC EC_{10}	0.19 mg a.s./L (mm) Cannot be calculated	[redacted] 2003; M-241191-01-1 KCA 8.2.5.1/01 [redacted] 2018; M-617757-01-1 Endpoint recalculation. KCA 8.2.5.1/02
	Invertebrate, chronic *Americamysis bahia*	28 d NOEC **EC_{10}**	0.34 mg a.s./L (mm) **0.18 mg a.s./L (mm)**	[redacted] 2015; M-544290-02-1 KCA 8.2.5.2/01
	Sediment dweller, chronic *Lumbriculus variegatus*	**28 d NOEC**	**1.98 mg a.s./kg (nom)**	[redacted] 2020; M-671529-03-1 KCA 8.2.5.4/02

Test substance	Test species	Endpoint		Reference
	Algae *Pseudokirchneriella subcapitata* Green algae	72 h E_rC_{50} 72 h E_bC_{50} 72 h NOE_rC 72 h E_rC_{10}	> 4.3 mg a.s./L (mm) 3.0 mg a.s./L (mm) 2.4 mg a.s./L (mm) 2.6 mg a.s./L (mm)	[redacted] 2003; M-219737-01-2 KCA 8.2.6.1/01 [redacted] 2018; M-643768-01-1 Endpoint recalculation. KCA 8.2.6.1/05
	Algae, *Skeletonema costatum* (Marine diatom)	**72 h E_rC_{50}** 96 h E_yC_{50} 72 h E_rC_{05} 72 h E_rC_{10}	**0.073 mg a.s./L (nom)** 0.0612 mg a.s./L (nom) 0.0160 mg a.s./L (nom) 0.0424 mg a.s./L (nom)	[redacted] 2015; M-533278-01-1 KCA 8.2.6.2/07
	Algae, *Navicula pelliculosa* (Freshwater diatom)	72 h E_rC_{50} 72 h E_yC_{50} 72 h NOE_rC 72 h E_rC_{10}	0.121 mg a.s./L (mm) 0.067 mg a.s./L (mm) 0.043 mg a.s./L (mm) 0.064 mg a.s./L (mm)	[redacted] 2020; M-678011-01-1 KCA 8.2.6.2/08
	Aquatic macrophytes, *Lemna gibba*	**7 d E_rC_{50}** NOE_rC	**> 3.2 mg a.s./L (mm) frond number & dry weight** 3.2 mg a.s./L (mm)	[redacted] 2003; M-220201-01-2 KCA 8.2.7/01
	Amphibian larvae, acute *Xenopus laevis*	48 h LC_{50} NOEC	> 1 mg a.s./L (nom) 0.125 mg a.s./L (nom)	[redacted] 2010; M-393869-01-1 KCA 8.2.8/01
M-01 (2,6-dichloro-benzamide (BAM; BCS-AA65784))	Fish, acute *Oncorhynchus mykiss*	**96 h LC_{50}**	**240 mg p.m./L (nom)**	[redacted] 2001; M-234311-01-2 KCA 8.2.1/07
	Invertebrate, acute *Daphnia magna*	**48 h EC_{50}**	**180 mg p.m./L (nom)**	[redacted] 2001; M-234306-01-2 KCA 8.2.4.1/02
	Algae *Pseudokirchneriella subcapitata* (Green algae)	72 h E_rC_{50} 72 h E_bC_{50} 72 h NOE_rC 72 h E_rC_{10}	120 mg p.m./L (nom) 60 mg p.m./L (nom) 40 mg p.m./L (nom) 49 mg p.m./L (nom)	[redacted] 2001; M-234304-01-2 KCA 8.2.6.1/03
	Algae, *Navicula pelliculosa* (Freshwater diatom)	**72 h E_rC_{50}** 72 h E_yC_{50} 72 h NOE_rC 72 h E_rC_{10}	**92 mg p.m./L (mm)** 46 mg p.m./L (mm) 30 mg p.m./L (mm) 42 mg p.m./L (mm)	[redacted] 2020; M-678377-01-1 KCA 8.2.6.2/10

Test substance	Test species	Endpoint		Reference
	Aquatic macrophytes, *Lemna gibba*	**7 d E_rC_{50}** 7 d E_yC_{50} NOE_rC E_rC_{10}	**97.6 mg p m./L (nom), frond number** 71.8 mg p m./L (nom) 25.0 mg p m./L (nom) 51.0 mg p m./L (nom)	[redacted] 2003; M-219725-01-2 KCA 8.2.7/02 [redacted] 2018; M-664031-01-1 Endpoint recalculation. KCA 8.2.7/03
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid; (BCS-AB43478))	Fish, acute *Oncorhynchus mykiss*	**96 h LC_{50}**	**> 102 mg p m./L (mm)**	[redacted] 2003; M-218631-01-2 KCA 8.2.1/08
	Algae, *Navicula pelliculosa* (Freshwater diatom)	**72 h E_rC_{50}** 72 h E_yC_{50} 72 h NOE_rC 72 h E_rC_{10}	**74 mg p.m./L (mm)** 72 mg p.m./L (mm) 42 mg p.m./L (mm) 48 mg p.m./L (mm)	[redacted] 2020; M-678012-01-1 KCA 8.2.6.2/09
Propamocarb-hydrochloride	Fish, acute *Lepomis macrochirus*	LC_{50}	> 92 mg a.s./L	EFSA Scientific Report (2006) 78, 1-80
	Fish, chronic *Pimephales promelas*[1)]	NOEC	≥ 6.3 mg a.s./L	EFSA Scientific Report (2006) 78, 1-80
	Invertebrate, acute *Daphnia magna*	EC_{50}	> 100 mg a.s./L	EFSA Scientific Report (2006) 78, 1-80
	Invertebrate, chronic *Daphnia magna*	NOEC	12.3 mg a.s./L	EFSA Scientific Report (2006) 78, 1-80
	Algae, *Pseudokirchneriella subcapitata*	E_rC_{50}	> 85 mg a.s./L	EFSA Scientific Report (2006) 78, 1-80
	Aquatic plant *Lemna gibba*	EC_{50}	> 18 mg a.s./L	EFSA Scientific Report (2006) 78, 1-80

Bold: Endpoints used in risk assessment
a.s.: active substance; p.m.: pure metabolite
nom = nominal concentrations, mm = mean measured concentration

Selection of algae and macrophytes endpoints for risk assessment

Following current state of science, the test guidelines OECD TG 201 and 221, the EU-Method C3, the Regulation for Classification and Labelling (Regulation (EC) No 1272/2008), the PPR Opinion (EFSA Journal 461, 1-44; 2007), the EFSA supporting publication 2015 (EN-924 published 22 December 2015) and also the EFSA Aquatic Guidance Document (AGD, 2013, noted by SCFCAH on July 10-11th, 2014), list growth rate as the relevant endpoint of the algae and the *Lemna* growth inhibition test. Therefore, the risk assessment is based on the E_rC_{50}, when available.

Valid algae studies with green algae and freshwater and marine diatoms species are available for fluopicolide. In general, diatoms show a greater sensitivity to fungicides targeting oomycetes. That is

the reason why tests on *Navicula* were also performed with the metabolites in order to cover the most sensitive organism group, even though diatoms do not belong to tier 1 standard species. The endpoint selected for algae risk assessment is the lowest of the 72h-E_rC_{50} (0.073 mg a.s./L), it was obtained with *Skeletonema costatum*.

Selection of endpoints for chronic risk assessment

According to the AGD, EC_{10} values are preferred over NOEC and should be used for risk assessment, when robust values are available. In the fish ELS study, the NOEC is 0.155 mg/L based on wet weight and length, the lowest EC_{10} is 0.278 mg a.s./L based on wet weight. It is proposed to use the EC_{10} for risk assessment (refer to MCA for further explanations).

Metabolites

Metabolites M-01, M-02 and M-03 are relevant for the aquatic risk assessment. No metabolite is relevant for sediment risk assessment.

Some studies were performed with metabolites M-01 and M-02, however, M-03 cannot be tested due to its very fast degradation in water and consequently also in the test medium. When data are available, they are used in the metabolite risk assessment. The EFSA AGD (2013) stepwise approach is used for all metabolites when no data are available.

The decision scheme is followed step by step.

- Step 1: None of the studies with the active substance is adequate for assessing the potential effect of the metabolites: ⇨ Step 3.
- Step 3: Is it clear that the toxophore has been lost from the molecule?

M-01 and M-02 do not show any fungicidal activity (see MCA 3.6 report by [redacted] M-224842-01-1), the structure of the fluopicolide molecule is split in two to create M-01 and M-02. On this basis, it is assumed that the toxophore has been lost. However, data on the most sensitive organism group are available so the comparison with parent of step 4 is performed anyway.

Regarding M-03, the toxophore is considered as present because its molecular structure is very similar to the parent. ⇨ Step 4

- Step 4: Identify the species or taxonomic group determining the lowest tier 1 $RAC_{sw,ac}$ for the active substance. Is the acute metabolite $L(E)C_{50}$ > 10 times the a.s. $L(E)C_{50}$ (on a molar basis)?

Studies on *Navicula* are available for fluopicolide and its metabolites M-01 and M-02, they are used for the comparison (see table below).

Substance name	Fluopicolide	M-01	M-02
Endpoint (mg/L)	0.121	92	74
Molecular Weight (g/mol)	383.59	190	225.6
Parent endpoint recalculated on a molar basis (mg/L) $10\frac{M_{met}}{M_{ai}}LC_{50ai}$	NA	0.60	0.71

The *Navicula* endpoints for both M-01 and M-02 are much greater than 10 times the parent endpoint recalculated on a molar basis ⇨ Step 6

This comparison cannot be performed for metabolite M-03. It is proposed, as a screening step, to use parent endpoints and an additional safety factor of 10, i.e. assuming that M-03 is 10 times more toxic than the parent.

- Step 6: Assume that the acute and chronic toxicity of the metabolite is equal to the toxicity of the a.s. for all first-tier taxonomic groups.

This approach will be followed for all missing endpoints for M-01 and M-02.

Summary of the metabolite endpoints used in risk assessment:

Endpoints (mg/L)	M-01	M-02	M-03
Acute fish	LC_{50} = 240	LC_{50} > 102	LC_{50} = 0.036**
Acute invertebrates	EC_{50} = 180	EC_{50} > 1.8*	EC_{50} > 0.18**
Algae	E_rC_{50} = 92	E_rC_{50} = 74	E_rC_{50} = 0.0121**
Macrophyte	E_rC_{50} = 976	E_rC_{50} > 3.2*	E_rC_{50} > 0.32**
Chronic fish	EC_{10} = 0.278*	EC_{10} = 0.278*	EC_{10} = 0.0278**
Chronic invertebrates	NOEC = 0.19*	NOEC = 0.19*	NOEC = 0.019**

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Predicted environmental concentrations used in the risk assessment

Predicted environmental concentrations of fluopicolide and its metabolites in surface water were calculated according to FOCUS Steps 1-3 for the use in potatoes, lettuce and cucumber.

Table 10.2- 2: Initial max PEC_{sw} values – FOCUS Steps 1 and 2 (potatoes)

Compound	FOCUS Scenario	Potatoes			
		4 × 100 g/ha	3 × 100 g/ha	2 × 100 g/ha	1 × 100 g/ha
		$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]
Early application					
Fluopicolide	STEP 1	102	76.5	51.0	25.5
	STEP 2 North	11.3	8.69	6.08	3.16
	STEP 2 South	**20.6**	**15.8**	**10.9**	**5.58**
M-01 (2,6-dichlorobenzamide (BAM))	STEP 1	44.1	33.1	22.0	11.0
	STEP 2 North	4.34	3.32	2.27	1.16
	STEP 2 South	**8.44**	**6.44**	**4.39**	**2.24**
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	STEP 1	19.3	14.5	9.66	4.83
	STEP 2 North	0.781	0.616	0.447	0.258
	STEP 2 South	**1.44**	**1.13**	**0.816**	**0.471**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	STEP 1	3.22	3.22	3.22	3.22 -
	STEP 2 North	0.769	0.647	0.486	0.276
	STEP 2 South	**1.54**	**1.29**	**0.973**	**0.552**
Late application					
Fluopicolide	STEP 1	102	76.5	51.0	25.5
	STEP 2 North	7.57	5.86	4.17	2.19
	STEP 2 South	**10.4**	**7.98**	**5.60**	**2.92**
M-01 (2,6-dichlorobenzamide (BAM))	STEP 1	44.1	33.1	22.0	11.0 -
	STEP 2 North	2.70	2.07	1.43	0.734
	STEP 2 South	**3.93**	**3.01**	**2.06**	**1.06**
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	STEP 1	19.3	14.5	9.66	4.83 -
	STEP 2 North	0.516	0.407	0.299	0.172
	STEP 2 South	**0.715**	**0.563**	**0.410**	**0.236**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	STEP 1	3.22	3.22	3.22	3.22 -
	STEP 2 North	0.462	0.388	0.292	0.166
	STEP 2 South	**0.692**	**0.582**	**0.438**	**0.248**

Table 10.2- 3: Initial max PEC_{sed} values – FOCUS Steps 1 and 2 (potatoes)

Compound	FOCUS Scenario	Potatoes			
		4 × 100 g/ha	3 × 100 g/ha	2 × 100 g/ha	1 × 100 g/ha
		$PEC_{sed, max}$ [µg/kg]	$PEC_{sed, max}$ [µg/kg]	$PEC_{sed, max}$ [µg/kg]	$PEC_{sed, max}$ [µg/kg]
Early application					
Fluopicolide	STEP 1	270	203	135	67.5
	STEP 2 North	29.7	22.9	16.0	8.28
	STEP 2 South	**54.6**	**41.8**	**28.7**	**14.8**
Late application					
Fluopicolide	STEP 1	270	203	135	67.5
	STEP 2 North	19.8	15.3	10.9	5.69
	STEP 2 South	**27.2**	**21.0**	**14.7**	**7.63**

Table 10.2- 4: Initial max PEC_{sw} values – FOCUS Steps 1 and 2 (lettuce)

Compound	FOCUS Scenario	Lettuce	Lettuce
		2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]
Early application			
Fluopicolide	STEP 1	-	25.5
	STEP 2 North	-	4.37
	STEP 2 South	-	**8.00**
M-01 (2,6-dichlorobenzamide (BAM))	STEP 1	-	11.0
	STEP 2 North	-	1.70
	STEP 2 South	-	**3.31**
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	STEP 1	-	4.83
	STEP 2 North	-	0.364
	STEP 2 South	-	**0.685**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	STEP 1	-	3.22
	STEP 2 North	-	0.414
	STEP 2 South	-	**0.828**
Late application			
Fluopicolide	STEP 1	51.0	25.5
	STEP 2 North	4.17	2.19
	STEP 2 South	**5.60**	**2.92**
M-01 (2,6-dichlorobenzamide (BAM))	STEP 1	22.0	11.0
	STEP 2 North	1.43	0.734
	STEP 2 South	**2.06**	**1.06**
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	STEP 1	9.66	4.83
	STEP 2 North	0.299	0.172
	STEP 2 South	**0.410**	**0.236**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	STEP 1	3.22	3.22
	STEP 2 North	0.292	0.166
	STEP 2 South	**0.438**	**0.248**

Table 10.2- 5: Initial max PEC_{sed} values – FOCUS Steps 1 and 2 (lettuce)

Compound	FOCUS Scenario	Lettuce	Lettuce
		2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sed, max}$ [µg/kg]	$PEC_{sed, max}$ [µg/kg]
Early application			
Fluopicolide	STEP 1	-	67.5
	STEP 2 North	-	11.5
	STEP 2 South		**21.2**
Late application			
Fluopicolide	STEP 1	135	67.5
	STEP 2 North	10.9	5.69
	STEP 2 South	**14.7**	**7.63**

Table 10.2- 6: Initial max PEC_{sw} values – FOCUS Steps 1 and 2 (cucumber)

Compound	FOCUS Scenario	Cucumber		
		Early	Mid	Late
		$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]
3 × 100 g/ha				
Fluopicolide	STEP 1	76.5	76.5	76.5
	STEP 2 North	5.86	5.86	**12.2**
	STEP 2 South	**10.1**	**7.98**	10.1
M-01 (2,6-dichlorobenzamide (BAM))	STEP 1	33.1	33.1	33.1
	STEP 2 North	2.07	2.07	**4.88**
	STEP 2 South	**3.94**	**3.01**	3.94
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	STEP 1	14.5	14.5	14.5
	STEP 2 North	0.407	0.407	**0.874**
	STEP 2 South	**0.718**	**0.563**	0.718
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	STEP 1	3.22	3.22	3.22
	STEP 2 North	0.388	0.388	**0.970**
	STEP 2 South	**0.776**	**0.582**	0.776

Table 10.2- 7: Initial max PEC_{sed} values – FOCUS Steps 1 and 2 (cucumber)

Compound	FOCUS Scenario	Cucumber		
		Early	Mid	Late
		$PEC_{sed, max}$ [µg/kg]	$PEC_{sed, max}$ [µg/kg]	$PEC_{sed, max}$ [µg/kg]
3 × 100 g/ha				
Fluopicolide	STEP 1	203	203	203
	STEP 2 North	15.3	15.3	32.3
	STEP 2 South	**26.7**	**21.0**	**26.7**

Table 10.2- 8: Initial max PEC_{sw} values – FOCUS Steps 3 (potatoes)

Compound	FOCUS Scenario	Potatoes			
		4 ×100 g/ha	3 ×100 g/ha	2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sw,max}$ [µg/L]	$PEC_{sw,max}$ [µg/L]	$PEC_{sw,max}$ [µg/L]	$PEC_{sw,max}$ [µg/L]
Early application					
Fluopicolide	D3 ditch	0.524	0.524	0.524	0.524
	D4 pond	3.70	2.66	1.72	0.823
	D4 stream	3.47	2.50	1.62	0.777
	D6 ditch	1.51	1.12	0.742	0.564
	D6 ditch 2nd	7.36	4.93	2.98	1.33
	R1 pond	0.260	0.217	0.152	0.111
	R1 stream	2.86	2.86	1.42	1.42
	R2 stream	1.82	1.82	1.32	0.574
	R3 stream	4.00	2.58	2.58	0.864
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	D3 ditch	0.021	0.014	0.008	0.003
	D4 pond	0.206	0.153	0.101	0.049
	D4 stream	0.365	0.272	0.181	0.091
	D6 ditch	0.191	0.144	0.098	0.051
	D6 ditch 2nd	0.489	0.364	0.242	0.121
	R1 pond	0.003	0.003	0.002	<0.001
	R1 stream	0.097	0.067	0.054	0.022
	R2 stream	0.081	0.063	0.040	0.020
	R3 stream	0.086	0.069	0.040	0.016

Compound	FOCUS Scenario	Potatoes			
		4 ×100 g/ha	3 ×100 g/ha	2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sw,max}$ [µg/L]	$PEC_{sw,max}$ [µg/L]	$PEC_{sw,max}$ [µg/L]	$PEC_{sw,max}$ [µg/L]
Late application					
Fluopicolide	D3 ditch	0.524	0.524	0.524	0.524
	D4 pond	3.65	2.59	1.71	0.754
	D4 stream	3.54	2.49	1.63	0.701
	D6 ditch	1.96	1.35	0.796	0.555
	D6 ditch 2nd	14.4	14.1	7.70	3.00
	R1 pond	0.125	0.072	0.059	0.026
	R1 stream	2.77	1.54	1.15	0.469
	R2 stream	2.01	1.33	1.16	0.589
	R3 stream	4.05	3.67	2.98	1.50
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	D3 ditch	0.011	0.007	0.005	0.002
	D4 pond	0.150	0.108	0.075	0.039
	D4 stream	0.266	0.191	0.133	0.069
	D6 ditch	0.226	0.161	0.100	0.051
	D6 ditch 2nd	0.360	0.326	0.243	0.114
	R1 pond	0.001	<0.001	<0.001	<0.001
	R1 stream	0.085	0.054	0.041	0.019
	R2 stream	0.092	0.064	0.043	0.020
	R3 stream	0.118	0.109	0.083	0.046

Table 10.2- 9: Initial max PEC_{sw} values – FOCUS Steps 3 (lettuce)

Compound	FOCUS Scenario	Lettuce	
		2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sw,\ max}$ [µg/L]	$PEC_{sw,\ max}$ [µg/L]
Early application			
Fluopicolide	D3 ditch	-	0.634
	D3 ditch 2nd	-	0.635
	D4 pond	-	0.714
	D4 stream	-	0.675
	D6 ditch	-	1.67
	R1 pond	-	0.094
	R1 pond 2nd	-	0.079
	R1 stream	-	1.12
	R1 stream 2nd	-	0.985

Compound	FOCUS Scenario	Lettuce	
		2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]
	R2 stream	-	0.553
	R2 stream 2nd	-	0.562
	R3 stream	-	1.31
	R3 stream 2nd	-	2.00
	R4 stream	-	2.27
	R4 stream 2nd	-	2.40
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	D3 ditch	-	0.003
	D3 ditch 2nd	-	0.003
	D4 pond	-	0.046
	D4 stream	-	0.084
	D6 ditch	-	0.130
	R1 pond	-	<0.001
	R1 pond 2nd	-	0.002
	R1 stream	-	0.018
	R4 stream 2nd	-	0.031
	R2 stream	-	0.018
	R2 stream 2nd	-	0.056
	R3 stream	-	0.033
	R3 stream 2nd	-	0.062
	R4 stream	-	0.015
	R4 stream 2nd	-	0.040
Late application			
Fluopicolide	D3 ditch	0.634	0.634
	D3 ditch 2nd	0.631	0.631
	D4 pond	1.53	0.646
	D4 stream	1.46	0.599
	D6 ditch	13.1	4.67
	R1 pond	0.437	0.288
	R1 pond 2nd	0.222	0.084
	R1 stream	2.39	1.11
	R1 stream 2nd	1.92	0.685
	R2 stream	0.963	0.562
	R2 stream 2nd	1.09	0.596
	R3 stream	2.18	0.862
	R3 stream 2nd	2.65	1.50

Compound	FOCUS Scenario	Lettuce	
		2 ×100 g/ha	1 ×100 g/ha
		$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]
	R4 stream	3.17	2.01
	R4 stream 2nd	3.29	1.90
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	D3 ditch	0.005	0.002
	D3 ditch 2nd	0.005	0.002
	D4 pond	0.061	0.031
	D4 stream	0.108	0.055
	D6 ditch	0.184	0.092
	R1 pond	0.003	0.001
	R1 pond 2nd	0.003	0.001
	R1 stream	0.047	0.015
	R1 stream 2nd	0.033	0.015
	R2 stream	0.052	0.022
	R2 stream 2nd	0.029	0.015
	R3 stream	0.054	0.030
	R3 stream 2nd	0.064	0.064
	R4 stream	0.020	0.016
	R4 stream 2nd	0.032	0.023

Table 10.2- 10: Initial max PEC_{sw} values – FOCUS Steps 3 (cucumber)

Compound	FOCUS Scenario	Cucumber		
		Early	Mid	Late
		$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]	$PEC_{sw, max}$ [µg/L]
3 × 100 g/ha				
Fluopicolide	D6 ditch	1.54	4.75	10.2
	R2 stream	2.10	1.14	2.39
	R3 stream	5.37	3.06	6.01
	R4 stream	8.33	7.85	9.06
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	D6 ditch	0.169	0.324	0.367
	R2 stream	0.047	0.124	0.045
	R3 stream	0.067	0.093	0.047
	R4 stream	0.069	0.241	0.099

Table 10.2- 11: Initial max PEC_{sw} values – FOCUS Steps 4 in potatoes (4 × 100 g a.s./ha)

PEC_{sw} (µg/L)	Scenario	Early application							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.524	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.052	0.017	0.009	*0.006*	*0.006*	0.009	*0.006*	*0.006*
None	D4 Pond	*3.70*	*3.70*	*3.70*	*3.70*	*3.70*	*3.70*	*3.70*	*3.70*
50 %		*3.70*	*3.70*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*
75 %		*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*
90 %		*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*	*3.69*
None	D4 Stream	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*
50 %		*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*
75 %		*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*
90 %		*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*	*3.47*
None	D6 Ditch	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*
50 %		*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*
75 %		*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*
90 %		*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*	*1.51*
None	D6 Ditch 2nd	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*
50 %		*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*
75 %		*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*
90 %		*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*	*7.36*
None	R1 Pond	*0.260*	*0.258*	*0.251*	*0.248*	*0.246*	*0.113*	*0.109*	*0.059*
50 %		*0.248*	*0.246*	*0.243*	*0.241*	*0.240*	*0.104*	*0.103*	*0.054*
75 %		*0.241*	*0.241*	*0.239*	*0.238*	*0.238*	*0.100*	*0.099*	*0.051*
90 %		*0.238*	*0.237*	*0.237*	*0.236*	*0.236*	*0.098*	*0.097*	*0.049*
None	R1 Stream	*2.86*	*2.86*	*2.86*	*2.86*	*2.86*	*1.30*	*1.30*	*0.682*
50 %		*2.86*	*2.86*	*2.86*	*2.86*	*2.86*	*1.30*	*1.30*	*0.682*
75 %		*2.86*	*2.86*	*2.86*	*2.86*	*2.86*	*1.30*	*1.30*	*0.682*
90 %		*2.86*	*2.86*	*2.86*	*2.86*	*2.86*	*1.30*	*1.30*	*0.682*
None	R2 Stream	*1.82*	*1.82*	*1.82*	*1.82*	*1.82*	*0.812*	*0.812*	*0.422*
50 %		*1.82*	*1.82*	*1.82*	*1.82*	*1.82*	*0.812*	*0.812*	*0.422*
75 %		*1.82*	*1.82*	*1.82*	*1.82*	*1.82*	*0.812*	*0.812*	*0.422*
90 %		*1.82*	*1.82*	*1.82*	*1.82*	*1.82*	*0.812*	*0.812*	*0.422*
None	R3 Stream	*4.00*	*4.00*	*4.00*	*4.00*	*4.00*	*1.82*	*1.82*	*0.957*
50 %		*4.00*	*4.00*	*4.00*	*4.00*	*4.00*	*1.82*	*1.82*	*0.957*
75 %		*4.00*	*4.00*	*4.00*	*4.00*	*4.00*	*1.82*	*1.82*	*0.957*
90 %		*4.00*	*4.00*	*4.00*	*4.00*	*4.00*	*1.82*	*1.82*	*0.957*

PEC$_{sw}$ (µg/L)	**Scenario**	**Late application**							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.524	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.052	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	*3.65*	*3.65*	*3.65*	*3.64*	*3.64*	*3.65*	*3.64*	*3.64*
50 %		*3.64*	*3.64*	*3.64*	*3.64*	*3.64*	*3.64*	*3.64*	*3.64*
75 %		*3.64*	*3.64*	*3.64*	*3.64*	*3.64*	*3.64*	*3.64*	*3.64*
90 %		*3.64*	*3.64*	*3.63*	*3.63*	*3.63*	*3.63*	*3.63*	*3.63*
None	D4 Stream	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*
50 %		*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*
75 %		*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*
90 %		*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*	*3.54*
None	D6 Ditch	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*
50 %		*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*
75 %		*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*
90 %		*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*	*1.96*
None	D6 Ditch 2nd	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*
50 %		*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*
75 %		*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*
90 %		*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*	*14.4*
None	R1 Pond	*0.125*	*0.123*	*0.118*	*0.115*	*0.114*	*0.055*	*0.053*	*0.030*
50 %		*0.115*	*0.114*	*0.112*	*0.110*	*0.110*	*0.049*	*0.048*	*0.026*
75 %		*0.110*	*0.110*	*0.109*	*0.108*	*0.107*	*0.047*	*0.046*	*0.024*
90 %		*0.107*	*0.107*	*0.107*	*0.106*	*0.106*	*0.045*	*0.045*	*0.023*
None	R1 Stream	*2.77*	*2.77*	*2.77*	*2.77*	*2.77*	*1.24*	*1.24*	*0.643*
50 %		*2.77*	*2.77*	*2.77*	*2.77*	*2.77*	*1.24*	*1.24*	*0.643*
75 %		*2.77*	*2.77*	*2.77*	*2.77*	*2.77*	*1.24*	*1.24*	*0.643*
90 %		*2.77*	*2.77*	*2.77*	*2.77*	*2.77*	*1.24*	*1.24*	*0.643*
None	R2 Stream	*2.01*	*2.01*	*2.01*	*2.01*	*2.01*	*0.916*	*0.916*	*0.480*
50 %		*2.01*	*2.01*	*2.01*	*2.01*	*2.01*	*0.916*	*0.916*	*0.480*
75 %		*2.01*	*2.01*	*2.01*	*2.01*	*2.01*	*0.916*	*0.916*	*0.480*
90 %		*2.01*	*2.01*	*2.01*	*2.01*	*2.01*	*0.916*	*0.916*	*0.480*
None	R3 Stream	*4.05*	*4.05*	*4.05*	*4.05*	*4.05*	*1.85*	*1.85*	*0.968*
50 %		*4.05*	*4.05*	*4.05*	*4.05*	*4.05*	*1.85*	*1.85*	*0.968*
75 %		*4.05*	*4.05*	*4.05*	*4.05*	*4.05*	*1.85*	*1.85*	*0.968*
90 %		*4.05*	*4.05*	*4.05*	*4.05*	*4.05*	*1.85*	*1.85*	*0.968*

* Maximum values coming from multiple applications are marked in italics

Table 10.2- 12: Initial max PEC_{sw} values – FOCUS Steps 4 in potatoes (3 × 100 g a.s./ha)

PEC_{sw} (µg/L)	Scenario	Early application							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.524	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.052	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
50 %		2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
75 %		2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
90 %		2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
None	D4 Stream	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
50 %		2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
75 %		2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
90 %		2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
None	D6 Ditch	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
50 %		1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
75 %		1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
90 %		1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
None	D6 Ditch 2nd	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
50 %		4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
75 %		4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
90 %		4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
None	R1 Pond	0.217	0.213	0.203	0.199	0.197	0.096	0.091	0.052
50 %		0.199	0.198	0.195	0.193	0.192	0.084	0.081	0.044
75 %		0.193	0.193	0.191	0.190	0.190	0.079	0.078	0.040
90 %		0.190	0.190	0.189	0.189	0.188	0.077	0.077	0.039
None	R1 Stream	2.86	2.86	2.86	2.86	2.86	1.30	1.30	0.682
50 %		2.86	2.86	2.86	2.86	2.86	1.30	1.30	0.682
75 %		2.86	2.86	2.86	2.86	2.86	1.30	1.30	0.682
90 %		2.86	2.86	2.86	2.86	2.86	1.30	1.30	0.682
None	R2 Stream	1.82	1.82	1.82	1.82	1.82	0.812	0.812	0.422
50 %		1.82	1.82	1.82	1.82	1.82	0.812	0.812	0.422
75 %		1.82	1.82	1.82	1.82	1.82	0.812	0.812	0.422
90 %		1.82	1.82	1.82	1.82	1.82	0.812	0.812	0.422
None	R3 Stream	2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612
50 %		2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612
75 %		2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612
90 %		2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612

PECsw (µg/L)	Scenario	Late application							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.525	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.052	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	*2.59*	*2.59*	*2.59*	*2.58*	*2.58*	*2.59*	*2.58*	*2.58*
50 %		*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*
75 %		*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*
90 %		*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*	*2.58*
None	D4 Stream	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*
50 %		*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*
75 %		*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*
90 %		*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*	*2.49*
None	D6 Ditch	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*
50 %		*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*
75 %		*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*
90 %		*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*	*1.35*
None	D6 Ditch 2nd	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
50 %		*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
75 %		*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
90 %		*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
None	R1 Pond	*0.072*	*0.071*	*0.065*	*0.065*	*0.064*	*0.033*	*0.031*	*0.018*
50 %		*0.065*	*0.064*	*0.062*	*0.061*	*0.061*	*0.028*	*0.028*	*0.015*
75 %		*0.061*	*0.061*	*0.060*	*0.060*	*0.059*	*0.026*	*0.026*	*0.014*
90 %		*0.059*	*0.058*	*0.059*	*0.059*	*0.058*	*0.025*	*0.025*	*0.013*
None	R1 Stream	*1.54*	*1.54*	*1.54*	*1.54*	*1.54*	*0.690*	*0.690*	*0.359*
50 %		*1.54*	*1.54*	*1.54*	*1.54*	*1.54*	*0.690*	*0.690*	*0.359*
75 %		*1.54*	*1.54*	*1.54*	*1.54*	*1.54*	*0.690*	*0.690*	*0.359*
90 %		*1.54*	*1.54*	*1.54*	*1.54*	*1.54*	*0.690*	*0.690*	*0.359*
None	R2 Stream	*1.33*	*1.33*	*1.33*	*1.33*	*1.33*	*0.607*	*0.607*	*0.318*
50 %		*1.33*	*1.33*	*1.33*	*1.33*	*1.33*	*0.607*	*0.607*	*0.318*
75 %		*1.33*	*1.33*	*1.33*	*1.33*	*1.33*	*0.607*	*0.607*	*0.318*
90 %		*1.33*	*1.33*	*1.33*	*1.33*	*1.33*	*0.607*	*0.607*	*0.318*
None	R3 Stream	*3.67*	*3.67*	*3.67*	*3.67*	*3.67*	*1.67*	*1.67*	*0.877*
50 %		*3.67*	*3.67*	*3.67*	*3.67*	*3.67*	*1.67*	*1.67*	*0.877*
75 %		*3.67*	*3.67*	*3.67*	*3.67*	*3.67*	*1.67*	*1.67*	*0.877*
90 %		*3.67*	*3.67*	*3.67*	*3.67*	*3.67*	*1.67*	*1.67*	*0.877*

* Maximum values coming from multiple applications are marked in italics

Table 10.2- 13: Initial max PEC_{sw} values – FOCUS Steps 4 in potatoes (2 × 100 g a.s./ha)

PEC_{sw} (µg/L)	Scenario	Early application							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.524	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.052	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
50 %		1.72	1.72	1.72	1.72	1.71	1.72	1.72	1.71
75 %		1.72	1.71	1.71	1.71	1.71	1.71	1.71	1.71
90 %		1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
None	D4 Stream	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
50 %		1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
75 %		1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
90 %		1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
None	D6 Ditch	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742
50 %		0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742
75 %		0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742
90 %		0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742
None	D6 Ditch 2nd	2.98	2.98	2.98	2.98	2.98	2.98	2.98	2.98
50 %		2.98	2.98	2.98	2.98	2.98	2.98	2.98	2.98
75 %		2.98	2.98	2.98	2.98	2.98	2.98	2.98	2.98
90 %		2.98	2.98	2.98	2.98	2.98	2.98	2.98	2.98
None	R1 Pond	0.152	0.150	0.146	0.144	0.143	0.066	0.064	0.035
50 %		0.144	0.143	0.141	0.140	0.139	0.061	0.060	0.031
75 %		0.140	0.139	0.138	0.138	0.138	0.058	0.058	0.030
90 %		0.138	0.137	0.137	0.137	0.137	0.057	0.056	0.029
None	R1 Stream	1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
50 %		1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
75 %		1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
90 %		1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
None	R2 Stream	1.32	1.32	1.32	1.32	1.32	0.587	0.587	0.305
50 %		1.32	1.32	1.32	1.32	1.32	0.587	0.587	0.305
75 %		1.32	1.32	1.32	1.32	1.32	0.587	0.587	0.305
90 %		1.32	1.32	1.32	1.32	1.32	0.587	0.587	0.305
None	R3 Stream	2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612
50 %		2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612
75 %		2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612
90 %		2.58	2.58	2.58	2.58	2.58	1.17	1.17	0.612

PEC_{sw} (µg/L)	**Scenario**	**Late application**							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.525	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.263	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.053	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	*1.71*	*1.71*	*1.71*	*1.71*	*1.70*	*1.71*	*1.71*	*1.70*
50 %		*1.71*	*1.71*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*
75 %		*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*
90 %		*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*	*1.70*
None	D4 Stream	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*
50 %		*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*
75 %		*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*
90 %		*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*	*1.63*
None	D6 Ditch	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*
50 %		*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*
75 %		*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*
90 %		*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*	*0.796*
None	D6 Ditch 2nd	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*
50 %		*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*
75 %		*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*
90 %		*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*	*7.70*
None	R1 Pond	*0.059*	*0.058*	*0.055*	*0.053*	*0.052*	*0.027*	*0.026*	*0.015*
50 %		*0.053*	*0.053*	*0.051*	*0.051*	*0.050*	*0.024*	*0.023*	*0.013*
75 %		*0.051*	*0.050*	*0.050*	*0.050*	*0.049*	*0.022*	*0.022*	*0.012*
90 %		*0.049*	*0.049*	*0.049*	*0.049*	*0.049*	*0.021*	*0.021*	*0.011*
None	R1 Stream	*1.15*	*1.15*	*1.15*	*1.15*	*1.15*	*0.515*	*0.515*	*0.268*
50 %		*1.15*	*1.15*	*1.15*	*1.15*	*1.15*	*0.515*	*0.515*	*0.268*
75 %		*1.15*	*1.15*	*1.15*	*1.15*	*1.15*	*0.515*	*0.515*	*0.268*
90 %		*1.15*	*1.15*	*1.15*	*1.15*	*1.15*	*0.515*	*0.515*	*0.268*
None	R2 Stream	*1.16*	*1.16*	*1.16*	*1.16*	*1.16*	*0.515*	*0.515*	*0.268*
50 %		*1.16*	*1.16*	*1.16*	*1.16*	*1.16*	*0.515*	*0.515*	*0.268*
75 %		*1.16*	*1.16*	*1.16*	*1.16*	*1.16*	*0.515*	*0.515*	*0.268*
90 %		*1.16*	*1.16*	*1.16*	*1.16*	*1.16*	*0.515*	*0.515*	*0.268*
None	R3 Stream	*2.98*	*2.98*	*2.98*	*2.98*	*2.98*	*1.36*	*1.36*	*0.713*
50 %		*2.98*	*2.98*	*2.98*	*2.98*	*2.98*	*1.36*	*1.36*	*0.713*
75 %		*2.98*	*2.98*	*2.98*	*2.98*	*2.98*	*1.36*	*1.36*	*0.713*
90 %		*2.98*	*2.98*	*2.98*	*2.98*	*2.98*	*1.36*	*1.36*	*0.713*

* Maximum values coming from multiple applications are marked in italics

Table 10.2- 14: Initial max PEC_{sw} values – FOCUS Steps 4 in potatoes (1 × 100 g a.s./ha)

PEC_{sw} (µg/L)	Scenario	Early application							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.524	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.052	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	0.823	0.823	0.822	0.822	0.821	0.822	0.822	0.821
50 %		0.822	0.821	0.821	0.821	0.821	0.821	0.821	0.821
75 %		0.821	0.821	0.820	0.820	0.820	0.820	0.820	0.820
90 %		0.820	0.820	0.820	0.820	0.820	0.820	0.820	0.820
None	D4 Stream	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777
50 %		0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777
75 %		0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777
90 %		0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777
None	D6 Ditch	0.564	0.367	0.367	0.367	0.367	0.367	0.367	0.367
50 %		0.367	0.367	0.367	0.367	0.367	0.367	0.367	0.367
75 %		0.367	0.367	0.367	0.367	0.367	0.367	0.367	0.367
90 %		0.367	0.367	0.367	0.367	0.367	0.367	0.367	0.367
None	D6 Ditch 2nd	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
50 %		1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
75 %		1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
90 %		1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
None	R1 Pond	0.111	0.109	0.105	0.102	0.101	0.049	0.047	0.027
50 %		0.102	0.101	0.099	0.097	0.097	0.043	0.042	0.023
75 %		0.097	0.097	0.096	0.095	0.095	0.040	0.040	0.021
90 %		0.095	0.094	0.094	0.094	0.094	0.039	0.038	0.020
None	R1 Stream	1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
50 %		1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
75 %		1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
90 %		1.42	1.42	1.42	1.42	1.42	0.648	0.648	0.339
None	R2 Stream	0.574	0.574	0.574	0.574	0.574	0.256	0.256	0.133
50 %		0.574	0.574	0.574	0.574	0.574	0.256	0.256	0.133
75 %		0.574	0.574	0.574	0.574	0.574	0.256	0.256	0.133
90 %		0.574	0.574	0.574	0.574	0.574	0.256	0.256	0.133
None	R3 Stream	0.864	0.864	0.864	0.864	0.864	0.390	0.390	0.204
50 %		0.864	0.864	0.864	0.864	0.864	0.390	0.390	0.204
75 %		0.864	0.864	0.864	0.864	0.864	0.390	0.390	0.204
90 %		0.864	0.864	0.864	0.864	0.864	0.390	0.390	0.204

PEC$_{sw}$ (µg/L)	**Scenario**	**Late application**							
Nozzle reduction	Vegetated strip (m)	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D3 Ditch	0.524	0.172	0.091	0.062	0.047	0.091	0.062	0.047
50 %		0.262	0.086	0.046	0.031	0.024	0.046	0.031	0.024
75 %		0.131	0.043	0.023	0.016	0.012	0.023	0.016	0.012
90 %		0.053	0.017	0.009	0.006	0.005	0.009	0.006	0.005
None	D4 Pond	0.754	0.753	0.752	0.751	0.751	0.752	0.751	0.751
50 %		0.751	0.751	0.750	0.750	0.749	0.750	0.750	0.749
75 %		0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749
90 %		0.749	0.748	0.748	0.748	0.748	0.748	0.748	0.748
None	D4 Stream	0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701
50 %		0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701
75 %		0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701
90 %		0.701	0.701	0.701	0.701	0.701	0.701	0.701	0.701
None	D6 Ditch	0.555	0.393	0.393	0.393	0.393	0.393	0.393	0.393
50 %		0.393	0.393	0.393	0.393	0.393	0.393	0.393	0.393
75 %		0.393	0.393	0.393	0.393	0.393	0.393	0.393	0.393
90 %		0.393	0.393	0.393	0.393	0.393	0.393	0.393	0.393
None	D6 Ditch 2nd	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
50 %		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
75 %		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
90 %		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
None	R1 Pond	0.026	0.025	0.024	0.023	0.022	0.014	0.012	0.009
50 %		0.023	0.023	0.022	0.022	0.021	0.010	0.010	0.006
75 %		0.021	0.021	0.021	0.021	0.021	0.010	0.009	0.005
90 %		0.021	0.021	0.021	0.020	0.020	0.009	0.009	0.005
None	R1 Stream	0.469	0.469	0.469	0.469	0.469	0.210	0.210	0.109
50 %		0.469	0.469	0.469	0.469	0.469	0.210	0.210	0.109
75 %		0.469	0.469	0.469	0.469	0.469	0.210	0.210	0.109
90 %		0.469	0.469	0.469	0.469	0.469	0.210	0.210	0.109
None	R2 Stream	0.589	0.589	0.589	0.589	0.589	0.263	0.263	0.137
50 %		0.589	0.589	0.589	0.589	0.589	0.263	0.263	0.137
75 %		0.589	0.589	0.589	0.589	0.589	0.263	0.263	0.137
90 %		0.589	0.589	0.589	0.589	0.589	0.263	0.263	0.137
None	R3 Stream	1.50	1.50	1.50	1.50	1.50	0.686	0.686	0.360
50 %		1.50	1.50	1.50	1.50	1.50	0.686	0.686	0.360
75 %		1.50	1.50	1.50	1.50	1.50	0.686	0.686	0.360
90 %		1.50	1.50	1.50	1.50	1.50	0.686	0.686	0.360

Table 10.2- 15: Initial max PEC_{sw} values – FOCUS Steps 4 in cucumber (3 × 100 g a.s./ha)

PEC_{sw} (µg/L)	Scenario	Early application	Mid application	Late application
Nozzle reduction	Vegetated strip (m)	None	None	None
	No spray buffer (m)	0 m	0 m	0 m
None	D6 Ditch	*1.54*	*4.75*	*10.2*
90 %		*1.54*	*4.75*	*10.2*
95 %		*1.54*	*4.75*	*10.2*
99 %		*1.54*	*4.75*	*10.2*
None	R2 Stream	*2.10*	*1.14*	*2.39*
90 %		*2.10*	*1.14*	*2.39*
95 %		*2.10*	*1.14*	*2.39*
99 %		*2.10*	*1.14*	*2.39*
None	R3 Stream	*5.37*	*3.06*	*6.01*
90 %		*5.37*	*3.06*	*6.01*
95 %		*5.37*	*3.06*	*6.01*
99 %		*5.37*	*3.06*	*6.01*
None	R4 Stream	*8.33*	*7.85*	*9.06*
90 %		*8.33*	*7.85*	*9.06*
95 %		*8.33*	*7.85*	*9.06*
99 %		*8.33*	*7.85*	*9.06*

* Maximum values coming from multiple applications are marked in italics

Risk assessment for aquatic organisms

According to the Aquatic Guidance Document (EFSA PPR Panel Guidance, 2013), the risk to aquatic organisms is evaluated based on the derivation of Regulatory Acceptable Concentrations (RACs) as follows:

Acute risk assessment:

$RAC_{sw, ac} = LC_{50}$ or EC_{50} / 100

The risk is considered acceptable, if the $RAC_{sw, ac} \geq PEC_{sw, max}$.

Chronic risk assessment:

$RAC_{sw, ch} = NOEC$ or EC_{10} / 10

$RAC_{sw, ch} = E_rC_{50}$ / 10

The risk is considered acceptable, if the $RAC_{sw, ch} \geq PEC_{sw, max}$

To summarise, these abbreviations are used in subscript following the term PEC or RAC:

ac: acute, ch: chronic, sw: surface water, max: maximum.

ACUTE RISK ASSESSMENT FOR AQUATIC ORGANISMS

Table 10.2- 16: Acute risk assessment based on FOCUS Step 2 for the application in potatoes (4 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	44.558	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	20.6	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		**No**
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	8.44	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	1.44	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	1.54	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes
Late application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	44.558	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	10.4	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	3.93	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.715	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
(trifluoromethyl) pyridine-2-carboxylic acid)	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.692	No
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

* 1st tier parent endpoint
** 1st tier parent endpoint divided by 10

Table 10.2- 17: Acute risk assessment based on FOCUS Step 2 for the application in potatoes (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	36.309	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	15.8	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	6.44	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	>1020	1.13	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	1.29	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes
Late application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	36.309	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	7.98	**No**

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	3.01	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.563	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.582	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

* 1st tier parent endpoint
** 1st tier parent endpoint divided by 10

Table 10.2- 18: Acute risk assessment based on FOCUS Step 2 for the application in potatoes (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	28.662	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	10.9	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	4.39	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.816	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.973	**No**

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl}benzamide)	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes
Late application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	28.662	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	5.60	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	2.06	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.410	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.438	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	1.8		Yes

* 1st tier parent endpoint
** 1st tier parent endpoint divided by 10

Table 10.2- 19: Acute risk assessment based on FOCUS Step 2 for the application in potatoes (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	16.679	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	5.58	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	2.24	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.471	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.552	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	1.8		Yes
Late application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	16.679	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	2.92	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	1.06	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} >102000	> 1020	0.236	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.248	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

* 1st tier parent endpoint
** 1st tier parent endpoint divided by 10

For the 4 x 100 g/ha application in potatoes the acute trigger was not met for fish and *Daphnia* for fluopicolide and for fish with metabolite M-03. For the 3 x 100 g/ha, 2 x 100 g/ha and 1 x 100 g/ha applications in potatoes the acute trigger was not met for fish for fluopicolide and for metabolite M-03. The consideration of the more realistic FOCUS Step 3 water concentrations is presented below.

Table 10.2- 20: Acute risk assessment based on FOCUS Step 2 for the application in lettuce (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	28.662	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	5.60	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	2.06	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.410	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.438	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

Table 10.2- 21: Acute risk assessment based on FOCUS Step 2 for the application in lettuce (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	16.679	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	8.00	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	3.31	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.685	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.828	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes
Late application					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	16.679	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	2.92	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	1.06	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.236	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.248	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

* 1st tier parent endpoint
** 1st tier parent endpoint divided by 10

For the 2 × 100 g/ha application and the 1 × 100 g/ha early application in lettuce the acute trigger was not met for fish for fluopicolide and for metabolite M-03. A risk assessment for fluopicolide and its metabolite M-03 under consideration of more realistic FOCUS Step 3 water concentrations is presented below.

For the 1 x 100 g/ha late application in lettuce the risk assessment indicates acceptable acute risk for all aquatic organisms.

Table 10.2- 22: Acute risk assessment based on FOCUS Step 2 for the application in cucumber (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	36.309	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	10.1	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	3.94	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.718	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.776	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes
Mid					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	36.309	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	7.98	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	3.01	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.563	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.582	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Late					
FLC + PCH SC 687.5	Fish, acute *Oncorhynchus mykiss*	LC_{50} 6600	66	36.309	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} > 100000	> 1000		Yes
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	1.22	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, acute *Oncorhynchus mykiss*	LC_{50} 240000	2400	4.88	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 180000	1800		Yes
M-02 (3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid)	Fish, acute *Oncorhynchus mykiss*	LC_{50} > 102000	> 1020	0.874	Yes
	Invertebrate, acute *Daphnia magna*	EC_{50} 1800*	> 18		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36**	0.36	0.970	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 180**	> 1.8		Yes

* 1st tier parent endpoint
** 1st tier parent endpoint divided by 10

For the 3 × 100 g/ha early, mid and late application in cucumber the acute trigger was not met for fish for fluopicolide and for metabolite M-03. A risk assessment for fluopicolide and its metabolite M-03 under consideration of more realistic FOCUS Step 3 water concentrations is presented below.

Acute risk assessment based on FOCUS Step 3 PEC_{sw} values

Potatoes

Table 10.2- 23: Acute risk assessment based on FOCUS Step 3 for potatoes (4 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	3.70	**No**
				D4 stream	3.47	Yes
				D6 ditch	1.51	Yes
				D6 ditch 2nd	7.36	**No**
				R1 pond	0.260	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
				R1 stream	2.86	Yes
				R2 stream	1.82	Yes
				R3 stream	4.00	**No**
	Invertebrate, acute *Daphnia magna*	EC_{50} > 1800	> 18	D3 ditch	0.524	Yes
				D4 pond	3.70	Yes
				D4 stream	3.47	Yes
				D6 ditch	1.51	Yes
				D6 ditch 2nd	7.36	Yes
				R1 pond	0.260	Yes
				R1 stream	2.86	Yes
				R2 stream	1.82	Yes
				R3 stream	4.00	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.021	Yes
				D4 pond	0.206	Yes
				D4 stream	0.365	**No**
				D6 ditch	0.191	Yes
				D6 ditch 2nd	0.489	**No**
				R1 pond	0.003	Yes
				R1 stream	0.097	Yes
				R2 stream	0.081	Yes
				R3 stream	0.086	Yes
Late application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	3.65	**No**
				D4 stream	3.54	Yes
				D6 ditch	1.96	Yes
				D6 ditch 2nd	14.4	**No**
				R1 pond	0.125	Yes
				R1 stream	2.77	Yes
				R2 stream	2.01	Yes
				R3 stream	4.05	**No**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluorometh	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.011	Yes
				D4 pond	0.150	Yes
				D4 stream	0.266	Yes
				D6 ditch	0.226	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
yl)-2-pyridinyl] (hydroxy) methyl} benzamide)				D6 ditch 2nd	0.360	Yes
				R1 pond	0.001	Yes
				R1 stream	0.085	Yes
				R2 stream	0.092	Yes
				R3 stream	0.118	Yes

* 1st tier parent endpoint divided by 10

Table 10.2- 24: Acute risk assessment based on FOCUS Step 3 for potatoes (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	2.66	Yes
				D4 stream	2.50	Yes
				D6 ditch	1.12	Yes
				D6 ditch 2nd	4.93	**No**
				R1 pond	0.217	Yes
				R1 stream	2.86	Yes
				R2 stream	1.82	Yes
				R3 stream	2.58	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.014	Yes
				D4 pond	0.153	Yes
				D4 stream	0.272	Yes
				D6 ditch	0.144	Yes
				D6 ditch 2nd	0.364	**No**
				R1 pond	0.003	Yes
				R1 stream	0.067	Yes
				R2 stream	0.063	Yes
				R3 stream	0.069	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Late application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	2.59	Yes
				D4 stream	2.49	Yes
				D6 ditch	1.35	Yes
				D6 ditch 2nd	14.1	**No**
				R1 pond	0.072	Yes
				R1 stream	1.54	Yes
				R2 stream	1.33	Yes
				R3 stream	3.67	**No**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.007	Yes
				D4 pond	0.108	Yes
				D4 stream	0.191	Yes
				D6 ditch	0.161	Yes
				D6 ditch 2nd	0.326	Yes
				R1 pond	<0.001	Yes
				R1 stream	0.054	Yes
				R2 stream	0.064	Yes
				R3 stream	0.109	Yes

* 1st tier parent endpoint divided by 10

Table 10.2- 25: Acute risk assessment based on FOCUS Step 3 for potatoes (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	1.72	Yes
				D4 stream	1.62	Yes
				D6 ditch	0.742	Yes
				D6 ditch 2nd	2.98	Yes
				R1 pond	0.152	Yes
				R1 stream	1.42	Yes
				R2 stream	1.32	Yes
				R3 stream	2.58	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.008	Yes
				D4 pond	0.101	Yes
				D4 stream	0.181	Yes
				D6 ditch	0.098	Yes
				D6 ditch 2nd	0.242	Yes
				R1 pond	0.002	Yes
				R1 stream	0.054	Yes
				R2 stream	0.040	Yes
				R3 stream	0.040	Yes
Late application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	1.71	Yes
				D4 stream	1.63	Yes
				D6 ditch	0.796	Yes
				D6 ditch 2nd	7.70	**No**
				R1 pond	0.059	Yes
				R1 stream	1.15	Yes
				R2 stream	1.16	Yes
				R3 stream	2.98	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.005	Yes
				D4 pond	0.075	Yes
				D4 stream	0.133	Yes
				D6 ditch	0.100	Yes
				D6 ditch 2nd	0.243	Yes
				R1 pond	<0.001	Yes
				R1 stream	0.041	Yes
				R2 stream	0.043	Yes
				R3 stream	0.083	Yes

* 1st tier parent endpoint divided by 10

Table 10.2- 26: Acute risk assessment based on FOCUS Step 3 for potatoes (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}?
Early application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.524	Yes
				D4 pond	0.823	Yes
				D4 stream	0.777	Yes
				D6 ditch	0.564	Yes
				D6 ditch 2nd	1.33	Yes
				R1 pond	0.111	Yes
				R1 stream	1.42	Yes
				R2 stream	0.574	Yes
				R3 stream	0.864	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.003	Yes
				D4 pond	0.049	Yes
				D4 stream	0.091	Yes
				D6 ditch	0.051	Yes
				D6 ditch 2nd	0.121	Yes
				R1 pond	<0.001	Yes
				R1 stream	0.022	Yes
				R2 stream	0.020	Yes
				R3 stream	0.016	Yes

* 1st tier parent endpoint divided by 10

For the 4 x 100 g/ha application in potatoes the acute trigger was not met for fish for fluopicolide for the scenarios D4 pond, D6 ditch 2nd and R3 stream; for metabolite M-03 the acute trigger was not met for fish for the scenarios D4 stream and D6 ditch 2nd.

For the 3 x 100 g/ha application in potatoes the acute trigger was not met for fish for fluopicolide for the scenarios D6 ditch 2nd and R3 stream; for metabolite M-03 the acute trigger was not met for fish for the scenario D6 ditch 2nd.

For the 2 x 100 g/ha application in potatoes the acute trigger was not met for fish for fluopicolide for the scenario D6 ditch 2nd; for metabolite M-03 the acute trigger was met for fish for all scenarios.

For the 1 x 100 g/ha application in potatoes the acute trigger was met for fish for fluopicolide and for metabolite M-03 for all scenarios.

A refined risk assessment for the use in potatoes for the acute risk to fish is presented below. Those scenarios are presented which do not pass the risk assessment at Tier 1.

Lettuce

Table 10.2- 27: Acute risk assessment based on FOCUS Step 3 for lettuce (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D3 ditch	0.634	Yes
				D3 ditch 2nd	0.631	Yes
				D4 pond	1.53	Yes
				D4 stream	1.46	Yes
				D6 ditch	13.1	**No**
				R1 pond	0.437	Yes
				R1 pond 2nd	0.222	Yes
				R1 stream	2.39	Yes
				R1 stream 2nd	1.92	Yes
				R2 stream	0.963	Yes
				R2 stream 2nd	1.09	Yes
				R3 stream	2.18	Yes
				R3 stream 2nd	2.65	Yes
				R4 stream	3.17	Yes
				R4 stream 2nd	3.29	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.005	Yes
				D3 ditch 2nd	0.005	Yes
				D4 pond	0.061	Yes
				D4 stream	0.108	Yes
				D6 ditch	0.184	Yes
				R1 pond	0.003	Yes
				R1 pond 2nd	0.003	Yes
				R1 stream	0.047	Yes
				R1 stream 2nd	0.033	Yes
				R2 stream	0.052	Yes
				R2 stream 2nd	0.029	Yes
				R3 stream	0.054	Yes
				R3 stream 2nd	0.064	Yes
				R4 stream	0.020	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
				R4 stream 2nd	0.032	Yes

* 1st tier parent endpoint divided by 10

Table 10.2- 28: Acute risk assessment based on FOCUS Step 3 for lettuce (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	3.6	D3 ditch	0.634	Yes
				D3 ditch 2nd	0.635	Yes
				D4 pond	0.714	Yes
				D4 stream	0.675	Yes
				D6 ditch	1.67	Yes
				R1 pond	0.094	Yes
				R1 pond 2nd	0.079	Yes
				R1 stream	1.12	Yes
				R1 stream 2nd	0.985	Yes
				R2 stream	0.553	Yes
				R2 stream 2nd	0.562	Yes
				R3 stream	1.31	Yes
				R3 stream 2nd	2.00	Yes
				R4 stream	2.27	Yes
				R4 stream 2nd	2.40	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5 (trifluoromethyl)-2-pyridinyl] (hydroxy) methyl} benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D3 ditch	0.003	Yes
				D3 ditch 2nd	0.003	Yes
				D4 pond	0.046	Yes
				D4 stream	0.084	Yes
				D6 ditch	0.130	Yes
				R1 pond	<0.001	Yes
				R1 pond 2nd	0.002	Yes
				R1 stream	0.018	Yes
				R1 stream 2nd	0.031	Yes
				R2 stream	0.018	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
				R2 stream 2nd	0.056	Yes
				R3 stream	0.033	Yes
				R3 stream 2nd	0.062	Yes
				R4 stream	0.015	Yes
				R4 stream 2nd	0.040	Yes

* 1st tier parent endpoint divided by 10

For the 2 x 100 g/ha application in lettuce the acute trigger was not met for fish for fluopicolide for the scenario D6 ditch; for metabolite M-03 the acute trigger was met for fish for all scenarios.

For the 1 x 100 g/ha application in lettuce the acute trigger was met for fish for fluopicolide and for metabolite M-03 for all scenarios.

A refined risk assessment for the use in lettuce for the acute risk to fish is presented below. Those scenarios are presented which do not pass the risk assessment at Tier 1.

Cucumber

Table 10.2- 29: Acute risk assessment based on FOCUS Step 3 for cucumber (3 x 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D6 ditch	1.54	Yes
				R2 stream	2.10	Yes
				R3 stream	5.37	**No**
				R4 stream	8.33	**No**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D6 ditch	0.169	Yes
				R2 stream	0.047	Yes
				R3 stream	0.067	Yes
				R4 stream	0.069	Yes
Mid application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D6 ditch	4.75	**No**
				R2 stream	1.14	Yes
				R3 stream	3.06	Yes
				R4 stream	7.85	**No**
M-03 (2,6-dichloro-N-{[3-chloro-5-	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D6 ditch	0.324	Yes
				R2 stream	0.124	Yes
				R3 stream	0.093	Yes

Compound	**Species**	**Endpoint [µg/L]**	**RAC [µg/L]**	**FOCUS Scenario**	**$PEC_{sw, max}$ [µg/L]**	**RAC ≥ PEC_{sw}**
(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)				R4 stream	0.241	Yes
Late application						
Fluopicolide	Fish, acute *Oncorhynchus mykiss*	LC_{50} 360	3.6	D6 ditch	10.2	**No**
				R2 stream	2.39	Yes
				R3 stream	6.01	**No**
				R4 stream	9.06	**No**
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Fish, acute *Oncorhynchus mykiss*	LC_{50} 36*	0.36	D6 ditch	0.367	**No**
				R2 stream	0.045	Yes
				R3 stream	0.047	Yes
				R4 stream	0.099	Yes

* 1st tier parent endpoint divided by 10

For the 3 x 100 g/ha early application in cucumber the acute trigger was not met for fish for fluopicolide for the scenarios R3 stream and R4 stream; for metabolite M-03 the acute trigger was met for fish for all scenarios.

For the 3 x 100 g/ha mid application in cucumber the acute trigger was not met for fish for fluopicolide for the scenarios D6 ditch and R4 stream; for metabolite M-03 the acute trigger was met for fish for all scenarios.

For the 3 x 100 g/ha late application in cucumber the acute trigger was not met for fish for fluopicolide for the scenarios D6 ditch, R3 stream and R4 stream; for metabolite M-03 the acute trigger was not met for fish for the scenario D6 ditch.

A refined risk assessment for the use in cucumber for the acute risk to fish is presented below. Those scenarios are presented which do not pass the risk assessment at Tier 1.

<u>Refined risk assessment (Tier 2b) for aquatic vertebrates</u>

Acute studies on 8 aquatic vertebrate species were performed with fluopicolide (7 on fish and 1 on amphibian). According to the Aquatic Guidance document, it is thus, possible to refine the risk assessment with a species sensitivity distribution (SSD). Several options are proposed in the guidance (table 28 page 101) for acute risk assessment: When no latency of effects is expected, LC_{50} can be used to derive the median HC_5, the RAC is then based on a assessment factor of 9; or the median HC_5 can be derived from NOEC or LC_{10} values from acute studies, the assessment factor in this case is 3.If latency of effects is expected, the SSD should be based on chronic data.

Latency of effects for fluopicolide:

The relevant effect to be considered for acute risk assessment is mortality. In all acute vertebrate studies, mortality is observed within the first 24h of the test, and as early as 3-4 h of exposure in some studies. Sublethal effects are observed in all tests, at the 1st observation time (3 or 4 h). Therefore, no latency of

mortality onset is expected with fluopicolide and the acute SSD can be derived with endpoints of acute studies.

The endpoints from acute studies are summarised in the table below:

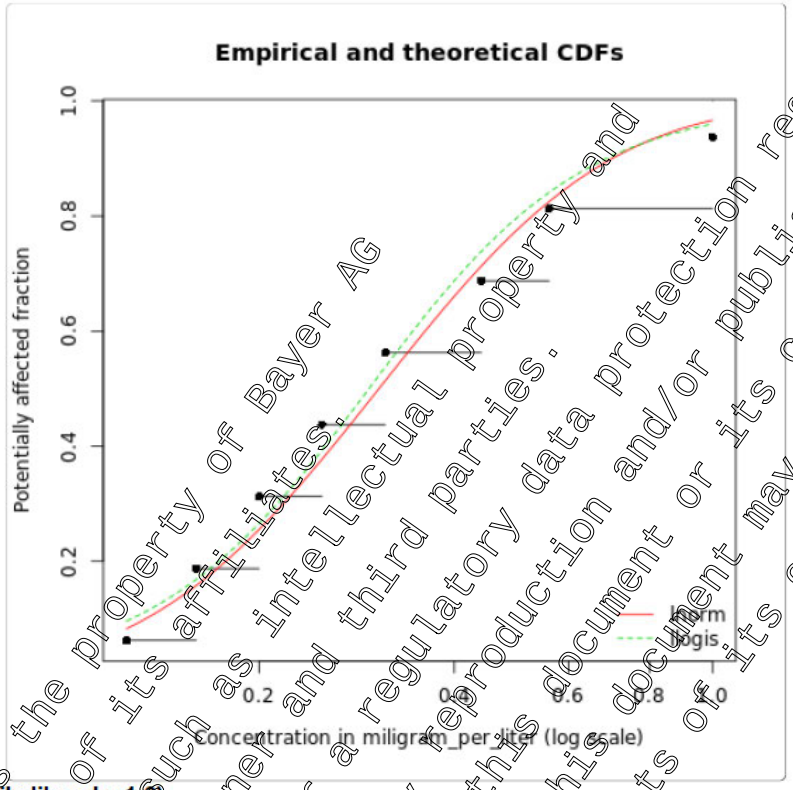
Species	LC_{50} (mg a.s./L)	NOEC based on both sublethal effects and mortality (mg a.s./L)
Oncorhynchus mykiss	0.36	0.16
Lepomis macrochirus	0.75	0.56
Cyprinus carpio	1.3	0.25
Danio rerio	1.8	1.0
Oryzias latipes	0.7	0.44
Pimephales promelas	1.34	0.313
Cyprinodon variegatus	0.41	0.2
Xenopus laevis	> 1	0.125

The NOEC-based SSD is preferred because it ensures less uncertainty regarding the compliance with the protection goals since no extrapolation is necessary from endpoints producing 50% of mortality to a safe concentration. Moreover, the dose response for fluopicolide is very steep: the ratio between the NOEC and the LC_{50} is below 2 for some species. To even allow a higher level of protection, the NOEC considered here are based on both mortality and sublethal effects.

However, for completeness reasons, SSD approaches based on both LC_{50} and NOEC, are presented below. The SSD calculations were performed with Mosaic (MOdeling and StAtistical tools for ecotoxICology, developed by Lyon University), for both available models: log normal and log logistic. The best fit is evaluated on the basis of the confidence interval width of the HC_5 and the visual fit to the data in the lower part of the curve.

NOEC-based SSD:

Calculation of NOEC based on SSD



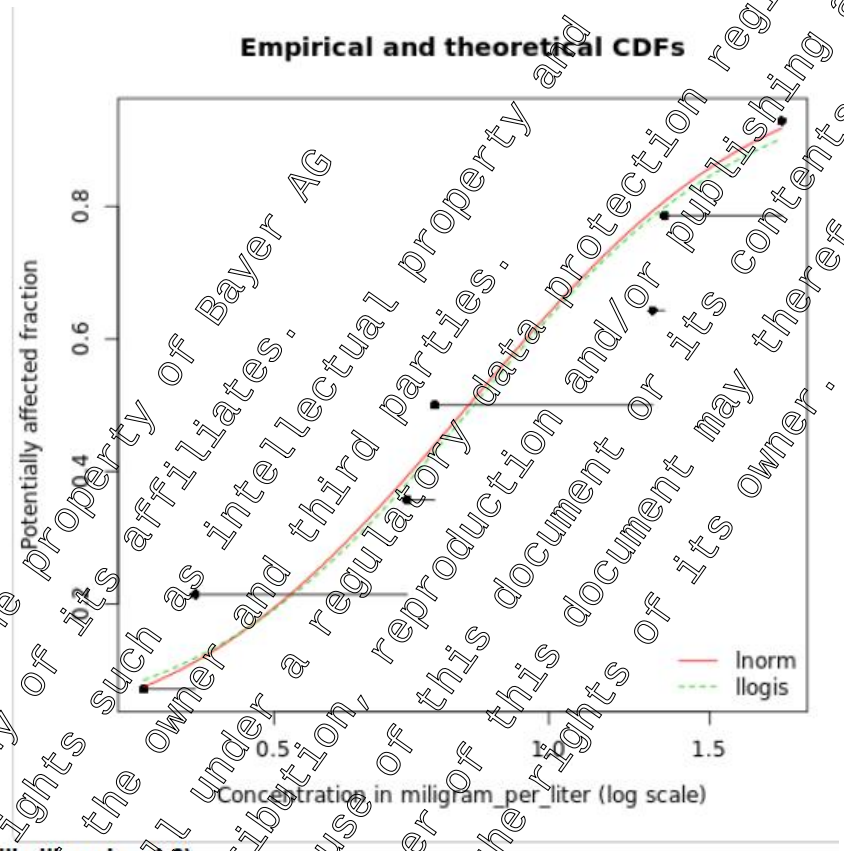
Log normal distribution (log-likelihood = 1.6)
meanlog: -1.2 [-1.6 ; -0.73]
sdlog: 0.65 [0.31 ; 0.91]
Log logistic distribution (log-likelihood = 1.3)
shape: 0.3 [0.18 ; 0.47]
scale: 2.6 [1.6 ; 5.7]

HC	Log-normal	Log-logistic
HC5	0.11 [0.059 ; 0.22]	0.095 [0.043 ; 0.21]
HC10	0.13 [0.079 ; 0.26]	0.13 [0.066 ; 0.25]
HC20	0.18 [0.11 ; 0.31]	0.17 [0.099 ; 0.31]
HC50	0.31 [0.19 ; 0.48]	0.3 [0.18 ; 0.47]

The log-normal HC_5 is selected according to the criteria stated above. The corresponding RAC is 0.037 mg/L (HC_5 divided by 3).

LC_{50}-based SSD:

Calculation of LC_{50} based on SSD



Log normal distribution (log-likelihood = -4.6)
meanlog: -0.2 [-0.61 ; 0.19]
sdlog: 0.57 [0.25 ; 0.81]
Log logistic distribution (log-likelihood = -4.9)
shape: 0.83 [0.52 ; 1.4]
scale: 2.9 [1.7 ; 6.8]

HC	Log-normal	Log-logistic
HC5	0.32 [0.19 ; 0.66]	0.3 [0.13 ; 0.64]
HC10	0.39 [0.24 ; 0.74]	0.36 [0.2 ; 0.73]
HC20	0.51 [0.33 ; 0.86]	0.51 [0.28 ; 0.91]
HC50	0.82 [0.54 ; 1.2]	0.83 [0.52 ; 1.4]

The fit to the LC_{50} data is worse than to the NOEC and less data can be included in the SSD since the LC_{50} for *Xenopus* is an unbound value. Applying an assessment factor of 9 to these HC_5 would result in a RAC of 0.033 mg/L, which is very similar to the RAC derived from the NOEC-based SSD. Therefore, for these reasons and the reasons given previously, the SSD-RAC of 0.037 mg/L should be used to refine the fluopicolide risk assessment for aquatic vertebrates.

Potatoes

Table 10.2- 30: Acute risk assessment based on FOCUS Step 3 for potatoes (4 × 100 g a.s./ha) considering a refined acute endpoint for aquatic vertebrates

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D4 pond	3.70	Yes
				D6 ditch 2nd	7.36	Yes
				R3 stream	4.00	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 11*	3.7	D4 stream	0.365	Yes
				D6 ditch 2nd	0.489	Yes
Late application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D4 pond	3.65	Yes
				D6 ditch 2nd	14.4	Yes
				R3 stream	4.05	Yes

*parent endpoint divided by 10

Table 10.2- 31: Acute risk assessment based on FOCUS Step 3 for potatoes (3 × 100 g a.s./ha) considering a refined acute endpoint for aquatic vertebrates

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D6 ditch 2nd	4.93	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC 11*	3.7	D6 ditch 2nd	0.364	Yes
Late application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D6 ditch 2nd	14.1	Yes
				R3 stream	3.67	Yes

*parent endpoint divided by 10

Table 10.2- 32: Acute risk assessment based on FOCUS Step 3 for potatoes (2 × 100 g a.s./ha) considering a refined acute endpoint for aquatic vertebrates

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,\ max}$ [µg/L]	RAC ≥ PEC_{sw}
Late application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D6 ditch 2nd	7.70	Yes

For all application patterns in potatoes the risk assessment indicates acceptable acute risk for all aquatic organisms.

Lettuce

Table 10.2- 33: Acute risk assessment based on FOCUS Step 3 for lettuce (2 × 100 g a.s./ha) considering a refined acute endpoint for aquatic vertebrates

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw, max}$ [µg/L]	$RAC \geq PEC_{sw}$
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D6 ditch	13.1	Yes

For all application patterns in lettuce the risk assessment indicates acceptable acute risk for all aquatic organisms.

Cucumber

Table 10.2- 34: Acute risk assessment based on FOCUS Step 3 for cucumber considering a refined acute endpoint for aquatic vertebrates

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw, max}$ [µg/L]	$RAC \geq PEC_{sw}$
Early application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	R3 stream	5.37	Yes
				R4 stream	8.33	Yes
Mid application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 110	37	D6 ditch	4.75	Yes
				R4 stream	7.85	Yes
Late application						
Fluopicolide	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio*	HC_5 110	37	D6 ditch	10.2	Yes
				R3 stream	6.01	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw, max}$ [µg/L]	RAC ≥ PEC_{sw}
	Oryzias latipes *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*			R4 stream	9.06	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl}benzamide)	Aquatic vertebrates, acute *Oncorhynchus mykiss* *Lepomis macrochirus* *Cyprinus carpio* *Brachydanio rerio* *Oryzias latipes* *Cyprinodon variegatus* *Pimephales promelas* *Xenopus laevis*	HC_5 11*	3.7	D6 ditch	0.367	Yes

*parent endpoint divided by 10

For the use in cucumber the risk assessment indicates acceptable acute risk for all aquatic organisms.

CHRONIC RISK ASSESSMENT FOR AQUATIC ORGANISMS

Potatoes

Table 10.2- 35: Chronic risk assessment based on FOCUS Step 2 for the application in potatoes (4 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	44.558	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	20.6	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		**No**
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	8.44	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	1.44	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	1.54	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes
Late application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	44.558	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	10.4	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	3.93	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.715	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.692	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 36: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in potatoes (4 × 100 g a.s./ha)

Compound	**Species**	**Endpoint [µg/kg]**	**RAC [µg/kg]**	**$PEC_{sed.max}$ [µg/kg]**	**RAC ≥ PEC_{sed}**
Early application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	54.6	Yes
Late application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	10.6	Yes

Table 10.2- 37: Chronic risk assessment based on FOCUS Step 2 for the application in potatoes (3 × 100 g a.s./ha)

Compound	**Species**	**Endpoint [µg/L]**	**RAC [µg/L]**	**$PEC_{sw.max}$ [µg/L]**	**RAC ≥ PEC_{sw}**
Early application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	36.309	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	15.8	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	6.44	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	1.13	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	1.29	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes
	Late application				
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	36.309	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	7.98	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	3.01	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.563	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.582	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 38: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in potatoes (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/kg]	RAC [µg/kg]	$PEC_{sed.max}$ [µg/kg]	RAC ≥ PEC_{sed}
Early application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	41.8	Yes
Late application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	21.0	Yes

Table 10.2- 39: Chronic risk assessment based on FOCUS Step 2 for the application in potatoes (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	28.662	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	10.9	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	4.39	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.816	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.973	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes
Late application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	28.662	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	5.60	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	2.06	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.410	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.438	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 40: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in potatoes (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/kg]	RAC [µg/kg]	$PEC_{sed.max}$ [µg/kg]	RAC ≥ PEC_{sed}
Early application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	28.7	Yes
Late application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	14.7	Yes

Table 10.2- 41: Chronic risk assessment based on FOCUS Step 2 for the application in potatoes (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	16.679	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	5.58	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	2.24	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.471	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes

Compound	Species	Endpoint [µg/L]		RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10}	27.8**	2.78	0.552	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC	19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50}	12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50}	> 320**	> 32		Yes
Late application						
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50}	890	89	16.679	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10}	278	27.8	2.92	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10}	180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50}	73	7.3		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50}	> 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10}	278*	27.8	1.06	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC	190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50}	92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50}	97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10}	278*	27.8	0.236	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC	190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50}	74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50}	> 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10}	27.8**	2.78	0.248	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC	19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50}	12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50}	> 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 42: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in potatoes (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/kg]	RAC [µg/kg]	$PEC_{sed.max}$ [µg/kg]	RAC ≥ PEC_{sed}
Early application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	14.8	Yes
Late application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	7.63	Yes

For the 4 x 100 g/ha application in potatoes the chronic trigger was not met for invertebrates and algae for fluopicolide and for algae for metabolite M-03. For the 3 x 100 g/ha application in potatoes the chronic trigger was not met for algae for fluopicolide and for metabolite M-03. For the 2 x 100 g/ha application in potatoes the chronic trigger was not met for algae for fluopicolide. For the 1 x 100 g/ha application in potatoes the risk assessment indicates acceptable chronic risk for all aquatic organisms. The consideration of the more realistic FOCUS Step 3 water concentrations is presented below.

<u>Lettuce</u>

Table 10.2- 43: Chronic risk assessment based on FOCUS Step 2 for the application in lettuce (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	28.662	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	5.60	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	2.06	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.410	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.438	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 44: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in lettuce (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/kg]	RAC [µg/kg]	$PEC_{sed.max}$ [µg/kg]	RAC ≥ PEC_{sed}
Fluopicolide	Sediment dweller, chronic *Limbriculus variegatus*	NOEC 1980	198	14.7	Yes

Table 10.2- 45: Chronic risk assessment based on FOCUS Step 2 for the application in lettuce (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	16.679	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	8.00	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	3.31	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.685	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.828	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes
Late application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	16.679	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	2.92	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	1.06	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.236	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.248	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier-1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 46: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in lettuce (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/kg]	RAC [µg/kg]	$PEC_{sed.max}$ [µg/kg]	RAC ≥ PEC_{sed}
Early application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	21.2	Yes
Late application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	7.63	Yes

For the 1 x 100 g/ha early application in lettuce the chronic trigger was not met for fluopicolide for algae. For the 2 x 100 g/ha and the 1 x 100 g/ha late applications in lettuce the risk assessment indicates acceptable chronic risk for all aquatic organisms. The consideration of the more realistic FOCUS Step 3 water concentrations is presented below.

Cucumber

Table 10.2- 47: Chronic risk assessment based on FOCUS Step 2 for the application in cucumber (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	36.309	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	10.2	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	3.94	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.718	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200**	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.776	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
Mid application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	36.309	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	7.98	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	3.01	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.563	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	> 320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.582	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes
Late application					
FLC + PCH SC 687.5	Algae *Navicula pelliculosa*	E_rC_{50} 890	89	36.309	Yes
Fluopicolide	Fish, chronic *Pimephales promelas*	EC_{10} 278	27.8	12.2	Yes
	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18		Yes
	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3		**No**
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200	> 320		Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	$PEC_{sw.max}$ [µg/L]	RAC ≥ PEC_{sw}
M-01 (2,6-dichlorobenzamide (BAM))	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	4.88	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Pseudokirchneriella subcapitata*	E_rC_{50} 92000	9200		Yes
	Aquatic macrophytes, *Lemna gibba*	E_rC_{50} 97600	9760		Yes
M-02 (3-chloro-5-(trifluoromethyl) pyridine-2-carboxylic acid)	Fish, chronic *Pimephales promelas*	EC_{10} 278*	27.8	0.874	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 190*	19		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 74000	7400		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 3200*	>320		Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl] (hydroxy)methyl} benzamide)	Fish, chronic *Pimephales promelas*	EC_{10} 27.8**	2.78	0.970	Yes
	Invertebrate, chronic *Daphnia magna*	NOEC 19**	1.9		Yes
	Algae *Navicula pelliculosa*	E_rC_{50} 12.1**	1.21		Yes
	Aquatic macrophyte *Lemna gibba*	E_rC_{50} > 320**	> 32		Yes

* 1st tier parent endpoint (*Skeletonema* and mysids are not considered as tier 1 species)
** 1st tier parent endpoint divided by 10

Table 10.2- 48: Chronic risk assessment for sediment organisms based on FOCUS Step 2 for the application in cucumber (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/kg]	RAC [µg/kg]	$PEC_{sed.max}$ [µg/kg]	RAC ≥ PEC_{sed}
Early application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	26.7	Yes
Mid application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	21.0	Yes
Late application					
Fluopicolide	Sediment dweller, chronic *Lumbriculus variegatus*	NOEC 1980	198	26.7	Yes

For the early, mid and late 3 x 100 g/ha application in cucumber the chronic trigger was not met for fluopicolide for algae. The consideration of the more realistic FOCUS Step 3 water concentrations is presented below.

Chronic risk assessment based on FOCUS Step 3 PEC_{sw} values

Potatoes

Table 10.2- 49: Chronic risk assessment based on FOCUS Step 3 for potatoes (4 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	PEC_{swmax} [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Invertebrate, chronic *Americamysis bahia*	EC_{10} 180	18	D3 ditch	0.524	Yes
				D4 pond	3.70	Yes
				D4 stream	3.47	Yes
				D6 ditch	1.51	Yes
				D6 ditch 2nd	7.36	Yes
				R1 pond	0.260	Yes
				R1 stream	2.86	Yes
				R2 stream	1.82	Yes
				R3 stream	4.00	Yes
	Algae *Skeletonema costatum*	ErC_{50} 73	7.3	D3 ditch	0.524	Yes
				D4 pond	3.70	Yes
				D4 stream	3.47	Yes
				D6 ditch	1.51	Yes
				D6 ditch 2nd	7.36	**No**
				R1 pond	0.260	Yes
				R1 stream	2.86	Yes
				R2 stream	1.82	Yes
				R3 stream	4.00	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Algae *Navicula pelliculosa*	ErC_{50} 12.1*	1.21	D3 ditch	0.021	Yes
				D4 pond	0.206	Yes
				D4 stream	0.365	Yes
				D6 ditch	0.191	Yes
				D6 ditch 2nd	0.489	Yes
				R1 pond	0.003	Yes
				R1 stream	0.097	Yes
				R2 stream	0.081	Yes
				R3 stream	0.086	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Late application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D3 ditch	0.524	Yes
				D4 pond	3.65	Yes
				D4 stream	3.54	Yes
				D6 ditch	1.96	Yes
				D6 ditch 2nd	14.4	**No**
				R1 pond	0.125	Yes
				R1 stream	2.77	Yes
				R2 stream	2.01	Yes
				R3 stream	4.05	Yes

* 1st tier parent endpoint divided by 10 (*Skeletonema* is not considered as a tier 1 species)

Table 10.2- 50: Chronic risk assessment based on FOCUS Step 3 for potatoes (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D3 ditch	0.524	Yes
				D4 pond	2.66	Yes
				D4 stream	2.50	Yes
				D6 ditch	1.12	Yes
				D6 ditch 2nd	4.93	Yes
				R1 pond	0.217	Yes
				R1 stream	2.86	Yes
				R2 stream	1.82	Yes
				R3 stream	2.58	Yes
M-03 (2,6-dichloro-N-{[3-chloro-5-(trifluoromethyl)-2-pyridinyl](hydroxy)methyl} benzamide)	Algae *Navicula pelliculosa*	E_rC_{50} 12.1*	1.21	D3 ditch	0.014	Yes
				D4 pond	0.153	Yes
				D4 stream	0.272	Yes
				D6 ditch	0.144	Yes
				D6 ditch 2nd	0.364	Yes
				R1 pond	0.003	Yes
				R1 stream	0.067	Yes
				R2 stream	0.063	Yes
				R3 stream	0.069	Yes

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Late application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D3 ditch	0.524	Yes
				D4 pond	2.59	Yes
				D4 stream	2.49	Yes
				D6 ditch	1.35	Yes
				D6 ditch 2nd	14.1	**No**
				R1 pond	0.072	Yes
				R1 stream	1.54	Yes
				R2 stream	1.33	Yes
				R3 stream	3.67	Yes

* 1st tier parent endpoint divided by 10 (*Skeletonema* is not considered as a tier 1 species)

Table 10.2- 51: Chronic risk assessment based on FOCUS Step 3 for potatoes (2 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D3 ditch	0.524	Yes
				D4 pond	0.72	Yes
				D4 stream	1.62	Yes
				D6 ditch	0.742	Yes
				D6 ditch 2nd	2.98	Yes
				R1 pond	0.152	Yes
				R1 stream	1.42	Yes
				R2 stream	1.32	Yes
				R3 stream	2.58	Yes

For the 4 x 100 g/ha and 3 x 100 g/ha applications in potatoes the chronic trigger was not met for fluopicolide for algae for the scenario D6 ditch 2nd, for metabolite M-03 the chronic trigger was met for algae for all scenarios.

For the 2 x 100 g/ha application in potatoes the chronic trigger was met for algae for all scenarios.

A refined risk assessment for the use in potatoes for the chronic algae is presented below. Those scenarios are presented which do not pass the risk assessment at Tier 1.

Lettuce

Table 10.2- 52: Chronic risk assessment based on FOCUS Step 3 for lettuce (1 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D3 ditch	0.634	Yes
				D3 ditch 2nd	0.635	Yes
				D4 pond	0.714	Yes
				D4 stream	0.675	Yes
				D6 ditch	1.67	Yes
				R1 pond	0.094	Yes
				R1 pond 2nd	0.079	Yes
				R1 stream	1.12	Yes
				R1 stream 2nd	0.985	Yes
				R2 stream	0.553	Yes
				R2 stream 2nd	0.562	Yes
				R3 stream	1.31	Yes
				R3 stream 2nd	2.00	Yes
				R4 stream	2.27	Yes
				R4 stream 2nd	2.40	Yes

For the 1x 100 g/ha application in lettuce acceptable chronic risk to algae could be proven for all FOCUS Step 3 scenarios.

Cucumber

Table 10.2- 53: Chronic risk assessment based on FOCUS Step 3 for cucumber (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D6 ditch	1.54	Yes
				R2 stream	2.10	Yes
				R3 stream	5.37	Yes
				R4 stream	8.33	**No**

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Mid application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D6 ditch	4.75	Yes
				R2 stream	1.14	Yes
				R3 stream	3.06	Yes
				R4 stream	7.85	**No**
Late application						
Fluopicolide	Algae *Skeletonema costatum*	E_rC_{50} 73	7.3	D6 ditch	10.2	**No**
				R2 stream	2.39	Yes
				R3 stream	6.01	Yes
				R4 stream	9.06	**No**

For the early applications in cucumber the chronic trigger was not met for fluopicolide for algae for the scenario R4 stream.

For the mid applications in cucumber the chronic trigger was not met for fluopicolide for algae for the scenario R4 stream.

For the late applications in cucumber the chronic trigger was not met for fluopicolide for algae for the scenarios D6 ditch and R4 stream.

A refined risk assessment for the use in cucumber for the chronic algae is presented below. Those scenarios are presented which do not pass the risk assessment at step 3.

Refinement of chronic risk assessment for algae

Two diatoms species (*Navicula pelliculosa* and *Skeletonema costatum*) have been tested with fluopicolide and as expected for fungicides targeting oomycetes, diatoms are the most sensitive algae taxonomic group. A geometric mean endpoint can be calculated for these 2 species (tier 2a of the AGD).

The approach is deemed acceptable for algae because the endpoints are based on the same type of effects (growth inhibition), occurring within the same time frame and are explained by the specific mode of action of the active substance. Non sensitive species have not been included in the geometric mean calculation.

The geometric mean for algae is 94 µg a.s./L, the corresponding RAC is 9.4 µg/L.

Potatoes

Table 10.2- 54: Refined chronic risk assessment based on FOCUS Step 3 for potatoes (4 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	*Navicula pelliculosa* *Skeletonema costatum*	94	9.4	D6 ditch 2nd	7.36	Yes
Late application						
Fluopicolide	*Navicula pelliculosa* *Skeletonema costatum*	94	9.4	D6 ditch 2nd	14.4	**No**

Table 10.2- 55: Refined chronic risk assessment based on FOCUS Step 3 for potatoes (3 × 100 g a.s./ha)

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Late application						
Fluopicolide	*Navicula pelliculosa* *Skeletonema costatum*	94	9.4	D6 ditch 2nd	14.1	**No**

No acceptable chronic risk to algae could be proven for the FOCUS Step 3 scenarios. Therefore, the risk assessment based on FOCUS Step 4 water concentrations is presented below.

Cucumber

Table 10.2- 56: Refined chronic risk assessment based on FOCUS Step 3 for cucumber

Compound	Species	Endpoint [µg/L]	RAC [µg/L]	FOCUS Scenario	$PEC_{sw,max}$ [µg/L]	RAC ≥ PEC_{sw}
Early application						
Fluopicolide	*Navicula pelliculosa* *Skeletonema costatum*	94	9.4	R4 stream	8.33	Yes
Mid application						
Fluopicolide	*Navicula pelliculosa* *Skeletonema costatum*	94	9.4	R4 stream	7.85	Yes
Late application						
Fluopicolide	*Navicula pelliculosa* *Skeletonema costatum*	94	9.4	D6 ditch	10.2	**No**
				R4 stream	9.06	Yes

No acceptable chronic risk to algae could be proven for the FOCUS Step 3 D6 ditch scenario of the late application. Therefore, the risk assessment based on FOCUS Step 4 water concentrations is presented below.

Chronic risk assessment based on FOCUS Step 4 PEC_{sw} values

The only scenario that does not pass the chronic risk assessment based on FOCUS Step 3 PEC_{sw} values is D6 ditch. Even though mitigation by the introduction of buffer zones or by the use of drift reduction

nozzles is not relevant for drainage scenarios, the chronic risk assessment based on FOCUS Step 4 water concentrations is presented below for the sake of completeness.

Table 10.2- 57: Chronic risk assessment based on FOCUS Step 4 for potatoes (4 × 100 g a.s./ha)

	FOCUS Scenario	$PEC_{sw, max}$ [µg/L]							
Late application									
Nozzle reduction	**Vegetated strip (m)**	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D6 Ditch 2nd	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
50 %		14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
75 %		14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
90 %		14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
RAC ≥ PEC_{sw}									
None	RAC = 9.4 µg/L	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
50 %		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
75 %		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
90 %		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Table 10.2- 58: Chronic risk assessment based on FOCUS Step 4 for potatoes (3 × 100 g a.s./ha)

	FOCUS Scenario	$PEC_{sw, max}$ [µg/L]							
Late application									
Nozzle reduction	**Vegetated strip (m)**	None	None	None	None	None	10 m	10 m	20 m
	No spray buffer (m)	0 m	5 m	10 m	15 m	20 m	10 m	15 m	20 m
None	D6 Ditch 2nd	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
50 %		*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
75 %		*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
90 %		*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*	*14.1*
RAC ≥ PEC_{sw}									
None	RAC = 9.4 µg/L	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
50 %		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
75 %		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
90 %		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Table 10.2- 59: Chronic risk assessment based on FOCUS Step 4 for cucumber (3 × 100 g a.s./ha)

Late application	
Nozzle reduction	**$PEC_{sw, max}$ [µg/L]**
FOCUS Scenario	D6 ditch
None	*10.2*
90 %	*10.2*
95 %	*10.2*
99 %	*10.2*
RAC = 9.4 µg/L	**RAC ≥ PEC_{sw}**
None	**No**
50 %	**No**
75 %	**No**
90 %	**No**

Combined toxicity risk assessment

According to the EFSA "Guidance on tiered risk assessment for plant protection products for aquatic organisms in edge-of-field surface waters" (EFSA Journal 2013;11(7):3290, chapter 10.3.11), for products containing more than one active substances, the mixture toxicity shall be addressed via the Concentration Addition (CA) Model. And, following the recommendations of the EFSA "Outcome of the pesticides peer review meeting on general recurring issues in ecotoxicology" (EFSA Supporting publication 2019: EN-1673), it is necessary to consider whether the formulation is more or less toxic than the parents. When the endpoint of the PPP (expressed in terms of fluopicolide) is at least three times lower than the equivalent endpoint for the active substance it should be considered to be more toxic.

The measured toxicity data (ECx) available for the given endpoint is shown in the table below for the formulated product (PPP) Fluopicolide + Propamocarb-hydrochloride SC 687.5 and the active substances fluopicolide and propamocarb-hydrochloride.

Is the formulation three times more toxic than fluopicolide?

Table 10.2- 60: Comparison of endpoints available for the formulated product (PPP) Fluopicolide + Propamocarb-hydrochloride SC 687.5 and the active substance fluopicolide

Test species	Endpoint and test system	Measured toxicity of PPP [mg prod./L]	Fluopicolide [mg a.s./L]	Formulation endpoint recalculated for fluopicolide* [mg a.s./L]	Fluopicolide endpoint / Recalculated formulation endpoint
O. mykiss	LC_{50}, acute, 96 h	6.6	0.36	0.38	0.95
D. magna	EC_{50}, acute, 48 h	> 100	> 1.8	not calculated	-
N. pelliculosa	E_rC_{50}, short-term, 72 h	0.89	0.121	0.05	2.4

* amount of fluopicolide in the test item used in formulation studies: 5.73%

Regarding fish, aquatic invertebrates and algae, endpoints are available for both, formulation (ECx_{PPP}) and a.s. ($ECx_{a.s.}$).

No meaningful comparison can be performed for *Daphnia* due to unbound values for both the formulation and the active substance.

The formulation is not more than 3 times more toxic than fluopicolide.

MDR calculation

Th calculation is performed only for fish and algae due to the unbound values for *Daphnia*. As a conservative approach the lowest endpoints for fish and algae are used in the calculation, therefore different species are considered.

Table 10.2- 61: Overview of endpoints available for the formulated product (PPP) Fluopicolide + Propamocarb-hydrochloride SC 687.5 and the active substances fluopicolide and propamocarb-hydrochloride

Test species	Endpoint and test system	Measured toxicity of PPP [mg prod./L]	Fluopicolide [mg a.s./L]	Propamocarb hydrochloride [mg a.s./L]
O. mykiss/ L. macrochirus	LC_{50}, acute, 96 h	6.6	0.36	> 92
D. magna	EC_{50}, acute, 48 h	> 100	> 1.8	> 100
N. pelliculosa / S. costatum	E_rC_{50}, short-term, 72 h	0.89	0.073	> 85

Table 10.2- 62: Summary of results obtained in the studies with the formulated product (PPP) Fluopicolide + Propamocarb-hydrochloride SC 687.5 and comparison of calculated and measured mixture toxicity

Test species	Endpoint and test system	Measured toxicity of PPP (converted to be a.s. based) ($LC_{50\ PPP}$ or $EC_{50\ PPP}$) [mg total a.s./L]	Calculated mixture toxicity [A] (a.s. in product) $LC_{50\ mix\text{-}CA}$ or $EC_{50\ mix\text{-}CA}$ [mg total a.s./L]	Model deviation ratio (MDR = $EC_{50\ mix\text{-}CA}$ / $EC_{50\ PPP}$)
Fish	LC_{50}, acute, 96 h	4.085	3.744	0.92
Algae	E_rC_{50}, short-term, 72 h	0.551	0.782	1.42

[A] The mixture toxicity of the formulation was re-calculated based on the measured contents of fluopicolide (64.7 g/L), and propamocarb-hydrochloride (634 g/L) within the formulation and the product density (1.129 g/cm³).

The calculated MDR values are between 0.2 and 5 for fish, and algae, indicating that the formulation does not cause an (unexpected) increased toxicity compared to the active substances for these organisms. No synergisms or additional toxicity occurs due to the co-formulants.

Therefore, the evaluation of the safety of the formulation can be based on the risk assessment of fluopicolide. Nevertheless, a formulation-based risk assessment has also been performed and was presented above.

CP 10.2.1 Acute toxicity to fish, aquatic invertebrates, or effects on aquatic algae and macrophytes

Data Point:	KCP 10.2.1/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE B066752 04 SC61 A1: Acute toxicity test with rainbow trout (Oncorhynchus mykiss) under static conditions
Report No:	C038493
Document No:	M-225109-01-1
Guideline(s) followed in study:	OECD: 203, (1992)
Deviations from current test guideline:	Method: Deviations from current guideline SANCO/3029/99 rev.4: Limited sets of validation recoveries were analysed. However, the average recoveries were within the acceptable range of 70–110% and the RSD values were below 20%. The analytical method can be regarded as fit for purpose. Study: Current Guideline: OECD 203 (2019) The temperature slightly exceeded the highest recommended value of 14°C (14.4° C for discrete measurements or 14.6° according to the min-max recording). This deviation is considered minor with no impact on the test results because the former version of the OECD guideline recommended a range of 13-17°C for trout. The fish loading is 0.92 g/L which exceed the recommended value of 0.8 g/L but all validity criteria of the study are fulfilled and the former version of the guideline allowed a loading rate up to 1 g/L.
Previous evaluation:	yes, evaluated and accepted in FLC DAR 2005; in Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

An acute toxicity test was performed with the rainbow trout (*Oncorhynchus mykiss*) in a static system. Juvenile rainbow trout were exposed to fluopicolide + propamocarb-hydrochloride SC 687.5 at nominal concentrations of 0.625, 1.25, 2.5, 5.0 and 10 mg /L in well water for a 96- hour period. Additionally, a negative and a solvent control was included. All treatments had 10 fish per test vessel (10 fish per treatment level). Test solutions were not renewed. Mortality, toxicity values and behaviour were recorded at time points 0, 24, 48, 72 and 96 hours.

Recoveries were between 68.2 and 109%. Analysis of the test solution were only 68.2% recovery occurred at day 0 showed a recovery of 92.2% at day 4. As all other measured values were in the range of 80-120% recovery LC_{50} values and biological data are based on nominal concentrations. There was no fluopicolide residue found in the control samples. All samples were analysed by Gas Chromatography with ECD detector.

The study fulfils all validity criteria of the current version of OECD 203 guideline.

Mortality occurred at 5 mg/L and above, with 100% mortality observed at 72 h at 10 mg/L. Sublethal effects were observed in one fish at 0.625 and 5.0 mg/L and in all living fish at 10 mg/L. The 96-hour LC_{50} of fluopicolide technical to rainbow trout is calculated as 6.6 mg/L (95% CL = 5 to 10 mg/L). The lowest observed concentration with mortality is 5 mg/L. The highest concentration without mortality is 2.5 mg/L.

I. MATERIAL AND METHODS:

Test material	Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) Code (AE B066752 04 SC61 A1) Batch No: OP220159 Active ingredients: 64.7 g/L fluopicolide, 634 g/L propamocarb-hydrochloride Density: 1.129 g/mL
Guideline(s) adaptation	None specified
Test species	Rainbow trout (*Oncorhynchus mykiss*)
Acclimation	At least 14 days Health during acclimation: No mortality during 48 hours prior to testing, less than 10% during 7 days before test start
Organism age/size	Mean length: 5.1 cm (range: 4.4 – 6.0 cm) representative sample two days before exposure Mean body weight: 1.34 g (range: 0.77 – 2.12 g) representative sample two days before exposure
Test solutions	Nominal concentrations: 0.625, 1.25, 2.5, 5.0 and 10 mg/L. Corresponding mean recovery: 80.2, 98.9, 98.5, 104.0, 100.4% Control: water Evidence of undissolved material: Not stated
Replication	No. of vessels per concentration (replicates): 1 No. of vessels per control (replicates): 1
Organisms per replicate	No. of organisms per vessel: 10
Exposure	Static Total exposure duration: 96 hours
Test Vessel Loading	0.92 g fish/L test medium
Feeding during test	None
Test conditions	Temperature: 13.6 – 14.4°C (single measurements in all test vessels) 13.9 – 14.6°C (continuous measurements in the control vessels) Photoperiod: 16 hours light, 8 hours dark; with 30 min transition periods Light intensity: 365 - 442 lux pH: 7.32 – 7.68 Dissolved oxygen: 9.10 – 11.09 mg/L (91 - 113 % of saturation) Water hardness: 152 - 156 mg $CaCO_3$/L
Parameters Measured / Observations	The test vessels were examined at start of exposure and after 24, 48, 72 and 96 hours for mortality, sublethal effects and physical characteristics. The pH, dissolved oxygen concentration and temperature were measured in the control and the test concentrations daily. The temperature was monitored continuously by placing the probe of a min/max thermometer in the control aquarium.
Sampling for Chemical analysis	Samples of test solutions were taken at test initiation (0 hour) and at test termination (96 hours) for analysis of fluopicolide. Samples were analysed by using a gas-chromatography with ECD detector. Fluopicolide, one active

	ingredient of Fluopicolide + Propamocarb-hydrochloride SC 687.5 was measured to derive the concentration of Fluopicolide + Propamocarb-hydrochloride SC 687.5 in the samples.
Data analysis	The $LC_{50\ values}$ were calculated by a computer program. The 24 hour LC_{50} was calculated by probit analysis, a binomial test was selected for the calculation of the 24, 48, 72 and 96-hour LC_{50} values.

II. RESULTS AND DISCUSSION:

Validity criteria (OECD 203, 2019)	Required	Obtained
Mortality in control during test	≤ 10%	0 %
Dissolved oxygen saturation	≥ 60%	91 - 113%
Analytical measurement of test concentrations	Compulsory	Done

Analytical results:

Recoveries were between 68.2 and 109% (see table below). Analysis of the test solution where only 68.2% recovery occurred at day 0, showed a recovery of 92.2% at day 4. As all other measured values were in the range of 80-120% recovery, and this low recovery was observed at a concentration which had no impact on the statistical analysis, LC_{50} values and biological data are based on nominal concentrations. No residues were found in the control samples above the limit of quantification (0.01 mg/L for fluopicolide + propamocarb-hydrochloride SC 687.5).

Nominal concentration (mg/L)	Day 0 (New)	Day 4 (Aged)	Day 0 and Day 4
	% Recovery	% Recovery	% Mean recovery
0.625	68.2	92.2	80.2
1.25	96.8	101	98.9
2.5	100	96.9	98.5
5.0	104	104	104.0
10.0	91.8	109	100.4

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4 with minor acceptable exceptions only.

Biological results:

Observations

After 48-hours, sub-lethal effects, i.e. dark colour was observed in one fish in the 0.625 mg/L treatment. In the treatment with 5 mg/L, sub-lethal effects were observed int one fish, i.e. complete loss of equilibrium, swimming on bottom and lethargy. In the highest treatment, sublethal effects (complete loss of equilibrium, swimming on bottom, lethargy) were observed in all living fish.

Mortality

Exposure time (hours)	0	24	48	72	96
Nominal conc. (mg/L)	No of dead (%)	No of dead (%)	No of dead (%)	No of dead (%)	No of dead (%)
Control	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
0.625	0 (0)	0 (0)	0 (0)	1 (10)	1 (10)
1.25	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2.5	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
5.0	0 (0)	0 (0)	0 (0)	1 (10)	1 (10)
10.0	0 (0)	5 (50)	8 (80)	10 (100)	10 (100)

III. Conclusions:

The study meets the validity criteria and the endpoints based on nominal concentrations are:

LC_{50} 96 hours (95% C.I.):	**6.6 mg/L (5 – 10 mg/L)**
LOEC: lowest concentration with an effect (mortality)	5.0 mg / L
NOEC: highest concentration without mortality	2.5 mg / L

Assessment and conclusion by applicant:

The concentrations of fluopicolide only were analytically determined during the test. However, this study is still considered reliable because propamocarb-hydrochloride is stable in the test conditions according to the corresponding static tests with the active substance propamocarb and the correct dosing of the test item is confirmed by fluopicolide measurements. Moreover, propamocarb-hydrochloride is not the toxicity driver for fish (LC_{50} greater than 99 mg/L).

The study is therefore reliable and the LC_{50} of 6.6 mg/L and NOEC of 2.5 mg/L can be used in risk assessment.

Data Point:	KCP 10.2.1/02
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE B066752 04 SC61 A1: Acute toxicity test with common carp (Cyprinus carpio) under static conditions
Report No:	C039853
Document No:	M-227280-01-1
Guideline(s) followed in study:	OECD: 203 (1992)
Deviations from current test guideline:	Method: Deviations from current guideline SANCO/3029/99 rev.4: Limited sets of validation recoveries were analysed. However, the average recoveries were within the acceptable range of 70–110% and the RSD values were below 20%. The analytical method can be regarded as fit for purpose. Study: Current Guideline: OECD 203 (2019) No deviations
Previous evaluation:	yes, evaluated and accepted in FLC DAR 2005; in Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

An acute toxicity test was performed with the common carp (*Cyprinus carpio*) in a static system. Juvenile common carp were exposed to fluopicolide + propamocarb-hydrochloride SC 687.5 at nominal concentrations of 6.25, 12.5, 25, 50 and 100 mg/L in well water for a 96-hour period. Additionally, a negative and a solvent control was included. All treatments had 10 fish per test vessel (10 fish per treatment level). Test solutions were not renewed. Mortality, toxicity values and behaviour were recorded at time points 0, 24, 48, 72 and 96 hours.
Recoveries were between 68.9 and 101% (see table below). The lower recoveries at 50 and 100 mg test item/L were most likely due to precipitation. Since all concentrations relevant for the interpretation of the biological data were within ± 20% of the mean measured concentrations, the biological data were based on nominal concentrations. No residues were found in the control samples. All samples were analysed by Gas Chromatography with ECD detector.
The study fulfils all validity criteria of the current version of OECD 203 guideline.
Mortality occurred at 12.5 mg/L and above, with 100% mortality observed at 48 h at 50 mg/L. Sublethal effects were observed in one fish at 12.5 mg/L and above all over the study in surviving fish. The 96-hour LC_{50} of fluopicolide + propamocarb-hydrochloride SC 687.5 to common carp is calculated as 18 mg/L (95% CL = 12.5 to 25 mg/L). The lowest observed concentration with mortality is 25 mg/L. The highest concentration without mortality is 12.5 mg/L.

I. Material and Methods:

Test material	Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) Code (AE B066752 04 SC61 A1) Batch No: OP220159 Active ingredients: 64.7 g/L fluopicolide, 634 g/L propamocarb-hydrochloride Density: 1.129 g/mL
Guideline(s) adaptation	None specified
Test species	Common carp (*Cyprinus carpio*)

Acclimation	At least 14 days Health during acclimation: 2.6% mortality during 72 hours prior to testing
Organism age/size	Mean length: 3.7 cm (range: 3.0 – 4.0 cm) at the end of the study Mean body weight: 0.48 g (range: 0.23 – 0.71 g) at the end of the study
Test solutions	Nominal concentrations: 6.25 – 12.5 – 25 – 50 – 100 mg/L. Corresponding mean recovery: 97.0, 98.6, 97.1, 87.3, 85.0% Controls: reconstituted water Evidence of undissolved material: At the 50 and 100 mg/L concentrations precipitated test material was observed on the bottom of the test vessels
Replication	No. of vessels per concentration (replicates): 1 No. of vessels per control (replicates): 1
Organisms per replicate	No. of organisms per vessel: 10
Exposure	Static Total exposure duration: 96 hours
Test Vessel Loading	0.28 g fish/L test medium
Feeding during test	None
Test conditions	Temperature: 21.7 – 22.8°C (single measurements in all test vessels) 21.8 – 23.6°C (continuous measurements in the control vessels) Photoperiod: 16 hours light / 8 hours dark; with 30 min transition periods Light intensity: 362 - 467 lux pH: 7.17 – 7.71. Water hardness: 160-164 mg $CaCO_3$/L Dissolved oxygen: 7.20 – 8.52 mg/L (79 - 103 %) Conductivity: 480 - 500 µS/cm Alkalinity: 30 - 40 mg/L
Parameters Measured / Observations	Observations for death and sublethal behavioural effects were observed after 24, 48, 72 and 96 hours. The pH, dissolved oxygen concentration and temperature were measured in the control and the test concentrations daily. The temperature was also monitored continuously by placing the probe of a min/max thermometer in the control aquarium.
Sampling for Chemical analysis	Samples of test solutions were taken at test initiation (0 hour) and at test termination (96 hours) for analysis of test substance. Samples were analysed by using a gas-chromatography with ECD detector. Fluopicolide, one active ingredient of Fluopicolide + Propamocarb-hydrochloride SC 687.5 was measured to derive the concentration of Fluopicolide + Propamocarb-hydrochloride SC 687.5 in the samples.
Data analysis	The LC_{50} values were calculated by a computer program. The 24-hour LC_{50} was calculated by probit analysis, a binomial test was selected for the calculation of the 48, 72 and 96-hour LC_{50} values.

II. Results and Discussion:

Validity criteria (OECD 203, 2019)	Required	Obtained
Mortality in control during test	≤ 10%	10 %
Dissolved oxygen saturation	≥ 60%	79 - 103%
Analytical measurement of test concentrations	Compulsory	Done

Analytical results:

Recoveries were between 68.9 and 101% (see table below). The lower recoveries at 50 and 100 mg test item/L were most likely due to precipitation. Since all concentrations relevant for the interpretation of the biological data were within ± 20% of the mean measured concentrations, the biological data were based on nominal concentrations.

No residues were found in the control samples above the limit of quantification (0.76 mg/L for fluopicolide + propamocarb-hydrochloride SC 687.5).

Nominal concentration (mg/L)	Day 0 (New)	Day 4 (Aged)	Day 0 and Day 4
	% Recovery	% Recovery	% Mean recovery
6.25	97.4	99.6	97.0
12.5	98.8	98.4	98.6
25	94.3	99.8	97.1
50	99.3	75.2*	87.3
100	101	68.9*	85.0

*Measured at 48h because all fish were dead

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4 with minor acceptable exceptions only.

Biological results:

Observations

After 24-hours, sub-lethal effects, i.e. loss of equilibrium and lethargy were observed at 1 fish in the 12.5 mg/L treatment. In the higher treatments all living fish showed the same sublethal effects. In the 25 mg/L treatment, fish lying on the bottom of the test vessel were also observed.

Mortality

Exposure time (hours)	0	24	48	72	96
Nominal conc. (mg/L)	No of dead (%)	No of dead (%)	No of dead (%)	No of dead (%)	No of dead (%)
Control	0 (0)	0 (0)	0 (0)	0 (0)	1 (10)
6.25	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
12.5	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
25	0 (0)	1 (10)	6 (60)	9 (90)	10 (100)
50	0 (0)	2 (20)	10 (100)	10 (100)	10 (100)
100	0 (0)	1 (10)	10 (100)	10 (100)	10 (100)

III. CONCLUSIONS:

The study meets the validity criteria and the endpoints based on nominal concentrations are:

LC_{50} 96 hours (95% C.I.):	**18 mg/L (12.5 - 25 mg/L)**
LOEC: lowest concentration with an effect (mortality)	25 mg / L
NOEC: highest concentration without mortality	12.5 mg / L

Assessment and conclusion by applicant:

The concentrations of fluopicolide only were analytically determined during the test. However, this study is still considered reliable because propamocarb is stable in the test conditions according to the corresponding static tests with the active substance propamocarb and the correct dosing of the test item is confirmed by fluopicolide measurements. Moreover, propamocarb-hydrochloride is not the toxicity driver for fish (LC_{50} greater than 99 mg/L).

The study is reliable and the LC_{50} of 18 mg/L and NOEC of 12.5 mg/L can be used in risk assessment.

Data Point:	KCP 10.2.1/03
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE B066752 04 SC61 A1: Acute immobilisation test with daphnids (Daphnia magna) under static conditions
Report No:	C039856
Document No:	M-227283-01-1
Guideline(s) followed in study:	OECD: 202-1 (1984)
Deviations from current test guideline:	Method: Deviations from current guideline SANCO/3029/99 rev.4: Limited sets of validation recoveries were analysed. However, the average recoveries were within the acceptable range of 70–110% and the RSD values were below 20%. The analytical method can be regarded as fit for purpose. Study: Current Guideline: OECD 202 (2004) None
Previous evaluation:	yes, evaluated and accepted in FLC DAR 2005; in Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

An acute toxicity test was performed with water flea (*Daphnia magna*) in a static system. Neonate daphnids (less than 24 hours old), were exposed to nominal concentrations of 0 (control), 6.25, 12.5, 25, 50 and 100 mg prod./ L of the test substance fluopicolide + propamocarb-hydrochloride SC 687.5 in modified Elendt M4 medium (19.4 - 21.2°C) for a 48-hour period. All treatments were conducted with 4 replicates with 5 daphnids per test vessel. Test solutions were not renewed. Observations for immobility and for abnormal appearance and behaviour were performed at 0, 24, and 48 hours. Samples of the test solutions were taken at 0 hours and 48 hours (study termination). All samples were analysed using gas chromatography (GC) with ECD detector. The recoveries from the test solutions at hour 0 and hour 48 ranged from 81.6 to 120%. Since all concentrations relevant for the interpretation of the biological data were within ± 20 % of the nominal concentration, the biological data were based on nominal concentrations. The study fulfils all validity criteria of the current version of OECD 202 guideline. No mortality or substance related sub-lethal effects were observed in the control or any treatment during the study. The endpoints based on nominal concentrations are: EC_{50} 48 hours > 100 mg prod./L and NOEC = 100 mg/L.

I. Material and Methods:

Test material	Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) Code AE B066752 04 SC61 A1 Batch No: OP220159 Active ingredients: 64.7 g/L fluopicolide, 634 g/L propamocarb-hydrochloride Density: 1.129 g/mL
Guideline(s) adaptation	None specified
Test species	Water flea (*Daphnia magna*)
Organism age/size at study initiation	First instar neonates, less than 24 hours old

Culture conditions	Same conditions as in the test. Daphnids were fed green algae (*Ankistrodesmus falcatus*)
Test solutions	6.25, 12.5, 25, 50 and 100 mg product/L (nominal concentration) Controls: dilution water control (modified Elendt M4 medium) A stock solution with a nominal concentration of 1000 mg test item/L was prepared by diluting 501.0 mg test item in 500 mL medium. This stock was further diluted with medium to obtain the exposure concentrations. Flasks were carefully shaken in order to make the suspension as homogeneous as possible. Appearance of test solution: no information reported.
Replication	No. of vessels per concentration (replicates): 4 No. of vessels per control (replicates): 4
Organisms per replicate	No. of organisms per vessel: 5
Exposure	Static Total exposure duration: 48 hours
Feeding during test	None
Test conditions	Temperature: 19.4 - 21.2°C (continuous recording), 20.2 – 21.0°C (discrete recording) Water hardness: 160 mg $CaCO_3$/L Specific conductivity: 460 µS/cm Photoperiod: 16 hours light / 8 hours dark with a 30 minutes transition period Light intensity: 399-400 lux pH: 7.36 – 8.16 Dissolved oxygen: 83 - 95% saturation (7.10 – 8.15 mg/L).
Parameters Measured / Observations	Observations for immobility (i.e., daphnids were not able to swim within approximately 15 seconds after gentle agitation of the test vessel) were performed at 0, 24, and 48 hours. Dissolved oxygen concentration and pH were measured at hour 0 in each test vessel and at hours 24 and 48 in one replicate of the control and of each test concentration level. The temperature of the water bath was continuously monitored throughout the exposure period. Daily temperature measurements were performed in each replicate on day 0. At 24 and 48 hours the temperature was measured in one replicate of the control and one replicate of each test concentration.
Chemical analysis	The parent test solutions were sampled at start of exposure and at the end of exposure. Fluopicolide analysis was performed using gas chromatography (GC) with ECD detector.
Data analysis	Not applicable: no effects were observed during the study.

II. Results and Discussion:

Validity criteria (OECD 202, 2004)	Required	Obtained
Immobilisation and sub-lethal effects in control during test	≤ 10%	0 %
Dissolved oxygen concentration at the end of the test	≥ 3 mg/L	≥ 7.1 mg/L

Analytical results:

Only fluopicolide was analysed in the test. The measured concentrations are in the range of 80-120% of nominal concentrations therefore the endpoints are based on nominal concentrations.

Nominal Concentration (mg/L)	Day 0 % of Nominal concentrations	Day 2 % of Nominal concentrations
Control	<LOQ[a]	<LOQ[a]
6.25	112	120
12.5	97.4	101
25.0	81.8	94.7
50.0	82.7	85.1
100	86.9	80.6

[a]LOQ = 0.15 mg/L

Full details and acceptable validation data to support this method are presented within document MCA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4 with minor acceptable exceptions only.

Biological results:

No floating or sub-lethally affected daphnids were observed except the lowest treatment level where 4 out of 20 daphnids were lethargic. These effects were not dose-response related and hence were not considered for the definition of the NOEC.

Exposure time (hours)	0	24	48
Nominal conc. (mg product/ L)	No of immobilized (%)	No of immobilized (%)	No of immobilized (%)
Control	0 (0)	0 (0)	0 (0)
6.25	0 (0)	0 (0)	0 (0)
12.5	0 (0)	0 (0)	0 (0)
25.0	0 (0)	0 (0)	0 (0)
50.0	0 (0)	0 (0)	0 (0)
100	0 (0)	0 (0)	0 (0)

III. CONCLUSIONS:

The study meets the validity criteria and the endpoints based on nominal concentrations are:

EC_{50} 48 hours (95% C.I.)	> 100 mg prod. / L (not applicable)
NOEC: highest concentration without adverse effects	100 mg prod. / L

Assessment and conclusion by applicant:

The study is reliable and the relevant endpoint for risk assessment is the 48-hour EC_{50} > 100 mg prod./L.

The concentrations of fluopicolide only were analytically determined during the test. However, this study is still considered acceptable because propamocarb-hydrochloride is stable in the test conditions according to the corresponding static tests with the active substance and the correct dosing of the test item is confirmed by fluopicolide measurements. Moreover, propamocarb-hydrochloride is not the toxicity driver for daphnia (EC_{50} greater than 106 mg/L).

Data Point:	KCP 10.2.1/04
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE B066752 04 SC61 A1: Alga, growth inhibition test with Pseudokirchneriella subcapitata (syn. Selenastrum capricornutum)
Report No:	C039863
Document No:	M-227290-01-1
Guideline(s) followed in study:	OECD: 201 (1984)
Deviations from current test guideline:	Method: Deviations from current guideline SANCO/3029/99 rev.4: Limited sets of validation recoveries were analysed. However, the average recoveries were within the acceptable range of 70-110% and the RSD values were below 20%. The analytical method can be regarded as fit for purpose. Study: Current Guideline: OECD 201 (2011): The study does not meet the validity criteria of the new version of the OECD guideline 201. Moreover, the pH in controls deviated by more than 1.5 unit at 72h.
Previous evaluation:	yes, evaluated and accepted in FLC DAR 2005; in Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Supportive only

Executive summary

The green alga, *Pseudokirchneriella subcapitata,* was exposed to a series of six test concentrations of fluopicolide + propamocarb-hydrochloride SC 687.5 and a negative (culture medium) control under static conditions for 72 hours. Three replicate test chambers were maintained in each treatment group and twelve replicates for the control group. The selected nominal test concentrations of the test item were 1.9, 4.3, 9.4, 20.7, 45.5 and 100 mg prod./L. Concentration of the test substance in the solution was determined by analysing the active substance fluopicolide by gas chromatography (GC) with ECD detector. Samples of the test solutions were collected at approximately 0 and 72 hours to measure concentrations of the test substance. Measured concentrations for the treatment levels ≤ 45.5 mg prod./L were in the range of 86.6-105% of the nominal concentrations and no residues above the limit of quantification (LOQ) were measured in the controls. However, recoveries for the highest treatment group decreased from 82.3% at 0 hours to 62.8% after 72 hours. Given that the toxicity of the product cannot be attributed to any one of the active ingredients but to the formulated product as a whole, EC_{50} values and biological data are based on nominal concentrations.
The study does not meet the validity criteria of the guideline OECD 201. The 72-hour calculated E_rC_{50} and E_bC_{50} values were > 100 and 13 mg prod./L, respectively. The 72-hour NOEC, based on biomass and growth rate is 4.3 mg prod./L.

I. MATERIAL AND METHODS:

Test material	Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) Code (AE B066752 04 SC61 A1) Batch No: OP220159 Active ingredients: 64.7 g/L fluopicolide, 634 g/L propamocarb-hydrochloride Density: 1.129 g/mL
Guideline(s) adaptation	None specified
Test species	Green algae *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum*)
Culturing conditions	Stock cultures were transferred to fresh medium approximately twice a week. The inoculum used to initiate the toxicity test with the test item was taken from a stock culture that had been set up five days prior to testing. Stock cultures of *Pseudokirchneriella subcapitata* were maintained under similar conditions as during the test. The culture medium used was OECD medium prepared with sterile deionized water and adjusted to pH 8.0 ± 0.1.
Test solutions	Nominal concentrations: 1.9, 4.3, 9.4, 20.7, 45.5 and 100 mg prod./L Control: culture medium (OECD medium)
Replication	No. of vessels per concentration (replicates): 3 No. of vessels per control (replicates): 12 Due to a high variability in the results of the growth of the control vessels, the controls of a second test which had run in parallel to this test in the same water bath were included.
Exposure	Static Total exposure duration: 72 hours
Initial cells density	1×10^4 cells/mL in each test group
Test conditions	Temperature: 23.7 – 25.2°C (continuous monitoring) Photoperiod: continuous light Light intensity: 7300 - 8700 lux (variation less than 15%) pH: 7.67 to 7.83 (beginning of exposure), 8.13 to 10.09 (end of exposure) Growth medium same as culture medium: Yes Type of light: Cool white fluorescent lamps
Parameters Measured / Observations	At each 24-hour interval, cell counts were conducted on all replicate vessels of each test concentration and the controls using a haemocytometer and a microscope. Temperature was monitored continuously in a control flask which ran in parallel in the same water bath. Light intensity was measured at test initiation and every 24 hours, pH was measured at test initiation and termination.
Sampling for chemical analysis	Samples of the test solutions were collected at approximately 0 and 72 hours to measure concentrations of fluopicolide. Samples at test initiation were collected from the individual flasks in which the test solutions were prepared for each treatment and control group prior to addition of the algae. At the end of the exposure, algae were removed by centrifugation. The supernatant was analysed by gas chromatography (GC) with ECD detector. QC (quality control) samples were prepared at hour 72 at nominal concentrations of 0.277, 278, 3.03, 13.9 and 15.1 mg test item/L and were stored and analysed together with the test solutions after approximately 1-month storage (deep frozen) to validate the storage stability.
Data analysis	The highest test concentration that caused no significant adverse effects (No-Observed-Effect-Concentration, NOEC) was determined using Dunnett's test and Bonferroni-t-Test. Before the analysis of variance was conducted, the data were examined for normality using Chi - Square Test, and for homogeneity of variance using Bartlett's Test. The E_bC_{50} and E_rC_{50} were calculated by Probit analysis using a special EC_{50} program.

II. Results and Discussion:

Validity criteria (OECD 201, 2011)	Required	Obtained
Increase of biomass in the control cultures	16	95.6
Mean coefficient of variation for section-by-section specific growth rates (days 0-1, 1-2 and 2-3) in the control cultures	≤ 35%	39.7
Coefficient of variation of average specific growth rates in replicate control cultures	≤ 7%	6.73

Analytical results:
Recovery of fluopicolide of the QC samples ranged from 102 to 107%. At the start of the exposure, recoveries of fluopicolide from the test solutions ranged from 82.3 to 102 % indicating that the test solutions were correctly dosed. After 72 hours of exposure recoveries ranged from 89.1 to 105 % of the nominal concentrations for the treatment levels with 1.9 to 45.5 mg prod./L. For the 100 mg prod./L treatment level, 62.8 % recovery was found. Given that the toxicity of the product cannot be attributed to any one of the active ingredients but to the formulated product as a whole, EC_{50} values and biological data are based on nominal concentrations.

Nominal Concentration (mg prod./L)	0-hour % of Nominal concentrations	72-hour % of Nominal concentrations
Control	< LOQ	< LOQ
1.9	102	97.2
4.3	97.2	101
9.4	100	96.0
20.7	86.6	105
45.5	90.4	89.1
100	82.3	62.8

LOQ = 0.13 mg prod/L

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4 with minor acceptable exceptions only.

Biological results:

The variance between the control replicates was relatively high, whereas the variance between the replicates of within the treatment groups was small. Therefore, additional controls of a test which had run in parallel to this test in the same water bath were included.

The inhibition of biomass and growth rate compared to control after 72 hours of exposure are presented in the table below.

Nominal Concentration (mg prod./L)	Biomass inhibition after 72 hours (%)	Growth rate inhibition after 72 hours (%)
1.9	5.0	1.3
4.3	28.7	5.3
9.4	50.8*	11.2*
20.7	61.3*	13.6*
45.5	76.5*	27.2*
100	73.3*	27.0*

* Statistically significant difference ($p<0.05$) from the control replicates using Dunnett's test and Bonferroni-t-test.

Exponential growth in the control: yes

III. Conclusions:

The study does not meet the validity criteria of the guideline. The endpoints based on nominal concentrations are:

E_rC_{50} 72 hours	**> 100 mg prod./L**
E_bC_{50}, 72 h	13.8 mg prod./L
NOErC 72 hours highest concentration without adverse effects	4.3 mg prod./L
NOEbC 72 hours highest concentration without adverse effects	4.3 mg prod./L

Assessment and conclusion by applicant:

The study is not reliable and should not be used in risk assessment.

Data Point:	KCP 10.2.1/05
Report Author:	[redacted]
Report Year:	2003
Report Title:	Alga, growth inhibition test with Navicula pelliculosa AE B066752 04 SC61 A1
Report No:	C039857
Document No:	M-227284-01-1
Guideline(s) followed in study:	OECD 201 (1984)
Deviations from current test guideline:	Method: Deviations from current guideline SANCO/3029/99 rev.4: Limited sets of validation recoveries were analysed. However, the average recoveries were within the acceptable range of 70–110% and the RSD values were below 20%. The analytical method can be regarded as fit for purpose. Study: OECD 201 (1984) Current Guideline: OECD 201 (2011) The OECD guideline recommends 2 growth media (OECD or AAP). In this study, the OECD medium was supplemented by 3% (v/v) of soil extract according to Schloesser (1994) to ensure good growth conditions. Since validity criteria were met in the study, this is not considered as a major guideline deviation.
Previous evaluation:	yes, evaluated and accepted in the DAR (2005)
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

The freshwater diatom, *Navicula pelliculosa*, was exposed to a series of five test concentrations of fluopicolide + propamocarb-hydrochloride SC 687.5 and a negative (culture medium) control under static conditions for 72 hours. Three replicate test chambers were maintained in each treatment group and control group. The selected nominal test concentrations of the test item were 10.1, 0.32, 1.0, 3.2 and 10 mg prod./L. Concentration of the test substance in the solution was determined by analysing the active substance fluopicolide by gas chromatography (GC) with ECD detector. Samples of the test solutions were collected at approximately 0 and 72 hours to measure concentrations of the test substance. Measured concentrations ranged from 104 to 108% at start of the exposure and from 96.2 to 107% at the end of exposure and no residues above the limit of quantification (LOQ) were measured in the controls. Therefore, EC_{50} values and biological data are based on nominal concentrations.
The study meets the validity criteria of the guideline OECD 201. The 72-hour calculated E_bC_{50} and E_rC_{50} values were 0.40 and 0.63 mg prod./L, respectively. The 72-hour NOEC, based on biomass and growth rate were 0.1 and 0.32 mg prod./L, respectively.

I. MATERIAL AND METHODS:

Test material	Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) Code (AE B066752 04 SC61 A1) Batch No: OP220159 Active ingredients: 64.7 g/L fluopicolide, 634 g/L propamocarb-hydrochloride Density: 1.129 g/mL
Guideline(s) adaptation	None specified
Test species	Freshwater diatom *Navicula pelliculosa*
Culturing conditions	The culture medium used was OECD medium with addition of soil extract and $Na_2SiO_3 9H_2O$ prepared with sterile deionized water and adjusted to pH 8.0 ± 0.1. Stock cultures were transferred to fresh medium, approximately twice a week. The inoculum used to initiate the toxicity test with the test item was taken from a stock

	culture that had been set up four days prior to testing. Stock cultures of *Navicula pelliculosa* were maintained under similar conditions as during the test.
Test solutions	Nominal concentrations: 0.1, 0.32, 1.0, 3.2 and 10 mg prod./L Control: culture medium
Replication	No. of vessels per concentration (replicates): 3 No. of vessels per control (replicates): 3
Exposure	Static Total exposure duration: 72 hours
Initial cells density	1 × 10^4 cells/mL in each test group
Test conditions	Temperature: 21.3 – 24.0°C (continuous monitoring) Photoperiod: continuous light Light intensity: 7700 - 8200 lux pH: 7.44 to 7.50 (beginning of exposure), 7.73 to 8.83 (end of exposure) Growth medium same as culture medium: Yes Type of light: Cool white fluorescent lamps
Parameters Measured / Observations	At each 24-hour interval, cell counts were conducted on all replicate vessels of each test concentration and the controls using a haemocytometer and a microscope. Temperature was monitored continuous in a control flask which ran in parallel in the same water bath. Light intensity was measured at test initiation and every 24 hours, pH was measured at test initiation and termination.
Sampling for chemical analysis	Samples of the test solutions were collected at approximately 0 and 72 hours to measure concentrations of the test substance. Samples at test initiation were collected from the individual flasks in which the test solutions were prepared for each treatment and control group. At the end of the exposure, algae were removed by centrifugation. The supernatant was analysed for fluopicolide by gas chromatography (GC) with ECD detector. QC (quality control) samples were prepared at hour 72 at nominal concentrations of 0.09, 1.0 and 12 mg test item/L and were analysed together with the test solutions to validate the procedures used.
Data analysis	The highest test concentration that caused no significant adverse effects (No-Observed-Effect-Concentration, NOEC) was determined using Dunnett's test. Before the analysis of variance was conducted, the data were examined for normality using Shapiro-Wilks Test, and for homogeneity of variance using Bartlett's Test. The E_bC_{50} and E_rC_{50} were calculated by Probit analysis using a special EC_{50} program.

II. Results and Discussion:

Validity criteria (OECD 201, 2011)	Required	Obtained
Increase of biomass in the control cultures	16	89.2
Mean coefficient of variation for section-by-section specific growth rates (days 0-1, 1-2 and 2-3) in the control cultures	≤ 35%	32.5%
Coefficient of variation of average specific growth rates in replicate control cultures	≤ 7%	2.29%

Analytical results:

Recovery of fluopicolide of the QC (quality control) samples prepared on both sampling intervals ranged from 96.4 to 106%, apart from one QC sample which showed a recovery of 28.6%. However, based on the results of the other QC samples and the recoveries found for the samples from the algae study it can be concluded that the appropriate quality control was maintained. The recoveries of fluopicolide from the test solutions ranged from 104 to 108% at start of the exposure and from 96.2 to 107% at the end of exposure. The concentrations were reported as nominal concentrations.

Nominal Concentration (mg prod./L)	0-hour % of Nominal concentrations	72-hour % of Nominal concentrations
Control	<LOQ	<LOQ
0.1	104	107
0.32	104	103
1.0	104	99.5
3.2	108	98.9
10.0	104	96.2

LOQ = 0.010 mg prod. /L (0 hour) and 0.011 mg prod. /L (72 hour)

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4 with minor acceptable exceptions only.

Biological results:

The inhibition of biomass and growth rate compared to control after 72 hours of exposure are presented in the table below.

Nominal Concentration (mg prod./L)	Biomass inhibition after 72 hours (%)	Growth rate inhibition after 72 hours (%)
0.1	3.3	0.5
0.32	37.3*	10.9
1.0	90.3*	54.2*
3.2	98.5*	107.3*
10.0	101.0*	125.7*

* Statistically significant difference ($p<0.05$) from the control replicates using Dunnett's test.

Exponential growth in the control: yes

III. Conclusions:

The study meets the validity criteria of the guideline. The endpoints based on nominal concentrations are:

E_rC_{50} 72 hours (95% CI)	**0.63 mg prod./L** (0.28-1.45)
E_bC_{50} 72 h (95% CI)	0.40 mg prod./L (0.15-1.11)
NOE_rC 72 hours highest concentration without adverse effects	0.32 mg prod. /L
NOE_bC 72 hours highest concentration without adverse effects	0.1 mg prod./L

Assessment and conclusion by applicant:

The study is reliable and can used in risk assessment. However, the growth rate endpoints were not correctly calculated therefore the E_rC_{50} and NOE_rC for this study are presented in the next summary.

The concentrations of fluopicolide only were analytically determined during the test. However, this study is still considered acceptable because propamocarb-hydrochloride is stable in the test

conditions according to the corresponding static tests with the active substance propamocarb and the correct dosing of the test item is confirmed by fluopicolide measurements.

Data Point:	KCP 10.2.1/06
Report Author:	[redacted]
Report Year:	2020
Report Title:	ECx calculation of Infinito study on Navicula pelliculosa ([redacted] 2003; M-227284-01-1)
Report No:	M-679538-01-1
Document No:	M-679538-01-1
Guideline(s) followed in study:	--
Deviations from current test guideline:	none
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	not applicable
Acceptability/Reliability:	Yes

EC_{10} and EC_{20} values are data requirements for chronic studies according to regulation EU 283/2013. Recalculations of EC_x for both growth rate and biomass variables were performed with ToxRat, version 3.2.1, using the same statistical method as in the initial report: probit analysis.

These recalculations unveiled calculations errors for the growth rate values in the report. The raw data of the study were checked to identify the source of error, but to no avail. However, it was possible to reproduce the growth rate values of the report when an initial cell density of 11 000 cells/mL was used instead of 10 000. Since the initial density was 10 000 cell/mL, it is then concluded, that the growth rate endpoints (EC_{50} and NOEC) found in the report were not correct and should be ignored. The correct endpoints are provided within this statement and are:

Endpoints (95% confidence limits) in mg prod./L	Growth rate	Biomass (AUC)
EC_{50}	0.89* (0.85 – 0.94)	0.40 (0.38 – 0.42)
EC_{20}	0.48 (0.43 – 0.52)	0.21 (0.20 – 0.23)
EC_{10}	0.35 (0.30 – 0.39)	0.15 (0.14 – 0.17)
NOEC	0.1	0.1**
LOEC	0.32	0.32**

*The E_rC_{50} calculated in the report was 0.63 mg prod./L.

** not recalculated, taken from the report

Assessment and conclusion by applicant:

The study is acceptable (see summary of M-227284-01-1) and the endpoint relevant for risk assessment is E_rC_{50} = 0.89 mg prod./L.

CP 10.2.2 Additional long-term and chronic toxicity studies on fish, aquatic invertebrates and sediment dwelling organisms

No new studies were necessary based on the current data requirements. Please refer to Document MCA, Section 8.2.

CP 10.2.3 Further testing on aquatic organisms

No studies were necessary based on the current data requirements. Please refer to Document MCA, Section 8.2.

CP 10.3 Effects on arthropods

In June 2019 EFSA issued a Technical Report Outcome of the pesticides Peer Review Meeting on general recurring issues in ecotoxicology. doi:10.2903/sp.efsa.2019.EN-1673

As part of this document guidance and a template were provided to complete the questionnaire for the use of residue data extracted from vol. 3 B.7.to support the ecotoxicological assessment of pesticides.

The completed template is provided below.

Magnitude of residues in pollen and bee products
Reference material: Technical guidelines for determining the magnitude of pesticide residues in honey and setting Maximum Residue Levels in honey (EC, 2018), Guidance on the risk assessment to plant protection products on bees (*Apis mellifera*, *bombus* spp. and solitary bees (EFSA, 2013).

Question 10: Are data on the magnitude of residues on pollen and bee products part of the residue section? If so, please indicate which data are available and sampling times.[16]

No data are available in the residues section concerning residues of fluopicolide / M-01 within the pollen of treated plants.

A study investigating fluopicolide and M-01 residues within honey is available ([redacted] 2020; M-681610-01-1). The study was conducted during the 2019 season in northern and southern Europe.

Four treatments of a suspension concentrate formulation, containing 0.1 kg fluopiolide / ha, were applied to *Phacelia tanacetifolia* under semi-field conditions:

Trial No. Country	Application No.	Application interval (days)	Growth stage at application (BBCH)	Fluopicolide application rate (kg a.s. /ha)
S19-01063-01 Germany	1	-	50	0.098
	2	6	55	0.099
	3	9	63	0.100
	4	6	67	0.100
S19-01063-02 Germany	1	-	50	0.101
	2	6	55	0.100
	3	8	61	0.098
	4	7	65	0.101
S19-01063-03 Spain	1	-	59 – 60	0.109
	2	8	61	0.100
	3	6	63	0.099
	4	7	65	0.102
S19-01063-03	1	-	59 – 60	0.102

[16] Residue section may contain information of residues in pollen, leaves and flowers. For residues assessment, data on nectar and pollen would be also useful for deriving a more realistic MRL/PF for nectar/honey and pollen/honey. Specific residue data can be used for refinement of higher tier studies in the risk assessment for bees if considered representative of the situation under assessment.

Spain	2	6	61	0.100
	3	7	63	0.107
	4	7	65	0.101

Even at the exaggerated application rates, only low levels of fluopicolide residues were found within the sampled honey (mature). Residues of M-01 were not observed above the LOQ for honey (mature):

Trial No. Country	Growth stage at sampling*	DALT	Honey: fresh or dried	Residues (mg/kg)		Sugar content of honey (%)
				Fluopicolide	M-01	
S19-01063-01 Germany	68	9	Fresh	<0.01	<0.01	77.0
	68	9	Dried**	<0.01	<0.01	80.3
S19-01063-02 Germany	69	8	Fresh	<0.01	<0.01	80.0
S19-01063-03 Spain	65	1	Fresh	<0.01	<0.01	81.1
S19-01063-03 Spain	66	2	Fresh	0.014	<0.01	80.8

DALT = Days after last treatment
* Growth stage of phacelia at sampling
** Drying period = 3 days

No plant matrices (i.e. leaves and flowers) were analysed as part of this study.

CP 10.3.1 Effects on bees

The risk assessment has been performed according to the existing guidance in force at the time of the preparation and submission of this dossier namely the EU Guidance Document on Terrestrial Ecotoxicology (SANCO/10329/2002 rev 2) and EPPO Standard PP 3/10 Environmental Risk Assessment Scheme for Plant Protection Products – Chapter 10: Honeybees.

Comission Regulations (EU) 283/2013 and 284/2013 require where bees are likely to be exposed, testing of both acute (oral and contact) and chronic toxicity, including sub-lethal effects. Consequently, in addition to the standard toxicity studies performed with adult bees (OECD 213 and 214) the following additional studies are also provided (please refer to MCA, Section 8):

- Chronic 10-day toxicity test with the solo formulation fluopicolide SC 486 on adult bees under laboratory conditions ([redacted] 2016; M-552253-01-1)
- Repeated exposure toxicity test with fluopicolide tech. on honey bee larvae under laboratory conditions (OECD guidance document 239), ([redacted] 2018; M-615695-01-1).
- Acute contact and oral toxicity of fluopicolide tech. to adult bumble bees under laboratory conditions, ([redacted] 2015; M-519981-01-1 and [redacted] 2015; M-511408-01-1)
- Brood feeding test according to Oomen *et al.* (1992) with the solo formulation fluopicolide SC 486 (using a realistic worse case spray solution concentration and covering exposure for effects on brood (eggs, young and old larvae) and their development, nurse bee on-going behaviour in brood care and colony strength), ([redacted] 2016; M-545732-01-1)
- Two semi-field brood studies following OECD guidance document 75 (using a more realistic spray scenario onto flowering *Phacelia* covering effects on mortality, foraging activity as well as general colony development) with the solo formulation fluopicolide SC 486 (these semi-field studies are presented in KCA Section 8, Point 8.3.1.3/03 and Point 8.3.1.3/04), [redacted] 2016; M-547124-01-1 and [redacted] 2020; M-685049-01-1)

- Two semi-field studies following EPPO 170 with the representative formulation fluopicolide + propamocarb-hydrochloride SC 687.5 using a more realistic spray scenario onto flowering *Phacelia* covering effects on brood development, adult and pupal mortality, foraging activity, behaviour and colony development and strength. These semi-field studies are presented in MCP Section 10, Point 10.3.1.5. One study was conducted in C-EU ([redacted] 2019; M-651105-01-1) and another study was conducted in S-EU ([redacted] 2019; M-653952-01-1) to cover two climatic zones within the EU.

The toxicity tests conducted with the representative formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5 are presented in this MCP document. The toxicity tests conducted with Fluopicolide tech., its bee relevant metabolites M-01 (AE C653711) and M-02 (AE C657188) and the solo formulation Fluopicolide SC 486 are presented in MCA, Section 8, Point 8.3.1.

A summary of the critical endpoints of Fluopicolide tech., its metabolites M-01 (AE C653711) and M-02 (AE C657188), the solo formulation Fluopicolide SC 486 and the representative formulated product Fluopicolide + Propamocarb-hydrochloride SC 687.5 are provided in the following tables. Endpoints shown in bold are considered relevant for risk assessment.

Table 10.3.1- 1: Critical endpoints for Fluopicolide tech. – acute toxicity to adult honey and bumble bees

Test substance	Test species/ study type	Endpoint	References
Fluopicolide tech.	Honeybee, adult, acute, 72 h	LD_{50} – oral > 241 µg a.s./bee	[redacted] 2012; M-200452-03-1 KCA 8.3.1.1.1/01
	Honeybee, adult, acute, 72 h	LD_{50} – contact > 100 µg a.s./bee	[redacted] 2012; M-200506-03-1 KCA 8.3.1.1.2/01
	Honeybee, adult, acute, 48 h	**LD_{50} – oral > 107.3 µg a.s./bee** **LD_{50} – contact > 100 µg a.s./bee**	[redacted] 2015; M-539964-01-1 KCA 8.3.1.1.1/02
	Bumble bee, adult, acute, 48 h	LD_{50} – oral > 87.3 µg a.s./bumble bee	[redacted] 2015; M-519981-01-1 KCA 8.3.1.1.1/03
	Bumble bee, adult, acute 48 h	LD_{50} - contact > 100 µg a.s./bumble bee	[redacted] 2015; M-511408-01-1 KCA 8.3.1.1.2/02

Bold values used in risk assessment
a.s.: active substance

Acute toxicity to adult bumble bees

Currently there are no testing requirements for any bee other than for the honey bee within Regulation EU 1107/2009. Nevertheless, acute oral and contact bumble bee studies were conducted with Fluopicolide tech. and the representative formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5 which is presented as additional information (Table 10.3.1-2).

At time of study conduct, both guidelines for testing bumble bees (OECD 246 and OECD 247) were still undergoing the OECD validation process. However, the bumble bee oral and contact toxicity studies

with Fluopicolide + Propamocarb-hydrochloride SC 687.5 were performed considering the latest version of the draft OECD guidelines at that point in time. The findings for the formulation indicate comparable or even higher endpoints compared to the acute oral and contact bumble bee study or even compared to the honey bee acute endpoints performed with the active ingredient fluopicolide tech. Hence, the findings indicate that the bumble bee is not more sensitive to Fluopicolide + Propamocarb-hydrochloride SC 687.5 or fluopicolide tech. compared to the honey bee.

Table 10.3.1- 2: Critical endpoints for Fluopicolide + Propamocarb-hydrochloride SC 687.5 – acute toxicity to adult honey and bumble bees

Fluopicolide + Propamocarb-hydrochloride SC 687.5	Honeybee, adult, acute, 72 h	LD_{50} – oral	> 203.52 µg product/bee	[redacted] 2002; M-213822-01-1 KCP 10.3.1.1.1/01
	Honeybee, adult, acute, 48 h	**LD_{50} – oral** **LD_{50} – contact**	**> 233.2 µg product/bee** **> 200 µg product/bee**	[redacted] 2014; M-504109-01-1 KCP 10.3.1.1.1/02
	Honeybee, adult, acute, 72 h	LD_{50} – contact	> 143.1 µg product/bee	Exeler, N.; [redacted] -02-1 KCP 10.3.1.1.2/01
	Bumble bee, adult, acute, 48 h	LD_{50} – oral LD_{50} – contact	> 345.4 µg product/bumble bee > 320 µg product/bumble bee	[redacted] 2017; M-581093-01-1 KCP 10.3.1.1.1/03

Bold values used in risk assessment
a.s.: active substance

Acute toxicity to adult honey bees for bee relevant metabolites

According to Regulation EU 1107/2009 testing of metabolites should be driven by an examination of existing data on other organisms and biological screening. Moreover, the higher exposure level of the parent will compensate for any higher toxicity of the metabolite and therefore the risk will already be covered in the majority of cases. When referring to the EFSA Bee Guidance Document (2013), metabolites exceeding a total radioactive residue (TRR) of 10% or identified as > 0.01 mg/kg in plant metabolism studies should be assessed for risk assessment to bees. The same parameter was chosen to identify the relevant metabolites of fluopicolide in the present case. Moreover, the focus is on metabolites that may occur in pollen and nectar, as these are defined as the major route of exposure.

Several plant metabolism studies were performed with the active fluopicolide and its metabolites using seed, foliar or soil application methods conducted on three crop groups (fruit, leafy and root) (see MCA 6.2.1). In addition, confined rotational crop studies (CRC) performed with the active fluopicolide and its metabolites as soil application were also conducted (see MCA 6.6.1). From these studies, the most relevant plant parts for exposure to bees were identified as oilseed rape seeds, grapes and wheat grain. In these crop parts six metabolites were found to be > 10% TRR or > 0.01 mg/kg as parent equivalents, two further metabolites were formed in other plant parts and no metabolites were unique to the least relevant crop parts for bees (i.e. roots and tubers formed underground). The metabolites found were grouped according to their chemical structures into three groups: similar to parent (meaning covered by parent), M-01 (AE C653711) and M-02 (AE C657188). Hence, the metabolites M-01 (AE C653711)

and M-02 (AE C657188) were identified to be the focus for bees in relevant plant parts and were further investigated for toxicity and exposure to bees.

Both bee relevant metabolites (M-01 (AE C653711) and M-02 (AE C657188)) were tested for their acute oral and contact toxicity on honey bees (Table 10.3.1-3). The endpoints for both metabolites are of low toxicity to bees and comparable to the acute oral and contact honey bee study endpoints performed with the active ingredient fluopicolide. These findings indicate that the bee relevant metabolites M-01 (AE C653711) and M-02 (AE C657188) are not to be considered more toxic than the parent. Consequently, the risk for plant metabolites is considered to be covered by the risk assessment for the parent molecule.

Details of the honey bee testing with the fluopicolide relevant metabolites M-01 (AE C653711) and M-02 (AE C657188) are presented together with the ecotoxicological endpoints in MCA, Section 8, Point 8.3.1.

Table 10.3.1- 3: Critical endpoints for metabolites M-01 (AE C653711) and M-02 (AE C657188) – acute toxicity to adult honey

Metabolite M-01 (AE C653711)	Honeybee, adult, acute, 48 h	LD_{50} – oral LD_{50} – contact	> 100 µg p m./bee > 80.8 µg p.m./bee	[redacted] 2016; M-571897-01-1 KCA 8.3.1.1.1/04
Metabolite M-02 (AE C657188)	Honeybee, adult, acute, 48 h	LD_{50} – oral LD_{50} – contact	> 110.9 µg p.m./bee > 100.0 µg p.m./bee	[redacted] 2016; M-566365-01-1 KCA 8.3.1.1.1/05

p m.: pure metabolite

Chronic toxicity to adult honey bees

In the year of study conduct ([redacted] 2016; M-552253-01-1) of the chronic adult honey bee study with Fluopicolide SC 486 there was no finalized and adopted test guideline available. However, the study was conducted considering the latest version and recommendations according to [redacted] (2015). The final guideline OECD 245 for testing chronic oral toxicity on adult honey bees was implemented and adopted in October 2017. The performed study by [redacted] (2016) included analytical verification of the active ingredient fluopicolide in the final feeding solution which is also a requirement of the OECD 245. A simple SC formulation was chosen in place of technical material to enable chronic administration of fluopicolide in a 50% sugar solution and to overcome any solubility or palatability issues that may have occurred by using technical fluopicolide and organic solvents.

The endpoint for the solo formulation presented as a.s./bee/day is comparable to the acute oral toxicity endpoint for Fluopicolide tech., indicating that there are no signs of accumulated toxicity expected after chronic exposure to the active substance fluopicolide.

A chronic adult honey bee study was also conducted with the representative formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5.

Table 10.3.1- 4: Critical endpoints for Fluopicolide SC 486 and Fluopicolide + Propamocarb-hydrochloride SC 687.5 – chronic toxicity to adult bees

Test substance	Test species	Endpoint		Reference
Fluopicolide SC 486	Honeybee, adult, 10 day feeding test	LDD_{50} NOEDD	> 132.68 µg a.s./bee/day = 132.68 µg a.s./bee/day	[redacted] 2016; M-552253-01-1

Test substance	Test species	Endpoint		Reference
				KCA 8.3.1.2/01
Fluopicolide + Propamocarb-hydrochloride SC 687.5	Honeybee, adult, 10 day feeding test	LDD_{50} NOEDD	> 119 µg product/bee/day ≥ 119 µg product/bee/day	[redacted] 2020; M-682991-01-1 KCP 10.3.1.2/01

a.s. = active substance

Effects on honeybee development and other honeybee life stages

The chronic toxicity to larvae of honey bees under laboratory conditions considering emergence after 22 days was performed with fluopicolide tech. following the OECD TG 239 (2016). The findings do not indicate a risk of fluopicolide tech. after repeated feeding of contaminated food to larvae and considering emergence after 22 days. Details of the study are presented together with the ecotoxicological endpoints in MCA, Section 8, Point 8.3.1.

A chronic study with first instar larva of honey bee was also conducted with the representative formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5.

Table 10.3.1- 5: Critical endpoints for Fluopicolide tech. and Fluopicolide + Propamocarb-hydrochloride SC 687.5 – repeated exposure to honey bee larvae

Test substance	Test species	Endpoint		Reference
Fluopicolide tech.	Honeybee larvae, chronic (emergence after 22 days follow repeated feeding)	NOED	≥ 60.1 µg a.s./larva	[redacted] 2018; M-615695-01-1 KCA 8.3.1.3/01
Fluopicolide + Propamocarb-hydrochloride SC 687.5	Honeybee larvae, chronic (emergence after 22 days follow repeated feeding)	NOED	500 µg product/larva	[redacted] 2020; M-682868-01-1 KCP 10.3.1.3/01

a.s. = active substance

In order to reveal whether fluopicolide poses a risk to immature honey bee life stages, a bee brood feeding study ([redacted] 2016; M-545732-01-1) was conducted by following the provisions/method of Oomen P.A., de Ruijter, A. & van der Steen, J. (OEPP/EPPO Bulletin 22:613-616 (1992)). Moreover, and to clarify whether fluopicolide poses a risk to honey bee brood and colony development, in particular, as well as on honey bees in general under realistic worst-case conditions, two higher tier semi-field honey bee brood studies (according to the provisions of the OECD Guidance Document 75) were conducted under forced/confined exposure conditions. One study was conducted in C-EU [redacted] 2016; M-547124-01-1) and another study was conducted in S-EU ([redacted] 2020; M-685049-01-1) to cover two climatic zones within the EU. All three higher tier studies were conducted with the solo formulation fluopicolide SC 486 (Table 10.3.1-6).

In addition, two higher tier semi-field honey bee studies (according to the provisions of the OEPP/EPPO guideline No. 170 (4) (2010)) with the representative formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5 were conducted under forced/confined exposure conditions. One study was conducted in C-EU ([redacted] 2019; M-651105-01-1) and another study was conducted in S-EU ([redacted] 2019; M-653952-01-1) to cover two climatic zones within the EU.

It can be concluded from all five higher tier studies (Oomen *et al*., OECD Guidance Document 75 and OEPP/EPPO guideline No. 170 (4)) performed with Fluopicolide SC 486 and Fluopicolide + Propamocarb-hydrochloride SC 687.5, investigating side-effects on immature honey bee life stages, that fluopicolide and the representative formulation Fluopicolide + Propamocarb-hydrochloride SC 687.5 are of low general intrinsic toxicity to honey bees.

Table 10.3.1- 6: Critical endpoints for Fluopicolide SC 486 and Fluopicolide + Propamocarb-hydrochloride SC 687.5 – toxicity to bee brood and colony development

Test substance	Test species	Endpoint	Reference
Fluopicolide SC 486	Honeybee brood feeding test (Oomen *et al*., 1992)	No adverse effects were observed on the development of brood (eggs, young and old larvae) and on pupal mortality. Adult bee mortality in the test item treatment group appeared higher, compared to the control group. However, since this observation was not consistent amongst replicates it is considered to be random and not of biological relevance. Overall, fluopicolide fed at a concentration of 1.33 g a.s./L sugar solution caused no adverse effects on honey bee colony performance including no indication for negative impacts on brood rearing success.	[redacted] 2016; M-545732-01-1 KCA 8.3.1.3/02
	Honeybee Brood – Semi-Field (OECD GD 75)	Overall, no adverse effects on brood development, adult and pupal mortality, foraging activity, behaviour, colony development and strength after application of 331.6 g product/ha (corresponding to 133 g fluopicolide/ha) onto flowering *Phacelia tanacetifolia*.	[redacted] 2016; M-547124-01-1 KCA 8.3.1.3/03
	Honeybee Brood – Semi-Field (OECD GD 75)	Overall, no adverse effects on brood development, adult and pupal mortality, foraging activity, behaviour, colony development and strength after application of 133 g fluopicolide/ha onto flowering *Phacelia tanacetifolia*.	[redacted] 2020; M-685049-01-1 KCA 8.3.1.3/04
Fluopicolide + Propamocarb-hydrochloride SC 687.5	Honeybee colony development – Semi-Field (EPPO 170)	Overall, no adverse effects on brood development, adult and pupal mortality, foraging activity, behaviour, colony development and strength when applied twice onto flowering *Phacelia tanacetifolia* at a rate of 1.965 L product/ha and at 1.6 L product/ha.	[redacted] 2019; M-651105-01-1 KCP 10.3.1.5/01
	Honeybee colony development – Semi-Field (EPPO 170)	Overall, no adverse effects on brood development, adult and pupal mortality, foraging activity, behaviour, colony development and strength when applied twice onto flowering *Phacelia tanacetifolia* at a rate of 1.965 L product/ha and at 1.6 L product/ha.	[redacted] 2019; M-653952-01-1 KCP 10.3.1.5/02

a.s. = active substance

Risk assessment for bees

The risk assessment for bees for fluopicolide is based on the application rates of 1.6 L prod./ha corresponding to the maximum single application rate of 100 g FLC/ha for applications in potatoes and lettuce using the endpoints (LD_{50} values) for the formulation FLC + PCH SC 687.5 and the active substance fluopicolide.

Hazard Quotients

The risk assessment is based on Hazard Quotient approach (Q_H) by calculating the ratio between the application rate (expressed in g/ha) and the laboratory contact and oral LD_{50} (expressed in µg/bee).

Q_H values are calculated using data from the studies performed with the active substance and with the formulation. Q_H values higher than 50 indicate the need of higher tiered activities to clarify the actual risk to honeybees.

Hazard Quotient, oral: $$Q_{HO} = \frac{\text{maximum application rate}}{LD_{50}\text{oral}} = \frac{[\text{g a.s./ha or g product/ha}]}{[\mu\text{g a.s./bee or µg product/bee}]}$$

Hazard Quotient, contact: $$Q_{HC} = \frac{\text{maximum application rate}}{LD_{50}\text{contact}} = \frac{[\text{g a.s./ha or g product/ha}]}{[\mu\text{g a.s./bee or µg product/bee}]}$$

Table 10.3.1- 7: Hazard quotients for bees for the application in potatoes and lettuce – oral exposure

Compound	Oral LD_{50} [µg/bee]	Max. appl. rate [g/ha]	Hazard quotient Q_{HO}	Trigger	*A-priori* acceptable risk for adult bees
FLC + PCH SC 687.5	> 233.2	1787 a)	< 7.7	50	yes
Fluopicolide	> 107.3	100	< 0.9	50	yes

a) Based on an application rate of 1600 mL prod./ha and a product density of 1.123 g/mL

The hazard quotients for oral exposure are below the validated trigger value for higher tier testing (i.e. $Q_{HO} < 50$).

Table 10.3.1- 8: Hazard quotients for bees for the application in potatoes and lettuce – contact exposure

Compound	Contact LD_{50} [µg/bee]	Max. appl. rate [g/ha]	Hazard quotient Q_{HC}	Trigger	*A-priori* acceptable risk for adult bees
FLC + PCH SC 687.5	> 200	1797 a)	< 9.0	50	yes
Fluopicolide	> 100	100	< 1.0	50	yes

a) Based on an application rate of 1600 mL prod./ha and a product density of 1.123 g/mL

The hazard quotients for oral exposure are below the validated trigger value for higher tier testing (i.e. $Q_{HO} < 50$).

CP 10.3.1.1 Acute toxicity to bees

CP 10.3.1.1.1 Acute oral toxicity to bees

Data Point:	KCP 10.3.1.1.1/01
Report Author:	[redacted]
Report Year:	2002
Report Title:	Oral toxicity (LD50) to honey bees (Apis mellifera L.) Propamocarb hydrochloride + AE C638206 water miscible suspension concentrate 634 + 64.7 g/L Code: AE B066752 04 SC61 A102
Report No:	C027693
Document No:	M-213822-01-1
Guideline(s) followed in study:	EPPO 170 (1992); OECD: 213 (1998)
Deviations from current test guideline:	Current Guideline: OECD 213 (1998) Triazophos was used as reference item instead of dimethoate as recommended in the guideline. Only 3 test item doses were used with a spacing factor of 10 instead of 5 with a maximum spacing factor of 2.2 as recommended in the guideline. Behavioural abnormalities were not checked during the study. These deviations are not expected to have impacted the study results.
Previous evaluation:	yes, evaluated and accepted In the DAR (2005)
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the acute oral toxicity of propamocarb hydrochloride + AE C638206 to the honeybee (*A. mellifera* L.) in the laboratory. Mortality of the bees was used as toxic endpoint.
Therefore, under laboratory conditions *Apis mellifera* worker bees were exposed by use of 50% sucrose solution to mean measured doses of 2.76, 29.19 and 203.52 µg product/bee during a 5-hour feeding period. Furthermore, each test consisted of a control and a reference item group. Each treatment group consisted of 5 replicates (test units) with 10 bees per replicate. The tests were conducted in darkness, temperature was 24 - 26°C and relative humidity was between 53 and 63 %. The number of dead bees in each cage was assessed 24, 48 and 72 hours after application. The oral LD_{50} values were calculated with the aid of SAS probit – analysis. No mortality occurred during the test in the control and in the test with the different test levels. In the test with the reference item the doses of 0.0928, 0.13325 and 0.60592 µg product/bee resulted in 5, 7 and 32 dead bees after 72 hours. The LD_{50} of the reference item was calculated to be 0.168 µg/bee. All validity criteria of the test were met. The LD_{50} (72 h) for honeybees was > 203.52 µg product/bee in the oral toxicity test.

I. MATERIAL AND METHODS:

Test item: Propamocarb hydrochloride + AE C638206: 634 g/L propamocarb hydrochloride, 64.7 g/L AE C638206 g/L, density: 1.129 g/L, Identification code: AE B066752 04 SC61 A102, Certificate of Analysis: AGF2002-0022-01 (dated 19 February 2002).
Test organism: female worker honeybees (*Apis mellifera*), obtained from a healthy and queen-right colony.
Under laboratory conditions *Apis mellifera* worker bees were exposed by use of 50% sucrose solution to mean measured doses of 2.76, 29.19, and 203.52 µg product/bee during a 5-hour feeding period. Furthermore, each test consisted of a control and a reference item group. In the control untreated 50% sucrose solution was offered to the bees as food source. In the test AE F002960 00 EC40 C668 (active ingredient: 40.9 % w/w triazophos, Batch no.: AAEH00057) was used as reference item; the reference item was tested at three different doses (0.09298, 0.13325 and 0.60592 µg product/bee).

Each treatment group consisted of 5 replicates (test units) with 10 bees per replicate. Test units were 12-13 cm high cylindrical test cages with a diameter of 5 cm.
The tests were conducted in darkness, temperature was 24 - 26°C and relative humidity was between 53 and 63 %. The number of dead bees in each cage was assessed 24, 48 and 72 hours after application. The oral LD_{50} values were calculated with the aid of SAS probit – analysis.

II. Results and Discussion:

Observations

No mortality occurred during the test in the control and in the test with the different test levels. In the test with the reference item the doses of 0.0928, 0.13325 and 0.60592 µg product/bee resulted in 5, 7 and 32 dead bees after 72 hours.

	Total number of dead bees after		
	24 h	**48 h**	**72 h**
Control	0	0	0
Test item [µg product/bee]			
2.76448	0	0	0
29.19202	0	0	0
203.51760	0	0	0
Reference item [µg product/bee]			
0.09298	5	5	5
0.13325	7	7	7
0.60592	31	32	32

Biological findings

Test substance	**Endpoint**	
Propamocarb hydrochloride + AE C638206	24-72 h LD_{50} [µg a.s./bee]	> 203.52
Reference item	72 h LD_{50} [µg product/bee]	0.411

Validity criteria:
All validity criteria of the test were met.

Validity criteria (OECD 213, 1998)	**Obtained in this study**
Control mortality should not exceed 10 % at test end	Control: 0 %
LD_{50} of the reference item should be in the specified range (oral test: 0.10 – 0.35 µg a.s./bee)	0.168 µg a.s./bee*

*0.411µg product/bee × 40.9 % w/w triazophos

III. Conclusions:

The LD_{50} (72 h) was > 203.52 µg product/bee in the oral toxicity test.

Assessment and conclusion by applicant:

This study is considered reliable for risk assessment and the endpoint is:
LD_{50} oral (72 h) > 203.52 µg product/bee

Data Point:	KCP 10.3.1.1.1/02
Report Author:	[redacted]
Report Year:	2014
Report Title:	Effects of fluopicolide + propamocarb-hydrochlorid SC 687.5 (62.5+625) G (Acute contact and oral) on honey bees (Apis mellifera L.) in the laboratory
Report No:	92591035
Document No:	M-504109-01-1
Guideline(s) followed in study:	OECD 213 and 214 (1998)
Deviations from current test guideline:	Current Guidelines: OECD 213 (1998) and OECD 214 (1998) A 5 µL droplet was chosen in the contact toxicity test in deviation to the guideline recommendation of a 1 µL droplet, since a higher volume ensured a more reliable dispersion of the test item and allows to test for a higher application dose. The relative humidity was 39 – 68%, below the 50 – 70% recommended range as given in the guideline. These deviations are not expected to have impacted the study results.
Previous evaluation:	No, not previously submitted for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the acute contact and oral toxicity of fluopicolide + propamocarb-HCl SC 687.5 (62.5+625) G to the honey bee *(A. mellifera L.)*. Mortality of the bees was used as the toxic endpoint. Sublethal effects, such as changes in behaviour, were also assessed. Therefore, under laboratory conditions *Apis mellifera* 50 worker bees were exposed for 48 hours to a single dose of 200.0 µg product/bee by topical application and 50 worker bees were exposed for 48 hours to a single dose of 233.2 µg product/bee by feeding. At the end of the contact toxicity test, there was no mortality at 200.0 µg product/bee. Also, no mortality occurred in the control group. In the oral toxicity test an actual intake of 233.2 µg product/bee led to 2.0% mortality after 48 hours. No mortality occurred in the control group. The LD_{50} of the reference item was calculated to be 0.19 and 0.14 µg/bee in the contact and oral test, respectively. All validity criteria of the test were met. The contact LD_{50} (48 h) was > 200.0 µg product/bee. The oral LD_{50} (48 h) was > 233.2 µg product/bee.

I. MATERIAL AND METHODS:

Test item: Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G: Fluopicolide (AE C638206): 5.18 % w/w, 58.14 g/L; Propamocarb-HCl (AE B066752): 55.8 % w/w, 627.0 g/L; (all values analytical); Batch ID.: EM4L011180; Sample Description: FAR01771-00; Specification No.: 102000027553; density: 1.123 g/mL (20 °C).
Under laboratory conditions *Apis mellifera* 50 worker bees were exposed for 48 hours to a single dose of 200.0 µg product/bee by topical application (contact limit test) and 50 worker bees were exposed for 48 hours to a single dose of 233.2 µg product/bee by feeding (oral limit test, value based on the actual intake of the test item).

Dates of experimental work: May 12, 2014 to May 17, 2014

II. RESULTS AND DISCUSSION:

Toxicity to Honey Bees; laboratory tests

Test Item	Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G	
Test Species	*Apis mellifera*	
Exposure	contact (solution in Adhäsit (0.5 %)/water)	oral (sucrose solution)
Application rate µg prod./bee	200.0	233.2
LD_{50} µg prod./bee	> 200.0	> 233.2
LD_{20} µg prod./bee	> 200.0	> 233.2
LD_{10} µg prod./bee	> 200.0	> 233.2
NOED µg prod./bee*	≥ 200.0	≥ 233.2

* The NOED was estimated using Fisher's Exact Test (pairwise comparison, one-sided greater, α = 0.05).

The contact and oral LD_{50} (24 h) values of the reference item (dimethoate) were calculated to be 0.19 and 0.14 µg product/bee, respectively.

Observations:

Contact Test:

At the end of the contact toxicity test (48 hours after application), there was no mortality at 200.0 µg product/bee. Also, no mortality occurred in the control group (water + 0.5 % Adhäsit). There were no behavioural abnormalities of the bees during the entire trial at 200.0 µg product/bee.

	Total number of dead bees (and mortality in %) after		
	4 h	24 h	48 h
Control	0 (0)	0 (0)	0 (0)
Test item [µg product/bee]			
200	0 (0)	0 (0)	0 (0)
Reference item [µg a.s./bee]			
0.30	3 (6)	38 (76)	40 (80)
0.20	1 (2)	27 (54)	37 (74)
0.15	1 (2)	17 (34)	25 (50)
0.10	1 (2)	1 (2)	3 (6)

Oral Test:

In the oral toxicity test, the maximum nominal test level of Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G (*i.e.* 200 µg product/bee) corresponded to an actual intake of 233.2 µg product/bee. This dose level led to 2.0% mortality after 48 hours. No mortality occurred in the control group (50% w/v sucrose solution = 500 g sucrose/L tap water). One single bee was found to be affected during the 4 hours assessment (before dying) at the 233.2 µg product/bee dose level.

	Total number of dead bees (and mortality in %) after		
	4 h	**24 h**	**48 h**
Control	0 (0)	0 (0)	0 (0)
Test item [µg product/bee]			
233.2	0 (0)	1 (2)	1 (2)
Reference item [µg a.s./bee]			
0.33	10 (20)	50 (100)	50 (100)
0.17	2 (4)	41 (82)	41 (82)
0.08	0 (0)	6 (12)	8 (16)
0.06	0 (0)	1 (2)	1 (2)

Validity criteria:

Validity criteria (OECD 213 and 214, 1998)	**Obtained in this study**
Control mortality should not exceed 10 % at test end	Contact test: 0% Oral test: 0%
LD_{50} of the reference item should be in the specified range (contact test: 0.10 – 0.30 µg a.s./bee, oral test: 0.10 – 0.35 µg a.s./bee)	Contact test: 0.19 µg a.s./bee Oral test: 0.14 µg a.s./bee

III. Conclusions

The toxicity of Fluopicolide + Propamocarb-HCl SC 687.5 (62.5 + 625) G was tested in both, an acute contact and an acute oral toxicity test on honey bees.
The contact LD_{50} (48 h) was > 200.0 µg product/bee. The oral LD_{50} (48 h) was > 233.2 µg product/bee.

Assessment and conclusion by applicant:

This study is considered reliable for risk assessment and the endpoints are:
LD_{50} contact (48 h) > 200.0 µg product/bee
LD_{50} oral (48 h) > 233.2 µg product/bee

Data Point:	KCP 10.3.1.1.1/03
Report Author:	[redacted]
Report Year:	2017
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) G: Effects (Acute contact and oral) on bumble bees (Bombus terrestris L.) in the laboratory
Report No:	118591105
Document No:	M-581093-01-1
Guideline(s) followed in study:	EC) No. 1107/2009 Directive 2003-01 (Canada/PMRA) US EPA OCSPP 850.SUPP OECD 213 and OECD 214 (1998) Van der Steen (2001) ICPPR non-apis group (2015 and 2016)
Deviations from current test guideline:	Current Guidelines: OECD 246 (2017) and 247 (2017) A 5 µL droplet was chosen in the contact toxicity test in deviation to the guideline recommendation of a 1 µL droplet, since a higher volume ensured a more reliable dispersion of the test item and allows for testing higher application volumes. Analytical determination of the test item was not conducted, but the study was performed before the guideline implementation and no analytical dose verification was foreseen at that point in time. Moreover, since it is a limit test with a single dosing of the test item this deviation is not expected to have impacted the study results.
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the acute oral and contact toxicity of fluopicolide + propamocarb-hydrochloride SC 687.5 to the bumble bee (*Bombus terrestris* L.) in the laboratory. Mortality of the bumble bees was used as the toxic endpoint. Sublethal effects, such as changes in behaviour, were also assessed.
Therefore, under laboratory conditions 50 bumble bees (*Bombus terrestris*) were exposed for 48 hours to a single dose of 320 µg prod./bumble bee, by topical application of 5 µL, in a contact limit test and to a single dose of 345.4 µg prod./bumble bee by feeding in an oral limit test. At the end of the contact toxicity test (48 hours after application) no mortality occurred in the 320 µg prod./bumble bee treatment group. Mortality of 2.0% occurred in the water control group (48 hours). After 48 hours there was no mortality in the 345.4 µg prod./bumble bee test item group. No mortality occurred also in the water control group. The mortality in the reference item group in the contact and oral test was 100% at rates of 12 µg dimethoate/bumble bee (contact) and 4.3 µg dimethoate/bumble bee (oral). All validity criteria of the test were met. The contact LD_{50} (48 h) was > 320 µg product/bee. The oral LD_{50} (48 h) was > 345.5 µg product/bee.

I. MATERIAL AND METHODS:

Test item: Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G: 5.96% fluopicolide (analytical), 55.4% propamocarb-hydrochloride (analytical), Supplier batch No: EV58002080, Sample description: FAR30060-00, Specification No.: 102000027553.
Test organism: female worker bumble bees (*B. terrestris*), obtained from a healthy and queen-right colony, bred by a commercial bumble bee breeding company ([redacted]
Under laboratory conditions worker bumble bees were exposed for 48 hours to a single dose of 320 µg prod./bumble bee, by topical application of 5 µL, in a contact limit test and to a single dose of 345.4 µg prod./bumble bee by feeding in an oral limit test (value based on the actual intake of the test item). Furthermore, each test consisted of a control and a reference item group. In the contact limit test, tap water containing 0.1% v/v Triton X-100 was used as control. In the oral limit test a 50% w/v sucrose solution (500 g sucrose/L tap water) was used as control. In both limit tests, BAS 152 11 I (active ingredient 420.3 g/L dimethoate, batch No: FRE-001226) was used as reference item. Each treatment group, control and reference in the acute oral and contact toxicity test consisted out of 50 bumble bees with 1 bumble bee per test unit (replicate).
For the acute oral toxicity test from the 50 bumble bees per treatment group/control only those were taken into consideration which achieved at least 80% of the mean food uptake per treatment group. For the 345.4 µg prod./bumble bee test item treatment group 41 bumble bees were considered for the evaluation. For the water control (50% w/v sucrose solution) and the reference item treatment groups 50 and 47 bumble bees were considered for the evaluation, respectively.
Test units were cylindrical, latticed plastic cages with a length of approximately 7 cm and a diameter of 2.2 cm at the large and 1.7 cm at the small opening.
The test was conducted in darkness, temperature was 23-25°C and humidity was 50-64 % during exposure. Biological observations, including mortality and sub-lethal effects were recorded 4, 24 and 48 h after application. The software used to perform the statistical analysis was ToxRat Professional Version 3.2.1.

Dates of experimental work: November 15, 2016 to November 16, 2016

II. RESULTS AND DISCUSSION:

Biological findings:

Test item	**Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G**	
Test object	***Bombus terrestris* L.**	
Exposure	**Contact (CO_2 / tap water containing 0.1% v/v Triton X-100)**	**Oral (50% w/v sucrose solution) (based on recorded consumption considering bumble bees with food uptake of ≥ 80% of the mean uptake per treatment group[3])**
Dose rate [µg prod./bumble bee]	320	345.4
LD_{50} [µg prod./bumble bee][1,4]	24 hours: > 320 48 hours: > 320	24 hours: > 345.4 48 hours: > 345.4
LD_{20} [µg prod./bumble bee][1,4]	24 hours: > 320 48 hours: > 320	24 hours: > 345.4 48 hours: > 345.4
LD_{10} [µg prod./bumble bee][1,4]	24 hours: > 320 48 hours: > 320	24 hours: > 345.4 48 hours: > 345.4
NOED [µg prod./bumble bee][2,4]	24 hours: ≥ 320 48 hours: ≥ 320	24 hours: ≥ 345.4 48 hours: ≥ 345.4
LOEC [µg prod./bumble bee][2,4]	24 hours: > 320 48 hours: > 320	24 hours: > 345.4 48 hours: > 345.4

[1] As the test item treatment groups did not show mortality above 50% no statistical evaluation on the LD_{50}, LD_{20} and LD_{10} was carried out.
[2] The NOED/LOED was determined using Fisher's Exact Test after Bonferroni-Holm (pairwise comparison, one-sided greater, α = 0.05).
[3] For the 345.4 µg prod./bumble bee test item treatment group 41 bumble bees were considered for the evaluation.
[4] Results obtained from test item treated group were compared to those obtained from the water control treated group.

Observations

Contact test

At the end of the contact toxicity test (48 hours after application) no mortality occurred in the 320 µg prod./bumble bee treatment group. Mortality of 2.0% occurred in the water control group (tap water containing 0.1% v/v Triton X-100) at test termination (48 hours). The mortality in the reference item group was 100% at test end. During the first 4 hours assessment one affected bumble bee was observed in the water control group (tap water containing 0.1% Triton X-100). No test item induced behavioural effects were observed at any time in the 320 µg prod./bumble bee treatment group.

Treatment group	**After 4 hours**		**After 24 hours**		**After 48 hours**	
	Mortality mean %	**Behavioral abnormalities mean %**	**Mortality mean %**	**Behavioral abnormalities mean %**	**Mortality mean %**	**Behavioral abnormalities mean %**
Test item 320 µg product/ bumble bee	0.0	0.0	0.0	0.0	0.0	0.0
Water control	0.0	2.0	2.0	0.0	2.0	0.0
Reference item 12 µg dimethoate/ bumble bee	10.0	33.3	100.0	-	100.0	-

Test item: Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G
Behav. abnorm mean = Behavioural abnormalities; mean = mean of 50 individual per treatment group
Water control = CO_2 / tap water containing 0.1% Triton X-100

Oral test

After 48 hours there was no mortality in the 345.4 µg prod./bumble bee test item group. No mortality occurred also in the water control group (50 % w/v sucrose solution). The mortality in the reference item group was 100% at test end.

Treatment	After 4 hours		After 24 hours		After 48 hours	
	Mortality mean %	Behavioural abnormalities mean %	Mortality mean %	Behavioural abnormalities mean %	Mortality mean %	Behavioural abnormalities mean %
Test item 354.4 µg product/ bumble bee	0.0	0.0	0.0	0.0	0.0	0.0
Water control	0.0	0.0	0.0	0.0	0.0	0.0
Reference item 4.3 µg dimethoate/ bumble bee	48.9	95.8	100	-	100	-

Test item: Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625) G
Mortality mean = Mean of 41-50 individuals per treatment group
Behav. abnorm mean = Mean of living individuals per treatment group
Water control = 50% w/v sucrose solution

Validity criteria:

All validity criteria of the test were met.

Validity criteria (OECD 246 and 247, 2017)	Obtained in this study
Control mortality should not exceed 10 % at test end	Contact test: 2.0 % Oral test: 0.0 %
Mortality of the reference item should be ≥ 50 % at test end	Contact test: 100% Oral test: 100%

III. CONCLUSIONS:

The 48-h contact LD_{50} of fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) was estimated to be > 320 µg prod/bumble bee.
The 48 oral LD_{50} of fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) was estimated to be > 345.4 µg prod./bumble bee.

Assessment and conclusion by applicant:

This study is considered reliable for risk assessment and the endpoints are:
LD_{50} contact (48 h) > 320 µg product/bumble bee
LD_{50} oral (48 h) > 345.4 µg product/bumble bee

CP 10.3.1.1.2 Acute contact toxicity to bees

Data Point:	KCP 10.3.1.1.2/01
Report Author:	[redacted]
Report Year:	2020
Report Title:	Amendment no. 01: Contact Toxicity (LD50) to honey bees (Apis mellifera L.) propamocarb hydrochloride + AE C68206 - Water miscible suspension concentrate 634 + 64.7 g/L
Report No:	CW02/054
Document No:	M-213107-02-1
Guideline(s) followed in study:	EPPO 170 (1992); OECD: 214 (1998)
Deviations from current test guideline:	Current Guideline: OECD 214 (1998) Triazophos was used as reference item instead of dimethoate as recommended in the guideline. The spacing factor of the test item doses was slightly above the maximum of 2.2 recommended in the guideline between the two lowest test item doses only. These deviations are not expected to have impacted the study results.
Previous evaluation:	yes, evaluated and accepted In the DAR (2005)
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the acute contact toxicity of Propamocarb hydrochloride + AE C638206 to the honeybee (*A. mellifera* L.) in the laboratory. Mortality of the bees was used as toxic endpoint. Therefore, under laboratory conditions *Apis mellifera* worker bees were exposed to the test item, reference item and a control by topical application of a single dose of 1.0 µL to the ventral thorax. The five dose rates of the test substance were 14.3, 35.8, 71.5, 107.3 and 143.1 µg product/bee.
Each treatment group consisted of 5 replicates (test units) with 10 bees per replicate. The tests were conducted in darkness, temperature was 24 – 26°C and relative humidity was between 57 and 66 %.
The number of dead bees in each cage was assessed 24, 48 and 72 hours after application. Contact LD_{50} values were calculated with the aid of SAS probit – analysis. The LD_{50} of the reference item was calculated to be 0.104 µg product/bee. All validity criteria of the test were met. The LD_{50} (72 h) for honeybees was > 143.1 µg product/bee in the contact toxicity test.

I. MATERIAL AND METHODS:

Test item: Propamocarb hydrochloride + AE C638206: 634 g/L propamocarb hydrochloride, 64.7 g/L AE C638206 g/L, density: 1.129 g/L, Identification code: AE B066752 04 SC61 A102, Certificate of Analysis: AGF2002-0022-01 (dated 19 February 2002).
Test organism: female worker honeybees (*Apis mellifera*), obtained from a healthy and queen-right colony.
Under laboratory conditions *Apis mellifera* worker bees were exposed to the test item, reference item and control by topical application of a single dose of 1.0 µL to the ventral thorax. The control bees were treated with 1.0 µL drinking water. The five dose rates of the test substance were 14.3, 35.8, 71.5, 107.3 and 143.1 µg product/bee. The reference item (triazophos 40.9% w/w) prepared in water was tested in 3 dose rates of 0.2, 0.3 and 0.4 µg product/bee. Before application, the bees were slightly anaesthetized with CO_2.
Each treatment group consisted of 5 replicates (test units) with 10 bees per replicate. Test units were 12-13 cm high cylindrical test cages with a diameter of 5 cm.

The tests were conducted in darkness, temperature was 24 – 26°C and relative humidity was between 57 and 66 %. The number of dead bees in each cage was assessed 24, 48 and 72 hours after application. Contact LD_{50} values were calculated with the aid of SAS probit – analysis. One dead bee was found in the control after 24 hours. In the test item group 3, 1 and 2 dead bees were found in the test item concentrations with 14.3, 35.8 and 71.5 µg product/bee after 24 hours. No more dead bees were found in the test item concentrations till end of the study. In the test with the reference item group 5, 42 and 46 dead bees were found after 72 hours in the concentrations with 0.2, 0.3 and 0.4 µg product/bee respectively.

II. Results and Discussion:

Observations

One dead bee was found in the control after 24 hours. No more bees died in the control till the end of the study. In the test item group 3, 1 and 2 dead bees were found in the test concentrations with 14.3, 35.8 and 71.5 µg product/bee after 24 hours. No more dead bees were found in the test item concentrations till end of the study. In the test with the reference item group 5, 42 and 46 dead bees were found after 72 hours in the concentrations with 0.2, 0.3 and 0.4 µg product/bee, respectively.

	Total number of dead bees after		
	24 h	**48 h**	**72 h**
Control	1	1	1
Test item [µg product/bee]			
14.3	3	3	3
35.8	1	1	1
71.5	2	2	2
107.3	0	0	0
143.1	0	0	0
Reference item [µg product/bee]			
0.2	4	5	5
0.3	41	42	42
0.4	46	46	46

Biological findings

Test substance	**Endpoint**	
Propamocarb hydrochloride + AE C638206	24-72 h LD_{50} [µg product/bee]	> 143.1
Reference item	72 h LD_{50} [µg product/bee]	0.255

Validity criteria:

All validity criteria of the test were met.

Validity criteria (OECD 214, 1998)	**Obtained in this study**
Control mortality should not exceed 10 % at test end	2 %
LD_{50} of the reference item should be in the specified range (contact test: 0.10 – 0.30 µg a.s./bee)	0.104 µg a.s./bee*

*0.255 µg product/bee × 40.9 % w/w triazophos

III. Conclusions:

The LD_{50} (72 h) was > 143.1 µg product/bee in the contact toxicity test.

Assessment and conclusion by applicant:
This study is considered reliable for risk assessment and the endpoint is: LD_{50} contact (72 h) > 143.1 µg product/bee.

CP 10.3.1.2 Chronic toxicity to bees

Data Point:	KCP 10.3.1.2/01
Report Author:	[redacted]
Report Year:	2020
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5+625 g/L): Chronic toxicity to the honey bee Apis mellifera L. under laboratory conditions
Report No:	19 48 BAC 0030
Document No:	M-682991-01-1
Guideline(s) followed in study:	Regulation (EC) No 1107/2009 (2009) OECD TG 245 (2017)
Deviations from current test guideline:	Current Guideline: OECD 245 (2017) No deviations
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

The purpose of this study was to determine the chronic oral toxicity (LDD_{50}/LC_{50} and NOEDD/NOEC) of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L) applied on ten consecutive days to young adults of the honey bee (*Apis mellifera* L.). Mortality of bees was used as the toxic endpoint. Sublethal effects, such as changes in behavior, were also assessed.

In a 10-day chronic toxicity feeding test max. 2 days old worker honey bees (*Apis mellifera* L. subspecies Buckfast) were exposed to a daily application of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L) diluted in the bee food (50% (w/v) aqueous sucrose solution + 0.1% (w/v) xanthan). The chronic toxicity of the test item was determined at nominal doses of 165, 82.5, 41.3, 20.6 and 10.3 µg product/bee/day, corresponding to concentrations of 4202, 2101, 1050, 525 and 263 mg product/kg food, respectively.

Additionally, honey bees were treated with Dimethoate EC 400 as toxic standard at a nominal dose of 27.3 ng a.s./bee/day. Untreated 50% (w/v) aqueous sucrose solution (AC) and 50% (w/v) aqueous sucrose solution + 0.1% (w/v) xanthan (BC) served as control.

Assessments of mortality and behavioral abnormalities were done daily. The daily food consumption was corrected by subtracting the mean evaporation figure of each day of application.

A mean mortality of 6.7% was observed in control group AC and 13.3% in control group BC at end of the test. In the test item group bees effectively consumed doses of 119, 77.8, 43.0, 19.3 and 11.0 µg product/bee/day which caused mortalities of 13.3, 13.3, 6.7, 3.3 and 6.7%, respectively, after 10 days. None of the obtained mortalities was statistically significantly increased compared to the control group BC.

No treatment related abnormal behaviour was observed in any of the test item groups during the test.

The analysed concentrations of the active substance fluopicolide in the feeding solutions ranged between 90% and 101%. The analysed concentrations of the active substance propamocarb-hydrochloride in the feeding solutions ranged between 101% and 103%.

Due to low obtained mortalities, the LDD_{50}, LDD_{20} and LDD_{10} are considered to be higher than 119 µg consumed product/bee/day and the LC_{50}, LC_{20} and LC_{10} to be higher than 4202 mg product/kg food.

The NOEDD was determined to be higher than or equal to 119 µg consumed product/bee/day and the NOEC to be higher than or equal to 4202 mg product/kg food.

The study fulfilled all validity criteria of the current OECD 245 guideline.

I. MATERIAL AND METHODS

Test item: Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L), supplier batch no: EV57002753, sample description: TOX21332-00, specification no.: 102000027553, active substances: Fluopicolide 62.5 g/L (nominal), 5.66% w/w corresponding to 64.04 g/L (analysed) and Propamocarb-hydrochloride 625 g/L (nominal), 54.6% w/w corresponding to 618.0 g/L.

Test species: Honey bee (*Apis mellifera* L., subspecies Buckfast); young female worker bees (max. two days old), healthy, disease-free and queen-right honey bee colonies.

Test concentrations: The chronic toxicity of the test item was determined at nominal doses of 165, 82.5, 41.3, 20.6 and 10.3 µg product/bee/day, corresponding to concentrations of 4202, 2101, 1050, 525 and 263 mg product/kg food, respectively.

Additionally, honey bees were treated with Dimethoate EC 400 as toxic standard at a nominal dose of 27.3 ng a.s./bee/day. Untreated 50% (w/v) aqueous sucrose solution (AC) and 50% (w/v) aqueous sucrose solution + 0.1% (w/v) xanthan (BC) served as control.

Each group (test item, controls and reference item) comprised three replicates containing ten bees.

Test design: In a 10-day chronic toxicity feeding test max. 2 days old worker honey bees (*Apis mellifera* L. subspecies Buckfast) were exposed to a daily application of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L) diluted in the bee food (50% (w/v) aqueous sucrose solution + 0.1% (w/v) xanthan).

For the collection of honey bees, brood combs with capped cells were taken from outside hives and different colonies. Sufficient food supply was ensured either by honey and pollen which was on the same brood comb or by an additional comb containing food. These frames were placed without adult worker bees in a "five comb hive body" and incubated under controlled environmental conditions in a climatic chamber at 33 ± 2 °C in darkness. Afterwards, the newly hatched worker bees were transferred into the test cages in groups of ten bees per cage. For the following 24 ± 2 h the bees were held in the test cages at 33 ± 2 °C and 50 - 70% relative humidity and provided with 50% (w/v) sucrose solution for acclimatization to the test conditions.

Test item solutions were prepared daily just before the administration of food. Daily dose rates were based on a theoretical food consumption of 33 µL/bee. The reference item stock solution was prepared once for the whole feeding period and the respective feeding solutions at least every 4 days and stored in the refrigerator at about 6 °C. The respective feeding solutions (test item, control and reference item) were provided *ad libitum* in a plastic syringe, which had been weighed before application. The feeders remained in the cages for about 24 h (± 2 h). The actual consumption was determined by reweighing the syringe containing the remaining test solution each day after removal from the test units. Any unconsumed food was discarded.

Assessments of mortality and behavioral abnormalities were done daily. The daily food consumption was corrected by subtracting the mean evaporation figure of each day of application.

Test conditions:

Temperature: 31.6 - 33.6 °C, Relative Humidity: 54.1 – 63.2 %; Photoperiod: 24 h darkness.

Analytics: For verification of the exposure concentration, all test item solutions as well as control solution were sampled in duplicate as specimens for analysis and retain directly after preparation on each day (D0-D9) of application. Samples were quantified by reversed phase High Performance Liquid Chromatography (HPLC), coupled with electrospray and mass spectrometry (MS/MS) detection.

Statistics: The statistical calculations were performed with the computer program ToxRat Professional 3.2.1 (2015). Fisher´s Exact Binomial Test with Bonferroni Correction was used for mortality data (one-sided greater, α = 0.05) and determination of NOEDD/NOEC (no observed effect dietary dose/concentration). Due to low obtained mortalities the $LDD_{50/20/10}$ and $LC_{50/20/10}$ are considered to be higher than the highest dose/concentration.

Dates of work: September 3, 2019 to February 02, 2020.

II. RESULTS AND DISCUSSION

Analytical results:

The mean recovery of fluopicolide ranged between 90% and 101% and the mean recovery of propamocarb ranged between 101% and 103% in the final diets. No residues of fluopicolide (LOQ = 6.86 mg/kg) and propamocarb (LOQ = 66.2 mg/kg) above the limit of detection were found in any of the control samples.

The mean measured concentrations of the test item in the larval diet were within ± 20% of the nominal. Therefore, the concentrations of the test item in the larval diet were confirmed and the endpoints are based on nominal concentrations.

Analysis results for fluopicolide in final diets

Treatment Group	Timing	Nominal* concentration of fluopicolide [mg a.s./kg diet]	Analysed concentration of fluopicolide [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
Control	D0	0	< 30% LOQ	-	-
	D1		< 30% LOQ	-	
	D2		< 30% LOQ	-	
	D3		< 30% LOQ	-	
	D4		< 30% LOQ	-	
	D5		< 30% LOQ	-	
	D6		< 30% LOQ	-	
	D7		< 30% LOQ	-	
	D8		< 30% LOQ	-	
	D9		< 30% LOQ	-	
Fluopicolide	D0	237.8	236.7	100	101
	D1		237.0	100	
	D2		239.0	101	
	D3		242.9	102	
	D4		228.9	96	
	D5		242.3	102	

Treatment Group	Timing	Nominal* concentration of fluopicolide [mg a.s./kg diet]	Analysed concentration of fluopicolide [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
	D6		251.6	106	
	D7		230.7	97	
	D8		251.7	106	
	D9		245.5	103	
	D0	118.9	106.2	89	96
	D1		114.4	96	
	D2		97.4	82	
	D3		123.4	104	
	D4		108.5	91	
	D5		121.2	102	
	D6		121.0	102	
	D7		112.5	95	
	D8		118.4	100	
	D9		114.9	97	
	D0	59.45	43.06	72	90
	D1		54.87	92	
	D2		58.36	98	
	D3		59.73	100	
	D4		54.07	91	
	D5		58.24	98	
	D6		58.29	98	
	D7		48.68	82	
	D8		48.61	82	
	D9		49.28	83	
	D0	29.73	28.51	96	93
	D1		27.72	93	
	D2		28.97	97	
	D3		29.83	100	
	D4		29.82	100	
	D5		24.55	83	
	D6		24.30	82	
	D7		30.05	101	
	D8		24.03	81	
	D9		29.50	99	
	D0	14.86	14.67	99	99

Treatment Group	Timing	Nominal* concentration of fluopicolide [mg a.s./kg diet]	Analysed concentration of fluopicolide [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
	D1		13.95	94	
	D2		15.10	102	
	D3		14.84	100	
	D4		13.90	93	
	D5		14.83	100	
	D6		15.20	102	
	D7		14.45	97	
	D8		14.77	99	
	D9		15.03	101	

LOQ = 6.86 mg/kg, corresponding to 6.75 µg/L in diluted extracts; *based on analysed content of propamocarb according to the certificate of analysis (5.66% w/w)

Analysis results for propamocarb in final diets

Treatment Group	Timing	Nominal* concentration of propamocarb [mg a.s./kg diet]	Analysed concentration of propamocarb [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
Control	D0	0	< 30% LOQ	-	-
	D1		< 30% LOQ	-	
	D2		< 30% LOQ	-	
	D3		< 30% LOQ	-	
	D4		< 30% LOQ	-	
	D5		< 30% LOQ	-	
	D6		< 30% LOQ	-	
	D7		< 30% LOQ	-	
	D8		< 30% LOQ	-	
	D9		< 30% LOQ	-	
propamocarb	D0	2294	2258	98	103
	D1		2427	106	
	D2		2316	101	
	D3		2389	104	
	D4		2313	101	
	D5		2375	104	
	D6		2416	105	
	D7		2339	102	
	D8		2446	107	

Treatment Group	Timing	Nominal* concentration of propamocarb [mg a.s./kg diet]	Analysed concentration of propamocarb [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
	D9		2457	107	
	D0	1147	1157	101	103
	D1		1110	97	
	D2		1160	101	
	D3		1260	110	
	D4		1121	98	
	D5		1197	104	
	D6		1182	103	
	D7		1187	103	
	D8		1210	105	
	D9		1188	104	
	D0	573.5	589.9	103	101
	D1		554.9	97	
	D2		568.1	99	
	D3		593.9	104	
	D4		560.5	98	
	D5		565.1	99	
	D6		570.9	100	
	D7		604.5	105	
	D8		597.6	104	
	D9		605.5	106	
	D0	286.8	297.9	104	101
	D1		272.4	95	
	D2		297.4	104	
	D3		298.7	104	
	D4		304.6	106	
	D5		280.5	98	
	D6		281.7	98	
	D7		296.6	103	
	D8		288.8	101	
	D9		286.8	100	
	D0	143.4	145.2	101	102
	D1		137.7	96	
	D2		149.5	104	
	D3		148.3	103	

Treatment Group	Timing	Nominal* concentration of propamocarb [mg a.s./kg diet]	Analysed concentration of propamocarb [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
	D4		144.5	101	
	D5		144.9	101	
	D6		146.5	102	
	D7		148.1	103	
	D8		148.9	104	
	D9		148.0	103	

LOQ = 66.2 mg/kg, corresponding to 65.1 µg/L in diluted extracts; *based on analysed content of propamocarb according to the certificate of analysis (54.6% w/w)

Full details and acceptable validation data to support this method are presented within document M-CA 4, which comply with the EU regulatory requirements outlined within SANCO/3029/99 rev 4.

Biological results:

Summary of mean mortality and toxicity of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L) to adult honey bees after 10 days of chronic exposure

Treatment group	Treatment group ID	Daily dose nominal [µg product/bee/day]	Daily dose consumed [µg product/bee/day]	Concentration [mg product/kg food]	After 10 days: Mean mortality absolute [%]	After 10 days: Mean mortality corrected [%]	After 10 days: Number of bees showing behavioural abnormalities *
Control	AC	-	-	-	6.7	-	0 out of 28
	BC	-	-	-	13.3	-	0 out of 26
Test item	AT	165	119	4202	13.3	0.0	0 out of 26
	BT	82.5	77.8	2101	13.3	0.0	0 out of 26
	CT	41.3	43.0	1050	6.7	0.0	0 out of 28
	DT	20.6	19.3	525	3.3	0.0	0 out of 29
	ET	10.3	11.0	263	6.7	0.0	0 out of 28
		[ng a.s./bee/day]		[mg a.s./kg food]			
Reference item	AR	27.3	19.2	0.6%	90.0	89.3	0 out of 3

	Endpoints	10 d
Test item doses	$LDD_{50/20/10}$ [µg consumed product/bee/day]	> 119
	NOEDD [µg consumed product/bee/day]	≥ 119
Test item concentrations	$LC_{50/20/10}$ [mg product/kg food]	> 4202
	NOEC [mg product/kg food][1]	≥ 4202

Results are averages based on 3 replicates, containing 10 bees each; calculations are performed with non-rounded values and corrected for evaporation

corrected: corrected mortality (according to SCHNEIDER-ORELLI 1947), negative values are treated as "0"; test item treatment group was corrected for mortality of untreated control BC; reference item treatment group was corrected for mortality of untreated control AC

* Number of bees with behavioural abnormalities referring to number of remaining bees

[1] No observed effect dietary dose/concentration was calculated using Fisher´s Exact Binomial Test with Bonferroni Correction; α = 0.05; one sided greater

A mean mortality of 6.7% was observed in control group AC and 13.3% in control group BC. In the test item group bees effectively consumed doses of 119, 77.8, 43.0, 19.3 and 11.0 µg product/bee/day which caused mortalities of 13.3, 13.3, 6.7, 3.3 and 6.7%, respectively, after 10 days. None of the obtained mortalities was statistically significantly increased compared to the control group BC. The reference dosage tested in the study was 27.3 ng a.s./bee/day (actual consumption on average per day: 19.2 ng a.s./bee), which caused a mean mortality of 90.0%.

In the test item group, the food consumption ranged between 28.4 and 41.9 mg solution per bee per day

with a tendency of higher food uptake in the lower concentrations.

The mean daily amount of evaporated feeding solution AC ranged between 38.7 and 50.0 mg per day per feeding tube and of BC between 34.7 and 44.7 mg per day per feeding tube.

In the course of the test as well as in the final assessment on the last day of the test no treatment related abnormal behaviour was observed in any of the test item groups.

Validity criteria:

All validity criteria according to the guideline OECD 245 were met in this study.

Validity Criteria (OECD 245, 2017)		Recommended	Obtained
Mortality after 10 days of exposure	Control	≤ 15 %	6.7 % and 13.3 %
Mortality after 10 days of exposure	Dimethoate	> 50 %	90.0 %

III. CONCLUSION

The chronic oral toxicity of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625 g/L) on young adult honey bees (*Apis mellifera* L.) was investigated in a 10 day chronic, dose-response feeding study under laboratory conditions.

Due to low obtained mortalities, the LDD_{50}, LDD_{20} and LDD_{10} are considered to be higher than 119 µg consumed product/bee/day and the LC_{50}, LC_{20} and LC_{10} to be higher than 4202 mg product/kg food.

The NOEDD was determined to be higher than or equal to 119 µg consumed product/bee/day and the NOEC to be higher than or equal to 4202 mg product/kg food.

Assessment and conclusion by applicant:

This study is considered reliable for risk assessment and the endpoints are:

LDD_{50}, LDD_{20}, LDD_{10} oral (10 days) > 119 µg product/bee/day

LC_{50}, LC_{20}, LC_{10} oral (10 days) > 4202 mg product/kg food

NOEDD oral (10 days) ≥ 119 µg consumed product/bee/day

NOEC oral (10 days) ≥ 4202 mg product/kg food

CP 10.3.1.3 Effects on honey bee development and other honey bee life stages

Data Point:	KCP 10.3.1.3/01
Report Author:	[redacted]
Report Year:	2020
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625 g/L) - Repeated exposure to honey bee larvae (Apis mellifera L.) under laboratory conditions
Report No:	19 48 BLC 0035
Document No:	M-682868-01-1
Guideline(s) followed in study:	OECD Guidance Document 239 (2016)
Deviations from current test guideline:	Current Guideline: OECD GD 239 (2016) The relative humidity between D8 and D15 was below 80 ± 5% due to a malfunction of the climate chamber. There was no impact assumed on the study outcome as no effects occurred in the untreated control.
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive summary

The purpose of this study was to determine the chronic toxicity (NOED, LOED, NOEC and LOEC for adult emergence up to D22, and ED_{10}, ED_{20}, ED_{50} if possible) of the test item to the honey bee larvae, *Apis mellifera* L., in a laboratory test after repeated exposure.

First instar honey bee larvae of *Apis mellifera* L. were transferred from brood combs to polystyrene grafting cells in 48-well cell culture plates 2 days before the start of the exposure period (D1, grafting). Larvae were exposed to 5 nominal concentrations of 1153, 1613, 2257, 3162 and 4426 mg product/kg food (corresponding to a nominal cumulative dose of 182, 255, 357, 500 and 700 µg product/larva) via the larval diet on 4 consecutive days (D3 to D6). No additional feeding of the larvae took place after D6.

Additionally, a reference item (dimethoate tech. at a cumulative nominal dose of 7.6 µg a.s./larva) and an untreated control were included in the experimental design. Each treatment group comprised 3 replicates including 12 larvae each. Assessments of larval mortality were done on D4, D5, D6, D7 and D8. Additionally, other observations such as small body size or unconsumed food on D8 were noted. Pupal mortality was assessed on D15 and emergence of adults was evaluated on D22.

Concentration of the active substances fluopicolide and propamocarb-hydrochloride was determined in the larval diet of each day of the exposure period.
On D8, a larval mortality of 2.8% was observed in the control. In the test item group larval mortalities on D8 were 36.1%, 11.1%, 5.6%, 0.0% and 0.0% following a treatment with 700, 500, 357, 255 and 182 µg product/larva, respectively. In the final assessment on D22, larvae treated with 700 µg product/larva showed an emergence rate of 55.6% which was statistically significantly different compared to the control (77.8%).

The mean recovery of fluopicolide and propamocarb-hydrochloride ranged between 82% and 104% in the final diets.

The NOED and LOED were determined to be 500 µg and 700 µg product/larva (based on adult emergence), respectively. The NOEC and LOEC were 3162 mg and 4426 mg product/kg food, respectively.

The ED_{50}, ED_{20} and ED_{10} values (based on adult emergence) were determined to be >700 µg, 613 µg and 351 µg product/larva, respectively. The EC_{50}, EC_{20} and EC_{10} values were determined to be >4426 mg, 3876 mg and 2219 mg product/kg food, respectively.

The study fulfilled all validity criteria until day 8 of the current OECD guidance document 239 (2016).

I. MATERIAL AND METHODS

Test item: FLC + PCH SC 687.5 (62.5 + 625 g/L), supplier batch no.: EV57002753, sample description: certificate of analysis; TOX21332-00, specification no.: 102000027553, content of fluopicolide: 62.5 g/L (nominal), 5.66% w/w corresponding to 64.04 g/L (analysed) and propamocarb-hydrochloride: 625 g/L (nominal), 54.6% w/w corresponding to 618.0 g/L (analysed).

Test species: Honey bee larvae (Hymenoptera, Apoidea), *Apis mellifera* L. subspecies Buckfast, commonly known as Buckfast bees, synchronized first instar (L1, one day old) larvae originating from three adequately fed, healthy (free of clinical symptoms of any disease) and queen-right bee colonies. The larvae were taken from hives that had not received treatments with chemical substances for at least one month.

Test concentrations: Larvae were exposed to 5 concentrations of the test item 1153, 1613, 2257, 3162 and 4426 mg product/kg food (nominal), equivalent to a cumulative dose of 182, 255, 357, 500 and 700 µg product/larva (nominal), and one reference item group with 48.0 mg dimethoate/kg food, equivalent to a cumulative nominal dose of 7.6 µg dimethoate/larva.

One untreated control group (feeding diet) was also assessed.

Each treatment group comprised 3 replicates, including 12 larvae each.

Test design: Larvae were exposed to 5 concentrations of the test item via the larval diet on 4 consecutive days (D3 to D6). No additional feeding of the larvae took place after D6. The aqueous sugar solution (ASS-A) as one component of the artificial diet A was prepared freshly on D1. ASS-B and ASS-C were prepared prior to the test and thereafter stored in a freezer (≤-10 °C) for use on D3, D4, D5 and D6. The sugar solution was mixed with royal jelly every day before each feeding occasion. The volumes and contents of diets A, B and C are presented below.

Test day	1[1]	2	3[2]	4[2]	5[2]	6[2]
Artificial diet	A	-	B	C	C	C
Volume of diet per larva	20 µL	-	20 µL	30 µL	40 µL	50 µL
Composition of diets:						
Royal jelly	50% w/w	-	50% w/w	50% w/w		
Sugar solution	50% w/w		50% w/w	50% w/w		
Composition of sugar solution:						
Glucose	12% w/v	-	15% w/v	18% w/v		
Fructose	12% w/v		15% w/v	18% w/v		
Yeast extract	2% w/v		3% w/v	4% w/v		

[1] day of grafting [2] days of exposure

On D1 the combs containing the L1 larvae were transported from the hives to an acclimatized laboratory room. Larvae were transferred from the combs to the cells. The larvae were placed on the surface of the artificial diet within the grafting cells. Assessments of larval mortality were done on D4, D5, D6, D7 and D8. Additionally, other observations such as small body size or unconsumed food on D8 were noted. Pupal mortality was assessed on D15 and emergence of adults was evaluated on D22. In the analytical phase of the study, the concentration of the active substances fluopicolide and propamocarb-hydrochloride was determined in the larval diet of each day of the exposure period.

Test conditions: Temperature: 34.0 – 35.0°C, Relative Humidity: D1 – D8: 90 – 100%, D8 – D15: 30 – 70%, D15 – D22: 56 – 63%, Photoperiod: 24h darkness (diffuse artificial light only during handling and assessments).

Statistics: The Step-down Cochran-Armitage Test was used for statistical analysis of the adult emergence data and the estimation of the NOEC/NOED and LOEC/LOED. The accepted significance level was $\alpha = 0.05$ (one-sided greater). The $ED/EC_{10/20/50}$ values were determined with the Weibull analyses using linear maximum likelihood regression.

The statistical calculations were performed with the statistical program ToxRat Professional 3.3.0 (Ratte, 2018).

Analytics: All final diets were sampled in duplicate as retain (-R) samples after preparation and as analysis (-A) samples right after feeding on D3, D4, D5 and D6. The chemical analyses were performed by using reversed phase High Performance Liquid Chromatograph (HPLC) coupled with MS/MS detection.

Dates of work: September 09, 2019 to September 23, 2019.

II. RESULTS AND DISCUSSION

Analytical findings:

The mean recovery of fluopicolide ranged between 82% and 100% and the mean recovery of propamocarb ranged between 99% and 104% in the final diets. No residues of fluopicolide (LOQ = 30.6 mg/kg) and propamocarb (LOQ = 295.4 mg/kg) above the limit of detection were found in any of the control samples.

The mean measured concentrations of the test item in the larval diet were within ± 20% of the nominal content. Therefore, the concentrations of the test item in the larval diet were confirmed and the endpoints are based on nominal concentrations.

Analysis results for fluopicolide in final diets

Treatment Group	Timing	Nominal* concentration of fluopicolide [mg a.s./kg diet]	Analysed concentration of fluopicolide [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
Control	D3	0	< 30% LOQ	-	-
	D4		< 30% LOQ	-	
	D5		< 30% LOQ	-	
	D6		< 30% LOQ	-	
Fluopicolide	D3	250.5	261	104	100
	D4		254	101	
	D5		237	95	
	D6		255	102	
	D3	179.0	173	97	89
	D4		161	90	
	D5		153	86	
	D6		148	83	
	D3	127.8	118	92	86

Treatment Group	Timing	Nominal* concentration of fluopicolide [mg a.s./kg diet]	Analysed concentration of fluopicolide [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
	D4		108	84	
	D5		110	86	
	D6		107	84	
	D3	91.3	76.8	84	82
	D4		73.7	81	
	D5		73.2	80	
	D6		77.4	85	
	D3	65.2	59.7	91	84
	D4		52.9	81	
	D5		52.1	80	
	D6		55.2	85	

LOQ = 30.6 mg/kg, corresponding to 6.02 µg/L in diluted extracts; *based on analysed content of fluopicolide according to the certificate of analysis (5.66% w/w)

Analysis results for propamocarb in final dicts

Treatment Group	Timing	Nominal* concentration of propamocarb [mg a.s./kg diet]	Analysed concentration of propamocarb [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
Control	D3	0	< 30% LOQ	-	-
	D4		< 30% LOQ	-	
	D5		< 30% LOQ	-	
	D6		< 30% LOQ	-	
Propamocarb	D3	2416.64	2577	107	104
	D4		2495	103	
	D5		2477	102	
	D6		2550	106	
	D3	1726.45	1846	107	104
	D4		1809	105	
	D5		1766	102	
	D6		1755	102	
	D3	1232.49	1260	102	100
	D4		1222	99	
	D5		1264	103	
	D6		1189	97	
	D3	880.62	892.5	101	100
	D4		894.5	102	

Treatment Group	Timing	Nominal* concentration of propamocarb [mg a.s./kg diet]	Analysed concentration of propamocarb [mg a.s./kg diet]	Recovery [%]	Mean recovery [%]
	D5		864.5	98	
	D6		883.8	100	
	D3	629.29	641.0	102	99
	D4		634.1	101	
	D5		604.4	96	
	D6		609.5	97	

LOQ = 295.4 mg/kg, corresponding to 58.1 µg/L in diluted extracts; *based on analysed content of propamocarb according to the certificate of analysis (54.6% w/w)

Biological findings:

Biological observations
On D8, a larval mortality of 2.8% was observed in the control (AC). In the test item group larval mortalities on D8 were 36.1%, 11.1%, 5.6%, 0.0% and 0.0% following a treatment with 700, 500, 357, 255 and 182 µg product/larva respectively. Mortality of the reference item treated group (AR) was above 50% on D8.

Other observations
On D8, none of the remaining larvae treated with the test item were observed to have food left and/or a smaller body size.

Adult emergence
In the final assessment on D22, an adult emergence rate of 77.8% was determined for the honey bees in the control group. In the test item treated group, the adult honey bees emerged at rates of 55.6%, 69.4%, 88.9%, 75.0% and 86.1% exposed to a cumulative dose 700, 500, 357, 255 and 182 µg product/larva, respectively, during the larval stages. On D22, larvae treated with 700 µg product/larva, showed an emergence rate, which was statistically significantly different compared to the control.

Mortality and other observations of larvae and adult emergence in the repeated exposure toxicity test

Treatment group	Treatment ID	Cumulative Dose (nominal) [µg product/ larva]	Concentration (nominal) [mg product/ kg food]	On D8			On D22		
				Larval mortality D3 to D8		Mean OO	Total mortality D3-D22		Adult emergence rate
				[%]		[%]	[%]		[%]
				abs.	corr.		abs.	corr.	abs.
Control	AC	-	-	2.8	0.0	0.0	22.2	0.0	77.8
Test item	AT	700	4426	36.1	34.3	0.0	44.4	28.6	55.6*
	BT	500	3162	11.1	8.6	0.0	30.6	10.7	69.4
	CT	357	2257	5.6	2.9	0.0	11.1	0.0	88.9
	DT	255	1613	0.0	0.0	0.0	25.0	3.6	75.0
	ET	182	1153	0.0	0.0	0.0	13.9	0.0	86.1
Reference item		[µg a.s./larva]	[mg a.s./kg food]						
	AR	7.6	48	88.9	88.6	33.3	97.2	96.4	2.8

Results are averages based on 3 replicates (hives), containing 12 larvae each; corr.: corrected mortality (according to SCHNEIDER-ORELLI 1947), mortality in test and reference item treated groups were corrected by the mortality of the control (AC); abs.: absolute mortality as counted from the results; calculation were performed with non-rounded values; OO: Other observations (e.g. remaining food); negative values were set to "0"
* Statistically significant difference compared to control (Step-down Cochran-Armitage Test; p≤0.05; one sided greater)

Calculated endpoints of the repeated exposure larvae toxicity test

Treatment	Endpoint: Adult emergence at D22	
Test item cumulative doses	ED_{50} [µg product/larva] [2,3]	**>700**
	ED_{20} [µg product/larva] (95% CL) [2]	613 (440 – 854)
	ED_{10} [µg product/larva] (95% CL) [2]	351 (274 – 450)
	LOED [µg product/larva] [1]	**700**
	NOED [µg product/larva] [1]	**500**
Test item concentrations	EC_{50} [mg product/kg food] [2,3]	**>4426**
	EC_{20} [mg product/kg food] (95% CL) [2]	3876 (2786 – 5394)
	EC_{10} [mg product/kg food] (95% CL) [2]	2219 (1732 – 2844)
	LOEC [mg product/kg food] [1]	**4426**
	NOEC [mg product/kg food] [1]	**3162**

[1] Step-down Cochran-Armitage Test; α=0.05; one-sided greater
[2] Weibull analyses using linear maximum likelihood regression
[3] Value was extrapolated to be outside of the tested range
CL…Confidence limits

Validity criteria:

All validity criteria were met in this study.

Validity Criteria (OECD GD 239, 2016)		Recommended	Obtained
Cumulative larval mortality from day 3 to 8 in the control groups	Control	≤ 15%	2.8%
Adult emergence rate until day 2	Control	≥ 70%	77.8%
Cumulative larval mortality from day 3 to 8 in the reference group	Dimethoate	≥ 50%	88.9%

III. CONCLUSION

In a repeated exposure larval toxicity study performed in a dose-response design with FLC + PCH SC 687.5 (62.5 + 625 g/L), the NOED and LOED was determined to be 500 µg and 700 µg product/larva (based on adult emergence), respectively. The NOEC and LOEC were 3162 mg and 4426 mg product/kg food, respectively.

The ED_{50}, ED_{20} and ED_{10} values (based on adult emergence) were determined to be >700 µg, 613 µg and 351 µg product/larva, respectively. The EC_{50}, EC_{20} and EC_{10} values were determined to be >4426 mg, 3876 mg and 2219 mg product/kg food, respectively.

Assessment and conclusion by applicant:

This study is considered reliable for risk assessment and the endpoints are:
NOED (emergence) = 500 µg product/larva
LOED (emergence) = 700 µg product/larva
NOEC (emergence) = 3162 mg product/kg food
LOEC (emergence) = 4426 mg product/kg food

ED_{50} (emergence) > 700 µg product/larva
ED_{20} (emergence) = 613 µg product/larva
ED_{10} (emergence) = 351 µg product/larva

EC_{50} (emergence) > 4426 mg product/kg food
EC_{20} (emergence) = 3876 mg product/kg food
EC_{10} (emergence) = 2219 mg product/kg food

CP 10.3.1.4 Sub-lethal effects

There is no particular study design / test guideline to assess “sub-lethal effects” in honeybees. However, in each laboratory study as well as in any higher-tier study, sub-lethal effects, if occurring, are described and reported.

CP 10.3.1.5 Cage and tunnel tests

Data Point:	KCP 10.3.1.5/01
Report Author:	[redacted]
Report Year:	2019
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) G: Toxicity testing on honey bees (Apis mellifera L.) under semi-field conditions in Germany - Tunnel test
Report No:	122691037
Document No:	M-651105-01-1
Guideline(s) followed in study:	Regulation (EC) No. 1107/2009 Directive 2003-01 (Canada/PMRA) US EPA OCSPP Not Applicable OEPP/EPPO guideline No. 170 (4) (2010)
Deviations from current test guideline:	Current Guideline: EPPO 170 (4) (2010) No deviations
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this semi-field study in Germany was to conduct a test under forced/confined exposure conditions (tunnel), in order to assess potential effects of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G on honey bees and honey bee colonies. Four tunnels for each treatment group (20 m length × 5.0 m width × 2.5 m height) were set up on a *ca.* 80 m² plot of *Phacelia tanacetifolia* (2 × 40 m²). Small bee colonies were introduced to the tunnels 6 days before the daytime application of the test item, the control and reference item, respectively. One honey bee colony was used per tunnel. Four tunnels were treated at 1.965 L/ha during full flowering in the evening without honey bees present. On the following day a second test item application was performed at 1.6 L/ha during full flowering of the crop while honey bees were actively foraging (daytime application). For the control and the reference item the treatment with tap water and dimethoate, respectively, was done at full flowering at daytime, when bees foraged actively. In addition to the 12 tunnels being treated with the test item, water and reference item, three further tunnels were set up. These tunnels were treated with the test item and thereafter exclusively used for monitoring and collecting residues. Test parameters were mortality of adult bees, behavioural abnormalities, foraging activity of the bees and assessment of brood status. Mean temperature during the confinement period (day -3 to day + 7) ranged between 16.3 and 26.6°C. No rain occurred during the exposure phase of the bees to the treated crop in the tunnels for the first 5 days. No effects on mortality of adult and immature honey bees were observed. Foraging activity, behaviour, nectar- and pollen storage as well as queen survival was not affected. There was no effect on overall colony development, development of brood and colony strength observed. Based on the study results it can be concluded that Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G does not adversely affect honey bee behaviour, brood development, colony strength and queen survival when applied twice, at a rate of 1.965 L product/ha and at 1.6 L product/ha in 400 L water/ha under the above described conditions.

I. MATERIAL AND METHODS:

Test Item:

Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G (FLC + PCH SC 687.5 (62.5 + 625) G): fluopicolide (AE C638206): 5.96 % w/w, 67.42 g/L, propamocarb-hydrochloride (AE B066752): 55.4 % w/w, 627.6 g/L (all analysed values); Supplier Batch No.: EV58002080; Sample Description: FAR30060-00; Specification No.: 102000027553; Sample ID: M1600053900l; density: 1.132 g/cm³.

Test Species:

Honey bees (*Apis mellifera carnica* L.); small bee colonies, maintained according to normal beekeeping practice, containing 11 combs with honey, pollen and 5 – 7 brood combs (eggs, larvae and pupae). The preliminary brood check indicated healthy colonies, with all brood stages present and a sufficient amount of pollen and honey to guarantee colony viability. The mean strength of the colonies per treatment group, three days before the daytime application, was similar and ranged between 4770 and 6233 adult bees per colony. No medical treatments were used in the hives 4 weeks prior to the experimental start.

Test Design:

The test was conducted under forced/confined exposure conditions (tunnel), in order to assess potential effects of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G on honey bees and honey bee colonies under semi-field conditions. Four tunnels for each treatment group (20 m length × 5.0 m width × 2.5 m height) were set up on a *ca.* 80 m² plot of *Phacelia tanacetifolia* (2 × 40 m²). Small bee colonies were introduced to the tunnels 6 days before the daytime application of the test item, the control and reference item, respectively. One honey bee colony was used per tunnel.
The following application scenarios were performed:

a) four tunnels (with one colony per tunnel) were treated twice with the test item: once at 1.965 L/ha during full flowering of the crop (BBCH 65) in the evening (evening application; without honey bees present). On the following day a second test item application was performed at 1.6 L/ha during full flowering of the crop (BBCH 65) while honey bees are actively foraging during daytime (daytime application).

b) four tunnels (with one colony per tunnel) were treated with tap water (serving as controls) during full flowering of the crop while honey bees were actively foraging during daytime.

a) four tunnels (with one colony per tunnel) were treated with a reference item during full flowering of the crop while honey bees were actively foraging during daytime (a.s. dimethoate, 1.2 L BAS 152 11 I/ha).

The confined exposure phase of the honey bees to the control (water) and reference item treated crop inside the tunnels was 7 days following the daytime application. In the evening of the 7th day after daytime application, all bee colonies (*i.e.* the colonies from the test item, the control and the reference item group, respectively) were relocated after 7 days of confined exposure from their respective tunnels and placed in an area with no main flowering, bee attractive crops.
After foliar (spray) application of the water (control), test item and the reference item, mortality as well as foraging activity of the bees was assessed. Mortality and foraging activity of the bees were assessed before and after the daytime application (corresponding to **D**ay of **D**aytime **A**pplication = DDA0). The condition of the colonies including assessment of brood status was assessed in regular intervals until the end of the trial.

In addition to the 12 tunnels being treated with the test item, water and reference item, three further tunnels were set up. These tunnels were treated with the test item and thereafter were exclusively used for monitoring and collecting residues ("residue tunnels") to describe exposure. Three tunnels (with one

colony per tunnel) were treated twice with the test item: once at 1.965 L/ha during full flowering of the crop in the evening (without honey bees present). On the following day a second test item application was performed at 1.6 L/ha during full flowering of the crop while honey bees are actively foraging during daytime. The following specimens were collected from each of the three test item residue tunnels, separately:

- pollen and nectar via foraging bees on DDA0 (ca. 2 hours after application) and on DDA +1.

No biological assessments were performed in the three-test item “residue tunnels” after application at any time during the confinement period.

In order to verify application and exposure of the bees, a duplicate sample of the spray solution was taken out of the spray tank before each application in each tunnel separately:

- 2 × approx. 80 mL sample from the test item spraying solution following evening application (DDA-1), out of the spray tank for each test item tunnel separately (= 4 × biological tunnels + 3 × residue tunnels = 7 tunnels).

- 2 × approx. 80 mL sample from the test item spraying solution following daytime application (DDA0), out of the spray tank for each test item tunnel separately (= 4 × biological tunnels + 3 × residue tunnels = 7 tunnels).

Afterwards all samples were transported deep-frozen (≤ -20 °C) to the ibacon laboratory in Rossdorf, Germany. In the laboratory of the ibacon test facility, the collected foraging bees were further processed (pollen and nectar extraction). The residue samples of the spray solution(s) were stored deep frozen (≤ -20 °C) until further shipment, only.

After processing the samples (including residue samples of the spray solution(s)) were send (deep-frozen, ≤ -20 °C) to Bayer AG - Crop Science Division - in Monheim, Germany, for the analytical phase of the study. After transfer of the deep-frozen samples from ibacon to Bayer AG, residue analysis of the active ingredient contained in test item in the samples was conducted at Bayer AG - Crop Science Division - Human Safety - Residue Analysis. The analytical phase report is added to the final report (ibacon 122691037).

Test Parameters:
Mortality of adult bees: 3 days before to 42 days after daytime application (2 brood cycles).
Behavioural abnormalities: 3 days before to 42 days after daytime application (2 brood cycles).
Foraging activity of the bees: 3 days before to 7 days after daytime application
Colony assessments including assessment of brood status (food stores, colony strength and hive populations): once before application on day -3 and on days 7, 14, 21, 28, 34, 41 (2 brood cycles and end of the trial).

Application Rates:
Control: 400 L tap water/ha, during bees actively foraging on the crop.

Test Item evening application: 1.965 L product in 400 L water/ha corresponding to 2.224 kg product/ha[17] and to 5.56 g product/L, without bees present.

[17] Considering a density of 1.132 g/mL according to Certificate of Analysis.

Test Item daytime application: 1.6 L product in 400 L water/ha corresponding to 1.811 kg product/ha and to 4.53 g product/L (considering a density of 1.132 g/mL), during bees actively foraging on the crop.

Reference Item: nominally 1.2 L BAS 152 11 I in 400 L water/ha (corresponding to 3.0 mL/L or 3.22 g/L), during bees actively foraging on the crop.

<u>Test Conditions:</u>

The period before daytime application was characterized by unsettled weather with some rain. The weather stabilised on the day of the evening application and during the evening and daytime application, the weather was warm and sunny. On the day of the daytime application honeybee foraging activity was sufficient on the crop within the tunnels.
Mean temperature during the confinement period (day- 3 to day +7) ranged between 16.3 and 26.6°C. No rain occurred during the exposure phase of the bees to the treated crop in the tunnels for the first 5 days. First precipitation (4 mm) occurred on day 6.

<u>Statistics:</u>

Statistical evaluation was done for mortality, foraging activity and colony strength using Shapiro-Wilk`s test (check for normal distribution), Levene's test (check for homogeneity of variance), Student or Welch t-test and Mann- Whitney U-test (pairwise comparison), (software: TOX Rat Professional, Version 3.2.1, ® ToxRat Solutions GmbH).

Dates of experimental work: July 11 to August 25, 2017

II. RESULTS AND DISCUSSION:

<u>Mortality of the adult (worker bees)</u>

Pre-application phase (day- 3 to day -1 before daytime application):

Mortality before daytime application in the control, test item and reference item group was 43.2, 42.4 and 42.6 dead bees/colony/day, respectively. This was not statistically significantly different compared to the water control (Student t-test, pairwise comparison to the control, two-sided, α = 0.05).

Exposure phase in the tunnels (day 0 after daytime application to day 7):

Mean mortality of adult bees in the test item treatment during the exposure phase was similar or even lower to the control group at any assessment day. There was no sign of any acute effect on mortality of the adult honey bees at any time after exposure to the treated crops in the tunnels. The comparison of the daily and the overall mortality values (day 0 to day 7) between the test item treatment and the control group showed no statistically significant difference to the control (Student t-test [day wise] or Mann-Whitney U-test [overall], pairwise comparison, one-sided greater, α = 0.05). Average control mortality of adult bees during the exposure phase (day 0 to day 7 following the daytime application) was 42.6 dead bees/colony/day. The average mortality in the test item group was distinctly lower with 25.0 dead bees/colony/day.

In contrast, application of the reference item (dimethoate at a rate of 480 g/ha) resulted in a markedly increased number of dead bees found in the traps and on the gauze strips during the confinement period. Following the application on day 0, mortality in the reference item group increased up to ca. 72 × the mortality levels of the control group. From day 0 to day 3 following the application the number of dead bees found in the reference item treatment was statistically significantly increased compared to the control values (Student t-test, pairwise comparison, one-sided greater, α = 0.05). The average mortality during the exposure phase (day 0 to day 7) in the reference item group was 246.1 dead bees/colony/day *vs* 42.6 dead bees/colony/day in the control group.

Phase outside the tunnels (day 8 after daytime application to day 21 [1st brood cycle]):

Overall, the number of dead bees in the test item treatment was low with a mean of 8.4 dead bees per day and colony during the period from day 8 to day 21 after treatment. This was lower and accordingly not statistically significant different to the control (14.6 dead bees/day/colony) (overall comparison with Mann-Whitney U-test, pairwise comparison, one-sided greater, $\alpha = 0.05$). Mortality levels in the test item group were not statistically significant different to the control at any time when subjected to a day wise comparison (Student t-test, pairwise comparison, one-sided greater, $\alpha = 0.05$).

Phase outside the tunnels (day 22 after daytime application to day 42 [2nd brood cycle]):

The overall comparison from day 22 to day 42 showed that the number of dead bees found in the test item treatment (4.9 dead bees/day/colony) was lower and thus not statistical significant compared to the number of dead bees found in the control group (5.8 dead bees/day/colony (Mann-Whitney U-test, pairwise comparison, one-sided greater, $\alpha = 0.05$). The pairwise comparison on every day displayed no statistically significant difference of the test item group to the control.
The relative low amounts of dead bees in the reference item group during the phase outside the tunnels (days 8 - 42) is the result of the high effects on bees caused by dimethoate during the exposure phase. Half of the bees in the colonies were lost during the exposure phase in the reference item.

Foraging Activity

Pre-application phase (day -3 to day 1 before daytime application):

The mean foraging activity in the intended test item and reference item groups was comparable to the control group, resulting in overall daily mean values of 13.0, 12.4 and 13.8 bees/m²/day in the control, test item group and reference item groups, respectively. Day -2 was excluded from evaluation as no flight activity occurred due to enduring rain. No statistically significant differences were found between the control, the test and reference item treatment groups at the overall daily mean comparison of this period (Welch t-test, $\alpha = 0.05$, two-sided).

Exposure phase in the tunnels (day 0 after daytime application to day 7):

Overall, from day 0 to day 7, mean foraging activities in the test item group were comparable to the control values (16.1 bees/m²/day and 16.8 bees/m²/day, respectively), and thus not statistically significantly different (Welch t-test, pairwise, one-sided smaller, $\alpha = 0.05$).
After application of the reference item (dimethoate), foraging broke down and was statistically significantly reduced compared to the control group (Welch t-test, pairwise, one-sided smaller, $\alpha = 0.05$). The overall daily mean foraging activity from day 0 to day 7 in the reference item group was 0.1 bees/m²/day, which was statistically significantly reduced compared to the control group (Welch t-test, pairwise, one-sided smaller, $\alpha = 0.05$).

Behavioural abnormalities:

No behavioural abnormalities occurred in the test item treated group and in the control group at any assessment day. The reference item caused behavioural abnormalities (moribund and affected bees) for three days following day 0.

Condition of the colonies:

Condition of the colonies was assessed over two complete brood cycles of the honey bees (*i.e.* 42 days [2 × 21 days]). At the beginning of the trial all colonies to be used for the test were similar according to the season. All queens (or eggs) and brood stages (eggs, larvae and closed brood) were found in all colonies as an indication of healthy colonies. Moreover, the amount of food reserves (uncontaminated

nectar and pollen) was sufficient to ensure colony viability and brood status but also allowed that enough space was available for exposure of the brood to new food sources.
At the end of the 7th day after daytime application, the hives were relocated from their tunnels. In general, the test item treatment group colonies developed in the same manner as the control colonies.
Compared to the control, a similar amount of brood could be found during the assessments with no indication of a test item related effect. All colonies exposed to the test item remained vital with increasing bee numbers and healthy brood. The amount of individual brood stages (eggs, larvae and pupae) present in the colonies of the different treatment groups fluctuated and was alternating higher in the different treatment groups on the different assessment days. All queens and/or a sufficient presence of eggs were found in the test item treated colonies during all following brood checks indicating that the queens were alive and healthy.
There was no indication of any effect of the test item on the condition of the bee colonies.

Colony strength:

Three days before daytime application the mean number of honey bees per colony was between 4770 and 6233 in all treatment groups. The subsequent development of the colony strength among the colonies in the control and test item treatment groups followed the same pattern. Following re-movement of the colonies from the tunnels, (beside a short decrease within the confinement period) there was a continuous increase of colony strength observable. The relative increase of bee population in the control group was slightly higher and is explainable by the slightly lower bee numbers in the control colonies at the beginning of the trial. No statistically significant difference in the colony strength between the test item treated colonies and the control colonies occurred at any assessment date (Student t-test, pair-wise comparison to the control, one sided smaller, α = 0.05). Overall, no adverse effects of the test item on colony strength and population development have been observed throughout the study. Development in the reference item group was slightly decreased which was statistically significantly different to the control on days 7 and 28.

Considering the initial mean number of bees per treatment group before the application as 100 %, the following relative mean numbers of bees were determined:

Treatment Group	Day[1] -1	Day 7	Day 14	Day 21	Day 28	Day 34	Day 41
Control	100%	115%	168%	144%	163%	190%	198%
Test Item	100%	96% (n.s.)	118% (n.s.)	136% (n.s.)	120% (n.s.)	141% (n.s.)	154% (n.s.)
Reference Item	100%	60% (*)	97% (n.s.)	119% (n.s.)	99% (*)	137% (n.s.)	140% (n.s.)

[1] time in relation to the daytime application
n.s. = not statistically significant to the control, * = statistically significant to the control; Student t-test, α=0.05, pairwise; one-sided smaller.

Summarised mortality and foraging activity data of the honey bees

Parameter	Treatment group[1)] Control	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) G	Reference Item BAS 152 11 I [0.48 kg a.s./ha]
Mean mortality of worker bees / colony / day [n] during			
pre-application phase day -3 - 1[2)]	43.2 ± 14.7	42.4 ± 13.0 (n.s.)	42.6 ± 15.4 (n.s.)
exposure phase in the tunnels day 0 - 7[2)]	42.6 ± 23.9	25.0 ± 9.8 (n.s.)	246.1 ± 430.5 (n.s.)
phase outside the tunnels day 8 - 21[3)]	14.6 ± 9.7	8.4 ± 4.7 (n.s.)	5.5 ± 5.0 (n.s.)
phase outside the tunnels day 22 - 42[4)]	5.8 ± 2.6	4.9 ± 0.8 (n.s.)	4.6 ± 1.5 (n.s.)
overall after application day 0 -42	15.0 ± 6.6	9.7 ± 0.9 (n.s.)	48.8 ± 4.9 (n.s.)
Mean foraging activity / m² / colony / day [n] during			
pre-application phase	13.0 ± 8.4	12.4 ± 9.3 (n.s.)	13.8 ± 11.0 (n.s.)
exposure phase in the tunnels	16.8 ± 7.8	16.1 ± 7.4 (n.s.)	0.1 ± 0.1 (*)

Statistical evaluation:
Mortality: before application: Student t-test, $\alpha = 0.05$, two-sided; after application: Student t-test [day wise] or Mann-Whitney U-test [overall], pairwise, one-sided greater.
Foraging Activity: before application: Welch t-test, $\alpha = 0.05$, two-sided; after application: Welch t-test, pairwise, one-sided smaller (No flight activity occurred on day -2 due to enduring rain, therefore day -2 was excluded from evaluation). n.s. = not statistically significant compared to the control; * = statistically significant compared to the control.
1) each with four tunnels (replicate)
2) mean number of dead honey bees per day and colony found in dead bee traps and on gauze strips in the tunnels
3) mean number of dead honey bees per day and colony found in dead bee traps (1st brood cycle; day 8 to day 21)
4) mean number of dead honey bees per day and colony found in dead bee traps (2nd brood cycle; day 22 to day 42)

Analytical findings

The exposure of the honeybees to the test item was confirmed by analytical measurement of the active substances fluopicolide and propamocarb-hydrochloride in the spray solution samples taken from the biological assessment tunnels and the extra residue tunnels. The concentration of fluopicolide and propamocarb-hydrochloride in both groups of tunnels was in a comparable range so that it is assumed that the exposure conditions were comparable in all tunnels treated with the test item. In those tunnels allocated to residue determination, honeybees were used as sampling device. The concentration of fluopicolide and propamocarb-hydrochloride measured in the collected pollen and nectar samples of the day of daytime application and the day after allows for confirmation of the exposure of the bees inside the tunnels.
The following table gives an overview of the concentration of fluopicolide and propamocarb-hydrochloride in the analysed sample materials.

Residue summary in/on pollen, nectar and spray solution

Sample Material	Test Item	Sampling Day	Source	Fluopicolide Concentration [mg/kg]	Mean Concentration [mg/kg]	Recovery from Target* [%]	Mean Recovery from Target* [%]
Pollen	Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G	DDA0	T1 - T3	19 - 27	24	-	-
		DDA1	T1 - T3	2.3 - 2.5	2.4	-	-
Nectar		DDA0	T1 - T3	0.22 - 0.32	0.28	-	-
		DDA1	T1 - T3	0.028 - 0.068	0.047	-	-
		DDA-1	TSE: T1 - T4	265 – 273	269	80 - 82	81
			TRE: T5 - T7	248 - 288	268	75 - 87	81

Sample Material	Test Item	Sampling Day	Source	Fluopicolide			
				Concentration [mg/kg]	**Mean Concentration [mg/kg]**	**Recovery from Target* [%]**	**Mean Recovery from Target* [%]**
Spray Solution		DDA0	TSD: T1 - T4	196 - 231	214	73 - 86	79
			TRD: T5 - T7	222 - 242	234	82 - 90	87
				Propamocarb-hydrochloride			
Pollen		DDA0	T1 - T3	323 - 474	410	-	-
		DDA1	T1 - T3	41 - 50	45	-	-
Nectar		DDA0	T1 - T3	11 - 13	12	-	-
		DDA1	T1 - T3	0.73 - 1.5	1.1	-	-
Spray Solution		DDA-1	TSE: T1 - T4	2470 - 2960	2640	80 - 96	86
			TRE: T5 - T7	2520 - 2680	2590	82 - 87	84
		DDA0	TSD: T1 - T4	1880 - 2090	2010	75 - 83	80
			TRD: T5 - T7	2080 - 2110	2090	83 - 84	83

DDA: Day of Daytime Application
Pollen/Nectar: T1 to T3 description for samples from tunnels used for Residue Analysis
Spray Solution: TSE = Test Item Evening Spray Solution from Tunnels used for Biological Assessments, TRE = Test Item Evening Spray Solution from Tunnels used for Residue Analysis, TSD = Test Item Daytime Spray Solution from Tunnels used for Biological Assessments, TRD = Test Item Daytime Spray Solution from Tunnels used for Residue Analysis
T-1 to T-4 description are samples from tunnels used for Biological Assessments, T5 to T7 descriptions are samples from tunnels used for Residue Analysis
Mean concentrations were calculated using unrounded values.
*The target concentration in the spray solution for fluopicolide was 331 mg/kg for DDA-1 and 270 mg/kg for DDA0, and for propamocarb-hydrochloride 3080 mg/kg for DDA-1 and 2510 mg/kg for DDA0
LOQ = Limit of Quantification = 0.01 mg/kg (= 10 µg/kg = 10 ppb) for fluopicolide and propamocarb hydrochloride
LOD = Limit of Detection = 0.003 mg/kg (= 3 µg/kg = 3 ppb) for fluopicolide and propamocarb hydrochloride

III. Conclusions:

In order to assess the potential risk of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G to honey bee colonies, honey bees were exposed under realistic but severe (forced) exposure conditions in a semi-field test (confinement in tunnels). The test item was applied twice: once at 1.965 L product/ha during full flowering of the surrogate crop *Phacelia tanacetifolia* in the evening (without honey bees present) and subsequently the next day during daytime at 1.6 L product/ha in 400 L water/ha, during full flowering of the crop (BBCH 65) while honey bees were actively foraging.
Concurrently to the second test item application, the control (tap water) and reference item applications (dimethoate) were conducted on the full flowering *Phacelia tanacetifolia* crop (BBCH 65), during daytime and with honey bees actively foraging on the crop.
No effects on mortality of adult and immature honey bees were observed. Foraging activity, behaviour, nectar- and pollen storage as well as queen survival was not affected. There was no effect on overall colony development, development of brood and colony strength observed.
Based on the results of this study, it can be concluded that Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G does not adversely affect honey bee behaviour, brood development, colony strength and queen survival when applied twice, at a rate of 1.965 L product/ha and at 1.6 L product/ha in 400 L water/ha under the above described conditions.

Data Point:	KCP 10.3.1.5/02
Report Author:	[redacted]
Report Year:	2019
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) G: Toxicity testing on honey bees (Apis mellifera L.) under semi-field conditions in Spain - Tunnel test - Final report -
Report No:	121561037
Document No:	M-653952-01-1
Guideline(s) followed in study:	Regulation (EC) No. 1107/2009 Directive 2003-01 (Canada/PMRA) US EPA OCSPP - Not Applicable OEPP/EPPO guideline No. 170 (4) (2010)
Deviations from current test guideline:	Current Guideline: EPPO 170 (4) (2010) No deviations
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this semi-field study in Spain was to conduct a test under forced/confined exposure conditions (tunnel), in order to assess potential effects of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G on honey bees and honey bee colonies. Four tunnels for each treatment group (25 m length × 5.5 m width × 3.5 m height) were set up on a *ca.* 80 m² plot of *Phacelia tanacetifolia* (2 × 40 m²). One honey bee colony was introduced to each tunnel, in the morning, at BBCH 65, two days before the evening application of the test item and three days before the daytime applications of the control (water), second test item application and the reference item.

Four tunnels were treated at 1.965 L/ha during full flowering (BBCH 65) in the evening without honey bees present. On the following day a second test item application was performed at 1.6 L/ha during full flowering of the crop (BBCH 65) while honey bees were actively foraging. For the control and the reference item the treatment with tap water and dimethoate, respectively, was done at full flowering at daytime, when bees foraged actively. In addition to the 12 tunnels being treated with the test item, water and reference item, three further tunnels were set up. These tunnels were treated with the test item and thereafter exclusively used for monitoring and collecting residues. Test parameters were mortality of adult bees, behavioural abnormalities, foraging activity of the bees and colony assessments including assessment of brood status. Mean temperature during the confinement period (day- 3 to day + 7) ranged between 18.1 and 25.5°C. During the exposure phase inside the tunnels and the following monitoring phase outside the tunnels, weather was very warm and no rain occurred until study end.

Overall, the mortality and foraging activity were comparable to the control throughout the study duration and no test item related effects on adult and immature honey bees were observed. Behaviour of the bees, nectar- and pollen storage as well as queen survival was not affected. There were no observable effects on overall colony development, development of brood and colony strength.

Based on the study results it can be concluded that Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G does not adversely affect honey bee behaviour, brood development, colony strength and queen survival when applied twice, at a rate of 1.965 L product/ha and at 1.6 L product/ha in 400 L water/ha under the above described conditions.

I. Material and Methods:

Test Item:

Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G (FLC + PCH SC 687.5 (62.5 + 625) G): fluopicolide (AE C638206): 5.96 % w/w, 67.42 g/L, propamocarb-hydrochloride (AE B066752): 55.4 % w/w, 627.6 g/L (all analysed values); Supplier Batch No.: EV58002080; Sample

Description: FAR30060-00; Specification No.: 102000027553; Sample ID: M16000539001; density: 1.132 g/cm³.

Test Species:
Honey bees (*Apis mellifera iberica* L.); Healthy, well-fed and queen-right colonies were used for the test. Colonies were free of obvious bee diseases. Small honey bee colonies, equipped with 6 combs containing at least 5-6 brood combs with all brood stages present (eggs, larvae and pupae) and at least 1 comb with an appropriate amount of nectar and pollen. The queen-right colonies consisted of a mean of 7101 to 7524 honey bees/colony. No medical treatments were used in the hives 4 weeks prior to the experimental start.

Test Design:
The test was conducted under forced/confined exposure conditions (tunnel), in order to assess potential effects of Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5 + 625) G on honey bees and honey bee colonies under semi field conditions. Four tunnels for each treatment group (25 m length × 5.5 m width × 3.5 m height) were set up on a *ca.* 80 m² plot of *Phacelia tanacetifolia* (2 × 40 m²). One honey bee colony was introduced to each tunnel, in the morning, at BBCH 65, two days before the evening application of the test item and three days before the daytime applications of the control (water), second test item application and the reference item. The study was carried out according to the following test design:

- four tunnels (with one colony per tunnel) were treated twice with the test item: once at 1.965 L/ha during full flowering of *Phacelia tanacetifolia* crop (BBCH 65) in the evening (without honey bees present). On the following day a second test item application was performed at 1.6 L/ha during full flowering of the crop (BBCH 65) while honey bees were actively foraging during daytime;

- four tunnels (with one colony per tunnel) were (concurrently to the test item daytime application) treated with tap water, while honey bees were actively foraging on the crop (serving as controls);

- four tunnels (with one colony per tunnel) were treated with a reference item during full flowering of the crop while honey bees were actively foraging during daytime (a.s. dimethoate, 1.2 L BAS 152 11 I/ha), while honey bees were actively foraging on the crop.

The confined exposure phase of the honey bees to the control (water) and reference item treated crop inside the tunnels was 7 days following the application day DDA0[18] (during full flowering (BBCH 65) and honey bees actively foraging on the crop). The confined exposure phase of the honey bees to the test item-treated crop inside the tunnels started in the morning of DDA0 when the bees started to forage on the test item treated crop after the first test item application in the evening on DDA-1.
In the morning of DDA8, all honey bee colonies were removed from the tunnels to an area with no main flowering crops in the surroundings. The condition of the colonies and the mortality were examined until day 42 following DDA0 (= end of study).

In addition to the 12 tunnels being treated with the test item, water and reference item, three further tunnels were set up. These three tunnels were also treated with the test item and thereafter were exclusively used for monitoring and collecting residues (“residue tunnels”) to describe exposure. Three tunnels (with one colony per tunnel) were treated twice with the test item: once at 1.965 L/ha during full

[18] In the following, the point in time refers to the control, second test item application and reference item application during full flowering (BBCH 65) and honey bees actively foraging on the crop (= Day of Daytime Application, DDA0).

flowering of the crop (BBCH 65) in the evening (without honey bees present). On the following day a second test item application was performed at 1.6 L/ha during full flowering of the crop (BBCH 65) while honey bees were actively foraging during daytime.

The following samples were collected from each of the three test item residue tunnels, separately:

- pollen and nectar via foraging bees: DDA0 approx. 2 hours after the test item application and on DDA1

No biological assessments were performed in the three test item "residue tunnels" after application at any time during the confinement period. In order to verify application and exposure of the bees, a duplicate sample of the spray solution was taken out of the spray tank before each application in each tunnel separately:

- 2 × approx. 100 mL from the test item spraying solution on DDA-1, out of the spray tank for each test item tunnel separately (= 4 × biological tunnels + 3 × residue tunnels = 7 tunnels)

- 2 × approx. 100 mL from the test item spraying solution on DDA0, out of the spray tank for each test item tunnel separately (= 4 × biological tunnels + 3 × residue tunnels = 7 tunnels)

All collected samples were stored in a freezer (≤ -20 °C) located near the experimental field site. After all samples were collected during the experimental field phase, they were dispatched deep-frozen (≤ -20 °C) to the ibacon laboratory in Leverkusen, Germany. There, the collected foraging bees were further processed (pollen and nectar extraction) and the residue samples of the spray solution(s) were stored deep-frozen (≤ -20 °C).
In the end, all samples were shipped deep-frozen (≤ -20 °C) to Bayer AG - Crop Science Division - in Monheim, Germany, for the analytical phase of the study. The analytical phase report is added to this final report.

Test Parameters:
Mortality of adult bees: DDA-3 to DDA42;
Behavioural abnormalities: DDA-3 to DDA42;
Foraging activity of the bees: DDA-3 to DDA7;
Colony assessments including assessment of brood status (food stores, colony strength and hive populations): once before the application days on DDA-1 and on DDA9, DDA13, DDA21, DDA28, DDA35 and DDA42.

Application Rates:
Control: 400 L tap water/ha

Test Item:
1) Evening application rate (without bees present): 1.965 L product in 400 L water/ha. This corresponded to 2.22 kg product/ha and to 5.56 g product/L, considering a density of 1.132 g/mL according to Certificate of Analysis.
2) Daytime application rate (during bee flight): 1.6 L product in 400 L water/ha. This corresponded to 1.81 kg product/ha and to 4.53 g product/L, considering a density of 1.132 g/mL according to Certificate of Analysis.

Reference Item: nominally 1.2 L BAS 152 II (Dimethoate) in 400 L water/ha (corresponding to 3.0 mL/L or 3.22 g/L.

Test Conditions:

Natural field conditions. On the day of the test item evening application (DDA-1), weather conditions were good, and no rain occurred. On the following day during the daytime applications of the control, test item and reference item on DDA0, the sky was cloudy (80%) but the temperature was warm. Mean temperature during the confinement period (day- 3 to day + 7) ranged between 18.1 and 25.5°C. During the exposure phase inside the tunnels and the following monitoring phase outside the tunnels, the weather was very warm and no rain occurred until study end.

Statistics:

Statistical evaluation was done for mortality, foraging activity and colony strength using Shapiro-Wilk`s test (check for normal distribution), Levene`s test (check for homogeneity of variance), Student t-test or Welch t-test (pairwise comparison); (software: TOX Rat Professional, Version 3.2.1, ® ToxRat Solutions GmbH.

Dates of experimental work: May 28 to July 12, 2017

II. Results and Discussion:

Mortality of the adult (worker bees)

Pre-application phase (DDA-3 to DDA-1):

Mortality of the pre-application phase in the control, test item and reference item group was 11.9, 12.9 and 12.3 dead bees/colony/day, respectively. This was not statistically significantly different compared to the water control (Welch t-test, pairwise comparison to the control, two-sided, α = 0.05).

Exposure phase (DDA-0 to DDA-7):

At start of foraging activity on DDA0, the honey bees in the test item treatment group were exposed to residues of the first application of the test item (DDA-1). Following this exposure, the mean mortality in the test item group was slightly higher with 26.8 dead bees/colony/day and resulted to be statistical significant different compared to the water control (mean of 17.3 dead bees/colony/day) at DDA0 before the second test item application during daytime (Welch t-test, pairwise comparison to the control, one-sided greater, α = 0.05). These statistically significance was caused by time management of the mortality assessments before daytime application (two-hour difference between assessments in the control and test item group) and was not treatment related. Moreover, after the daytime application of the water control and test item (DDA0), mean mortality of adult bees in the test item group was slightly lower compared to the control group (23.5 vs. 27.0 dead bees/colony/day in the control and the test item group, respectively). Thus, this was not statistically significantly different compared to the control (Welch t-test, pairwise, one-sided greater, α = 0.05).

The overall evaluation of the mean mortality level of the exposure days from DDA0 to DDA7, resulted in a statistically significant difference compared to the control group (Welch t-test, pairwise comparison, one-sided greater, α = 0.05). Average control mortality of adult bees during the exposure phase (DDA0 to DDA7) was 22.0 dead bees/colony/day whilst the average mortality in the test item group was slightly increased with 31.5 dead bees/colony/day, respectively. The higher mortality levels in the test item group were mostly driven by one replicate (tunnel 4) with increased mortalities. However, the overall mortality levels observed in the test item group were negligible and within a normal range considering the starting colony strength of 7101 bees/colony in the test item group and an increase of 120% (8515 bees/colony) at test end (DDA42).

In contrast, application of the reference item (dimethoate at a rate of 480 g/ha) resulted in a markedly increased number of dead bees found in the traps and on the gauze strips during the assessments

performed after the daytime application on DDA0. Following the application, mortality in the reference item group increased up to ca. 41 × the mortality levels of the control group on day DDA0. The average mortality during the exposure phase (DDA0 to DDA7) in the reference item group was statistically significantly increased, with a mean mortality of 311.1 dead bees/colony/day (Welch t-test, pairwise comparison to the control, one-sided greater, α = 0.05).

Phase outside the tunnels (DDA8 after application to DDA21 [1st brood cycle]):

After the confined exposure phase inside the tunnels, a day wise comparison from DDA8 to DDA21 did not indicate a statistically significant difference of the test item mortality and the control mortality (Welch t-test, pairwise comparison, one-sided greater, α = 0.05).
Overall, the number of dead bees in the test item group was very low with a mean of 2.5 dead bees/colony/day during the period from DDA8 to DDA21 after the test item treatments. This was comparable and accordingly not statistically significant different to the control group (2.1 dead bees/day/colony) (Welch t-test, pairwise comparison to the control, one-sided greater, α = 0.05). In the reference item group, the mortality of adult worker bees was considerably increased from DDA8 to DDA14 but was not reflected in statistically significant differences compared to the control group (Welch t-test, pairwise comparison, one-sided greater, α = 0.05). The increased mortality was only detected in two out of the four reference item replicates. This variation within the reference item group resulted in a high standard deviation. Following DDA15 the mean mortality levels in the reference item group were comparable to those of the control and even of the test item group.

Phase outside the tunnels (DDA22 after application to DDA42 [2nd brood cycle]):

The overall comparison from DDA22 to DDA42 showed very low mortality levels with a mean of 0.9 dead bees/colony/day found in the test item group. This was not statistically significant different compared to the also very low mean mortality level found in the control group of 1.9 dead bees/day/colony, respectively (Welch t-test, pairwise comparison to the control, one-sided greater, α = 0.05). Moreover, the overall mortalities from DDA0 to DDA21 and from DDA0 to DDA42 did also not show statistically significant differences between the test item and control group (Welch t-test, pairwise comparison, one-sided greater, α = 0.05).
The very low amounts of dead bees in the reference item group from DDA22 to DDA42 were the result of the high effects on bees caused mainly by dimethoate during the exposure phase. An overall comparison showed a mortality in the reference item group of 2.1 dead bees/day/colony which was not significantly different to the control group with a mortality of 1.9 dead bees/day/colony (Student t-test, pairwise comparison, one-sided greater, α = 0.05). In contrast, the overall mortalities from DDA0 to DDA21 and from DDA0 to DDA42 did show statistically significant differences between the reference item and the control group (Welch t-test, pairwise comparison, one-sided greater, α = 0.05).

<u>Foraging Activity</u>

Pre-application phase (DDA-3 to DDA0):

The mean foraging activities from DDA-3 to DDA-1 were comparable in all three treatment groups with 9.3, 9.1 and 7.9 bees/m²/day in the control, test item and reference item group, respectively. Therefore, no statistical differences were found between the test item and reference item compared to the control (Student t-test, pairwise, two-sided, α = 0.05).

Exposure phase (DDA0 to DDA7):

At start of foraging activity on DDA0 and thus exposure to fresh residues in the test item group, the first assessment of the mean foraging activity in the test item group was performed shortly before the daytime application around noon. The high foraging activity of 23.3 bees/m²/day in the test item group was not statistically significantly different compared to the lower foraging activity value of 14.8 bees/m²/day in the control group assessed approx. 2 hours earlier in the morning of that day (Student t-test, pairwise,

one-sided smaller, α = 0.05). On DDA0, after the second test item daytime application, the mean foraging activity of 12.2 bees/m²/day in the test item group showed a statistically significant difference compared to the mean foraging activity of 14.5 bees/m²/day in the control group (Student t-test, pairwise, one-sided smaller, α = 0.05). This was caused by displaced application timings and consequently different assessment timings between the control and test item groups and thus, is not considered to be treatment related. Moreover, the mean foraging activity on DDA1 in the test item group was with 17.6 bees/m²/day slightly higher compared to 15.8 bees/m²/day in the control group and thus not statistical different (Student t-test, pairwise comparison to the control, one-sided smaller, α = 0.05).

Overall, from DDA0 to DDA7, mean foraging activity in the test item group was slightly higher compared to the control values (20.6 bees/m²/day vs. 19.9 bees/m²/day), and thus not statistically significantly different (Student t-test, pairwise, one-sided smaller, α = 0.05). On DDA0 before the daytime application, the mean foraging activity of 20.0 bees/m²/day resulted to be statistically significantly increased in the reference item group compared to the mean foraging activity of 14.8 bees/m²/day in the control group, respectively (Student t-test, pairwise, one-sided smaller, α = 0.05). Again, this was caused by displaced application timings and consequently different assessment timings between the control and reference item groups.

Following DDA0 after application of the reference item (dimethoate), almost no flight was recorded on any of the assessment days. This resulted in an overall daily mean foraging activity of 0.0 bees/m²/day from DDA0 to DDA7.

Behavioural abnormalities:

No behavioural abnormalities occurred in the test item treated group and in the control group at any assessment day. There were also no noticeable behavioural abnormalities recorded in the reference item group as the impact of the application with dimethoate was mainly reflected in the high mortality rates after DDA0.

Condition of the colonies:

Condition of the colonies was assessed over two complete brood cycles of the honey bees (i.e. 42 days [2 × 21 days]).

At the beginning of the trial all colonies assigned for the test were similar according to the season. All queens (or eggs) and brood stages (eggs, larvae and closed brood) were found in all colonies as an indication of healthy colonies. Moreover, the amount of food reserves (uncontaminated nectar and pollen) was sufficient to ensure colony viability and brood status but also allowed that enough space was available for exposure of the brood to new food sources.

In the morning of DDA8, all honey bee hives were relocated from their tunnels to a monitoring site (approx. 42 km distance from the field site). In general, the test item treatment group colonies developed in the same manner as the control colonies. Compared to the control, a similar amount of brood was found during the assessments with no indication of a test item related effect. All colonies exposed to the test item remained vital with healthy brood. The amount of individual brood stages (eggs, larvae and pupae) present in the colonies of the control and test item treatment groups fluctuated and slightly alternated on the different assessment days. All queens and/or a sufficient presence of eggs were found in the test item treated colonies during all following brood checks indicating that the queens were alive and healthy. There was no indication of any effect of the test item on the condition of the bee colonies.

On DDA28, after expert judgement (beekeeper) colonies used for the biological assessments showed low food stores and all honey bee colonies assigned to the control, test item and reference item groups were additionally fed with 1.0 kg commercial ready-to-use syrup (Apicar Pro) in order to avoid artefacts from insufficient food supply (food uptake from DDA28 to DDA29).

The colonies in the reference item group showed a decrease in the total amount of brood during the assessment days after DDA0. This was a result of the high effects on bees caused by dimethoate during the exposure phase.

Colony strength:

The mean number of honey bees per colony in all treatment groups was similar one day before the daytime application (DDA0) and did not differ statistically significantly (mean of 7101 to 7524 per colony). Following re-movement of the colonies from the tunnels a short decrease was observed during the assessment on DDA9 in the test item group (86%). But overall there was an increase of colony strength observable and even stronger compared to the control group from DDA13 to DDA42 (120%) (= last assessment day after two brood cycles). Thus, no statistically significant difference in the colony strength between the test item treated colonies and the control colonies occurred at any assessment date (Student t-test, pair-wise comparison to the control, one-sided smaller, α = 0.05). Overall, no adverse effects of the test item on colony strength and population development were observed throughout the study.
The development of the colony strength in the reference item group was statistically significantly decreased on all assessment days after DDA0 except on DDA9 (Student t-test, pair-wise comparison to the control, one-sided smaller, α = 0.05).

Considering the initial mean number of bees per treatment group before the application as 100 %, the following relative mean numbers of bees were determined:

Treatment Group	DDA[1] -1	DDA9	DDA13	DDA21	DDA28	DDA35	DDA42
Control	100%	103%	129%	98%	92%	86%	86%
Test Item	100%	86% (*)	111% (n.s.)	112% (n.s.)	104% (n.s.)	111% (n.s.)	120% (n.s.)
Reference Item	100%	90% (n.s.)	76% (*)	52% (*)	50% (*)	44% (*)	40% (*)

[1] time in relation to the daytime application
n.s. = not statistically significant to the control, *: = statistically significant to the control
Student t-test, α = 0.05, pairwise; two-sided (before application), one-sided smaller (after application)

Summarised mortality and foraging activity data of the honey bees

	Foraging activity					Mortality							
	water treated control	Test Item		Reference Item		water treated control		Test Item			Reference Item		
time[a]	mean number of bees per m² [b]	mean number of bees per m² [b]	statistics	mean number of bees per m² [b]	statistics	total dead bees[b]	SD	total dead bees[b]	SD	statistics	total dead bees[b]	SD	statistics
DDA-3	0.7 ± 0.4	0.5 ± 0.8	-	0.4 ± 0.4	-	1.0	± 0.8	2.0	± 0.8	-	2.3	± 0.5	-
DDA-2	15.8 ± 3.6	14.0 ± 5.8	-	11.5 ± 3.5	-	19.0	± 11.6	13.0	± 7.0	-	19.5	± 4.4	-
DDA-1	11.3 ± 2.5	12.9 ± 2.8	-	11.9 ± 1.9	-	15.8	± 5.7	23.8	± 11.3	-	15.0	± 3.8	-
Daily mean DDA-3 to DDA-1	**9.3 ± 7.8**	**9.1 ± 7.5**	**n.s.**	**7.9 ± 6.5**	**n.s.**	**11.9**	**± 9.6**	**12.9**	**± 10.9**	**n.s.**	**12.3**	**± 8.9**	**n.s.**
DDA0 b.a.	14.8 ± 0.2	23.3 ± 4.5	n.s.	20.0 ± 1.6	*1)	**17.3**	**± 5.1**	**26.8**	**± 7.9**	*	**12.5**	**± 2.1**	**n.s.**
mean DDA0 a.a.	**14.5 ± 1.1**	**12.2 ± 1.9**	*	**0.0 ± 0.0**	*	**27.0**	**± 5.3**	**23.5**	**± 8.7**	**n.s.**	**1107.5**	**± 424.3**	*
DDA1	15.8 ± 1.7	17.6 ± 2.1	n.s.	0.1 ± 0.1	*	17.0	± 4.8	18.8	± 6.1	n.s.	605.0	± 323.4	*
DDA2	20.8 ± 1.0	20.0 ± 2.3	n.s.	0.0 ± 0.0	*	30.8	± 11.4	41.5	± 12.8	n.s.	232.5	± 120.9	*
DDA3	13.0 ± 2.4	13.6 ± 5.1	n.s.	0.1 ± 0.2	*	16.8	± 6.2	33.8	± 21.5	n.s.	171.0	± 89.2	*
DDA4	20.3 ± 2.6	20.4 ± 2.7	n.s.	0.0 ± 0.0	*	17.5	± 7.1	22.8	± 16.2	n.s.	69.3	± 22.8	*
DDA5	22.1 ± 3.2	23.5 ± 6.1	n.s.	0.0 ± 0.0	*	14.5	± 5.9	16.8	± 8.2	n.s.	44.3	± 29.4	n.s.
DDA6	28.4 ± 4.1	30.8 ± 1.8	n.s.	0.0 ± 0.0	*	19.3	± 14.6	42.0	± 13.1	*	101.0	± 64.8	*
DDA7	24.3 ± 2.0	26.6 ± 4.4	n.s.	0.0 ± 0.0	*	33.3	± 7.0	50.3	± 15.1	n.s.	158.5	± 147.9	n.s.
Daily mean DDA0 to DDA7 a.a.	**19.9 ± 5.2**	**20.6 ± 6.3**	**n.s.**	**0.0 ± 0.1**	*	**22.0**	**± 7.3**	**31.5**	**± 12.2**	*	**311.1**	**± 367.1**	*
Daily mean DDA8 to DDA21 a.a.						**2.1**	**± 1.7**	**2.5**	**± 2.5**	**n.s.**	**27.8**	**± 39.0**	*
Daily mean DDA22 to DDA42 a.a.						**1.9**	**± 1.6**	**0.9**	**± 0.8**	**n.s.**	**2.1**	**± 4.0**	**n.s.**
Daily mean DDA0 to DDA21 a.a.						**9.4**	**± 10.7**	**13.1**	**± 16.0**	**n.s.**	**130.8**	**± 255.6**	*
Daily mean DDA0 to DDA42 a.a.						**5.7**	**± 8.6**	**7.1**	**± 12.9**	**n.s.**	**68.0**	**± 192.1**	*

DDA = Day of Daytime Application
Day of evening application of the test item group only (BBCH 65): May 30; 2017 = DDA-1
Day of daytime application of control, test item and reference item group (BBCH 65): May 31, 2017 = DDA0
[A] DDA-3 to DDA-1 = days before application DDA0; DDA0 to DDA7 = days after application DDA0
[B] Mean values (rounded) of four tunnels per treatment group
b.a. = before daytime application (DDA0)
a.a. = after daytime application (DDA0)
n.s. = not statistically significant compared to the control; * = statistically significant compared to the control; "-" = no statistics were performed statistics (foraging activity): Student t-test; pairwise; α = 0.05; before DDA0; two-sided (control, reference item), one-sided smaller (test item); after DDA0: one-sided smaller (control, test item, reference item)
statistics (mortality): Welch t-test; pairwise; α = 0.05; before DDA0; two-sided (control, reference item), one-sided greater (test item); after DDA0: one-sided greater (control, test item, reference item)
1) Statistically significantly increased compared to the control Welch t-test; pairwise; α = 0.05; two-sided)

Analytical findings

The exposure of the honeybees to the test item was confirmed by analytical measurement of the active substances fluopicolide and propamocarb-hydrochloride in the spray solution samples taken from the biological assessment tunnels and the extra residue tunnels. The concentration of fluopicolide and propamocarb-hydrochloride in both groups of tunnels was in a comparable range so that it is assumed that the exposure conditions were comparable in all tunnels treated with the test item. In those tunnels allocated to residue determination, honeybees were used as sampling device. The concentration of fluopicolide and propamocarb-hydrochloride measured in the collected pollen and nectar samples on the day of daytime application and the day after allows a confirmation of the exposure of the bees inside the tunnels.
The following table gives an overview of the concentration of fluopicolide and propamocarb-hydrochloride in the analysed sample materials.

Residue summary in/on pollen, nectar and spray solution

Fluopicolide							
Sample Material	**Test Item**	**Sampling Day**	**Source**	**Concentration [mg/kg]**	**Mean Concentration [mg/kg]**	**Recovery from Target* [%]**	**Mean Recovery from Target* [%]**
Pollen	FLC+ PCH SC 687.5 (62.5+ 625) G	DDA0	T1-T3	27 – 30	28	-	-
		DDA1	T1-T3	1.4 – 2.3	2.0	-	-
Nectar		DDA0	T1-T3	0.15 – 0.21	0.18	-	-
		DDA1	T1-T3	0.10 – 0.14	0.11	-	-
Spray Solution		DDA-1	TSE: T1-T4	260 – 270	260	79 – 80	79
			TRE: T5-T7	260 – 270	260	79 – 82	80
		DDA0	TSD: T1-T4	210 – 230	220	77 – 84	79
			TRD: T5-T7	200 – 220	210	74 – 80	77
Propamocarb-hydrochloride							
Sample Material	Test Item	Sampling Day	Source	Concentration [mg/kg]	Mean Concentration [mg/kg]	Recovery from Target* [%]	Mean Recovery from Target* [%]
Pollen	FLC+ PCH SC 687.5 (62.5+ 625) G	DDA0	T1-T3	390 – 500	442	-	-
		DDA1	T1-T3	12 – 17	15	-	-
Nectar		DDA0	T1-T3	14 – 18	16	-	-
		DDA1	T1-T3	1.0 – 1.9	1.6	-	-
Spray Solution		DDA-1	TSE: T1-T4	2480 – 2910	2600	81 – 94	85
			TRE: T5-T7	2470 – 2670	2560	80 – 87	83
		DDA0	TSD: T1-T4	2040 – 2120	2080	81 – 84	83
			TRD: T5-T7	2080 – 2220	2130	83 – 88	85

DDA: Day of Daytime Application; Pollen/Nectar: T1 to T3 description for samples from tunnels used for Residue Analysis
Spray Solution: TSE = Test Item Evening Spray Solution from Tunnels used for Biological Assessments, TRE = Test Item Evening Spray Solution from Tunnels used for Residue Analysis, TSD = Test Item Daytime Spray Solution from Tunnels used for Biological Assessments, TRD = Test Item Daytime Spray Solution from Tunnels used for Residue Analysis
T1 to T4 description are samples from tunnels used for biological assessments, T5 to T7 descriptions are samples from tunnels used for residue analysis. Mean concentrations were calculated using unrounded values.
* The target concentration in the spray solution for fluopicolide was 331 mg/kg for DDA-1 and 270 mg/kg for DDA0 and for propamocarb-hydrochloride 3080 mg/kg for DDA-1 and 2510 mg/kg for DDA0.
LOQ = Limit of Quantification = 0.01 mg/kg (= 10 µg/kg = 10 ppb) for fluopicolide and propamocarb-hydrochloride
LOD = Limit of Detection = 0.003 mg/kg (3 µg/kg = 3 ppb) for fluopicolide and propamocarb-hydrochloride

III. CONCLUSIONS:

In order to assess the potential risk of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G to honey bee colonies, honey bees were exposed under realistic but severe (forced) exposure conditions in a semi-field test (confinement in tunnels). The test item was applied twice: once at 1.965 L product/ha during full flowering of the surrogate crop *Phacelia tanacetifolia* (BBCH 65) in the evening (without honey bees present) and, during daytime on the following day at 1.6 L product/ha, during full flowering of the crop (BBCH 65) while honey bees were actively foraging.

Concurrently to the second test item application, the control (tap water) and reference item applications (dimethoate) were conducted on the full flowering *Phacelia tanacetifolia* crop (BBCH 65), during daytime and with honey bees actively foraging on the crop.
Overall, the mortality and foraging activity were comparable to the control throughout the study duration and no test item related effects on adult and immature honey bees were observed. Behaviour of the bees, nectar- and pollen storage as well as queen survival was not affected. There were no observable effects on overall colony development, development of brood and colony strength.
Based on the results of this study, it can be concluded that Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5 + 625) G does not adversely affect honey bee behaviour, brood development, colony strength and queen survival when applied twice at a rate of 1.965 L in 400 L/ha (corresponding to 2.22 kg product/ha) in the evening after bee flight and at a rate of 1.6 L/ha (corresponding to 1.81 kg product/ha) during daytime and foraging activity, under the above described conditions.

CP 10.3.1.6 Field tests with honeybees

Not necessary when considering the outcome of the risk assessment and the results of the lower-tiered studies.

CP 10.3.2 Effects on non-target arthropods other than bees

The risk assessment was performed according to Guidance Document on Terrestrial Ecotoxicology (SANCO/10329/2002) and to the Guidance Document on regulatory testing and risk assessment procedures for plant protection products with non-target arthropods (ESCORT 2, Candolfi et al. 2000[19]).

Table 10.3.2- 1: Toxicological endpoints for arthropods other than bees (FLC + PCH SC 62.5 + 625 G)

Test Species, Dossier-file-No.	Tested Formulation, Study type, Duration, Exposure	Ecotoxicological Endpoint	
Aphidius rhopalosiphi [redacted] 2003 M-217140-01-1 Rep.No: CW02/078 KCP 10.3.2.1/03	FLC + PCH SC 62.5 + 625 G Laboratory, spray deposits on glass plates		
		Corr. Mortality [%]	Effect on Reproduction [%]
	177.1 mL product/ha	-0.1 A	8.3
	354.3 mL product/ha	0.0	10.5
Aphidius rhopalosiphi [redacted] 2003 M-221752-01-1 Rep.No: CW03/009 KCP 10.3.2.1/01	FLC + PCH SC 62.5 + 625 G Laboratory, spray deposits on glass plates	LR_{50} [mL product/ha]: 2482 ER_{50} [mL product/ha] > 427	
		Corr. Mortality [%]	Effect on Reproduction [%]
	427 mL product/ha	16.9	47.4
	811 mL product/ha	11.9	73.0
	1541 mL product/ha	47.5	n.a. C
	2921 mL product/ha	44.1	89.7
	5564 mL product/ha	76.3	n.a. C

[19] Candolfi et al.: Guidance document on regulatory testing and risk assessment procedures for plant protection products with non-target arthropods; ESCORT 2 workshop (European Standard Characteristics Of Non-Target Arthropod Regulatory Testing), Wageningen, NL, March 21-23, 2000, SETAC Europe; SETAC publication August 2001

Test Species, Dossier-file-No.	Tested Formulation, Study type, Duration, Exposure	Ecotoxicological Endpoint		
Typholodromus pyri [redacted] 2003 M-221754-01-1 Rep.No: CW03/011 KCP 10.3.2.1/02	FLC + PCH SC 62.5 + 625 G Laboratory, spray deposits on glass plates.	LR_{50} [mL product/ha]: 3238 ER_{50} [mL product/ha]: > 2318		
		Mortality [%]	Effect on Reproduction [%]	
	397 mL product/ha	2.5	7.9	
	716 mL product/ha	5.0	19.4	
	1287 mL product/ha	26.3	40.8	
	2318 mL product/ha	38.8	49.4	
	4173 mL product/ha	56.3	86.1	
Chrysoperla carnea [redacted] 2003 M-225401-01-1 Rep.No: C038632 KCP 10.3.2.2/01	FLC + PCH SC 62.5 + 625 G Laboratory, spray deposits on glass plates.	LR_{50} [mL product/ha]: > 6400 ER_{50} [mL product/ha]: > 6400		
		Corr. Mortality [%]	Eggs/Female/ Day	Hatching [%]
	Control	-	18.3	81
	1600 mL product/ha	0	23	82
	4320 mL product/ha	0	18.2	82
	6400 mL product/ha	2.8	17.8	79
Aphidius rhopalosiphi [redacted] 2003 M-225402-01-1 Rep.No: C038633 KCP 10.3.2.2/02	FLC + PCH SC 62.5 + 625 G Extended laboratory, spray deposits on potted wheat plants	LR_{50} [mL product/ha]: > 8000 ER_{50} [mL product/ha]: ~ 4000		
		Corr. Mortality [%]	Effect on Reproduction [%]	
	500 mL product/ha	0	10.8	
	1000 mL product/ha	0	7.6	
	2000 mL product/ha	5	20.3	
	4000 mL product/ha	5	50.0	
	8000 mL product/ha	10	98.7	
Typholodromus pyri [redacted] 2003 M-221756-01-1 Rep.No: CW03/017 KCP 10.3.2.2/03	FLC + PCH SC 62.5 + 625 G Extended laboratory, freshly dried residues on detached leaves of bean	LR_{50} [mL product/ha]: > 4173 ER_{50} [mL product/ha]: > 4173		
		Corr. Mortality [%]	Effect on Reproduction [%]	
	397 mL product/ha	7.5	12.9	
	716 mL product/ha	11.3	17.9	
	1287 mL product/ha	2.5	27.6	
	2318 mL product/ha	11.3	29.8	
	4173 mL product/ha	13.8	34.3	
Coccinella septempunctata [redacted] 2005 M-256344-01-1 Rep.No.: 23841012 KCP 10.3.2.2/04	FLC + PCH SC 62.5 + 625 G Extended lab., spray deposits on detached bean leaves	LR_{50} [mL product / ha]: > 4800 ER_{50} [mL product / ha]: > 4800		
		Corr. Mortality [%]	Eggs/Female/ Day	Hatching [%]
	Control	-	15.3	65.4
	300 mL product/ha	0	15.3	72.6
	600 mL product/ha	9.7	19.8	76.7
	1200 mL product/ha	-9.7 [A]	8.9	76.5
	2400 mL product/ha	9.7	17.6	73.1
	4800 mL product/ha	-6.5	11.6	81.1

Test Species, Dossier-file-No.	Tested Formulation, Study type, Duration, Exposure	Ecotoxicological Endpoint	
Aphidius rhopalosiphi [redacted] 2014 M-503125-01-1 Rep.No: BAY-14-1 KCP 10.3.2.2/05	FLC + PCH SC 62.5 + 625 G Aged residues spray deposits on barley plants, 2 × 2800 mL prod./ha (7-day interval)	Corr. Mortality [%]	Effect on Reproduction [%]
	residues aged for 0 d:	3.3	-2.1 [B]
	residues aged for 7 d:	0	-16.5 [B]
	residues aged for 14 d:	0	1.6

A: a negative value indicates a higher mortality rate in the control than in the treatment
B: a negative value indicates a higher reproduction rate in the treatment than in the control
C: not applicable, reproduction was not assessed

The exposure scenario is based on the use pattern as given in Table 10- 1. The product FLC + PCH SC 687.5 is intended to be applied at a rate of 1.6 L product/ha (1-4 applications in potatoes, 1-2 applications in lettuce).

According to ESCORT 2 and the Terrestrial Guidance Document (SANCO/10329/2002) the exposure is calculated as:

in-field: Application rate × MAF

off-field: Max. single application rate × MAF × drift factor VDF × correction factor

Application rate: 1.6 L product/ha in all crops

MAF (multiple application factor) = 1.7 (2 applications), 2.3 (3 applications), 2.7 (4 applications)

Drift factor = 0.0277, 90th percentile for one application, 0.0238, 82nd percentile for two applications; 0.0201, 77th percentile for three applications, 0.0185, 74nd percentile for four applications (according to Ganzelmeier)

VDF = vegetation distribution factor = 10 (studies with 2D exposure system) and 1 (studies with 3D exposure system)

Correction factor = 10 (Tier 1) and 5 (Tier 2)

The risk is considered acceptable if the calculated HQ is ≤ 2

Table 10.3.2- 2: Exposure calculation for in-field assessment (Tier 1 and 2)

Crop	No. of appl.	Appl. rate [L prod./ha]	MAF	$PER_{in-field}$ [L prod./ha]
Potatoes	4	1.6	2.7	4.320
Potatoes	3	1.6	2.3	3.680
Potatoes, lettuce	2	1.6	1.7	2.720
Potatoes, lettuce	1	1.6	1.0	1.600

MAF: Multiple application factor; PER: Predicted environmental rate

Table 10.3.2- 3: Exposure calculation for the off-field scenario (Tier 1)

Crop	No. of appl.	Appl. rate [L prod./ha]	MAF	Drift [%]	VDF	Correction factor	$PER_{off\text{-}field}$ [L prod./ha]
Potatoes	4	1.6	2.7	1.85	10	10	0.080
Potatoes	3	1.6	2.3	2.01	10	10	0.074
Potatoes, lettuce	2	1.6	1.7	2.38	10	10	0.065
Potatoes, lettuce	1	1.6	1.0	2.77	10	10	0.044

MAF: Multiple application factor; VDF: Vegetation distribution factor; PER: Predicted environmental rate

Table 10.3.2- 4: Exposure calculation for the off-field scenario (Tier 2)

Crop	No. of appl.	Appl. rate [L prod./ha]	MAF	Drift [%]	Test system	VDF	Correction factor	$PER_{off\text{-}field}$ [L prod./ha]
Potatoes	4	1.6	2.7	1.85	3D [a)]	1	5	0.400
					2D [b)]	10	5	0.040
Potatoes	3	1.6	2.3	2.01	3D [a)]	1	5	0.370
					2D [b)]	10	5	0.037
Potatoes, lettuce	2	1.6	1.7	2.38	3D [a)]	1	5	0.324
					2D [b)]	10	5	0.032
Potatoes, lettuce	1	1.6	1.0	2.77	3D [a)]	1	5	0.222
					2D [b)]	10	5	0.022

MAF: Multiple application factor; VDF: Vegetation distribution factor; PER: Predicted environmental rate
a) Relevant for the extended lab study with *Aphidius rhopalosiphi* (Roehlig, U.; 2003, M-225402-01-1)
b) Relevant for the extended lab studies with *Chrysoperla carnea* (Roehlig, U.; 2003, M-225401-01-1), *Typholodromus pyri* ([redacted] 2003, M-221756-01-1) and *Coccinella septempunctata* ([redacted] 2005, M-256344-01-1)

Risk assessment for non-target arthropods

The risk assessment was performed according to Guidance Document on Terrestrial Ecotoxicology (SANCO/10329/2002) and to the Guidance Document on regulatory testing and risk assessment procedures for plant protection products with non-target arthropods (ESCORT 2, Candolfi et al. 2000[20]).

[20] Candolfi et al.: Guidance Document on regulatory testing and risk assessment procedures for plant protection products with non-target arthropods; ESCORT 2 workshop (European Standard Characteristics Of Non-Target Arthropod Regulatory Testing), Wageningen, NL, March 21-23, 2000, SETAC Europe; SETAC publication August 2001

Tier 1 in-field risk assessment for non-target arthropods

Table 10.3.2- 5: Tier 1 in-field risk assessment for non-target arthropods

Crop and application rate	Species	$PER_{in\text{-}field}$ [L prod./ha]	LR_{50} [L prod./ha]	HQ	Trigger
Potatoes 4 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	4.320	2.482	1.74	2
	Typhlodromus pyri		3.238	1.33	2
Potatoes 3 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	3.680	2.482	1.48	2
	Typhlodromus pyri		3.238	1.14	2
Potatoes, lettuce 2 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	2.720	2.482	1.10	2
	Typhlodromus pyri		3.238	0.84	2
Potatoes, lettuce 1 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	1.600	2.482	0.64	2
	Typhlodromus pyri		3.238	0.49	2

PER: Predicted environmental rate; HQ: Hazard quotient

For the standard species, the in-field HQ values are below the trigger of concern, indicating an acceptable risk for non-target arthropods.

Tier 1 off-field risk assessment for non-target arthropods

Table 10.3.2- 6: Tier 1 off-field risk assessment for non-target arthropods

Crop and application rate	Species	$PER_{off\text{-}field}$ [L prod./ha]	LR_{50} [L prod./ha]	HQ	Trigger
Potatoes 4 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	0.080	2.482	0.03	2
	Typhlodromus pyri		3.238	0.02	2
Potatoes 3 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	0.074	2.482	0.03	2
	Typhlodromus pyri		3.238	0.02	2
Potatoes, lettuce 2 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	0.065	2.482	0.03	2
	Typhlodromus pyri		3.238	0.02	2
Potatoes, lettuce 1 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	0.044	2.482	0.02	2
	Typhlodromus pyri		3.238	0.01	2

PER: Predicted environmental rate; HQ: Hazard quotient

For the standard species, the off-field HQ values are below the trigger of concern, indicating an acceptable risk for non-target arthropods.

Tier 2 in-field risk assessment for non-target arthropods

Table 10.3.2- 7: Tier 2 in-field risk assessment for non-target arthropods

Crop and application rate	Species	$PER_{in-field}$ [L prod./ha]	LR_{50}/ER_{50} [L prod./ha]	$PER_{in-field}$ below rate with ≤ 50% effect
Potatoes 4 × 1.6 L prod./ha	*Chrysoperla carnea*	4.320	> 6.400	Yes
	Aphidius rhopalosiphi		~ 4.000	**No**
	Typhlodromus pyri		> 4.173	**No**
	Coccinella septempunctata		> 4.800	Yes
Potatoes 3 × 1.6 L prod./ha	*Chrysoperla carnea*	3.680	> 6.400	Yes
	Aphidius rhopalosiphi		~ 4.000	Yes
	Typhlodromus pyri		> 4.173	Yes
	Coccinella septempunctata		> 4.800	Yes
Potatoes, lettuce 2 × 1.6 L prod./ha	*Chrysoperla carnea*	2.720	> 6.400	Yes
	Aphidius rhopalosiphi		~ 4.000	Yes
	Typhlodromus pyri		> 4.173	Yes
	Coccinella septempunctata		> 4.800	Yes
Potatoes, lettuce 1 × 1.6 L prod./ha	*Chrysoperla carnea*	1.600	> 6.400	Yes
	Aphidius rhopalosiphi		~ 4.000	Yes
	Typhlodromus pyri		> 4.173	Yes
	Coccinella septempunctata		> 4.800	Yes

PER: Predicted environmental rate

The $PER_{in-field}$ is below the rate with ≤ 50% effect for all species and uses, except for *Aphidius rhopalosiphi* and *Typhlodromus pyri* for the application of 4 × 1.6 L prod./ha in potatoes. Taking the results from studies on glass plates and natural substrates into account, *Aphidius rhopalosiphi* is considered to be the most sensitive species to FLC + PCH SC 62.5 + 625 G. Hence, an aged residue study with *A. rhopalosiphi* is presented to demonstrate the potential for recovery of in-field non-target arthropod populations and thus no unacceptable risk.

Table 10.3.2- 8: Tier 2 in-field risk assessment for non-target arthropods

Crop	Species	$PER_{in-field}$ [L prod./ha]	Rate with ≤ 50 % effect (L/ha) at 0 DALT	$PER_{in-field}$ below rate with ≤ 50 % effect?
Potatoes 4 × 1.6 L prod./ha	*Aphidius rhopalosiphi*	4.320	2 × 2.8 [A]	Yes

PER: Predicted environmental rate; DALT: Days after last treatment.
[A] 2 × 1.6 L/ha can be expressed as 1.7 (MAF for 2 applications) × 1.6 L/ha = 2.72 L/ha, therefore the tested 2 × 2.8 L/ha cover the use pattern of 4 × 1.6 L/ha; 2 × 2.8 L/ha would be equivalent to 1.7 (MAF for 2 applications) × 2.8 L/ha = 4.76 L/ha, which is > the PER

The $PER_{in-field}$ is below the rate with ≤ 50% effect for all species and uses indicating an acceptable risk for non-target arthropods.

Tier 2 off-field risk assessment for non-target arthropods

Table 10.3.2- 9: Tier 2 off-field risk assessment for non-target arthropods

Crop and application rate	Species	Off-field $PER_{max.}$ [L prod./ha]	LR_{50}/ER_{50} [L prod./ha]	$PER_{off\text{-}field}$ below rate with ≤ 50% effect
Potatoes 4 × 1.6 L prod./ha	*Chrysoperla carnea*	0.040	> 6.400	Yes
	Aphidius rhopalosiphi	0.400	~ 4.000	Yes
	Typhlodromus pyri	0.040	> 4.173	Yes
	Coccinella septempunctata	0.040	> 4.800	Yes
Potatoes 3 × 1.6 L prod./ha	*Chrysoperla carnea*	0.037	> 6.400	Yes
	Aphidius rhopalosiphi	0.370	~ 4.000	Yes
	Typhlodromus pyri	0.037	> 4.173	Yes
	Coccinella septempunctata	0.037	> 4.800	Yes
Potatoes, lettuce 2 × 1.6 L prod./ha	*Chrysoperla carnea*	0.032	> 6.400	Yes
	Aphidius rhopalosiphi	0.324	~ 4.000	Yes
	Typhlodromus pyri	0.032	> 4.173	Yes
	Coccinella septempunctata	0.032	> 4.800	Yes
Potatoes, lettuce 1 × 1.6 L prod./ha	*Chrysoperla carnea*	0.022	> 6.400	Yes
	Aphidius rhopalosiphi	0.222	~ 4.000	Yes
	Typhlodromus pyri	0.022	> 4.173	Yes
	Coccinella septempunctata	0.022	> 4.800	Yes

PER: Predicted environmental rate

The $PER_{off\text{-}field}$ is below the rate with ≤ 50% effect for all species and uses indicating an acceptable risk for non-target arthropods.

CP 10.3.2.1 Standard laboratory testing for non-target arthropods

Data Point:	KCP 10.3.2.1/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	Toxicity to the parasitoid wasp Aphidius rhopalosiphi (DeStephani-Perez) (Hymenoptera: Braconidae) in the laboratory Propamocarb hydrochloride + AE C638206 water miscible suspension concentrate 625 + 62.5 g/l Code: AE B066752 04 SC61 A102
Report No:	C036920
Document No:	M-221752-01-1
Guideline(s) followed in study:	IOBC: Mead-Briggs et al. 2000
Deviations from current test guideline:	Current Guideline: Mead-Briggs et al. (2000) No deviations.
Previous evaluation:	yes, evaluated and accepted DAR 2005 for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The objective of this laboratory study was to investigate the lethal and sublethal effects of FLC + PCH SC 687.5 on the parasitoid wasp *Aphidius rhopalosiphi* when exposed on a glass surface. The test substance was applied at rates of 27.6, 52.5, 99.7, 189 and 360 g fluopicolide/ha (equivalent to 0.43, 0.81, 1.54, 2.92 and 5.56 L product/ha) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 0.12 g a.s./ha and a water treated control. Mortality of 60 adults was assessed 24 and 48 hours after exposure. From the water control and the 0.43, 0.81 and 2.92 L product (FLC + PCH SC 687.5)/ha treated groups, 15 impartially chosen females per treatment were each transferred to a cylinder containing untreated cereal plants infested with *Rhopalosiphum padi* for a period of 24 hours. The number of mummies was assessed 11 days later. All validity criteria were met. The LR_{50} was 160.6 g fluopicolide/ha (equivalent to 2.48 L product/ha). Sublethal effects lower than 50% were observed at the rate of 0.43 L product/ha.

I. MATERIAL AND METHODS:

Test item: Infinito SC Fungicide (FLC + PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm³, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/L + 634 g/L, respectively) as active ingredients.
The test substance was applied at rates of 27.6, 52.5, 99.7, 189 and 360 g Fluopicolide/ha (equivalent to 0.43, 0.81, 1.54, 2.92 and 5.56 L product/ha) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 0.12 g a.s./ha and a water treated control.
Mortality of 60 adults was assessed 24 and 48 hours after exposure.
From the water control and the 0.43, 0.81 and 2.92 L product (Infinito SC Fungicide)/ha treated groups, 15 impartially chosen females per treatment were each transferred to a cylinder containing untreated cereal plants infested with *Rhopalosiphum padi* for a period of 24 hours. The number of mummies was assessed 11 days later.

Dates of experimental work: May 26, 2003 to July 14, 2003

II. RESULTS AND DISCUSSION:

In this laboratory test the effects of Infinito SC Fungicide residues on the survival of *Aphidius rhopalosiphi* were determined at 0.43, 0.81, 1.54, 2.92 and 5.56 L product/ha), applied to glass plates.
In the highest dose rate of 5.56 L product/ha, a mortality of 76.3% was observed. At the other rates of 0.43, 0.81, 1.54 and 2.92 L product/ha, mortality percentages lower than 50% (16.9, 11.9, 47.5 and 44.1%, respectively).
The reduction in reproductive success relative to the control at the dose rates of 0.43, 0.81 and 2.92 L product/ha was 47.4%, 73.0% and 89.7, respectively.

Mortality / Reproduction - 48 hours after treatment

	Mortality [%]			Reproduction		
Infinito SC Fungicide (L/ha)	Uncorrected	Abbott	P-Value(*)	Rate	% to Control	P-Value(#)
0 (control)	1.7	**0**		7.7	**0**	
0.43	18.3	**16.9**	0.008	4.1	**47.4**	<.001
0.81	13.3	**11.9**	0.032	2.1	**73.0**	<.001
1.54	48.3	**47.5**	<.001	n.d.**	**n.d.****	n.d.**
2.92	45.0	**44.1**	<.001	0.8	**89.7**	<.001
5.56	76.7	**76.3**	<.001	n.d.	**n.d.**	n.d.
Reference item 0.12 g a.s./ha	100	100	<.001	n.d.	n.d.	n.d.

LR_{50}: 160.6 g a.s. fluopicolide /ha; 95 % Confidence Interval: (114 – 243), equivalent to LR_{50}=2.48 L prod./ha
* Fisher`s Exact test, two-sided, p-values are adjusted according to Bonferroni-Holm
** not detected because 10 females (instead of 15) were available after the mortality phase of the study
# one-way ANOVA, p-values are adjusted according to Dunnett
n.d.: not detected

Validity criteria:

Validity criteria (Mead-Briggs et al., 2000):	Guideline	Test result
Control mortality	Not more than 5 out of 40 wasps (12.5%)	1.7 %
Toxic reference mortality (according to study protocol)	>50%	100 %
Reproduction rate	≥ 5 mummies/female ≤ 2 females producing 0 mummies	7.7 mummies/female 0 female with 0 mummies

III. Conclusions:

The LR_{50} (median lethal rate) of Infinito SC Fungicide to the cereal aphid parasitoid *Aphidius rhopalosiphi* was 160.6 g fluopicolide/ha (equivalent to 2.48 L product/ha).
Sublethal effects lower than 50% were observed at the rate of 0.43 L product/ha.

Assessment and conclusion by applicant:

The study is considered reliable. LR_{50} = 2.48 L/ha and ER_{50} > 0.43 L/ha are the relevant endpoints for the risk assessment.

Data Point:	KCP 10.3.2.1/02
Report Author:	[redacted]
Report Year:	2003
Report Title:	Toxicity to the predatory mite Typhlodromus pyri SCHEUTEN (Acari, Phytoseidae) in the laboratory Propamocarb hydrochloride + AE C638206 water miscible suspension concentrate 625 + 62.5 g/l Code: AE B066752 04 SC61 A102
Report No:	C036921
Document No:	M-221754-01-1
Guideline(s) followed in study:	IOBC: Blümel et al. 2000
Deviations from current test guideline:	Current Guideline: Blümel et al. (2000) No deviations
Previous evaluation:	yes, evaluated and accepted DAR 2005 for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The objective of this laboratory study was to investigate the lethal and sublethal toxicity of FLC + PCH SC 687.5 to the predatory mite *Typhlodromus pyri* when exposed to a treated glass surface. The test item was applied at rates of 25.7; 46.3; 83.3; 150 and 270 g a.s. (related to fluopicolide)/ha (equivalent to 0.40, 0.72, 1.29, 2.32 and 4.17 L product/ha) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 6 g a.s./ha, and a water treated control. Mortality of 80 protonymphs was assessed 1, 3, 7, 10, 12 and 14 days after exposure. The reproduction rate of the surviving mites was then evaluated over the period 7-14 days after treatment by counting the total number of offspring (eggs and larvae) produced. All validity criteria were met. The LR_{50} to the predatory mite *Typhlodromus pyri* was 209.5 g fluopicolide/ha (equivalent to 3.24 L product/ha). Sublethal effects lower than 50% were observed at the rate of 2.32 L product/ha.

I. MATERIAL AND METHODS:

Test item: Infinito SC Fungicide (FLC + PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm^3, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/kg + 634 g/L, respectively) as active ingredients.
The test substance was applied at rates of 25.7; 46.3; 83.3; 150 and 270 g a.s. (related to fluopicolide)/ha (equivalent to 0.40, 0.72, 1.29, 2.32 and 4.17 L product/ha) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 6 g a.s./ha, and a water treated control.
Mortality of 80 protonymphs was assessed 1, 3, 7, 10, 12 and 14 days after exposure. The reproduction rate of the surviving mites was then evaluated over the period 7-14 days after treatment by counting the total number of offspring (eggs and larvae) produced.

Dates of experimental work: June 03, 2003 to June 17, 2003

II. RESULTS AND DISCUSSION:

The mortality / escaping rate in the control chambers up to day 7 after treatment was 0%. The mean corrected mortality of the nymphs, and the mean reproduction rate of the surviving females exposed to the test material and the toxic reference is given below:
In the highest dose rate of 4.17 L product/ha there was 56.3% corrected mortality. The reduction in reproductive success relative to the control at this rate was 86%. At the lower rates of 0.40, 0.72, 1.29 and 2.32 L product/ha the corrected mortality and the reduction of reproduction were <50%.

Mortality / Reproduction - 7 days after treatment

	Mortality [%]			Reproduction [%]		
Infinito SC Fungicide (L/ha)	Uncorr.	Abbott	P-Value (*)	Total No. of offspring	Rel. to Control	P-Value (#)
0.0 (control)	0.0	0.0		11.7	0	
0.40	2.5	2.5	0.497	10.8	7.9	0.976
0.72	5.0	5.0	0.241	9.4	19.4	0.526
1.29	26.3	26.3	<.001	6.9	40.8	0.025
2.32	38.8	38.8	<.001	5.9	49.4	0.003
4.17	56.3	56.3	<.001	1.6	86.1	<.001
Toxic reference item 6 g a.s./ha	73.8	73.8	<.001	n.d.	n.d.	

LR_{50}: 209.5 g a.s./ha 95 % Confidence Interval: (174 – 268), equivalent to LR50=3.24 L/ha
* Fisher`s Exact test, two-sided, p-values are adjusted according to Bonferroni-Holm
\# one-way ANOVA, p-values are adjusted according to Dunnett

Validity criteria:

Validity criteria (Blümel et al., 2000)	Guideline	Test result
Mortality rate	Mean mortality (dead + escaped) ≤ 20% at day 7	0 %
Toxic reference mean mortality of protonymphs at day 7 (control corrected)	Between 50 and 100 %	55 %
Reproduction (number of eggs per female in the control from day 7 to 14)	≥4	11.7

III. CONCLUSIONS:

The LR_{50} (median lethal rate) of Infinito SC Fungicide to the predatory mite *Typhlodromus pyri* was 209.5 g fluopicolide/ha (equivalent to 3.24 L product/ha).
Sublethal effects lower than 50% were observed at the rate of 2.32 L product/ha.

Assessment and conclusion by applicant:

The study is considered reliable. LR_{50} = 3.24 L/ha and ER_{50} > 2.32 L/ha are the relevant endpoints for the risk assessment.

Data Point:	KCP 10.3.2.1/03
Report Author:	[redacted]
Report Year:	2003
Report Title:	Toxicity to the parasitoid wasp Aphidius rhopalosiphi (DeStephani-Perez) (Hymenoptera: Braconidae) in the laboratory Propamocarb hydrochloride + AE C638206 water miscible suspension concentrate 625 + 62.5 g/L Code: AE B066752 04 SC61 A102
Report No:	C029419
Document No:	M-217140-01-1
Guideline(s) followed in study:	ESCORT: Candolfi et al., 2000; IOBC: Mead-Briggs et al., 2000
Deviations from current test guideline:	Current Guideline: Mead-Briggs et al. (2000) No deviations.
Previous evaluation:	No, not previously submitted for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The objective of this laboratory study was to investigate the lethal and sublethal toxicity of FLC + PCH SC 687.5 on the parasitoid wasp *Aphidius rhopalosiphi* when exposed on a treated glass surface. The test substance was applied at rates of 200 and 400 g product/ha (corresponding to 177.1 and 354.3 mL product/ha, respectively) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 0.12 g a.s./ha, and a water treated control. Mortality of the adults was assessed 24 and 48 hours after exposure. From the water control and both test rates of test item impartially chosen females per treatment were each transferred to a cylinder containing untreated cereal plants infested with *Rhopalosiphum padi* for a period of 24 h hours. This parasitation period provided a measure of reproductive success. The number of mummies was assessed 14 days later. All validity criteria were met. In both dose rates there was no mortality. The reduction in reproductive success relative to the control at the 200 g product/ha rate (177.1 mL product/ha) was 8.3% and that of the 400 g product/ha rate (354.3 mL product/ha) was 10.5%.

I. MATERIAL AND METHODS:

Test item: Infinito SC Fungicide (FLC + PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm^3, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/L + 634 g/L, respectively) as active ingredients.

The toxicity of freshly dried residues of the product AE B066752 04 SC61 A102 applied onto glass plates, to the parasitoid wasp *Aphidius rhopalosiphi* was examined. The test substance was applied at rates of 200 and 400 g product/ha (corresponding to 177.1 and 354.3 mL product/ha, respectively) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 0.12 g a.s./ha, and a water treated control.

Mortality of the adults was assessed 24 and 48 hours after exposure. From the water control and both test rates of AE 8066752 04 SC61 A102 impartially chosen females per treatment were each transferred to a cylinder containing untreated cereal plants infested with *Rhopalosiphum padi* for a period of 24h hours. This parasitation period provided a measure of reproductive success. The number of mummies was assessed 14 days later.

Dates of experimental work: March 09, 2005 to July 28, 2005

II. Results and Discussion:

The findings are summarized in the following table.

Mortality and reproduction results

	Control	AE 8066752 04 SC61 A102		Reference substance
		200 g product/ha (177.1 mL product/ha)	400 g product/ha (354.3 mL product/ha)	Dimethoate
Corrected mortality (%)	-	-0.1	0	100
Reproduction (after 1 day, no. of mummies/female)	12.1	11.1	10.8	n.d.
% Reduction of reproduction (relative to the control)	-	8.3	10.5	n.d.

n.d. = not determined

Validity criteria:

Validity criteria (Mead-Briggs et al., 2000)	Guideline	Test result
Control mortality	Not more than 5 out of 40 wasps (12.5%)	5 %
Toxic reference mortality (according to study protocol)	>50%	100 %
Reproduction rate	≥ 5 mummies/female ≤ 2 females producing 0 mummies	12.5 mummies/female 1 female with 0 mummies

III. Conclusions:

In this laboratory test the effects of Infinito SC Fungicide (AE 8066752 04 SC61 A102) residues on the survival of *Aphidius rhopalosiphi* were determined at 200 and 400 g product/ha, applied to glass plates. In both dose rates there was no mortality. The reduction in reproductive success relative to the control at the 200 g product/ha rate (177.1 mL product/ha) was 8.3% and that of the 400 g product/ha rate (354.3 mL product/ha) was 10.5%.

Assessment and conclusion by applicant:

The study is considered reliable. No effects on survival and reproduction were observed at both application rates tested leading to LR_{50} and ER_{50} >354.3 mL/ha. These endpoints are not further considered in the risk assessment as a higher dosed study is available providing more relevant information for the risk assessment (KCP 10.3.2.1/01; Waltersdorfer, 2003; M-221754-01-1).

CP 10.3.2.2 Extended laboratory testing, aged residue studies with non-target arthropods

Data Point:	KCP 10.3.2.2/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	Toxicity of AE B066752 04 SC61 A102 to larvae of the green lacewing Chrysoperla carnea (Steph.) under laboratory conditions
Report No:	C038632
Document No:	M-225401-01-1
Guideline(s) followed in study:	IOBC: Vogt et al. (2000)
Deviations from current test guideline:	Current Guideline: Vogt et al. (2000) Exposure on glass plates
Previous evaluation:	yes, evaluated and accepted DAR 2005 for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the lethal and sublethal effects of FLC + PCH SC 687.5 on larvae of the green lacewing *Chrysoperla carnea* STEPH. in a laboratory test. Lacewing larvae were exposed to dried residues of 1.6, 4.32 and 6.4 L product/ha in 200 L deionized water/ha and a control. The different application rates of the test item were applied onto glass plates. Dimethoate EC 400 (30 mL product/ha in 200 L/ha of water) was used as a toxic reference treatment. Larvae of *Chrysoperla carnea* (Steph.) were exposed in 40 replicates of 1 larva (per treatment group) to the residues of the test item, reference item and control, respectively. During the assessments the larvae were fed with UV-sterilized eggs of *Sitotroga cerealella*. The number of surviving larvae and hatched adults as well as the number of eggs laid, and larvae hatched (F_1) were recorded over a period of 42 days. From these data the endpoints mortality and reproductive performance were calculated. All validity criteria were met. No statistically significantly differences in mortality were observed in all test item treatment groups. No abnormalities regarding larvae or hatched adults were observed in any treatment group during the test.

I. MATERIAL AND METHODS:

Test item: Infinito SC Fungicide (FLC + PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm^3, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/kg + 634 g/L, respectively) as active ingredients.

The product was tested on larvae of the green lacewing *Chrysoperla carnea* (Steph.) under laboratory conditions after residual contact exposure to spray residues. The test item was applied at rates of 1.6, 4.32 and 6.4 L product/ha in 200 L deionized water/ha on glass plates. The control was treated with deionized water (200 L/ha). Dimethoate EC 400 (30 mL product/ha in 200 L/ha of water) was used as a toxic reference treatment.

Larvae of *Chrysoperla carnea* (Steph.) were exposed in 40 replicates of 1 larva (per treatment group) to the residues of the test item, reference item and control, respectively. During the assessments the larvae were fed with UV-sterilized eggs of *Sitotroga cerealella*. The number of surviving larvae and hatched adults as well as the number of eggs laid and larvae hatched (F_1) were recorded over a period of 42 days. From these data the endpoints mortality and reproductive performance were calculated.

Dates of experimental work: August 26, 2003 to October 07, 2003

II. Results and Discussion:

The toxic reference treatment resulted in 52.8 % corrected mortality (57.5 % mortality) after 21 days.

Mortality and reproduction results

Test item	**Infinito SC Fungicide**				
Test object	*Chrysoperla carnea* (Steph.)				
Exposure	Dried spray deposits on glass plates				
Treatment	**Mortality** after 21 days [%]	**Reproduction**			
		Fecundity		Fertility	
		mean number of eggs/female/day	reduction relative to control [%]	mean hatching rate [%]	reduction relative to control [%]
Control	10	18.3	-	81	-
Application rate [L product/ha]	Corrected mortality [%]				
1.6	**0**	23.0	**0 (+25.7)**	82	**0 (+ 1.2)**
4.32	**0**	18.2	**0.5**	82	**0 (+1.2)**
6.4	**2.8**	17.8	**2.7**	79	**2.5**
Reference item Dimethoate EC 400 30 mL product/ha	52.8	-	-	-	-

No statistically significantly differences in mortality were observed in all test item treatment groups compared to control group.

The reproductive output (mean number of eggs/female) was above the lower limit given as validity criterion for the glass plate method (mean fecundity of 15 eggs/female/day in the first week), according to the historical database of the ring testing group. According to that, this parameter was considered as not impacted by the treatment.

Validity criteria:

Validity criteria (Vogt et al., 2000)	Guideline	Test result
Mortality rate	≤ 20%	10%
Toxic reference mean mortality of protonymphs at day 7 (control corrected)	Between 50 and 100 %	57.5%
Fecundity in the control (mean number of eggs/female and day)	≥ 15 %	18.3%
Fertility in the control (mean hatching rate)	≥ 70 %	81%

III. Conclusions:

The fungicide product Infinito SC Fungicide did not induce any noticeable mortality (max corrected mortality 2.8%) to the green lacewing *Chrysoperla carnea* exposed to dose rates up to 6.4 L product/ha on glass plates. No noticeable sublethal effects on reproduction were observed up to the maximal rate of 6.4 L product/ha (2.5% reduction, only).

Assessment and conclusion by applicant:

The study is considered reliable. The relevant endpoints for the risk assessment are LR_{50} and ER_{50} >6.4 L/ha.

Data Point:	KCP 10.3.2.2/02
Report Author:	[redacted]
Report Year:	2003
Report Title:	Acute dose-response toxicity (LR50) of AE B066752 04 SC61 A102 to the cereal aphid parasitoid Aphidius rhopalosiphi (Destefani-Perrez) under extended laboratory conditions
Report No:	C038633
Document No:	M-225402-01-1
Guideline(s) followed in study:	IOBC: Mead-Briggs et al. (2000)
Deviations from current test guideline:	Current Guideline: Mead-Briggs et al. (2000) No deviations.
Previous evaluation:	yes, evaluated and accepted DAR 2005 for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to investigate the lethal and sublethal toxicity of FLC + PCH SC 687.5 to the cereal aphid parasitoid *Aphidius rhopalosiphi* (DESTEFANI-PEREZ) in an extended laboratory test. Wasps were exposed to dried residues with rates of 0.5, 1, 2, 4 and 8 L product/ha in 200 L deionized water/ha applied on potted wheat plants. The control was treated with deionized water (200 L/ha). Dimethoate EC 400 (10 mL product/ha in 200 L/ha of water) was used as a toxic reference treatment. Adults of *Aphidius rhopalosiphi* were exposed in 4 replicates of 5 female wasps (per treatment group) to the residues of the test item, reference item (only 1 replicate) and control, respectively. During the mortality test, the wasps were fed with aqueous fructose solution (25 % w/v). The number of surviving wasps, behaviour and position and the number of parasitised aphids (mummies) were recorded over a period of 14 days. From these data the endpoints mortality and fecundity were calculated. All validity criteria were met. The LR_{50} (median lethal rate) of Infinito SC Fungicide to the cereal aphid parasitoid *Aphidius rhopalosiphi* was estimated to be >8 L product/ha. Sublethal effects lower than 50% were observed at the max. rate of 4 L product/ha.

I. Material and Methods:

Test item: Infinito SC Fungicide (FLC + PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm^3, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/kg + 634 g/L, respectively) as active ingredients.

The product was tested under extended laboratory conditions after residual contact exposure of adults of the cereal aphid parasitoid *Aphidius rhopalosiphi* to spray residues with rates of 0.5, 1, 2, 4 and 8 L product/ha in 200 L deionized water/ha applied on potted wheat plants.

The control was treated with deionized water (200 L/ha). Dimethoate EC 400 (10 mL product/ha in 200 L/ha of water) was used as a toxic reference treatment.

Adults of *Aphidius rhopalosiphi* were exposed in 4 replicates of 5 female wasps (per treatment group) to the residues of the test item, reference item (only 1 replicate) and control, respectively. During the mortality test, the wasps were fed with aqueous fructose solution (25 % w/v). The number of surviving wasps, behaviour and position and the number of parasitised aphids (mummies) were recorded over a period of 14 days. From these data the endpoints mortality and fecundity were calculated.

Dates of experimental work: September 22, 2003 to October 06, 2003

II. RESULTS AND DISCUSSION:

The toxic reference treatment resulted in 100 % corrected mortality within 24 hours.

Mortality and reproduction results

Test item	**Infinito SC Fungicide**			
Test object	*Aphidius rhopalosiphi* (DESTEFANI-PEREZ)			
Exposure	Dried spray deposits on potted wheat plants			
Treatment	Mortality after 48 hours [%]	Reproduction		
		mean number of mummies/ female	Relative to control [%]	Reduction relative to control [%]
Control	0	15.8	-	-
Application rate [L product/ha]	Corrected mortality [%]			
0.5	0	14.1	89.2	10.8
1	0	14.6	92.4	7.6
2	5	12.6	79.7	20.3
4	5	7.9*	50.0	50.0
8	10	0.2*	1.3	98.7
LR_{50} [CL 95 %]	**not determinable (above 8 L product/ha)**			
Reference item Dimethoate EC 400 10 mL product/ha	100	not assessed	-	-

* statistically significantly different ($p < 0.05$)

No statistically significant differences in mortality were observed in all test item treatment groups, compared to the control group.

The behaviour assessments showed only a statistically significant difference in the 8 L product/ha test item treatment group compared to the control group 30 minutes after exposure. This effect on behaviour was not anymore observed 2 hours after the application.

A statistically significant difference in reproduction (mean number of mummies/female), was observed in the 4 and 8 l product/ha test item groups, when compared to the control group.

Because of no or low mortality in all test item treatment groups, a calculation of the LR_{50} was not possible.

The LR_{50} has to be regarded above the highest tested application rate of the test item (8 L product/ha).

Validity criteria:

Validity criteria (Mead-Briggs et al., 2000)	Guideline	Test result
Control mortality	Not more than 5 out of 40 wasps (12.5 %)	0 %
Toxic reference mortality (according to study protocol)	> 50 %	100 %
Reproduction rate	≥ 5 mummies/female ≤ 2 females producing 0 mummies	15.8 mummies/female 1 female with 0 mummies

III. CONCLUSIONS:

The LR_{50} (median lethal rate) of Infinito SC Fungicide to the cereal aphid parasitoid *Aphidius rhopalosiphi* was estimated to be > 8 L product/ha.
Sublethal effects lower than 50 % were observed at the max. rate of 4 L product/ha.

Assessment and conclusion by applicant:

The study is considered reliable. Endpoints for the risk assessment are LR_{50} > 8 L/ha and ER_{50} of 4 L/ha.

Data Point:	KCP 10.3.2.2/03
Report Author:	[redacted]
Report Year:	2003
Report Title:	Toxicity to the predatory mite Typhlodromus pyri SCHEUTEN (Acari, Phytoseiidae) using an extended laboratory test Propamocarb hydrochloride + AE C638206 water miscible suspension concentrate 625 + 62.5 g/l Code: AE B066752 04 SC61 A102
Report No:	C036922
Document No:	M-221756-01-1
Guideline(s) followed in study:	IOBC: Blümel et al. 2000
Deviations from current test guideline:	Current Guideline: Blümel et al. (2000) No deviations
Previous evaluation:	yes, evaluated and accepted DAR 2005 for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The aim of the study was to determine the toxicity of freshly dried residues FLC + PCH SC 687.5 applied onto leaves of *Phaseolus vulgaris* var. *nanus*, to the predatory mite *Typhlodromus pyri*. The test item was applied at rates of 25.7, 46.3, 83.3, 50 and 270 g a.s. (related to fluopicolide)/ha (equivalent to 0.40, 0.72, 1.29, 2.32 and 4.17 L product/ha) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 35 g a.s./ha, and a water treated control. Mortality of 80 protonymphs was

assessed 1, 3, 7, 10, 12 and 14 days after exposure by counting the number of living and dead mites. The reproduction rate of the surviving mites was then evaluated over the period 7-14 days after treatment by counting the total number of offspring (eggs and larvae) produced. All validity criteria were met. The LR_{50} of test item to the predatory mite *Typhlodromus pyri* was > 4.17 L product/ha. Sublethal effects lower than 50% were observed at the maximal rate of 4.17 L product/ha.

I. Material and Methods:

Test item: Infinito SC Fungicide (FLC + PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm³, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/L + 634 g/L, respectively) as active ingredients.

The test substance was applied on bean leaves (*Phaseolus vulgaris*) at rates of 25.7, 46.3, 83.3, 150 and 270 g a.s. (related to fluopicolide)/ha (equivalent to 0.40, 0.72, 1.29, 2.32 and 4.17 L product/ha) and the effects were compared to a toxic reference (a.s.: dimethoate) applied at 35 g a.s./ha, and a water treated control.

Mortality of 80 protonymphs was assessed 1, 3, 7, 10, 12 and 14 days after exposure by counting the number of living and dead mites. The reproduction rate of the surviving mites was then evaluated over the period 7-14 days after treatment by counting the total number of offspring (eggs and larvae) produced.

Dates of experimental work: September 09, 2003 to September 23, 2003

II. Results and Discussion:

The mortality / escaping rate in the control chambers up to day 7 after treatment was > 4 %. The mean corrected mortality of the nymphs, and the mean reproduction rate of the surviving females exposed to the test material and the toxic reference is given below:

In the highest dose rate of 4.17 L product/ha there was 13.8% corrected mortality. The reduction in reproductive success relative to the control at this highest tested rate was 34.3 %. At the lower rates of 0.40, 0.72, 1.29 and 2.32 L product/ha the corrected mortality and the reduction of reproduction were also < 50 %.

Mortality / Reproduction - 7 days after treatment

	Mortality [%]		Reproduction [%]	
Infinito SC Fungicide (L/ha)	Uncorr	Abbott	Rate	Relative to Control
0.0 (control)	0.0	0.0	7.5	0
0.40	7.5	7.5	6.6	12.9
0.72	11.3	11.3	6.2	17.9
1.29	2.5	2.5	5.4	27.6
2.32	11.3	11.3	5.3	29.8
4.17	13.8	13.8	4.9	34.3
Toxic reference item 6 g a.s./ha	96.3	96.3	n.d.	n.d.

n.d.: not detected

Validity criteria:

Validity criteria (Blümel et al., 2000)	Guideline	Test result
Mortality rate	Mean mortality (dead + escaped) ≤ 20 % at day 7	0 %
Toxic reference mean mortality of protonymphs at day 7 (control corrected)	Between 50 and 100 %	96.3 %
Reproduction (number of eggs per female in the control from day 7 to 14)	≥ 4	8

III. CONCLUSIONS:

The LR_{50} (median lethal rate) of Infinito SC Fungicide to the predatory mite *Typhlodromus pyri* was > 4.17 L product/ha. Sublethal effects lower than 50% were observed at the maximal rate of 4.17 L product/ha.

Assessment and conclusion by applicant:
The study is considered reliable. Relevant endpoints for the risk assessment are LR_{50} and ER_{50} > 4.17 L/ha.

Data Point:	KCP 10.3.2.2/04
Report Author:	[redacted]
Report Year:	2005
Report Title:	Effects of Fluopicolide + Propamocarb SC 62.5 + 625 on the ladybird beetle Coccinella septempunctata, extended laboratory study - dose response test -
Report No:	23841012
Document No:	M-256344-01-1
Guideline(s) followed in study:	Schmuck et al. 2000
Deviations from current test guideline:	Current Guideline: Schmuck et al. (2000) No deviations.
Previous evaluation:	yes, evaluated and accepted DAR 2005
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The objective of this extended laboratory study was to investigate the lethal and sublethal toxicity of FLC + PCH SC 687.5 on the ladybird beetle larvae and pupae *Coccinella septempunctata* L. by contacting substance treated leaf surfaces (exposure period) compared to a water treated control and a toxic standard. Additionally, an assessment for sublethal effects on reproduction of the survivors (reproduction) was made. Approximately 4-day old larvae of *C. septempunctata* (1 larva per replicate) were exposed to dried spray deposits of 300, 600, 1200, 2400, and 4800 mL product/ha (diluted in 200 L deionised water/ha) on treated bean leaves (*Phaseolus vulgaris*; 40 replicates per treatment group). Deionised water was used as a control treatment and Perfekthion (50 mL product/ha diluted in 200 L deionised water/ha) as a reference treatment. The duration of the pre-imaginal mortality part was 15 - 16 days (toxic standard only 1 day). The reproductive performance of the survivors was examined over 2 weeks (oviposition period) using adults from the control and from those test item concentrations where

the corrected mortality was < 50.0 %. All validity criteria were met. The LR_{50} (median lethal rate) of the test item to the ladybird beetle *C. septempuncta* was > 4.8 L product/ha. Sublethal effects lower than 50% were observed at the maximal rate of 4.8 L product/ha.

I. Material and Methods:

Fluopicolide + Propamocarb SC 62.5 + 625 [active ingredients: Fluopicolide (AE C638206) 63.00 g/L, Propamocarb-HCl 640.13 g/L; batch no.: 08490/0012(0001), sample no.: TOX06993-00, article no.: 00-06373046, development no.: 30-00312153]; under extended laboratory conditions approximately 4 day old larvae of *Coccinella septempunctata* (1 larva per replicate) were exposed to dried spray deposits of 300, 600, 1200, 2400, and 4800 mL product/ha (diluted in 200 L deionised water/ha) on treated bean leaves (*Phaseolus vulgaris*; 40 replicates per treatment group). Deionised water was used as a control treatment and Perfekthion (50 mL product/ha diluted in 200 L deionised water/ha) as a reference treatment.

The duration of the pre-imaginal mortality part was 15 - 16 days (toxic standard only 1 day). The reproductive performance of the survivors was examined over 2 weeks (oviposition period) using adults from the control and from those test item concentrations where the corrected mortality was < 50.0%. The toxic standard treatment caused a 100% corrected mortality.

Dates of experimental work: March 09, 2005 to August 15, 2005

II. Results and Discussion:

In the highest dose rate of 4.8 L product/ha there was -6.5% corrected mortality. The reproductive success was not significantly lower compared to the control at this highest tested rate.

Treatment [mL product/ha]	Pre-imaginal mortality [a] [%]	Corrected mortality [%]	Eggs per female per day [b]	Fertile eggs per female per day [b]	Larval hatching rate [b] [%]
Control	22.5	-	15.3	10.1	65.4
300	22.5 n.s.	0.0	15.3 n.s.	11.2 n.s.	72.6 n.s.
600	30.0 n.s.	9.7	19.8 n.s.	15.3 n.s.	76.7 *
1200	15.0 n.s.	-9.7	8.9 n.s.	6.9 n.s.	76.5 *
2400	30.0 n.s.	9.7	17.6 n.s.	13.2 n.s.	73.1 n.s.
4800	17.5 n.s.	-6.5	11.6 n.s.	9.4 n.s.	81.1 *
Toxic reference 50 mL Perfekthion/ha	100.0 *	100.0	n.a.	n.a.	n.a.

[a] n.s. = not significant, * = significant; Fisher Exact Test, $\alpha = 0.05$
[b] n.s. = not significant, * = significant; Dunnett-Test, $\alpha = 0.05$
n.a. = not assessed

Validity criteria:

Validity criteria (Schmuck et al., 2000)	Guideline	Test result
Average pre-imaginal mortality on the control	≤ 30 %	22.5 %
Pre-imaginal mortality in the reference treatment	> 40 %	100 %
Number of eggs/female/day on the control	> 2	10.1

III. CONCLUSIONS:

The LR_{50} (median lethal rate) of AE B066752 04 SC61 A102 to the ladybird beetle *Coccinella septempuncta* was > 4.8 L product/ha. Sublethal effects lower than 50 % were observed at the maximal rate of 4.8 L product/ha.

Assessment and conclusion by applicant: The study is considered reliable. Relevant endpoints for the risk assessment are LR_{50} and ER_{50} > 4.8 L/ha.

Data Point:	KCP 10.3.2.2/05
Report Author:	[redacted]
Report Year:	2014
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5+625 g/L): Aged-residue extended laboratory tests to determine effects on the parasitic wasp Aphidius rhopalosiphi (Hymenoptera, Braconidae)
Report No:	BAY-14-1
Document No:	M-503125-01-1
Guideline(s) followed in study:	Mead-Briggs et al. (2009). An extended laboratory test for evaluating the effects of plant protection products on the parasitic wasp Aphidius rhopalosiphi (De Stefani-Perez) (Hymenoptera, Braconidae)
Deviations from current test guideline:	Current Guideline: Mead-Briggs et al. (2009) No deviations.
Previous evaluation:	No, not previously submitted for Propamocarb RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The objective of this extended laboratory study was to investigate the lethal and sublethal effects of FLC + PCH SC 687.5 on the parasitoid wasp *Aphidius rhopalosiphi* when exposed of both freshly-dried and field-aged residues of this test item. The test item was applied at a treatment rate of 2.8 L product/ha to pots of seedling barley plants on two occasions (T1, T2) with 7 days in-between. A control treatment of water and a toxic reference treatment (BAS 152 11 I, containing nominally 400 g/L dimethoate) were applied to barley plants at a rate of 10 mL product/ha. An initial bioassay on freshly-dried residues commenced following the applications at time T2, hereafter referred to as 0 days after treatment (DAT), with subsequent bioassays commencing at 7 and 14 DAT. Five wasps were confined in each pot, with six replicates (i.e. a total of 30 wasps) prepared for each treatment. Wasp survival was assessed over a period of 48 h. To assess any significant sub-lethal effects on the reproductive capacity of the exposed wasps, further assessments were then carried out in bioassays where the test-item treatment had resulted in < 50% corrected mortality at 48 h. Fifteen surviving female wasps from the treatment rate and control were confined individually for 24 h over untreated barley plants infested with the cereal aphids, *Metopolophium dirhodum* and *Rhopalosiphum padi*. The wasps were then removed, and the plants left for a further 10 days before the number of 'mummies' (parasitised aphids containing wasp pupae) that had developed was recorded. All validity criteria were met. The corrected mortality did not exceed 3.3% and the effect on reproduction was less than or equal to 1.6% throughout all of the bioassays. No statistically significant repellent effect of the test item was observed during the initial 3 hours of any of the bioassays and the percentage of wasps which settled on treated plants was 24.7%, 32.7% and 38.0% in the bioassays initiated 0, 7 and 14 DAT respectively.

I. MATERIAL AND METHODS:

Test item: Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G: Fluopicolide 5.18 % w/w, 58.14 g/L; Propamocarb-HCl: 55.8 % w/w, 627.0 g/L; (all values analytical); Batch ID.: EM4L011180; Sample Description: FAR01771-00; Specification No.: 102000027553; density: 1.123 g/mL (20 °C).
A single treatment rate of FLC+PCH SC 687.5 (62.5+625 g/L) equivalent to 2.8 L product/ha, was applied to pots of seedling barley plants on two occasions (T1, T2) with 7 days in-between. A control treatment of water and a toxic reference treatment (BAS 152 11 I, containing nominally 400 g/L dimethoate) were applied to barley plants at a rate of 10 mL product/ha. An initial bioassay on freshly-dried residues commenced following the applications at time T2, hereafter referred to as 0 days after treatment (DAT), with subsequent bioassays commencing at 7 and 14 DAT. Five wasps were confined in each pot, with six replicates (i.e. a total of 30 wasps) prepared for each treatment. Wasp survival was assessed over a period of 48 h. To assess any significant sub-lethal effects on the reproductive capacity of the exposed wasps, further assessments were then carried out in bioassays where the test-item treatment had resulted in < 50% corrected mortality at 48 h. Fifteen surviving female wasps from the treatment rate and control were confined individually for 24 h over untreated barley plants infested with the cereal aphids, *Metopolophium dirhodum* and *Rhopalosiphum padi*. The wasps were then removed and the plants left for a further 10 days before the number of 'mummies' (parasitised aphids containing wasp pupae) that had developed was recorded.

Dates of experimental work: July 16, 2014 to August 19, 2014

II. RESULTS AND DISCUSSION:

Mortality and reproduction of *Aphidius rhopalosiphi* after exposure to Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625 g/L)

Bioassay initiated	Treatment	Rate (mL/ha x number of applications)	Mean % mortality [1] at 48 h	Corrected % mortality [2] at 48 h	% wasps settled on treated plants during initial 3 hours [3]	Mean No. mummies per surviving female [4]	Effect on reproduction [5]
0 DAT	Control	-	0.0	-	32.7	18.5	-
	Test Item	2800 x 2	3.3	3.3	24.7	18.9	-2.1
	Toxic ref.	-	96.7 *	96.7	20.0 *	~	~
7 DAT	Control	-	0.0	-	44.0	27.5	-
	Test Item	2800 x 2	0.0	0.0	32.7	32.1	-16.5
	Toxic ref.	-	100 *	100	24.0 *	~	~
14 DAT	Control	-	3.3	-	44.0	45.5	-
	Test Item	2800 x 2	3.3	0.0	38.0	44.8	1.6
	Toxic ref.	-	86.7 *	86.2	22.7 *	~	~

[1] For each bioassay, individual treatments were compared using Fisher's Exact Test ($\alpha = 0.05$). Values that differed significantly from their respective control are marked with an asterisk.
[2] Derived using Abbott's formula
[3] For each bioassay, treatments were compared to the control by one-way ANOVA and Dunnett's t-test ($\alpha = 0.05$). An asterisk indicates where the results were significant.
[4] For each bioassay, results were compared by t-test for independent samples ($\alpha = 0.05$), but there were no significant differences.
[5] Reproduction relative to respective control treatment. A positive value indicates a decrease in reproduction, and a negative value an increase.
~ No reproduction assessments were carried out.

Validity criteria:

Validity criteria (Mead-Briggs et al., 2009)	Guideline	Test result
Control mortality	Not more than 5 out of 40 wasps (12.5%)	3.3 %
Toxic reference mortality (according to study protocol)	>50%	86.7%
Reproduction rate	≥ 5 mummies/female ≤ 2 females producing 0 mummies	45.50 mummies/female 0 female with 0 mummies

III. CONCLUSIONS:

The residues of FLC + PCH SC 687.5 (62.5+625 g/L) had no harmful effects after application of 2 x 2.8 L/ha on either the survival or reproductive capacity of the wasp *Aphidius rhopalosiphi* in a bioassay initiated 0 DAT, and this was confirmed by further bioassays initiated at 7 and 14 DAT. The corrected mortality did not exceed 3.3% and the effect on reproduction was less than or equal to 1.6% throughout all of the bioassays. No statistically significant repellent effect of the test item was observed during the initial 3 hours of any of the bioassays and the percentage of wasps which settled on treated plants was 24.7%, 32.7% and 38.0% in the bioassays initiated 0, 7 and 14 DAT respectively.

Assessment and conclusion by applicant:

The study is considered reliable. The relevant endpoints for the risk assessment are LR_{50} and ER_{50} > 2 x 2.8 L/ha.

CP 10.3.2.3 Semi-field studies with non-target arthropods

In view of the results presented above, no semi-field studies were deemed necessary.

CP 10.3.2.4 Field studies with non-target arthropods

In view of the results presented above, no field studies were deemed necessary.

CP 10.3.2.5 Other routes of exposure for non-target arthropods

No relevant exposure of non-target arthropods is expected by other routes of exposure.

CP 10.4 Effects on non-target soil meso- and macrofauna

The risk assessment is based on the "Guidance Document on Terrestrial Ecotoxicology", (SANCO/10329/2002 rev. 2 final, 2002).

Predicted environmental concentrations used in risk assessment

For details of PEC_{soil} calculations refer to MCP Summary Section 9, Point 9.1.3.

Table 10.4- 1: Maximum PEC_{soil} values for fluopicolide, its metabolites and the product FLC + PCH SC 687.5 in potatoes (for details see MCP Section 9, Point 9.1.3)

Compound	Potatoes		
	$PEC_{soil, initial}$ [mg/kg]	$PEC_{soil, plateau, 20 cm}$ [mg/kg]	$PEC_{soil, accu}$*
	4 × 100 g a.s./ha		
Fluopicolide	0.144	0.049	0.192
M-01 (AE C653711)	0.034	0.008	0.042
M-02 (AE C657188)	0.007	<0.001	0.007
M-03 (AE 0608000)	0.016	0.014	0.030
	3 × 100 g a.s./ha		
Fluopicolide	0.125	0.042	0.167
M-01 (AE C653711)	0.030	0.007	0.036
M-02 (AE C657188)	0.007	<0.001	0.007
M-03 (AE 0608000)	0.014	0.012	0.026
	2 × 100 g a.s./ha		
Fluopicolide	0.106	0.036	0.142
M-01 (AE C653711)	0.025	0.006	0.031
M-02 (AE C657188)	0.007	<0.001	0.007
M-03 (AE 0608000)	0.012	0.010	0.022
	1 × 100 g a.s./ha		
Fluopicolide	0.053	0.018	0.071
M-01 (AE C653711)	0.013	0.003	0.016
M-02 (AE C657188)	0.005	<0.001	0.005
M-03 (AE 0608000)	0.006	0.005	0.011
	4 × 1.6 L prod./ha		
FLC + PCH SC 687.5	2.635 [1)]	-	-

3 × 1.6 L prod./ha			
FLC + PCH SC 687.5	2.276 [2)]	-	-
2 × 1.6 L prod./ha			
FLC + PCH SC 687.5	1.917 [3)]	-	-
1 × 1.6 L prod./ha			
FLC + PCH SC 687.5	0.958 [4)]	-	-

* $PEC_{soil,\ accu}$ means the sum of $PEC_{soil,\ initial}$ and $PEC_{soil,\ plateau}$

1) The PEC_{soil} value for the product FLC + PCH SC 687.5 is calculated based on the initial rate of the product (1.6 L/ha) in a four times application, the portion reaching soil (BBCH 21 – 40, worst case interception of 2 × 60% and 2 × 85% for potatoes), the standard soil density (1.5 g/cm³), the standard soil depth (5 cm) and the density of the formulation (1.123 g/mL).

2) The PEC_{soil} value for the product FLC + PCH SC 687.5 is calculated based on the initial rate of the product (1.6 L/ha) in a three times application, the portion reaching soil (BBCH 21 – 40, worst case interception of 2 × 60% and 1 × 85% for potatoes), the standard soil density (1.5 g/cm³), the standard soil depth (5 cm) and the density of the formulation (1.123 g/mL).

3) The PEC_{soil} value for the product FLC + PCH SC 687.5 is calculated based on the initial rate of the product (1.6 L/ha) in a two times application, the portion reaching soil (BBCH 21, worst case interception of 2 × 60% for potatoes), the standard soil density (1.5 g/cm³), the standard soil depth (5 cm) and the density of the formulation (1.123 g/mL).

4) The PEC_{soil} value for the product FLC + PCH SC 687.5 is calculated based on the initial rate of the product (1.6 L/ha) in a single application, the portion reaching soil (BBCH 21, worst case interception of 1 × 60% for potatoes), the standard soil density (1.5 g/cm³), the standard soil depth (5 cm) and the density of the formulation (1.123 g/mL).

Table 10.4.1- 1: Maximum PEC_{soil} values for fluopicolide, its metabolites and the product FLC + PCH SC 687.5 in lettuce (for details see MCP Section 9, Point 9.1.3)

Compound	Lettuce		
	$PEC_{soil,\ initial}$ [mg/kg]	$PEC_{soil,\ plateau,\ 20\ cm}$ [mg/kg]	$PEC_{soil,\ accu}$*
2×100 g a.s./ha			
Fluopicolide	0.080	0.027	0.107
M-01 (AE C653711)	0.019	0.004	0.023
M-02 (AE C657188)	0.005	<0.001	0.005
M-03 (AE 0608000)	0.009	0.008	0.016
1×100 g a.s./ha			
Fluopicolide	0.100	0.034	0.134
M-01 (AE C653711)	0.024	0.005	0.029
M-02 (AE C657188)	0.010	<0.001	0.010
M-03 (AE 0608000)	0.011	0.010	0.021
2 × 1.6 L prod./ha			
FLC + PCH SC 687.5	1.437 [1)]		
1 × 1.6 L prod./ha			
FLC + PCH SC 687.5	1.797 [2)]		

* $PEC_{soil,\ accu}$ means the sum of $PEC_{soil,\ initial}$ and $PEC_{soil,\ plateau}$

1) The PEC_{soil} value for the product FLC + PCH SC 687.5is calculated based on the initial rate of the product (1.6 L/ha) in a double application, the portion reaching soil (BBCH 40–49, worst case interception of 70 % for lettuce), the standard soil density (1.5 g/cm³), the standard soil depth (5 cm) and the density of the formulation (1.123 g/mL).

2) The PEC_{soil} value for the product FLC + PCH SC 687.5is calculated based on the initial rate of the product (1.6 L/ha) in a single application, the portion reaching soil (BBCH 13, worst case interception of 25 % for lettuce), the standard soil density (1.5 g/cm³), the standard soil depth (5 cm) and the density of the formulation (1.123 g/mL).

CP 10.4.1 Earthworms

The risk assessment (calculation of TER values) was based on the NOEC values calculated from the studies performed with the product and the metabolites.

Table 10.4.1- 2: Endpoints used in risk assessment

Test item	Test species, test design	Ecotoxicological endpoint		Reference
FLC + PCH SC 687.5	*Eisenia fetida* reproduction 56 d, sprayed	NOEC	≥ 30 L prod./ha	[redacted] 2003; M-218629-01-1 KCP 10.4.1.1/01
FLC + PCH SC 687.5	*Eisenia fetida* reproduction 56 d, mixed into soil	NOEC $EC_{10/20}$	**≥ 500 mg prod./kg dws** [a)] Calculation not possible	[redacted] 2015; M-542464-01-1 KCP 10.4.1.1/02
Fluopicolide	*Eisenia fetida* reproduction 56 d, mixed into soil	NOEC $EC_{10/20}$	**31.25 mg a.s./kg dws** [a)] Calculation not possible	[redacted] 2003; M-218270-01-1 KCA 8.4.1/05
M-01 (AE C653711)	*Eisenia fetida* reproduction 56 d, mixed into soil	NOEC $EC_{10/20}$	**250 mg p.m./kg dws** Calculation not possible	[redacted] 2003; M-218219-01-1 KCA 8.4.1/06
M-02 (AEC657188)	*Eisenia fetida* reproduction 56 d, mixed into soil	NOEC $EC_{10/20}$	**≥ 100 mg p.m./kg dws** Calculation not possible	[redacted] 2016; M-558329-01-1 KCA 8.4.1/08
M-03 (AE0608000)	*Eisenia fetida* reproduction 56 d, mixed into soil	NOEC $EC_{10/20}$	**≥ 50 mg p.m./kg dws** [a)] Calculation not possible	[redacted] 2016; M-557757-01-1 KCA 8.4.1/07

Bold values used in risk assessment
dws = dry weight soil; prod.= product; a.s. = active substance; p.m. = pure metabolite
a) Endpoint corrected by a factor of 2 due to lipophilic substance (log P_{ow} > 2)

Risk assessment for earthworms

Table 10.4.1- 3: TER calculation for earthworms for the product FLC + PCH SC 687.5

Compound	Species, study type	Endpoint [mg prod./kg]		PEC_{soil} [mg prod./kg]	TER_{LT}	Trigger
Potatoes, 4 × 1.6 L prod./ha						
FLC + PCH SC 687.5	Earthworm, reproduction	NOEC	≥ 500	2.635	≥ 190	5
Potatoes, 3 × 1.6 L prod./ha						
FLC + PCH SC 687.5	Earthworm, reproduction	NOEC	≥ 500	2.276	≥ 220	5
Potatoes, 2 × 1.6 L prod./ha						
FLC + PCH SC 687.5	Earthworm, reproduction	NOEC	≥ 500	1.917	≥ 261	5
Potatoes, 1 × 1.6 L prod./ha						
FLC + PCH SC 687.5	Earthworm, reproduction	NOEC	≥ 500	0.958	≥ 522	5
Lettuce, 2 × 1.6 L prod./ha						
FLC + PCH SC 687.5	Earthworm, reproduction	NOEC	≥ 500	1.437	≥ 348	5
Lettuce, 1 × 1.6 L prod./ha						
FLC + PCH SC 687.5	Earthworm, reproduction	NOEC	≥ 500	1.797	≥ 278	5

Table 10.4.1- 4: TER calculations for earthworms for fluopicolide and its metabolites

Compound	Species, study type	Endpoint [mg/kg]	PEC_{soil} [mg/kg]	TER_{LT}	Trigger
Potatoes, 4 × 1.6 L prod./ha					
Fluopicolide	Earthworm, reproduction	NOEC 31.25	0.192	161	5
M-01 (AE C653711)	Earthworm, reproduction	NOEC 250	0.042	5952	5
M-02 (AEC657188)	Earthworm, reproduction	NOEC ≥ 100	0.007	≥ 14286	5
M-03 (AE0608000)	Earthworm, reproduction	NOEC ≥ 50	0.030	≥ 1667	5
Potatoes, 3 × 1.6 L prod./ha					
Fluopicolide	Earthworm, reproduction	NOEC 31.25	0.167	187	5
M-01 (AE C653711)	Earthworm, reproduction	NOEC 250	0.036	6944	5
M-02 (AEC657188)	Earthworm, reproduction	NOEC ≥ 100	0.007	≥ 14286	5
M-03 (AE0608000)	Earthworm, reproduction	NOEC ≥ 50	0.026	≥ 1923	5
Potatoes, 2 × 1.6 L prod./ha					
Fluopicolide	Earthworm, reproduction	NOEC 31.25	0.142	220	5
M-01 (AE C653711)	Earthworm, reproduction	NOEC 250	0.031	8065	5
M-02 (AEC657188)	Earthworm, reproduction	NOEC ≥ 100	0.007	≥ 14286	5
M-03 (AE0608000)	Earthworm, reproduction	NOEC 50	0.022	2273	5
Potatoes, 1 × 1.6 L prod./ha					
Fluopicolide	Earthworm, reproduction	NOEC 31.25	0.071	440	5
M-01 (AE C653711)	Earthworm, reproduction	NOEC 250	0.016	15625	5
M-02 (AEC657188)	Earthworm, reproduction	NOEC ≥ 100	0.005	20000	5
M-03 (AE0608000)	Earthworm, reproduction	NOEC ≥ 50	0.011	4545	5
Lettuce, 2 × 1.6 L prod./ha					
Fluopicolide	Earthworm, reproduction	NOEC 31.25	0.107	292	5
M-01 (AE C653711)	Earthworm, reproduction	NOEC 250	0.023	10870	5
M-02 (AE C657188)	Earthworm, reproduction	NOEC ≥ 100	0.005	≥ 20000	5
M-03 (AE0608000)	Earthworm, reproduction	NOEC ≥ 50	0.016	≥ 3125	5

Compound	Species, study type	Endpoint [mg/kg]		PEC_{soil} [mg/kg]	TER_{LT}	Trigger
Lettuce, 1 × 1.6 L prod./ha						
Fluopicolide	Earthworm, reproduction	NOEC	31.25	0.134	233	5
M-01 (AE C653711)	Earthworm, reproduction	NOEC	250	0.029	8621	5
M-02 (AEC657188)	Earthworm, reproduction	NOEC	≥ 100	0.010	≥ 10000	5
M-03 (AE0608000)	Earthworm, reproduction	NOEC	≥ 50	0.021	≥ 2381	5

The TER values clearly exceed the trigger value of 5 indicating that no unacceptable adverse effects on earthworms are to be expected from the intended use of FLC + PCH SC 687.5 in potatoes and lettuce.

Data Point:	KCP 10.4.1/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE C638206 & propamocarb SC 62.5 & 625 (Code: AE B066752 04 SC61 A1): Acute toxicity to earthworms (Eisenia fetida)
Report No:	C035162
Document No:	M-218269-01-1
Guideline(s) followed in study:	OECD 207 (1984)
Deviations from current test guideline:	Current Guideline: OECD 207 (1984) No deviations
Previous evaluation:	yes, evaluated and accepted in the DAR (2005)
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to assess the effect of Fluopicolide + Propamocarb SC 687.5 on survival of the earthworm *Eisenia fetida* during an exposure into an artificial soil at 5 different application rates. Adult earthworms (*Eisenia fetida*) were exposed for 14 days in groups of 40 (four replicates of 10 worms per concentration) to concentrations of 10, 32, 100, 316 and 1000 mg test item/kg dry weight mixed into artificial soil. The assessment of the number of surviving earthworms and observations were made on day 7 and day 14. Earthworms were weighed initially and at end of the test. The validity criteria were met. The mortality of earthworms was 0% in the control and in all treatments with the test substance. The weight change of the earthworms ranged between -9 and 4% in the treated groups and was 2% in the control. The 14-day LC_{50} for the test material to earthworms (*Eisenia fetida*) based on nominal test concentrations was > 1000 mg/kg soil d.w. The No Observed Effect Concentration was 316 mg/kg soil d.w.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb SC 687.5 (62.5 + 625), Short name: FLC + PCH SC 687.5 (62.5 + 625) (Code: AE B066752 04 SC 61 A1, analysed contents of a.s.: 64.7 g/L fluopicolide and 634 g/L

propamocarb, density: 1.129 g/mL. Adult earthworms (*Eisenia fetida*) were exposed for 14 days in groups of 40 (four replicates of 10 worms per concentration) to concentrations of 10 – 32 – 100 - 316 – and 1000 mg test item/kg dry weight mixed into artificial soil containing 69 % quartz sand, 20 % kaolin clay, 10 % sphagnum peat and about 0.2 - 1% $CaCO_3$. The assessment of the number of surviving earthworms and observations were made on day 7 and day 14. Earthworms were weighed initially and at end of the test. Toxic standard: 2-chloroacetamide, separate study at concentrations of 5.6, 10, 18, 24 and 32 mg/kg soil d.w.; control: untreated, solvent control: none.

Dates of work: March 26, 2003 – April 10, 2003

II. Results and Discussion:

Biological findings:

Effects on mortality and growth of the earthworms are shown in the following table.

Test item **Test object** **Exposure**	**Fluopicolide + Propamocarb SC 687.5 (62.5 + 625)** ***Eisenia fetida*** **Artificial soil**
	Mortality [mg test item/kg soil d.w.]
NOEC	316
LOEC	1000
LC_{50}	> 1000

	Control	**Fluopicolide + Propamocarb SC 687.5 (62.5 + 625)** **[mg test item/kg soil d.w.]**				
		10	**32**	**100**	**316**	**1000**
% Mortality of adult worms after 14 days	0	0	0	0	0	0
Biomass change in % (change in fresh weight after 14 days relative to initial fresh weight)	2	1	4	1	1	-9*

* Statistically significant compared to control (U-Test of Wilcoxon, $\alpha = 0.05$, two-sided) d.w.: dry weight (of artificial soil)

The mortality of earthworms was 0% in the control and in all treatments with the test substance. The weight change of the earthworms ranged between -9 and 4% in the treated groups and was 2% in the control.

Validity criteria:

The validity criteria of the test according to OECD guideline 207 were fulfilled.

Validity criteria (OECD 207, 1984)	**Recommended**	**Obtained**
Mortality of the adults in the control	≤ 10 %	0 %
Average loss of biomass in the control	≤ 20 %	- 2 %

To verify the sensitivity of the test system, the reference item chloroacetamide was tested at concentrations of 5.6, 10, 18, 24 and 32 mg/kg soil d.w. The result of this positive control study gave a 14-day LC_{50} for 2-chloroacetamide of 23 mg/kg soil d.w.

III. CONCLUSIONS:

Fluopicolide + propamocarb SC 687.5 (62.5 + 625) showed no effects on survival of the earthworm *Eisenia fetida* in artificial soil at the highest treatment at 1000 mg test item/kg soil d.w. The 14-day LC_{50} for the test material to earthworms (*Eisenia fetida*) based on nominal test concentrations was > 1000 mg/kg soil d.w. The No Observed Effect Concentration was 316 mg/kg soil d.w.

Assessment and conclusion by applicant:

The study is considered reliable. However, acute earthworm studies are no longer a data requirement, therefore, this study is not further considered in the risk assessment.

CP 10.4.1.1 Earthworms sub-lethal effects

Data Point:	KCP 10.4.1.1/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	Effects of AE B066752 04 SC61 A1 on reproduction and growth of earthworms Eisenia fetida in artificial soil with 5 percent peat in the test substrate
Report No:	C035530
Document No:	M-218629-01-1
Guideline(s) followed in study:	BBA: VI 2-2, 1994; ISO: 11268 part 2 (1998)
Deviations from current test guideline:	Current Guideline: OECD 222 (2004) The number of replicates in the control was 4 instead of 8 as recommended by the guideline. This deviation is not expected to have impacted the study results.
Previous evaluation:	yes, evaluated and accepted In the DAR (2005)
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to investigate the effects of Fluopicolide + Propamocarb SC 687.5 on the mortality, body weight, feeding activity and reproduction of the earthworm *Eisenia fetida.* Adult earthworms (40 worms per treatment group and control) were exposed in artificial soil to the spraying rates of 2.16, 4.32, 10.8, 21.6 and 30.0 L product/ha. After 28 day, the number of surviving animals and their weight change was determined. After further 28 days, the number of off-spring was determined. Endpoints were mortality, growth and reproduction.

All validity criteria were met. During the 4 weeks of exposure, a slight mortality (2.5%) was observed among the control adult earthworms. No dead adult earthworms were observed in any of the treated test groups. The body weights of adult worms in the treatment groups increased by 48.6% to 57.5% compared to 57.2% in the control. The reproduction ranged from 386 to 441 juvenile worms in the groups treated with test item. 374 juvenile earthworms were found in the control. Weight changes and reproduction rates in the treatments were not significantly different compared to the control group.

No statistically significant effects ($p < 0.05$) were observed in mortality and reproduction of treated earthworms and hence the NOEL based on mortality (28 days) and the NOEL based on reproduction (56 day) is 30 L product/ha.

I. MATERIAL AND METHODS:

Test item: Infinito SC Fungicide (FLC+ PCH SC 687.5), Batch No.: OP220159, density 1.129 g/cm^3, a fungicide SC type product containing Fluopicolide + Propamocarb-HCl (measured concentrations 64.7 g/kg + 634 g/L, respectively) as active ingredients.

240 adult earthworms *Eisenia fetida* (approximately 11 months old, 4 x 10 animals per test group) were exposed in an artificial soil by spray application at rates of 2.16, 4.32, 10.8, 21.6 and 30.0 L product/ha. After 28 days, the number of surviving animals and their weight change were determined. They were then removed from the artificial soil. After further 28 days, the number of off-spring was determined.

The most recent reference test with Carbendazim (360 g a.s./L; trade name "Derosal SC 360") was performed from August to October 2002. The test ensured that the laboratory test conditions were adequate and verified that the response of the test organisms did not change significantly over time.

Dates of experimental work: May 06, 2003 to July 02, 2003

II. RESULTS AND DISCUSSION:

During the 4 weeks of exposure, a slight mortality (2.5%) was observed among the control adult earthworms. No dead adult earthworms were observed in any of the treated test groups.

The body weights of adult worms in the treatment groups increased by 48.6% to 57.5%, compared to 57.2% in the control. None of the weight changes was significantly different compared to the control group (Dunnett-test, $\alpha = 0.05$).

The reproduction ranged from 386 to 441 juvenile worms in the groups treated with test item. The reproduction was not significantly different compared to the control group, where 374 juvenile worms were found (Dunnett-test test, $\alpha = 0.05$).

The quantity of food added (which roughly reflects the amount of food eaten) was 25.0 in all the control and treatment groups.

Effects on mortality and changes in body weight of the adults after an exposure period of 28 days and the number of off-spring after 56 days.

Eisenia fetida						
Test substance	control	Infinito SC Fungicide				
Application rates (L product/ha)	--	2.16	4.32	10.8	21.6	30.0
Mortality of adults after 28 days (%)	**2.50**	**0**	**0**	**0**	**0**	**0**
Mean change of adult body weights (%)	+57.2	+56.7	+52.2	+55.2	+57.5	+48.6
Standard deviation	± 8.7	± 13.5	± 7.7	± 6.8	± 6.8	± 9.6
Statistical comparison to the control*	--	n.s.	n.s.	n.s.	n.s.	n.s.
Number of off-spring per group (56 days)	**374**	**409**	**386**	**390**	**441**	**410**
Standard deviation	± 44	± 53	± 46	± 18	± 27	± 19
Statistical comparison to the control*	--	n.s.	n.s.	n.s.	n.s.	n.s.

* Result of a Dunnett's multiple t-test, one sided smaller, $\alpha = 0.05$
n.s.: mean value not statistically significantly different compared to the control ($p \geq 0.05$)

The calculation of an ECx-curve was not possible due to the lack of a significant dose-response relationship.

Results of the most recent test with the reference substance (Carbendazim 360 g a.s./L): The EC_{50} for reproduction was calculated as 1.9 mg carbendazim/kg dry soil. The reproduction rate was significantly reduced at the application rates of 1.6 mg a.s./kg dry substrate.

Validity criteria:

Validity criteria (OECD 222, 2004)	Recommended	Obtained
Adult control mortality	≤ 10%	2.5 % (after 4 weeks)
Number of juveniles per control replicate	≥ 30	374 (mean)
Coefficient of variation of reproduction in the control	≤ 30%	11.8 %

III. Conclusions:

Under the conditions of the test, the chronic toxicity of Infinito SC Fungicide to the earthworm *Eisenia fetida*, is defined as follows:

28-day NOEL related to mortality and growth of adults	≥ 30.0 L product/ha
56-day NOEL related to reproduction	≥ 30.0 L product/ha

Assessment and conclusion by applicant:

The study is considered reliable. No effects were seen at the highest application rate tested. However, this study should not be further considered in the risk assessment as a higher dosed study is available with this product (Lührs, U. 2015; M-542464-01-1). The study of Lührs (2015) is considered more relevant for the risk assessment as the test substance was mixed into soil and the study showed effects at much higher dosing.

Data Point:	KCP 10.4.1.1/02
Report Author:	[redacted]
Report Year:	2015
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5+625) G: Effects on reproduction and growth of earthworms Eisenia fetida in artificial soil
Report No:	99761022
Document No:	M-542464-01-1
Guideline(s) followed in study:	OECD, Guideline for the testing of chemicals No. 222, Earthworm, Reproduction Test (adopted April 13, 2004) ISO-Guideline 11268-2, Soil quality - Effects of pollutants on earthworms - Part 2: Determination of effects on reproduction of Eisenia fetida/Eisenia andrei, International Organization for Standardization, 2012
Deviations from current test guideline:	Current Guideline: OECD 222 (2004) No deviations
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to investigate the effects of Fluopicolide + Propamocarb SC 687.5 on the mortality, body weight, feeding activity and reproduction of the earthworm *Eisenia fetida.* Adult earthworms (40 worms per treatment group and 80 per control) were exposed in artificial soil to concentrations of 100, 178, 316, 562 and 1000 mg product/kg dws mixed into soil. Assessment of adult worm mortality, behavioural effects and biomass development was carried out after 28 days exposure of adult worms in treated artificial soil. Reproduction rate (number of offspring) was assessed after additional 28 days (assessed 56 days after application). All validity criteria were met. During the 4 weeks of exposure, no dead adult earthworms were observed in the treatments and in the control. The body weight changes and reproduction rates of the earthworms after 4 weeks of exposure were not statistically different compared to the control at all tested concentrations. No behavioural abnormalities were observed in any of the treatment groups. The feeding activity in all the treated groups was comparable to the control. The No Observed Effect Concentration (NOEC) for mortality, growth and reproduction of the earthworm *Eisenia fetida* was determined to be ≥ 1000 mg test item/kg soil and the LOEC was determined to be > 1000 mg test item/kg soil.

I. Material and Methods:

Test material: Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625) G; batch ID: EM4L011180; sample description: FAR01771-00; specification no.: 102000027553; Fluopicolide (AE C638206, BCS-AM59797): 5.18% w/w, 58.14 g/L; Propamocarb hydrochloride (AE B066752, BCS-AV64527): 55.8% w/w 627.0 g/L, density: 1.123 g/mL.

Adult earthworms (*Eisenia fetida,* 8 to 9 months old) were exposed to control, 100, 178, 316, 562 and 1000 mg Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625) G/kg soil.

Different concentrations of the test item were incorporated into the soil; 5 test item concentrations and one control were tested; 4 replicates for the test item treatments and 8 replicates for the control with 10 worms each.

Assessment of adult worm mortality, behavioural effects and biomass development was carried out after 28 days exposure of adult worms in treated artificial soil. Reproduction rate (number of offspring) was assessed after additional 28 days (assessed 56 days after application).

Test test conditions were, artificial soil according to OECD 222 (10% peat content); initial pH 5.8 to 6.1, pH at experimental end 6.1 to 6.4; water content 28.6% to 29.2% (54.0% to 55.1% of maximum

water holding capacity, WHC) at experimental start and 28.1% to 30.8% (53.0% to 58.2% of the maximum WHC) at experimental end; temperature: within the range of 18 °C to 22 °C; photoperiod: 16 h light : 8 h dark, light intensity: within the range of 400 lux to 800 lux.
The effects of the reference item were investigated in a separate study (Carbendazim 600 g/L SC (600 g/L nominal)).

Dates of work: September 29 to November 25, 2015

II. RESULTS AND DISCUSSION:

No mortality was observed in any treatment group.
The body weight changes of the earthworms after 4 weeks exposure to Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625) G were not statistically significantly different compared to the control up to and including the highest test concentration of 1000 mg test item/kg soil (Williams t-test, α = 0.05, two-sided).
The reproduction rates were not statistically significantly different compared to the control up to and including the highest test concentration of 1000 mg test item/kg soil (Williams t-test, α = 0.05, one-sided smaller).
No behavioural abnormalities were observed in any of the treatment groups. The feeding activity in all the treated groups was comparable to the control.

Effect of Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625) G on earthworms (*Eisenia fetida*) in a 56-day reproduction study

Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62.5+625) G [mg/kg soil dry weight]	Control	100	178	316	562	1000
Mortality (day 28) [%]	0	0	0	0	0	0
Statistical Significance	-	-	-	-	-	-
Body weight change (day 28) [%]	33.1	31.4	25.3	35.5	27.4	26.7
Statistical Significance [1]	-	n.s.	n.s.	n.s.	n.s.	n.s.
Mean No. of juveniles (day 56)	248	261	209	255	229	215
Statistical Significance	-	n.s.	n.s.	n.s.	n.s.	n.s.
Reproduction in [%] of control (day 56)	-	105	84.2	103	92.2	86.5
	Endpoints [mg/kg soil dry weight]					
NOEC (day 28 mortality and weight)	**≥1000**					
LOEC (day 28 mortality and weight)	**>1000**					
NOEC (day 56 reproduction)	**≥1000**					
LOEC (day 56 reproduction)	**>1000**					

The results represent rounded values calculated on the exact raw data.
- = not applicable
n.s. = not significantly different compared to the control
[1] Williams t-test, α = 0.05, two-sided for weight changes and one-sided smaller for reproduction

The calculation of an ECx-curve was not possible due to the lack of a significant dose-response relationship.

Reference Item Test:
In the most recent test with the reference item Carbendazim 600 g/L SC (performed under ibacon Study Number 105861022 from June to August 2015), there were statistically significant effects on reproduction at a concentration of 2.08 mg a.s./kg soil and higher, which is in line with the guideline OECD 222 (effects should be observed between 1 and 5 mg a.s./kg soil). The EC_{50} for reproduction was

calculated as 1.91 mg a.s./kg soil.

Validity criteria:

Validity criteria (OECD 222, 2004)	Recommended	Obtained
Control mortality	≤ 10%	0%
Number of juveniles per replicate	≥ 30	173 to 311
Coefficient of variation of reproduction	< 30%	17.3%

III. CONCLUSIONS:

In an earthworm reproduction and growth study with Fluopicolide + Propamocarb-hydrochloride SC 687.5 (62,5+625) G the No Observed Effect Concentration (NOEC) for mortality, growth and reproduction of the earthworm *Eisenia fetida* was determined to be ≥1000 mg test item/kg soil and, accordingly, the LOEC was determined to be >1000 mg test item/kg soil, *i.e.* the highest concentration tested.

Assessment and conclusion by applicant:

The study is considered reliable. The NOEC ≥1000 mg/kg dws should be used in the risk assessment for earthworms.

CP 10.4.1.2 Earthworms field studies

In view of the results presented above, no field studies were necessary.

CP 10.4.2 Effects on non-target soil meso- and macrofauna (other than earthworms)

The risk assessment (calculation of TER values) was based on the NOEC values calculated from the studies performed with the product and the metabolites. In case EC$_{10}$ values were lower than the NOEC and the calculation was reliable they were used for the calculations of TER values.

Table 10.4.2- 1: Endpoints used in risk assessment

Test item	Test species, test design	Ecotoxicological endpoint	Reference
FLC + PCH SC 687.5	*Folsomia candida* reproduction 28 d, mixed into soil	NOEC **≥ 500 mg prod./kg dws** a)	[redacted] 2015; M-522170-01-1 KCP 10.4.2.1/01
FLC + PCH SC 687.5	*Hypoaspis aculeifer* reproduction 14 d, mixed into soil	NOEC **≥ 500 mg prod./kg dws** [redacted]	[redacted] 2015; M-521222-01-1 KCP 10.4.2.1/02
Fluopicolide	*Folsomia candida* reproduction 28 d, mixed into soil	NOEC 31.25 mg a.s./kg dws a) EC_{10} **16.44 mg a.s./kg dws** a)	[redacted] 2003; M-241194-01-1 KCA 8.4.2.1/01 EC_{10} calculation: [redacted] 2020; M-679637-01-1
Fluopicolide	*Hypoaspis aculeifer* reproduction 14 d, mixed into soil	NOEC **≥ 500 mg a.s./kg dws** a) EC_{10} calculation not possible	[redacted] 2016; M-548042-01-1 KCA 8.4.2.1/05
M-01 (AE C653711)	*Folsomia candida* reproduction 28 d, mixed into soil	NOEC **25 mg p.m./kg dws** EC_{10} calculation not possible	[redacted] 2003; M-241196-01-1 KCA 8.4.2.1/02
M-01 (AE C653711)	*Hypoaspis aculeifer* reproduction 14 d, mixed into soil	NOEC **≥ 100 mg p m./kg dws** EC_{10} calculation not possible	[redacted] 2015; M-538626-01-1 KCA 8.4.2.1/06
M-02 (AE C657188)	*Folsomia candida* reproduction 28 d, mixed into soil	NOEC **≥ 100 mg p m./kg dws** EC_{10} calculation not possible	[redacted] 2016; M-558332-01-1 KCA 8.4.2.1/04
M-02 (AE C657188)	*Hypoaspis aculeifer* reproduction 14 d, mixed into soil	NOEC **≥ 100 mg p.m./kg dws** EC_{10} calculation not possible	[redacted] 2016; M-557987-01-1 KCA 8.4.2.1/07
M-03 (AE 0608000)	*Folsomia candida* reproduction 28 d, mixed into soil	NOEC **≥ 50 mg p m./kg dws** a) EC_{10} calculation not possible	[redacted] 2016; M-558337-01-1 KCA 8.4.2.1/03
M-03 (AE 0608000)	*Hypoaspis aculeifer* reproduction 14 d, mixed into soil	NOEC **≥ 50 mg p m./kg dws** a) b) calculation not possible	calculated endpoint b)

Bold values used in risk assessment
dws = dry weight soil; prod = product; a.s. = active substance; p m.= pure metabolite
a) Endpoint corrected by a factor of 2 due to lipophilic substance (log Pow > 2)
b) calculated endpoint assuming a 10-fold higher toxicity of M-03 (AE 0608000) compared to the parent active substance (see KCA 8.4.2.1/03)

Risk assessment for non-target soil meso- and macrofauna (other than earthworms)

Table 10.4.2- 2: TER calculations for the product FLC + PCH SC 687.5 for other non-target soil meso- and macrofauna

Compound	Species	Endpoint [mg prod./kg]	PEC_{soil} [mg prod./kg]	TER_{LT}	Trigger
Potatoes, 4 × 1.6 L prod./ha					
FLC + PCH SC 687.5	*Folsomia candida*	NOEC ≥ 500	2.635	≥ 190	5
FLC + PCH SC 687.5	*Hypoaspis aculeifer*	NOEC ≥ 500	2.635	≥ 190	5
Potatoes, 3 × 1.6 L prod./ha					
FLC + PCH SC 687.5	*Folsomia candida*	NOEC ≥ 500	2.276	≥ 219	5
FLC + PCH SC 687.5	*Hypoaspis aculeifer*	NOEC ≥ 500	2.276	≥ 219	5
Potatoes, 2 × 1.6 L prod./ha					
FLC + PCH SC 687.5	*Folsomia candida*	NOEC ≥ 500	1.917	≥ 261	5
FLC + PCH SC 687.5	*Hypoaspis aculeifer*	NOEC ≥ 500	1.917	≥ 261	5
Potatoes, 1 × 1.6 L prod./ha					
FLC + PCH SC 687.5	*Folsomia candida*	NOEC ≥ 500	0.958	≥ 522	5
FLC + PCH SC 687.5	*Hypoaspis aculeifer*	NOEC ≥ 500	0.958	≥ 522	5
Lettuce, 2 × 1.6 L prod./ha					
FLC + PCH SC 687.5	*Folsomia candida*	NOEC ≥ 500	1.437	≥ 348	5
FLC + PCH SC 687.5	*Hypoaspis aculeifer*	NOEC ≥ 500	1.437	≥ 348	5
Lettuce, 1 × 1.6 L prod./ha					
FLC + PCH SC 687.5	*Folsomia candida*	NOEC ≥ 500	1.797	≥ 278	5
FLC + PCH SC 687.5	*Hypoaspis aculeifer*	NOEC ≥ 500	1.797	≥ 278	5

Table 10.4.2- 3: TER calculations for fluopicolide and its metabolites for other non-target soil meso- and macrofauna

Compound	Species	Endpoint [mg/kg]		PEC$_{soil}$ [mg/kg]	TER$_{LT}$	Trigger
Potatoes, 4 × 1.6 L prod./ha						
Fluopicolide	*Folsomia candida*	EC$_{10}$	16.44	0.192	85.63	5
Fluopicolide	*Hypoaspis aculeifer*	NOEC	≥ 500	0.192	2604	5
M-01 (AE C653711)	*Folsomia candida*	NOEC	25	0.042	595	5
M-01 (AE C653711)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.042	2381	5
M-02 (AE C657188)	*Folsomia candida*	NOEC	≥ 100	0.007	14286	5
M-02 (AE C657188)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.007	14286	5
M-03 (AE 0608000)	*Folsomia candida*	NOEC	≥ 50	0.030	1667	5
M-03 (AE 0608000)	*Hypoaspis aculeifer*	NOEC	≥ 50 [a)]	0.030	1667	5
Potatoes, 3 × 1.6 L prod./ha						
Fluopicolide	*Folsomia candida*	EC$_{10}$	16.44	0.167	98	5
Fluopicolide	*Hypoaspis aculeifer*	NOEC	≥ 500	0.167	2994	5
M-01 (AE C653711)	*Folsomia candida*	NOEC	25	0.036	694	5
M-01 (AE C653711)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.036	2778	5
M-02 (AE C657188)	*Folsomia candida*	NOEC	≥ 100	0.007	14286	5
M-02 (AE C657188)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.007	14286	5
M-03 (AE 0608000)	*Folsomia candida*	NOEC	≥ 50	0.026	1923	5
M-03 (AE 0608000)	*Hypoaspis aculeifer*	NOEC	≥ 50 [a)]	0.026	1923	5
Potatoes, 2 × 1.6 L prod./ha						
Fluopicolide	*Folsomia candida*	EC$_{10}$	16.44	0.142	116	5
Fluopicolide	*Hypoaspis aculeifer*	NOEC	≥ 500	0.142	3521	5
M-01 (AE C653711)	*Folsomia candida*	NOEC	25	0.031	806	5
M-01 (AE C653711)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.031	3226	5
M-02 (AE C657188)	*Folsomia candida*	NOEC	≥ 100	0.007	14286	5
M-02 (AE C657188)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.007	14286	5
M-03 (AE 0608000)	*Folsomia candida*	NOEC	≥ 50	0.022	2273	5
M-03 (AE 0608000)	*Hypoaspis aculeifer*	NOEC	≥ 50 [a)]	0.022	2273	5
Potatoes, 1× 1.6 L prod./ha						
Fluopicolide	*Folsomia candida*	EC$_{10}$	16.44	0.071	232	5
Fluopicolide	*Hypoaspis aculeifer*	NOEC	≥ 500	0.071	7042	5
M-01 (AE C653711)	*Folsomia candida*	NOEC	25	0.016	1563	5
M-01 (AE C653711)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.016	6250	5
M-02 (AE C657188)	*Folsomia candida*	NOEC	≥ 100	0.005	20000	5
M-02 (AE C657188)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.005	20000	5
M-03 (AE 0608000)	*Folsomia candida*	NOEC	≥ 50	0.011	4545	5

Compound	Species	Endpoint [mg/kg]		PEC_{soil} [mg/kg]	TER_{LT}	Trigger
M-03 (AE 0608000)	*Hypoaspis aculeifer*	NOEC	≥ 50 [a)]	0.011	4545	5
Lettuce, 2 × 1.6 L prod./ha						
Fluopicolide	*Folsomia candida*	EC_{10}	16.44	0.107	154	5
Fluopicolide	*Hypoaspis aculeifer*	NOEC	≥ 500	0.107	4673	5
M-01 (AE C653711)	*Folsomia candida*	NOEC	25	0.023	1087	5
M-01 (AE C653711)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.023	4348	5
M-02 (AE C657188)	*Folsomia candida*	NOEC	≥ 100	0.005	20000	5
M-02 (AE C657188)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.005	20000	5
M-03 (AE 0608000)	*Folsomia candida*	NOEC	≥ 50	0.016	3125	5
M-03 (AE 0608000)	*Hypoaspis aculeifer*	NOEC	≥ 50 [a)]	0.016	3125	5
Lettuce, 1 × 1.6 L prod./ha						
Fluopicolide	*Folsomia candida*	EC_{10}	16.44	0.134	123	5
Fluopicolide	*Hypoaspis aculeifer*	NOEC	≥ 500	0.134	3731	5
M-01 (AE C653711)	*Folsomia candida*	NOEC	25	0.029	862	5
M-01 (AE C653711)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.029	3448	5
M-02 (AE C657188)	*Folsomia candida*	NOEC	≥ 100	0.010	10000	5
M-02 (AE C657188)	*Hypoaspis aculeifer*	NOEC	≥ 100	0.010	10000	5
M-03 (AE 0608000)	*Folsomia candida*	NOEC	≥ 50	0.021	2381	5
M-03 (AE 0608000)	*Hypoaspis aculeifer*	NOEC	≥ 50 [a)]	0.021	2381	5

[a)] calculated endpoint for *Hypoaspis aculeifer*, assuming a 10-fold higher toxicity compared to the parent active substance

A *Hypoaspis aculeifer* reproduction study is not available for the metabolite M-03 (AE 0608000). However, the toxicity of the parent active substance fluopicolide and of all other metabolites to *Hypoaspis aculeifer* is very low. Even if a 10-fold higher toxicity compared to the parent active substance would be assumed, the tier 1 risk assessment would still indicate a low risk to soil mites with a high margin of safety (TER ≥ 1667). Hence, no unacceptable risk can be concluded for the metabolite M-03 (AE 0608000) in the risk assessment for soil mites.

M-03 has been observed only in soil matrices where it can exceed 5% AR in acidic soils dosed with parent. The metabolite is readily degraded in acidic soils and very rapidly degraded in soils at neutral or slightly alkaline soil pH. No information on the composition of possible enantiomers of M 03 formed in soil or their individual transformation or interconversion is available. M-03 has not been observed as a metabolite in plant, animal or water matrices.

Ecotoxicological studies for M-03 are available with the soil organisms *Eisenia fetida* and *Folsomia candida*, and on microbial nitrogen transformation. No effects on survival and reproduction were seen for *E. fetida* and *F. candida* up to 100 mg/kg, the highest concentration tested. For *Hypoaspis aculeifer* no ecotoxicological study with M-03 is available. However, an endpoint is extrapolated from the study with the parent active substance assuming 10-fold higher toxicity compared to the parent active substance (see above paragraph). Endpoints are corrected by a factor of 2 as the Log P for M-03 is > 2. The process of microbial nitrogen transformation was not adversely impacted up to 2.78 mg/kg (effects on nitrate formation rate < 25%), the highest concentration tested.

Information is not available on whether a specific stereoisomer of M-03 is enriched in the ecotoxicological studies listed above and/or whether the ecotoxicity properties of M-03 stereoisomers are comparable. For this case EFSA (2019) proposes an uncertainty factor is used in the ecotoxicological

risk assessment. For two isomers the EFSA guidance document (EFSA, 2019) advises the No Observed Effects Concentration (NOEC) can be divided by 2 provided the TER is exceeded. Considering an additional safety factor of 2 the risk assessment would still indicate no unacceptable risk for soil organisms. The risk assessment shows a high margin of safety.

Table 10.4.2- 4: Applying an additional safety factor = 2 on ecotoxicological endpoints to account for remaining uncertainty with regard to potential isomerization of M-03 (AE 0608000)

Ecotoxicological endpoint [b]		PEC_{soil}	TER	Critical trigger
E. fetida	$NOEC_{corr}$ ≥ 25 mg/kg [a, b] (with uncertainty factor)	0.030 mg/kg	≥833.3	5
F. candida	$NOEC_{corr}$ ≥ 25 mg/kg [a, b] (with uncertainty factor)	0.030 mg/kg	≥833.3	5
H. aculeifer	$NOEC_{corr}$ = 25 mg/kg * [a, b] (with uncertainty factor)	0.030 mg/kg	≥833.3	5
N-transformation	Effects < 25% at 1.39 mg/kg [b] (with uncertainty factor)	0.030 mg/kg	≥46.3	1

* NOEC extrapolated from Hypoaspis aculeifer reproduction study with the active substance (NOEC ≥ 1000 mg a.s./kg), assuming 10x higher toxicity of M-03 compared to the parent active substance

[a] As LogP for M-03 is >2 the ecotoxicological endpoints for *E. fetida* and *F. candida* are divided by a correction factor of 2 ($NOEC_{corr.}$ = NOEC corrected)

[b] Endpoint corrected by an additional safety factor of 2 to account for uncertainty with regard to potential isomerization of M-03 (EFSA, 2019)

No unacceptable risk to soil organisms is concluded from enantiomers of M-03 forming from fluopicolide.

All TER values clearly exceed the trigger value of 5 indicating that no unacceptable adverse effects on soil macro-organisms are to be expected from the intended use of FLC + PCH SC 687.5 in potatoes, lettuce and cucumber.

CP 10.4.2.1 Species level testing

Data Point:	KCP 10.4.2.1/01
Report Author:	[redacted]
Report Year:	2015
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5+625) G: Effects on reproduction of the Collembola Folsomia candida in artificial soil with 5 percent peat
Report No:	99761016
Document No:	M-522170-01-1
Guideline(s) followed in study:	GLP compliant study based on OECD 232, 2009 and ISO 11267, 1999
Deviations from current test guideline:	Current Guideline: OECD 232 (2016) No deviations
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of the study was to determine the effects of Fluopicolide + Propamocarb-HCl SC 687.5 (62,5 + 625) G on mortality and reproduction of the Collembola *Folsomia candida* in artificial soil. 10 collembolans (approximately 9 - 11 days) per replicate were exposed to control (8 replicates) and treatments (4 replicates) with concentrations of 18, 32, 56, 100, 178, 316, 562 and 1000 mg Fluopicolide + Propamocarb-HCl SC 687.5/kg dry weight soil. The different concentrations of the test item were mixed homogeneously into the soil which was placed into glass vessels before the collembolan were introduced on top of the soil. Assessment of adult mortality, behavioural effects and reproduction was performed after 28 days. All validity criteria were met. A mortality of up to 10% was observed in the test item treated groups, which was not statistically significantly different compared to the control, where 11% of the collembolans died. The reproduction of the collembolan exposed to Fluopicolide + Propamocarb-HCl SC 687.5 was not statistically significantly different compared to the control at any test concentration. No behavioural abnormalities were observed in any of the treatment groups. Therefore, the overall No Observed Effect Concentration (NOEC) was determined to be ≥ 1000 mg test item/kg soil. The overall Lowest Observed Effect Concentration (LOEC) was determined to be greater than 1000 mg test item/kg soil.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb-HCl SC 687.5 (62,5+625) G; batch ID: EM4L011180; sample description: FAR01771-00; specification no.: 102000027553; Fluopicolide (AE C638206): 5.18% w/w, 58.14 g/L; Propamocarb-HCl (AE B066752): 55.8% w/w, 627.0 g/L, density: 1.123 g/mL.

Ten collembolans per replicate (8 control replicates and 4 replicates for each application rate) were exposed to control (untreated) and treatments. The collembolans were of a uniform age (approximately 9-11 days). Concentrations of 18, 32, 56, 100, 178, 316, 562 and 1000 mg Fluopicolide + Propamocarb-HCl SC 687.5 (62,5+625) G/kg dry weight soil were tested.

The different concentrations of the test item were mixed homogeneously into the soil which was placed into glass vessels before the collembolan were introduced on top of the soil. The collembolans were fed with approximately 2 mg dry yeast for each test vessel at the beginning of the test and on day 14. Assessment of adult mortality, behavioural effects and reproduction was performed after 28 days.

Test conditions: Artificial soil according to OECD 232; pH at experimental start 5.7 to 5.8, pH at experimental end 5.8 to 6.0; water content at experimental start 21.5% to 22.0% (51.2% to 52.4% of the maximum water holding capacity); at experimental end 18.6% to 21.6% (44.3% to 51.3% of the maximum water holding capacity); temperature: within the range of 18°C to 22°C; illumination: 16 h light : 8 h dark, light intensity within the range of 400 to 800 lux. After a period of 14 days, the surviving adults and the number living juveniles were detected.

Boric acid was applied as positive control. The effects of the reference item are investigated in a separate study.

Dates of experimental work: March 16, 2015 to April 27, 2015

II. Results and Discussion:

A mortality of up to 10% was observed in one of the test item treated groups, which was not statistically significantly different compared to the control, where 11% of the collembolans died (Fisher's Exact test, $\alpha = 0.05$, one-sided greater). The reproduction of the collembolan exposed to Fluopicolide + Propamocarb-HCl SC 687.5 (62,5+625) G was not statistically significantly different compared to the control up to and including the highest test concentration of 1000 mg test item/kg soil (Williams t-test, $\alpha = 0.05$, one-sided smaller). No behavioural abnormalities were observed in any of the treatment groups. In a separate study (study code 61406016) the reference item Boric acid showed statistically

significant effects on reproduction at concentrations of ≥ 48.8 mg/kg soil; the EC_{50} for reproduction was calculated to be 145.1 mg/kg soil.

Effect of Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G on Collembola (*Folsomia candida*) in a 28-day reproduction study

Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G [mg/kg soil dry weight]	Control	18	32	56	100	178	316	562	1000
Mortality (day 28) [%]	11	8	0	0	5	5	10	0	0
Statistical significance[1]	-	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
No. of juveniles (day 14)	729	734	819	791	782	762	923	825	722
Reproduction in [%] of control (day 14)	-	101	112	109	107	105	127	113	99
Statistical significance[2]	-	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Endpoints [mg/kg soil dry weight]									
NOEC	≥1000								
LOEC	>1000								

n.s. = not statistically significantly different compared to the control
[1] Fisher's Exact Test, α = 0.05, one-sided greater
[2] Williams t-test, α = 0.05, one-sided smaller
- not applicable

The calculation of an ECx-curve was not possible due to the lack of a significant dose-response relationship.

Validity criteria:

Validity criteria (OECD 232, 2016)	Required	Achieved
Control Mortality	≤ 20 %	11 %
Control Reproduction (Juveniles per Container)	≥ 50	402 to 918
Coefficient of Variation of the Control Reproduction	< 30%	23.2 %

III. CONCLUSIONS:

Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G caused no statistically significant effects on mortality and reproduction of *Folsomia candida* up to and including the concentration of 1000 mg test item/kg soil. Therefore, the overall No Observed Effect Concentration (NOEC) was determined to be ≥1000 mg test item/kg soil. The overall Lowest Observed Effect Concentration (LOEC) was determined to be greater than 1000 mg test item/kg soil.

Assessment and conclusion by applicant:
The study is considered reliable. The NOEC ≥1000 mg/kg dws should be used in the risk assessment for *Folsomia candida*.

Data Point:	KCP 10.4.2.1/02
Report Author:	[redacted]
Report Year:	2015
Report Title:	Fluopicolide + propamocarb-hydrochloride SC 687.5 (62.5+625) G: Effects on reproduction of the predatory mite Hypoaspis aculeifer in artificial soil with 5percent peat
Report No:	99761089
Document No:	M-521222-01-1
Guideline(s) followed in study:	OECD 226 (2008)
Deviations from current test guideline:	Current Guideline: OECD 226 (2016) No deviations
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of the study was to determine the effects of Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G on mortality and reproduction of the predatory Mite *Hypoaspis aculeifer* tested during an exposure of 14 days in artificial soil comparing control and treatment. Ten adults, fertilized, female *Hypoaspis aculeifer* per replicate (8 control and 4 replicates for each application rate) were exposed to control (8 replicates) and treatments (4 replicates). Concentrations of 18, 32, 56, 100, 178, 316, 562 and 1000 mg a.s./dry weight soil were tested. The test item was mixed into soil. After a period of 14 days, the surviving adults and the living juveniles were detected. All *Hypoaspis aculeifer* were counted under a binocular. All validity criteria were met. Fluopicolide + Propamocarb-HCl SC 687.5 (62,5+625) G caused no statistically significant effects on mortality or reproduction of *Hypoaspis aculeifer* up to and including the concentration of 1000 mg test item/kg soil. Therefore, the overall No Observed Effect Concentration (NOEC) was determined to be ≥ 1000 mg test item/kg soil. The overall Lowest Observed Effect Concentration (LOEC) was estimated to be greater than 1000 mg test item/kg soil.

I. MATERIAL AND METHODS:

Test item: Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G; batch ID: EM4L011180; sample description: FAR01771-00; specification no.: 102000027553; Fluopicolide (AE C638206): 5.18% w/w, 58.14 g/L; Propamocarb-HCl (AE B066752): 55.8% w/w 627.0 g/L.

Ten adults, fertilized, female *Hypoaspis aculeifer* per replicate (8 control replicates and 4 replicates for each application rate) were exposed to control (water treated) and treatments. Concentrations of 18, 32 56, 100, 178, 316, 562, 1000 mg test item/kg dry weight soil were tested. The test item was mixed into soil. The *Hypoaspis aculeifer* were of a uniform age (approximately 14 days after reaching the adult stage, 35 days after placing the adult females in clean rearing vessels). They were fed with cheese mites (*Tyrophagus putrescentiae*) *ad libitum* at test start and on day 2, 4, 7, 9, and 11.

Test Conditions: artificial soil based on OECD 226; initial pH 6.1 to 6.5, pH at experimental end 5.8 to 5.9; water content at experimental start 19.6% to 22.0% (47% to 53% of the maximum water holding capacity); at experimental end 20.5% to 21.9% (49% to 52% of the maximum water holding capacity); temperature: within the range of 18°C to 22°C; illumination: 16 h light : 8 h dark (within the range of 400 to 800 lux).

After a period of 14 days, the surviving adults and the number living juveniles were detected.

Perfekthion (a.s. dimethoate, 400.0 g/L, nominal) was applied as positive control. The effects of the reference item are investigated at least once a year in a separate study.

Dates of experimental work: March 16, 2015 to April 01, 2015

II. RESULTS AND DISCUSSION:

A slight mortality of up to 7.5% was observed in one of the test item treated groups, which was not statistically significantly different compared to the control, where 5% of the adult mites died (Fisher's Exact Test, α = 0.05, one-sided greater).

Reproduction of the predatory mites exposed to Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G was not statistically significantly different compared to the control up to and including the highest test concentration of 1000 mg/kg soil (Williams t-test, α = 0.05, one-sided smaller).

No behavioural abnormalities were observed in any of the treatment groups.

The reference item dimethoate showed statistically significant effects on reproduction at a concentration of 4.5 mg dimethoate/kg soil and above. The EC_{50} for reproduction was 5.5 mg dimethoate/kg soil.

Effect of Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G on the Predatory Mite *Hypoaspis aculeifer* in a 14-day reproduction study

Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G [mg/kg soil dry weight]	Control	18	32	56	100	178	316	562	1000
Mortality (day 14) [%]	5.0	2.5	2.5	5.0	2.5	7.5	2.5	5.0	2.5
Statistical significance[1]	-	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
No. of juveniles (day 14)	239	230	236	250	224	223	237	253	235
Reproduction in [%] of control (day 14)	-	96.5	98.8	104.6	94.1	93.4	99.2	105.9	98.7
Statistical significance[2]	-	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	Endpoints [mg/kg soil dry weight]								
NOEC	≥ 1000								
LOEC	> 1000								

n.s. = not statistically significantly different compared to the control
[1] Fisher's Exact Test, $\alpha = 0.05$, one-sided greater
[2] Williams t-test, $\alpha = 0.05$, one-sided smaller
- not applicable

The calculation of an ECx-curve was not possible due to the lack of a significant dose-response relationship.

Validity criteria:

Validity criteria (OECD 226, 2016)	Required	Archieved
Control Mortality	≤ 20 %	5 %
Control Reproduction (Juveniles per Container)	≥ 50	195 to 278
Coefficient of Variation of the Control Reproduction:	≤ 30%	13.0 %

III. CONCLUSIONS:

Fluopicolide + Propamocarb-HCl SC 687.5 (62.5+625) G caused no statistically significant effects on mortality or reproduction of *Hypoaspis aculeifer* up to and including the concentration of 1000 mg test item/kg soil. Therefore, the overall No Observed Effect Concentration (NOEC) was determined to be ≥ 1000 mg test item/kg soil. The overall Lowest Observed Effect Concentration (LOEC) was estimated to be greater than 1000 mg test item/kg soil.

Assessment and conclusion by applicant:

The study is considered reliable. The NOEC ≥1000 mg/kg dws should be used in the risk assessment for *Hypoaspis aculeifer*.

CP 10.4.2.2 Higher tier testing

In view of the results presented in Section CP 10.4.2, no further testing is necessary.

CP 10.5 Effects on soil nitrogen transformation

Table 10.5- 1: Endpoints used in risk assessment

Test item	Test design	Endpoint	Reference
FLC + PCH SC 687.5	Study duration: 28 days	No unacceptable effects at an appl. rate of: **24.1 mg prod./kg dws**	[redacted] 2003; M-218267-01-1 KCP 10.5/02
Fluopicolide	Study duration: 28 days	No unacceptable effects at an appl. rate of: **1.77 mg a.s./kg dws**	[redacted] 2003; M-230023-01-1 KCA 8.5/01
M-01 (AE C653711)	Study duration: 28 days	No unacceptable effects at an appl. rate of: **0.92 mg p.m./kg dws**	[redacted] 2004; M-235991-01-1 KCA 8.5/03
M-01 (AE C653711)	Study duration: 14 days	No unacceptable effects at an appl. rate of: ≥ 8 mg p.m./kg dws	[redacted] 1996; M-234312-01-1 KCA 8.5/02
M-02 (AE C657188)	Study duration: 28 days	No unacceptable effects at an appl. rate of: **1.89 mg p.m./kg dws**	[redacted] 2016; M-557910-01-1 KCA 8.5/07
M-03 (AE 0608000)	Study duration: 28 days	No unacceptable effects at an appl. rate of: **2.78 mg p.m./kg dws**	[redacted] 2016; M-555852-01-1 KCA 8.5/06

Bold values: endpoints used for risk assessment
dws = dry weight soil; prod. = product; a.s. = active substance; p m. = pure metabolite

Risk assessment for Soil Nitrogen Transformation

Table 10.5- 2: Risk Assessment for the product FLC + PCH SC 687.5 for soil micro-organisms

Compound	Species	Endpoint [mg prod./kg]	$PEC_{soil, max}$ [mg prod./kg]	Refinement required
Potatoes, 4 × 1.6 L prod./ha				
FLC + PCH SC 687.5	Soil micro-organisms	24.1	2.635	No
Potatoes, 3 × 1.6 L prod./ha				
FLC + PCH SC 687.5	Soil micro-organisms	24.1	2.276	No
Potatoes, 2 × 1.6 L prod./ha				
FLC + PCH SC 687.5	Soil micro-organisms	24.1	1.917	No
Potatoes, 1 × 1.6 L prod./ha				
FLC + PCH SC 687.5	Soil micro-organisms	24.1	0.958	No
Lettuce, 2 × 1.6 L prod./ha				
FLC + PCH SC 687.5	Soil micro-organisms	24.1	1.437	No
Lettuce, 1 × 1.6 L prod./ha				
FLC + PCH SC 687.5	Soil micro-organisms	24.1	1.797	No

Table 10.5- 3: Risk Assessment for fluopicolide and its metabolites for soil micro-organisms

Compound	Species	Endpoint [mg/kg]	$PEC_{soil, max}$ [mg/kg]	Refinement required
Potatoes, 4 × 1.6 L prod./ha				
Fluopicolide	Soil micro-organisms	1.77	0.192	No
M-01 (AE C653711)	Soil micro-organisms	0.92	0.042	No
M-02 (AE C657188)	Soil micro-organisms	1.89	0.007	No
M-03 (AE 0608000)	Soil micro-organisms	2.78	0.030	No
Potatoes, 3 × 1.6 L prod./ha				
Fluopicolide	Soil micro-organisms	1.77	0.167	No
M-01 (AE C653711)	Soil micro-organisms	0.92	0.036	No
M-02 (AE C657188)	Soil micro-organisms	1.89	0.007	No
M-03 (AE 0608000)	Soil micro-organisms	2.78	0.026	No
Potatoes, 2 × 1.6 L prod./ha				
Fluopicolide	Soil micro-organisms	1.77	0.142	No
M-01 (AE C653711)	Soil micro-organisms	0.92	0.031	No
M-02 (AE C657188)	Soil micro-organisms	1.89	0.007	No

Compound	Species	Endpoint [mg/kg]	$PEC_{soil, max}$ [mg/kg]	Refinement required
M-03 (AE 0608000)	Soil micro-organisms	2.78	0.022	No
Potatoes, 1 × 1.6 L prod./ha				
Fluopicolide	Soil micro-organisms	1.77	0.071	No
M-01 (AE C653711)	Soil micro-organisms	0.92	0.016	No
M-02 (AE C657188)	Soil micro-organisms	1.89	0.005	No
M-03 (AE 0608000)	Soil micro-organisms	2.78	0.011	No
Lettuce 2 × 1.6 L prod. /ha				
Fluopicolide	Soil micro-organisms	1.77	0.107	No
M-01 (AE C653711)	Soil micro-organisms	0.92	0.023	No
M-02 (AE C657188)	Soil micro-organisms	1.89	0.005	No
M-03 (AE 0608000)	Soil micro-organisms	2.78	0.016	No
Lettuce, 1 × 1.6 L prod./ha				
Fluopicolide	Soil micro-organisms	1.77	0.134	No
M-01 (AE C653711)	Soil micro-organisms	0.92	0.029	No
M-02 (AE C657188)	Soil micro-organisms	1.89	0.010	No
M-03 (AE 0608000)	Soil micro-organisms	2.78	0.021	No

According to regulatory requirements, the risk is acceptable if the effect on nitrogen transformation at the maximum PEC_{soil} values is < 25% after 28 days (latest 100 days). In no case, deviations from the control exceeded 25% at concentrations which are clearly higher than the PECs in soil, indicating low risk to soil micro-organisms.

Data Point:	KCP 10.5/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE C638206 & propamocarb SC 62.5 + 625 (AE B066752 04 SC61 A1): Determination of effects on carbon transformation in soil
Report No:	C035158
Document No:	M-218265-01-1
Guideline(s) followed in study:	OECD 217 (2000)
Deviations from current test guideline:	Current Guideline: OECD 217 (2000) Not evaluated
Previous evaluation:	yes, evaluated and accepted In the DAR (2005)
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the effects of Fluopicolide + Propamocarb SC 687.5 on the activity of soil microflora with regard to carbon transformation in a laboratory test. A silty sand soil was exposed for 30 d to concentrations of 2.13 and 21.33 µL Fluopicolide + Propamocarb SC 687.5/kg soil. This is equivalent to a concentration of 2.41 mg product/kg and 24.1 mg product/kg dry weight soil, respectively, considering a product density of 1.129 g/mL. Glucose was added to the soil samples to induce maximum respiration rate (3 g/kg dry weight soil). No adverse effects of Fluopicolide + Propamocarb SC 687.5 on carbon transformation in soil were observed at both test concentrations (2.41 mg test item/kg dry weight soil and 24.1 mg test item/kg soil dry weight soil) after 28 days. Differences from the control of 10.54% (test concentration 2.41 mg test item/kg dry weight soil) and 0.43% (test concentration 24.1 mg test item/kg dry weight soil) are measured at the end of the 28-day incubation period. Fluopicolide + Propamocarb SC 687.5 caused no adverse effects (deviation from control < 25 %, OECD 217) on the soil carbon transformation at the end of the 28-day incubation period. The study was performed in a field soil at concentrations up to 24.1 mg test item/kg soil dry weight, which are equivalent to application rates up to 16 L test item/ha.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb SC 687.5 (62.5 + 625), Short name: FLC + PCH SC 687.5 (62.5 + 625) (Code AE B066752 04 SC61 A1), development No.: 3000312153, batch No.: OP220159, analysed contents of a.s.: 64.7 g/L fluopicolide and 634 g/L propamocarb, density 1.129 g/mL.
A silty sand soil was exposed for 30 d to concentrations of 2.41 and 24.1 mg Fluopicolide + Propamocarb SC 687.5 (application rates were equivalent to 1.6 and 16.0 L Fluopicolide + Propamocarb SC 687.5), which is equivalent to 1 × and 10 × recommended field rate, respectively.
Glucose was added to the soil samples to induce maximum respiration rate (3 g/kg dry weight soil).

Dates of work: February 25, 2003 – March 27, 2003

II. Results and Discussion:

No adverse effects of Fluopicolide + Propamocarb SC 687.5 on carbon transformation in soil were observed at both test concentrations (2.13 mg test item/kg dry weight soil and 21.33 mg test item/kg soil dry weight soil) after 28 days. Differences from the control of 10.54% (test concentration 2.41 mg test item/kg dry weight soil) and – 0.43% (test concentration 24.1 mg test item/kg dry weight soil) were measured at the end of the 28 day incubation period.

Sampling date	Control	2.41 mg test item/kg dws equiv. to 1.6 L test item/ha		24.1 mg test item/kg soil dws equiv. to 16 L test item/ha	
	[mg CO_2 / hour / kg dws]	[mg CO_2 / hour / kg dws]	% difference to control#	[mg CO_2 / hour / kg dws]	% difference to control#
0	216.03	186.63*	13.61	195.52	9.49
8	221.54	193.73	12.55	199.92	9.76
14	215.56	190.02	11.85	193.17	10.39
28	151.02	135.11	10.54	151.68	-0.43

* Significant difference between treated and untreated soil samples (t-test with 5% probability of error)
# Exact Values not given in study report; calculated on the basis of the mg CO_2 / hour / kg dws values given in this table.
dws = dry weight soil

In a separate study the reference item sodium chloride was used as a reference standard. In tests (non-GLP) with the agricultural soil described above, 16 g NaCl/kg dry weight soil had distinct and long-term (> 28 days) influences on microbial mineralization of carbon.

Validity criteria:

The validity criteria of the test according to OECD guideline 217 were fulfilled.

Validity criteria (OECD 217, 2000)	Recommended	Obtained
Coefficients of variation in the control	≤ 15 %	3.5 %

III. Conclusion:

Fluopicolide + Propamocarb SC 687.5 caused no adverse effects (deviation from control < 25 %, OECD 217) on the soil carbon transformation at the end of the 28-day incubation period. The study was performed in a field soil at concentrations up to 24.1 mg test item/kg soil dry weight, which are equivalent to application rates up to 16 L test item/ha.

Assessment and conclusion by applicant:

The study is considered reliable. However, carbon transformation studies are no longer a data requirement, therefore, this study is not further considered in the risk assessment.

Data Point:	KCP 10.5/02
Report Author:	[redacted]
Report Year:	2003
Report Title:	AE C638206 & propamocarb SC 62.5 + 625 (AE B066752 04 SC61 A1): Determination of effects on nitrogen transformation in soil
Report No:	C035160
Document No:	M-218267-01-1
Guideline(s) followed in study:	OECD 216 (2000)
Deviations from current test guideline:	Current Guideline: OECD 216 (2000) Sampling interval was 0, 8, 14 and 28 days instead of 0, 7, 14 and 28 days as recommended by the guideline. This deviation is not expected to have impacted the study results.
Previous evaluation:	yes, evaluated and accepted In the DAR (2005) for Propamocarb in RAR June 2017
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this study was to determine the effects of FLC+ PCH SC 687,5 on the activity of soil microflora with regard to nitrogen transformation in a laboratory test. A silty sand soil was exposed for 28 days to concentrations of 2.13 and 21.33 µL Infinito SC Fungicide/kg dry weight soil. Each treatment consisted of 3 replicates. Application rates were equivalent to 1.6 and 16.0 L Infinito SC Fungicide/ha, which is equivalent to 1x and 10x maximum field rate, respectively. The nitrogen transformation was determined in soil enriched with lucerne meal. NH_4-nitrogen, NO_3- and NO_2-nitrogen were determined by an autoanalyzer at different sampling intervals (0, 8, 14 and 28 days after treatment). A reference item is not required by the guideline. Nevertheless, sodium chloride was used as a reference. During the 28-day experiment, the maximum field rate of Infinito SC Fungicide (1.6 L/ha) and 10-fold this field rate of Infinito SC (21.33 µL/kg dry weight soil = 24.1 mg/kg dry weight soil) had no influence on the microbial mineralization of nitrogen to a silty sand amended with lucerne-grass-green meal.

I. Material and Methods:

Test item: Infinito SC Fungicide (AE B066752 04 SC61 A1, FLC+ PCH SC 687,5), Batch No.: OP220159, density 1.129 g/cm³, a fungicide SC type product containing fluopicolide + propamocarb-HCl (measured concentrations 64.7 g/kg + 634 g/L, respectively) as active ingredients.

A silty sand soil was exposed for 28 days to concentrations of 2.41 and 24.1 mg Infinito SC Fungicide/kg dry weight soil (application rates were equivalent to 1.6 and 16.0 L Infinito SC Fungicide/ha, which is equivalent to 1x and 10x maximum field rate, respectively).

Lucerne-grass-green meal (5 g/kg dry weight soil) was added to soil samples to stimulate nitrogen transformation.

Dates of experimental work: February 25, 2003 to March 25, 2003

II. Results and Discussion:

The findings are presented in the following table.

Effects on non-target soil micro-organisms

Test substance	Infinito SC Fungicide	
Test object	soil micro-organisms Nitrogen transformation (silty sand soil)	
Exposure	28 days	
mg/kg dry weight soil	2.41	24.1
L/ha (equivalent)	1.6 (recommended field rate)	16.0 (10x recommended field rate)
Final result after 28 days	Difference to control: -9% (<25%)	Difference to control: +11% (<25%)

Validity criteria:
All validity criteria were met in this study.

Validity criteria (OECD 216, 2000)	**Obtained in this study**
The coefficient of variation in the control for NO_3-N ≤ 15 %	5%

III. Conclusion:

During the 28-day experiment, the maximum field rate of Infinito SC Fungicide (1.6 L/ha) and 10-fold this field rate of Infinito SC (21.33 µL/kg dry weight soil = 24.1 mg/kg dry weight soil) had no influence on the microbial mineralization of nitrogen to a silty sand soil amended with lucerne-grass-green meal.

Assessment and conclusion by applicant:

The study is considered reliable. The relevant endpoint (maximum concentration with effects < 25%) for the risk assessment is 24.1 mg product/kg dry weight soil.

CP 10.6 Effects on terrestrial non-target higher plants

For the product FLC + PCH SC 687.5 two single dose studies on Terrestrial Plant Vegetative Vigour (testing 6 and 10 test species, respectively) and two single dose studies on Terrestrial Plant Seedling Emergence (testing 6 and 10 test species, respectively) were conducted to determine possible effects on terrestrial non-target higher plants.

Table 10.6- 1: Effect values relevant for the risk assessment for non-target terrestrial plants for the product FLC + PCH SC 687.5

Test organism	Study type	Max. effects	Most sensitive species	References
Application rate: 2.13 L product/ha (≙ 62.5 g FLC/ha) [a]				
Terrestrial non-target plants; 6 species	Seedling emergence; Tier 1 single dose 21 days	No effects ≥ 50 % at an appl. rate of 2.13 L/ha	*Allium cepa*: 31% reduction of emergence	[redacted] 2003; M-235772-02-1 KCP 10.6.2/02
Terrestrial non-target plants; 6 species	Vegetative vigour; Tier 1 single dose 21 days	No effects ≥ 50 % at an appl. rate of 2.13 L/ha	*Avena sativa*: 2% reduction of fresh weight	[redacted] 2003; M-235779-01-1 KCP 10.6.2/01
Application rate: 1.6 L product/ha (≙ 88.5 g FLC/ha) [a]				
Terrestrial non-target plants; 10 species	Seedling emergence; Tier 1 single dose 21 days	No effects ≥ 50 % at an appl. rate of 1.6 L/ha	*Allium cepa*: 24.9 % reduction of shoot dry weight	[redacted] 2019; M-652842-02-1 KCP 10.6.2/05
Terrestrial non-target plants; 10 species	Vegetative vigour; Tier 1 single dose 21 days	No effects ≥ 50 % at an appl. rate of 1.6 L/ha	*Allium cepa*: 41.5 % reduction of shoot dry weight	[redacted] 2019; M-652843-02-1 KCP 10.6.2/06

a) Based on an FLC content of 62.5 g/L and a product density: 1.13 g/cm³

In the case of FLC + PCH SC 687.5, the Tier 1 vegetative vigour studies and seedling emergence studies showed no phytotoxic effects ≥ 50 % at the tested rates of 2.13 and 1.6 L product/ha (equivalent to 62.5 and 88.5 g FLC/ha).

Risk assessment for Terrestrial Non-Target Higher Plants

The risk assessment is based on the "Guidance Document on Terrestrial Ecotoxicology", (SANCO/10329/2002 rev. 2 final, 2002). It is restricted to off-field situations, as non-target plants are defined as non-crop plants located outside the treated area. Effects on non-target plants are of concern in the off-field environment, where non-target plants may be exposed to spray drift.

As the single application rate of 1.6 L product/ha (corresponding to 62.5 g FLC/ha) does not result in effects ≥ 50 %, according to the "Guidance Document on Terrestrial Ecotoxicology" (SANCO/10329/2002 rev. 2 final, 2002), no risk for non-target terrestrial plants is expected. Thus, no further risk assessment is required and the need for risk mitigation measures is excluded.

Conclusion:

From the data presented above, it is concluded that unacceptable effects of FLC + PCH SC 687.5 on non-target terrestrial plants are not to be expected when the product is used as recommended.

CP 10.6.1 Summary of screening data

Not necessary as guideline GLP studies for terrestrial non-target plants are available (see Point 10.6.2 in this MCP Summary).

CP 10.6.2 Testing on non-target plants

Data Point:	KCP 10.6.2/01
Report Author:	[redacted]
Report Year:	2003
Report Title:	Non-target terrestrial plants: An evaluation of the effects of AE B066752 04 SC61 A102 in the vegetative vigour test (Tier 1)
Report No:	C034925
Document No:	M-235779-01-1
Guideline(s) followed in study:	OECD 208 B (draft, 2000)
Deviations from current test guideline:	Current Guideline: OECD 227 (2006) Seedling emergence of control plants, humidity and light intensity are not reported. Plant density was 5 plants per pot instead of 2 plants per pot for larger species. Used pots were smaller than 15 cm in diameter. These deviations are not expected to have impacted the study results.
Previous evaluation:	yes, evaluated and accepted In the DAR (2005) for Propamocarb in RAR June 2017
GLP/Officially recognised testing facilities:	No, not conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this specific study was to evaluate the effect of Fluopicolide + Propamocarb SC 687.5 on the vegetative vigour of six non-target terrestrial plant species following a post-emergence application of 2.13 L product/ha at the 2-4 leaf stage. The selected six non-target terrestrial plant species were sown in a standard soil fertilized with 2.4 g Blaukorn per L and grown in a greenhouse in 10 and 13 cm pots. The test item was dissolved in deionized water and was applied 2 times at 200 L/ha to the plant foliage using a spray chamber equipped with an overhead nozzle.
Plants were grown under controlled greenhouse conditions. Assessments were made 7, 14 and 21 days after application. Final assessments were made for plant survival, visual phytotoxicity, plant growth stage and fresh weight.

There were no significant adverse effects in the vegetative vigour of the six plant species tested after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 2.13 L product/ha.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb SC 687.5 (62.5 + 625); Short code: FLC + PCH SC 687.5 (62.5 + 625) (Code AE B066752 04 SC 61 A102), batch No: OP220159, analysed contents of a.s.: 64.7 g/L fluopicolide and 634 g/L propamocarb, density: 1.129 g/mL.

Test species: 4 dicotyledonous and 2 monocotyledonous species representing 6 different plant families (EPPO code): *Lactuca sativa* (LACSA), *Brassica napus* (BRSNW), *Cucumis sativus* (CUMSA), *Glycine max* (GLXMA), *Avena sativa* (AVESA), *Allium cepa* (ALLCE).

In order to reach the 2-4 leaf stage at the start of testing, the selected six non-target terrestrial plant species were sown in a standard soil (14.2% sand, 65.1% silt and 20.7% clay, organic carbon: 1.19%) fertilized with 2.4 g Blaukorn per L and grown in grown in a greenhouse in 10 and 13 cm pots.

The plant species were treated at the 2-4 leaf stage with an application rate of 2.13 L product/ha and a water control (400 L/ha of deionised water), respectively. The test item was dissolved in in deionized water and was applied 2 times at 200 L/ha using a spray chamber equipped with an overhead nozzle to the plant foliage. There were 5 plants per pot and 4 replicate pots, giving a total of 20 plants per control and treatment.

Following application, the pots with plants were maintained under greenhouse conditions with a temperature of 23 ± 5°C during day time and 18 ± 5°C during night time. The photoperiod was 16 h light and 8 h dark. Natural daylight was supplemented by artificial lighting to provide the required photoperiod.

Assessments were made 7, 14 and 21 days after application. Final assessments were made for plant survival, visual phytotoxicity, plant growth stage and fresh weight.

II. Results and Discussion:

Biological findings:
There were no visible symptoms of phytotoxicity in any species. Growth of the emerged plants was not influenced by the test compound for any of the tested species.

Detailed results for effects of the test item on survival, fresh weight, phytotoxicity and growth stage are given below.

Effects of the test item on survival

	Mean % mortality on day 21	
Species	**Control**	**2.13 L/ha**
Lactuca sativa	0	0
Brassica napus	0	0
Cucumis sativus	0	0
Glycine max	0	0
Avena sativa	0	0
Allium cepa	0	0

Effects of the test item on fresh weight

	Mean fresh weight (g) per plant on day 21		
Species	**Control**	**2.13 L/ha**	**% of control**
Lactuca sativa	12.501	13.343	107
Brassica napus	21.009	21.284	101
Cucumis sativus	23.297	27.249	117
Glycine max	7.238	7.512	104
Avena sativa	7.279	7.130	98
Allium cepa	1.180	1.195	101

Phytotoxicity and growth stage of the test item

	Mean phytotoxicity (%) on day 21		Growth stage on day 21	
Species	**Control**	**2.13 L/ha**	**Control**	**2.13 L/ha**
Lactuca sativa	0	0	20-22	21-22
Brassica napus	0	0	16-18	16-18
Cucumis sativus	0	0	61	61
Glycine max	0	0	51-76	51-76
Avena sativa	0	0	21-47	21-47
Allium cepa	0	0	13-14	13-14

III. Conclusions:

In a Tier 1 seedling emergence study Fluopicolide + Propamocarb SC 687.5 was tested under greenhouse conditions for effects on survival, fresh weight, and phytotoxicity and growth stage of six non-target terrestrial plant species. There were no adverse effects in the vegetative vigour of the six tested plant species after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 2.13 L product/ha.

Assessment and conclusion by applicant:

There were no adverse effects in the vegetative vigour of the six tested plant species after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 2.13 L product/ha. The study is considered reliable.

Data Point:	KCP 10.6.2/02
Report Author:	[redacted]
Report Year:	2003
Report Title:	Non-target terrestrial plants: An evaluation of the effects of AE B066752 04 SC61 A102 in the seedling emergence and growth test (Tier 1)
Report No:	C040880
Document No:	M-235772-02-1
Guideline(s) followed in study:	OECD 208 A (draft, 2000)
Deviations from current test guideline:	Current Guideline: OECD 208 (2006) Humidity and light intensity are not reported. Plant density was 5 plants per pot instead of 2 plants per pot for larger species. Used pots were smaller than 15 cm in diameter. These deviations are not expected to have impacted the study results.
Previous evaluation:	yes, evaluated and accepted in the DAR (2005) for Propamocarb in RAR June 2017
GLP/Officially recognised testing facilities:	No, not conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this specific study was to evaluate the effect of Fluopicolide + Propamocarb SC 687.5 on the seedling emergence and seedling growth of six non-target terrestrial plant species following a

pre-emergence application of 2.13 L product/ha. The day before application, 5 seeds per pot with 4 pots per control and treatment, respectively, were planted. The seeds were manually introduced in sterilised standard soil.
The spray solution was applied to the soil surface using a spray chamber equipped with an overhead nozzle. Plants were grown under controlled greenhouse conditions. Plants were assessed for emergence, survival and rated for phytotoxicity on days 7, 14 and 21 days. At study termination, biomass endpoint determinations were performed for plant fresh weights. The validity criteria of the study were fulfilled for all species, except for oilseed rape. For oilseed rape, two control plants died during the duraton of the study resulting in 11% mortality and therefore breaching the validity criterium of 90% survival in the control.
There were no significant adverse effects in the seedling emergence of the six crops tested after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 2.13 L product/ha.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb SC 687.5 (62.5 + 625); Short code: FLC + PCH SC 687.5 (62.5 + 625) (Code AE B066752 04 SC 61 A102), batch No: OP220159, analysed contents of a.s.: 64.7 g/L fluopicolide and 634 g/L propamocarb, density: 1.129 g/mL.

Test species: 4 dicotyledonous and 2 monocotyledonous species representing 6 different plant families (EPPO code): *Lactuca sativa* (LACSA), *Brassica napus* (BRSNW), *Cucumis sativus* (CUMSA), *Glycine max* (GLXMA), *Avena sativa* (AVESA), *Allium cepa* (ALLCE).

The day before application, 5 seeds per pot with 4 pots per control and treatment, respectively, were planted by manually introducing the seeds in sterilised standard soil (14.2% sand, 65.1% silt and 20.7% clay; pH 7.4 and organic carbon 1.19%). The spray solution was applied to the soil surface. The blank control spray solution was deionized water. The test item was dissolved in deionized water and applied 2 times at 200 L/ha using a spray chamber equipped with an overhead nozzle; a nominal rate of 2.13 L product/ha was applied.
Following application, the pots with seeds were maintained under greenhouse conditions with a photoperiod of 16 h light and 8 dark, a day temperature of 23 ± 5°C and a night temperature of 18 ± 5°C. Natural daylight was supplemented by artificial lighting to provide the required photoperiod.
Plants were assessed for emergence, survival and rated for phytotoxicity on days 7, 14 and 21 days. At study termination, biomass endpoint determinations were performed for plant fresh weights.

II. Results and Discussion:

Validity criteria:
The germination rate of the seeds used in this study was ≥ 70%.
The validity criterion of at least 90% survival of the plants during the study period was achieved for the untreated controls for all species tested except for oilseed rape. The control mortality for this species was 11%. It has to be noted that no mortality was detected in the treatment group of oilseed rape.

Biological findings:
There were no major effects on emergence and survival for any of the six plant species tested and all plants exhibited normal growth.

There were no major effects on fresh weight for all six of the crops tested (see second table below). Fresh weights were recorded for each replicate and the final data corrected on a per plant basis.

There were no visible symptoms of phytotoxicity in any species. Growth of the emerged plants was not influenced by the test compound for any of the species except for lettuce which showed a slight growth delay, however appeared normal.

Detailed results for effects of the test item on emergence, survival, fresh weight, phytotoxicity and growth stage are given below.

Effects of the test item on emergence and survival

	Mean % Emergence		Mean % Survival on day 21	
Species	**Control**	**2.13 L/ha**	**Control**	**2.13 L/ha**
Lactuca sativa	70	60	93	75
Brassica napus	80	80	89	100
Cucumis sativus	85	90	100	89
Glycine max	85	95	100	84
Avena sativa	100	95	100	100
Allium cepa	80	55	100	100

Effects of the test item on fresh weight

	Mean fresh weight (g) per plant on day 21*		
Species	**Control**	**2.13 L/ha**	**% of control**
Lactuca sativa	0.830	0.732	88
Brassica napus	3.514	3.481	99
Cucumis sativus	4.863	5.729	118
Glycine max	3.846	3.381	88
Avena sativa	1.742	1.413	81
Allium cepa	0.102	0.112	109

*On a per plant basis, and statistical analysis using the Williams Test revealed no significant differences between control and treatment for any species at the 5% level.

Phytotoxicity and growth stage of the test item

	Mean phytotoxicity (%) on day 21		Growth stage on day 21	
Species	**Control**	**2.13 L/ha**	**Control**	**2.13 L/ha**
Lactuca sativa	0	0	12-14	10-14
Brassica napus	0	0	14	14
Cucumis sativus	0	0	12	12
Glycine max	0	0	12-13	12-13
Avena sativa	0	0	13	13
Allium cepa	0	0	11-12	11-12

III. CONCLUSIONS:

In a Tier 1 seedling emergence study, Fluopicolide + Propamocarb SC 687.5 was tested under greenhouse conditions for effects on emergence, survival, fresh weight, visual phytotoxicity and growth of six non-target terrestrial plant species. There were no significant adverse effects in the seedling emergence of the six species tested after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 2.13 L product/ha.

Assessment and conclusion by applicant:

There were no significant adverse effects in the seedling emergence of the six species tested after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 2.13 L product/ha. The study is considered reliable.

Data Point:	KCP 10.6.2/03
Report Author:	[redacted]
Report Year:	2019
Report Title:	Fluopicolide + propamocarb SC 687.5 (62.5+625 g/L): Effects on the seedling emergence and growth of ten non-target terrestrial plant species (tier I)
Report No:	S18-02177
Document No:	M-652842-02-1
Guideline(s) followed in study:	EU Directive 91/414/EEC Regulation (EC) no. 1107/2009 US EPA OCSPP 850.4100 (2012) OECD 208 (2006)
Deviations from current test guideline:	Current Guideline: OECD 208 (2006) The light intensity was higher than required by the guideline (810 - 1150 µmol/m²/s). Higher light intensities (above 400 µmol/m²/s) are not considered as deviations as experience shows that higher light intensity has no negative influence on phytotoxicity, growth or morphology.
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this specific study was to evaluate the effect of fluopicolide + propamocarb SC 687.5 on the seedling emergence of ten non-target terrestrial plant species following a pre-emergence application of 1.6 L product/ha. The selected ten non-target terrestrial plant species were sown in a loamy sand and grown in a greenhouse in 15 cm pots. The test item was dissolved in deionised water and was applied one time at an average spray volume of 218 L/ha to the bare soil surface after sowing of the plants using a spray chamber equipped with an overhead nozzle.
Plants were grown under controlled greenhouse conditions. Assessments were made 7, 14 and 21 days after application. Assessments were made for seedling emergence, phytotoxicity and post-emergence mortality. Plant growth stage and shoot dry weight were assessed only at day 21. The validity criteria were fulfilled for all species.
There were no adverse effects > 50% on survival, phytotoxicity, emergence, growth stage and shoot dry weight after the treatment with fluopicolide + propamocarb SC 687.5 at an application rate of 1.6 L product/ha.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb SC 687.5 (62.5 + 625); Short code: FLC + PCH SC 687.5 (62.5 + 625), specification No.: 102000027553, Sample description: TOX20899-00, batch No: 2018-002211-01, analysed contents of a.s.: 65.91 g/L fluopicolide and 612.4 g/L propamocarb, density: 1.133 g/mL.

Test species: 7 dicotyledonous and 3 monocotyledonous species representing 8 different plant families (EPPO code): *Beta vulgaris* (BEAVX), *Brassica napus* (BRSNW), *Cucumis sativus* (CUMSA), *Glycine*

max (GLXMA), *Helianthus annuus* (HELAN), *Lactuca sativa (*LACSA*)*, *Solanum lycopersicum* (LYPES), *Allium cepa* (ALLCE), *Triticum aestivum* (TRZAX), *Zea mays* (ZEAMX).

The selected ten non-target terrestrial plant species were sown in a soil (loamy sand) composed of 77.11% sand, 18% silt and 4.89% clay, with a pH of 7.64, a total organic carbon content of 0.40% (0.69% organic matter) and an electronic conductivity of 133.9 µS/cm. Plants were grown in a greenhouse in 15 cm pots.

Treatment was done at the day of sowing with an application rate of 1.6 L product/ha and a water control (average 218 L/ha of deionised water), respectively. The test item was dissolved in deionised water and was applied once using a spray chamber equipped with an overhead nozzle to the soil surface. There were 2 plants per pot and 10 replicate pots for all dicotyledonous species and for the monocotyledonous test species *Zea mays.* For the two monocotyledonous species *Allium cepa* and *Triticum aestivum* there were 4 plants per pot and 5 replicates pots. In total 20 plants per control and treatment were tested for each species.

Following application, the pots with plants were maintained under greenhouse conditions with a temperature of 17.45 – 29.96°C and relative air humidity of 52.55 – 87.83%. The photoperiod was 16 h light and 8 h dark and the light intensity was between 810 – 1150 µmol/m²/s.
Plants were assessed for seedling emergence, post-emergence mortality and phytotoxicity symptoms 7, 14 and 21 days after at least 50% emergence of the seedlings in the control group. Additionally, the BBCH growth stage was determined for all treatment groups on day 21. The effects on plant shoot dry weight were determined for day 21.

II. RESULTS AND DISCUSSION:

Validity criteria:
The germination rate of the seeds used in this study was ≥ 70%.
The validity criterion of at least 90% survival of the plants during the study period was achieved for the untreated controls for all species tested.
The control seedlings of each species did not exhibit visible phytotoxic effects (e.g. chlorosis, necrosis, wilting, leaf and stem deformations) and control plants exhibited normal variation in growth and morphology for that particular species.

Biological findings:

No post-emergence mortality occurred for any of the plant species tested.

No symptoms of phytotoxicity were observed during the course of this study. Thus, the phytotoxic grade for all plant species is 1 (normal plant appearance).

Detailed results for effects of the test item on seedling emergence, growth stage, and shoot dry weight are given below.

No statistically significant effects on seedling emergence were observed for any of the plant species tested at the last assessment day. The highest inhibition for seedling emergence occurred for *Beta vulgaris* with 15.8% compared to the control group.

Effects of the test item on seedling emergence

	% emerged plants on day 21		Inhibition compared to the control [%]**
Species	**Control**	**1.6 L/ha**	
Beta vulgaris	95	80	15.8
Brassica napus	100	100	0
Cucumis sativus	95	95	0
Glycine max	95	85	10.5
Helianthus annuus	100	95	5
Lactuca sativa	100	100	0
Solanum lycopersicum	95	100	-5.3
Allium cepa	75	80	-6.7
Triticum aestivum	95	95	0
Zea mays	90	100	-11.1

**Negative values indicate that there was an increase compared to the control.

No differences in growth stage between the control and the test item treated plants were observed at the final assessment day (21 DA50E).

Effects on growth stage of the test item

	Growth stage on day 21 (Minimum / Maximum BBCH growth stage)	
Species	**Control**	**1.6 L/ha**
Beta vulgaris	14 / 14	14 / 14
Brassica napus	14 / 14	14 / 14
Cucumis sativus	13 / 13	13 / 13
Glycine max	16 / 16	16 / 16
Helianthus annuus	16 / 16	16 / 16
Lactuca sativa	15 / 15	15 / 15
Solanum lycopersicum	14 / 14	14 / 14
Allium cepa	13 / 13	13 / 13
Triticum aestivum	22 / 22	22 / 22
Zea mays	16 / 16	16 / 16

The application of the test item resulted in statistically significant differences on shoot dry weight compared to the control of 15.0% and 13.5%, respectively, for *Brassica napus* and *Solanum lycopersicum*. The highest non-significant inhibition occurred for *Allium cepa* with 24.3% inhibition compared to the control group.

Effects on shoot dry weight of the test item

	Mean shoot dry weight on day 21 [g] (Mean ± SD)		Inhibition (% compared to control)**
Species	**Control**	**1.6 L/ha**	
Beta vulgaris	0.315 ± 0.046	0.422 ± 0.090	-34.0
Brassica napus	0.602 ± 0.086	0.512 ± 0.082	15.0*
Cucumis sativus	0.912 ± 0.226	0.946 ± 0.253	-3.7
Glycine max	1.507 ± 0.287	1.556 ± 0.751	-3.3
Helianthus annuus	0.608 ± 0.079	0.079 ± 0.464	-27.6
Lactuca sativa	0.254 ± 0.038	0.237 ± 0.056	6.7
Solanum lycopersicum	0.466 ± 0.077	0.403 ± 0.066	13.5*
Allium cepa	0.037 ± 0.005[A]	0.028 ± 0.009	24.3
Triticum aestivum	0.191 ± 0.010	0.177 ± 0.015	7.3
Zea mays	1.197 ± 0.219	1.084 ± 0.245	9.4

[A] The shoot dry weight of *Allium cepa* replicate No. 1 in the control group was detected as statistical Outlier (Dixon & Harley test, α = 0.05). Hence this replicate was not considered for the evaluation of shoot dry weight.
*Significantly different compared to control (Student's t-test; test one-sided smaller, α = 0.05)
**Negative values indicate that there was an increase compared to the control.

III. Conclusions:

In a Tier 1 seedling emergence study fluopicolide + propamocarb SC 687.5 was tested under greenhouse conditions for effects on survival, phytotoxicity, seedling emergence, growth stage and shoot dry weight of ten non-target terrestrial plant species. There were no adverse effects > 50% on survival, phytotoxicity, emergence, growth stage and shoot dry weight after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 1.6 L product/ha.

Assessment and conclusion by applicant:

There were no adverse effects > 50% on survival, phytotoxicity, emergence, growth stage and shoot dry weight after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 1.6 L product/ha. The study is considered reliable.

Data Point:	KCP 10.6.2/04
Report Author:	[redacted]
Report Year:	2019
Report Title:	Fluopicolide + propamocarb SC 687.5 (62.5+625 g/L): Effects on the vegetative vigour of ten non-target terrestrial plant species (tier 1)
Report No:	S18-02178
Document No:	M-652843-02-1
Guideline(s) followed in study:	EU Directive 91/414/EEC Regulation (EC) no. 1107/2009 US EPA OCSPP 850.4150 (2012) OECD 227 (2006)
Deviations from current test guideline:	Current Guideline: OECD 227 (2006) The light intensity was higher than required by the guideline (460 - 910 µmol/m²/s). Higher light intensities (above 400 µmol/m²/s) are not considered as deviations as experience shows that higher light intensity has no negative influence on phytotoxicity, growth or morphology.
Previous evaluation:	No, not previously submitted
GLP/Officially recognised testing facilities:	Yes, conducted under GLP/Officially recognised testing facilities
Acceptability/Reliability:	Yes

Executive Summary

The purpose of this specific study was to evaluate the effect of fluopicolide + propamocarb SC 687.5 on the vegetative vigour of ten non-target terrestrial plant species following a post-emergence application of 1.6 L product/ha at the 2-4 leaf stage. The selected ten non-target terrestrial plant species were sown in a loamy sand and grown in a greenhouse in 15 cm pots. The test item was dissolved in deionised water and was applied once at 212 L/ha to the plant foliage using a spray chamber equipped with an overhead nozzle.
Plants were grown under controlled greenhouse conditions. Assessments were made 7, 14 and 21 days after application. Assessments were made for plant survival and visual phytotoxicity. Plant growth stage and shoot dry weight were only assessed at day 21. The validity criteria were fulfilled for all species.
There were no significant adverse effects > 50% in the vegetative vigour of the ten plant species tested after the treatment with Fluopicolide + Propamocarb SC 687.5 at an application rate of 1.6 L product/ha.

I. Material and Methods:

Test item: Fluopicolide + Propamocarb SC 687.5 (62.5 + 625); Short code: FLC + PCH SC 687.5 (62.5 + 625), Sample description: TOX20899-00, Specification No. 102000027553, batch No: 2018-002211-01, analysed contents of a.s.: 65.91 g/L fluopicolide and 612.4 g/L propamocarb, density: 1.133 g/mL.

Test species: 7 dicotyledonous and 3 monocotyledonous species representing 8 different plant families (EPPO code): *Beta vulgaris* (BEAVX), *Brassica napus* (BRSNW), *Cucumis sativus* (CUMSA), *Glycine max* (GLXMA), *Helianthus annuus* (HELAN), *Lactuca sativa* (LACSA), *Solanum lycopersicum* (LYPES), *Allium cepa* (ALLCE), *Triticum aestivum* (TRZAX), *Zea mays* (ZEAMX).

In order to reach the 2-4 leaf stage at the start of testing the selected ten non-target terrestrial plant species were sown in a soil (loamy sand) composed of 77.11% sand, 18% silt and 4.89% clay, with a pH of 7.64, a total organic carbon content of 0.40% (0.69% organic matter) and an electronic conductivity of 133.9 µS/cm. Plants were grown in a greenhouse in 15 cm pots.

The pots with plants were maintained under greenhouse conditions with a temperature of 17.97 – 28.60°C and relative air humidity of 46.95 – 78.65%. The photoperiod was 16 h light and 8 h dark and the light intensity was between 460 – 910 µmol/m^2/s.

The plant species were treated at the 2-4 leaf stage with an application rate of 1.6 L product/ha and a water control (average 212 L/ha of deionised water), respectively. The test item was dissolved in deionised water and was applied once using a spray chamber equipped with an overhead nozzle to the plant foliage. There were 2 plants per pot and 10 replicate pots for all dicotyledonous species and for the monocotyledonous test species *Zea mays.* For the two monocotyledonous species *Allium cepa* and *Triticum aestivum* there were 4 plants per pot and 5 replicates pots. In total 20 plants per control and treatment were tested for each species.

The plants were assessed for mortality and signs of phytotoxicity 7, 14 and 21 days after application. BBCH-growth stage and shoot dry weight were assessed for day 21.

II. Results and Discussion:

<u>Validity criteria:</u>
The germination rate of the seeds used in this study was ≥70%.
The validity criterion of at least 90% survival of the plants during the study period was achieved for the untreated controls for all species tested.
The control seedlings of each species did not exhibit visible phytotoxic effects (e.g. chlorosis, necrosis, wilting, leaf and stem deformations) and control plants exhibited normal variation in growth and morphology for that particular species.

<u>Biological findings:</u>

No mortality occurred for any species tested.

No symptoms of phytotoxicity were observed during the course of this study. Thus, the phytotoxic grade for all plant species is 1 (normal plant appearance).

Detailed results for effects of the test item on growth stage and shoot dry weight are given below.

No differences in the BBCH growth stage between the treatment group and the control group were observed for any of the plant species tested on the last assessment day (day 21).

Effects on growth stage of the test item

	Growth stage on day 21 (Minimum / Maximum BBCH growth stage)	
Species	**Control**	**1.6 L/ha**
Beta vulgaris	17 / 17	17 / 17
Brassica napus	17 / 17	17 / 17
Cucumis sativus	63 / 63	63 / 63
Glycine max	64 / 64	64 / 64
Helianthus annuus	18 / 18	18 / 18
Lactuca sativa	16 / 16	16 / 16
Solanum lycopersicum	17 / 17	17 / 17
Allium cepa	14 / 14	14 / 14
Triticum aestivum	23 / 23	23 / 23
Zea mays	17 / 17	17 / 17

An application of the test item resulted in statistically significant effects on shoot dry weight for the plant species *Allium cepa* and *Zea mays*. The highest inhibition of shoot dry weight compared to the control was determined for *Allium cepa* with 41.5% followed by *Zea mays* with 12.1% at the test item rate of 1.6 L product/ha.

Effects on shoot dry weight of the test item

	Mean shoot dry weight on day 21 [g] (Mean ± SD)		Inhibition (% compared to control)**
Species	**Control**	**1.6 L/ha**	
Beta vulgaris	1.714 ± 0.309	2.234 ± 0.195	-30.3
Brassica napus	3.376 ± 0.636	4.027 ± 0.443	-19.3
Cucumis sativus	3.993 ± 0.634	3.692 ± 0.858	7.5
Glycine max	3.962 ± 0.396	4.802 ± 0.731	-21.2
Helianthus annuus	2.109 ± 0.202	2.230 ± 0.194	-5.7
Lactuca sativa	1.516 ± 0.363	1.558 ± 0.343	-2.8
Solanum lycopersicum	2.238 ± 0.319	2.473 ± 0.389	-10.5
Allium cepa	0.275 ± 0.055	0.161 ± 0.029	41.5*
Triticum aestivum	0.708 ± 0.085	0.780 ± 0.041	-10.2
Zea mays	3.681 ± 0.285	4.411 ± 0.488	12.1*

* Significantly different compared to control (Student's *t*-test; test one-sided smaller, $\alpha = 0.05$)
**Negative values indicate that there was an increase compared to the control.

III. CONCLUSIONS:

In a Tier 1 vegetative vigour study fluopicolide + propamocarb SC 687.5 was tested under greenhouse conditions for effects on survival, phytotoxicity, growth stage and shoot dry weight of ten non-target terrestrial plant species. There were no adverse effects > 50% on survival and shoot dry weight after the treatment with fluopicolide + propamocarb SC 687.5 at an application rate of 1.6 L product/ha.

Assessment and conclusion by applicant:

There were no adverse effects > 50% on survival and shoot dry weight after the treatment with fluopicolide + propamocarb SC 687.5 at an application rate of 1.6 L product/ha. The study is considered reliable.

CP 10.6.3 Extended laboratory studies on non-target plants

In view of the results presented under Point CP 10.6.2 above, no further studies are deemed necessary.

CP 10.6.4 Semi-field and field tests on non-target plants

In view of the results presented under Point CP 10.6.2 above, no further studies are deemed necessary.

CP 10.7 Effects on other terrestrial organisms (flora and fauna)

No further tests on other terrestrial organism deemed to be necessary due to the low to moderate acute and chronic ecotoxicity of fluopicolide + propamocarb-hydrochloride SC 687.5 as presented under the Points CP 10.1 to CP 10.6 in this MCP Summary.

CP 10.8 Monitoring data

No monitoring data has been collected by the applicant nor have they been reported in any of the public literature references as evaluated in Document MCA, Section 9. Due to the low to moderate acute and chronic ecotoxicity of fluopicolide + propamocarb-hydrochloride SC 687.5 as presented under the Points CP 10.1 to CP 10.7, no monitoring of non-target organisms is deemed to be necessary.