Document Title

Summary of the fate and behaviour in the environment for Fosetyl-aluminium + Fluopicolide WG 71.11 (666.7 + 44.4 g/kg)

Data Requirements

EU Regulation 1107/2009 & EU Regulation 284/2013
Document MCP
Section 9: Fate and behaviour in the environment

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

Date

2016-09-01

Author(s)

[redacted].

Bayer CropScience

OWNERSHIP STATEMENT

Version history

Date (yyyy-mm-dd)	Data points containing amendments or additions[1] and brief description	Document identifier and version number
2015-10-05	Original Document MCP – Section 9 of Supplementary Dossier	M-534271-02-1
2016-09-01	Dossier update according to “Request for additional information on the supplementary dossier submitted by Bayer CropScience for the approval renewal of the active substance Fosetyl (2015-5865)” by RMS France on 2016-07-27: New PEC calculations have been added to chapters CP 9.1.3, CP 9.2.4.1 and CP 9.2.5.	M-534271-03-1

[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 9 FATE AND BEHAVIOUR IN THE ENVIRONMENT

Fosetyl was included in Annex I to Directive 91/414/EEC in 2006 (Directive 2006/64/CE of 18 July 2006, Entry into Force on 1 May 2007). This Supplementary Dossier contains only data which were not submitted at the time of the Annex I inclusion of fosetyl under Directive 91/414/EEC and which were therefore not evaluated during the first EU review. All data which were already submitted by Bayer CropScience (BCS) for the Annex I inclusion under Directive 91/414/EEC are contained in the DAR, its Addenda and are included in the Baseline Dossier provided by BCS. These data are only mentioned in the Supplementary Dossier for the sake of completeness and only general information (e.g. author, reference etc.) is available for these data. In order to facilitate discrimination between new data and data submitted during the Annex I inclusion process under Directive 91/414/EEC, the old data are written in grey typeface. For all new studies, detailed summaries are provided within this Supplementary Dossier. Additional information requested by the RMS France on 2016-07-27 during the evaluation of the Supplementary Dossier is highlighted in green.

Fosetyl is the ISO common name for ethyl hydrogen phosphonate (IUPAC) but the aluminium salt fosetyl-aluminium (fosetyl-Al), a variant of fosetyl, is used in the formulated product.

In original reports study authors may have used different names or codes for metabolites of fosetyl-Al. In this summary, a single name or a single code is used for each metabolite. A full list containing structural formula, various names, short forms, codes and occurrences of metabolites is provided as Document N3.

As some pragmatic approach "phosphonic acid" formed as a major metabolite is reported in this Supplementary Dossier as the free acid for the sake of clarity and unequivocal handling. After application, aluminium tris-O-ethyl phosphonate (i.e. fosetyl-Al) dissociates into the O-ethyl phosphonate and aluminium ions. Any phosphonate formed from O-ethyl phosphonate in the following would never be present in the form of the free acid (i.e. phosphonic acid) under the conditions of the environment (pH 4 to 9). This conclusion is supported by the molecular structure and by the dissociation constant observed (dissociation constant for the first step of deprotonation: pKa = 2.0). Consequently phosphonates in their fully protonated form are strong acids that spontaneously form salts in contact with soil or natural water with any suitable counter ion present (i.e. sodium, potassium, magnesium, calcium). With the ability to readily form salts in the environment phosphonates are, in terms of their acidic or alkaline character, similar to the salts of phosphoric acid (i.e. phosphates) in their environmental behavior.

The formulation Fosetyl-aluminium + Fluopicolide WG 71.11 (FEA + FLC WG 71.11) is a water dispersible granule (WG) formulation containing 666.7 g/kg of fosetyl-Al and 44.4 g/kg of fluopicolide. This formulation is registered throughout Europe under trade names such as Profiler. FEA + FLC WG 71.11 was not a representative formulation for the Annex I inclusion of fosetyl under Directive 91/414/EEC but has been evaluated as the representative formulation for the Annex I inclusion of fluopicolide under Directive 91/414/EEC. As FEA + FLC WG 71.11 is a representative formulation for the approval renewal of fosetyl, only the fate and behavior in the environment for this active substance will be described.

Use patterns considered in this risk assessment

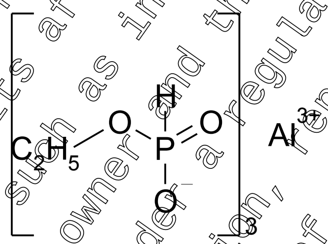
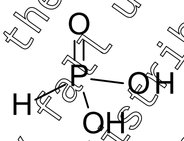
Table 9- 1: Intended application pattern

Crop	Timing of application (range)	Number of applications	Application interval [days]	Maximum label rate [kg prod./ha]	Maximum application rate, individual treatment (ranges) [kg a.s./ha]	
					Fluopicolide	Fosetyl-Al
Grapes	BBCH 15-81	1-3	10-14	3.0	0.133	2.0

Compounds addressed in this document

In addition to the active substance fosetyl-Al, the degradation product summarised in Table 9- 2 was addressed in this document as it was major in environmental fate studies.

Table 9- 2: Active substance and degradation products addressed in this document

Compound / Codes	Chemical Structure	Considered for
Fosetyl-aluminium (parent substance)		PEC_{soil} PEC_{gw} PEC_{sw} & PEC_{sed}
Phosphonic acid		PEC_{soil} PEC_{gw} PEC_{sw} & PEC_{sed}

Definition of the residue for risk assessment

Justification for the residue definition for risk assessment is provided in Document MCA, Section 7.4.1.

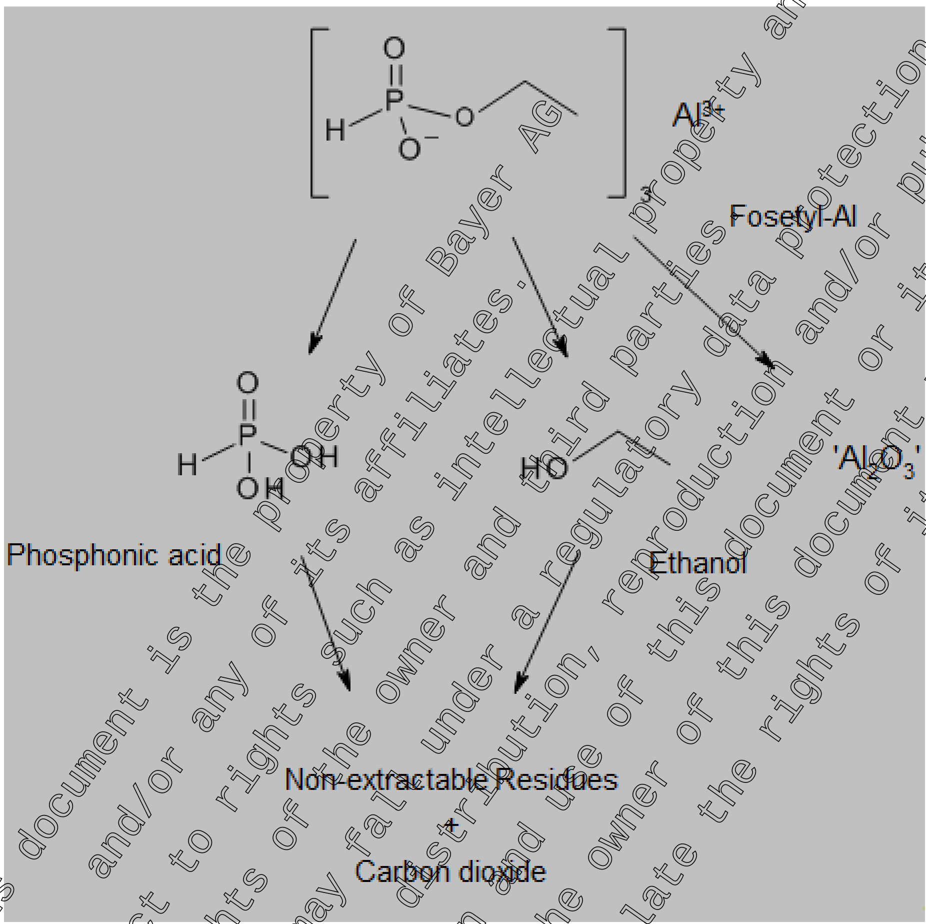
Table 9- 3: Definition of the residue for risk assessment

Compartment	Residue Definition
Soil	Fosetyl-Al, phosphonic acid
Surface water	Fosetyl-Al, phosphonic acid
Sediment	Phosphonic acid
Groundwater	Fosetyl-Al, phosphonic acid
Air	Fosetyl-Al

CP 9.1 Fate and behaviour in soil

The proposed degradation pathway of fosetyl-aluminium (fosetyl-Al) in soil is shown in Figure 9.1- 1.

Figure 9.1- 1: Proposed degradation pathway of fosetyl-Al in soil



For further information on the fate and behaviour in soil please refer to Document MCA, Section 7.1.

CP 9.1.1 Rate of degradation in soil

For information on the rate of degradation in soil please refer to Document MCA, Section 7.1.2.

CP 9.1.1.1 Laboratory studies

For information on laboratory studies please refer to Document MCA, Section 7.1.2.1.

CP 9.1.1.2 Field studies

For information on field studies please refer to Document MCA, Section 7.1.2.2.

CP 9.1.1.2.1 Soil dissipation studies

For information on field dissipation studies please refer to Document MCA, Section 7.1.2.2.1.

CP 9.1.1.2.2 Soil accumulation studies

For information on field accumulation studies please refer to Document MCA, Section 7.1.2.2.2.

CP 9.1.2 Mobility in the soil

For information on mobility studies please refer to Document MCA, Section 7.1.4.

CP 9.1.2.1 Laboratory studies

For information on laboratory studies please refer to Document MCA, Section 7.1.4.1

CP 9.1.2.2 Lysimeter studies

For information on lysimeter studies please refer to Document MCA, Section 7.1.4.2.

CP 9.1.2.3 Field leaching studies

For information on field leaching studies please refer to Document MCA, Section 7.1.4.3.

CP 9.1.3 Estimation of concentrations in soil

New calculations were performed to reflect findings from new studies presented in Document MCA, Section 7, Fate and behavior in the environment. In addition these calculations considered the most recent guidance documents for exposure calculations. Calculations of predicted environmental concentrations in soil (PEC_{soil}) are presented below.

Predicted environmental concentrations in soil (PEC_S)

Endpoints for PEC_{soil}

Table 9.1.3- 1: Modelling input parameters for fosetyl-aluminium (fosetyl-Al) and its metabolite

Endpoint	Fosetyl-Al and metabolite
	Value used for modelling
Fosetyl-Al	
Molar mass [g/mol]	354.14
DT_{50} [days] (worst-case DT_{50})	0.1
Maximum occurrence [%]	100
Molecular mass correction	1.0
Phosphonic acid	
Molar mass [g/mol]	246
DT_{50} [days] (worst-case DT_{50})	270
Maximum occurrence [%]	100 (3 equivalents)
Molecular mass correction	0.6946

PEC_{soil} modelling approach

The predicted environmental concentrations in soil (PEC_{soil}) for the active substance fosetyl-aluminium (fosetyl-Al) were calculated based on a simple first tier approach (Microsoft® Excel spreadsheet) assuming even distribution of the compound in the upper 0-5 cm soil layer. A standard soil density of 1.5 g/cm³ was assumed.

Crop interception will reduce the amount of a compound reaching the soil and therefore this has been taken into account depending on the growth stage at application. The interception rates follow the recommendations of the FOCUS groundwater guidance paper (FOCUS 2014) for vines (see Table 9.2.4- 2).

Derivation of kinetic modelling input values for fosetyl-Al and its major degradation product is presented in Document MCA, Section 7.1.2, a summary of modelling input parameters is given in the report KCP 9.1.3/01.

Predicted environmental concentrations in soil (PEC_S) of fosetyl-Al and its major degradation product

For fosetyl-Al, the major degradation product phosphonic acid was considered.

Report:	KCP 9.1.3/01[redacted],; 2015; M-532544-01-1
Title:	Fosetyl-Al (FEA) and metabolite: PECsoil EUR - Use in pome fruits and grapes in Europe
Report No.:	EnSa-15-0555
Document No.:	M-532544-01-1
Guideline(s):	EU Commission, 2000, Guidance Document on Persistence in Soil (Working Document), 9188/VI/97 rev.8; FOCUS 1997, Soil persistence models and EU registration; FOCUS, 2014: Generic Guidance for Tier 1 FOCUS Groundwater Assessments, Version 2.2
Guideline deviation(s):	none
GLP/GEP:	**no**

Methods and Materials:

The predicted environmental concentrations in soil (PEC_{soil}) of fosetyl-Al and its major soil degradation product phosphonic acid were calculated based on a first tier approach using a Microsoft® Excel spreadsheet.

The use of fosetyl-Al in grapes was assessed according to Good Agricultural Practice (GAP) under European cropping conditions. Detailed application data used for simulation of PEC_{soil} were compiled in Table 9.1.3- 2.

Table 9.1.3- 2: Application pattern used for PEC_{soil} calculations of fosetyl-Al

Individual Crop	FOCUS crop used for Interception	Application				Amount reaching the soil per application [g a.s./ha]
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	
Grapes	Vines	3 × 2000	10	3 × 60	15-81	3 × 800.00

Substance Specific Parameters:

PEC_{soil} calculations were based on the DT_{50} of 0.1 days (worst case of laboratory studies) for the parent compound fosetyl-Al. Further compound specific input parameters are summarized below.

Table 9.1.3- 3: Input parameters for PEC_{soil} for fosetyl-Al and its major degradation product

Compound	DT_{50} [days]	Max occurence in soil [%]	Molar mass [g/mol]	Molar mass corr. factor
Fosetyl-Al	0.1	100	354.14	1
Phosphonic Acid	270	100	246	0.6946

Findings:

The maximum PEC_{soil} values for fosetyl-Al and its major degradation product are summarized in Table 9.1.3- 4. The accumulation potential of fosetyl-Al and its metabolite phosphonic acid after long term use was also assessed. The results are presented in Table 9.1.3- 5. Detailed PEC_{soil} and TWA_{soil} values for the individual uses are listed in Table 9.1.3- 6 and Table 9.1.3- 7.

Table 9.1.3- 4: Maximum PEC_{soil} of fosetyl-Al and its degradation product for the uses assessed

Use pattern	Fosetyl-Al	Phosphonic acid
	PEC_{soil} [mg/kg]	
Grapes, 3×2000 g a.s./ha	1.067	2.167

Table 9.1.3- 5: PEC_{soil} of fosetyl-Al and its metabolite for the uses assessed, considering accumulation - mixing depth of 5 cm for plateau calculation

		Fosetyl-Al	Phosphonic acid
Use Pattern	PEC_{soil}	[mg/kg]	[mg/kg]
Grapes, 3×2000 g a.s./ha	plateau total	<0.001 1.067	1.396 3.563

Table 9.1.3- 6: PEC_{soil} of fosetyl-Al and its degradation product for the use in <u>grapes (3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)</u>

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		PEC_{soil} [mg/kg]	
Initial	0	1.067	2.167
Short-term	1	0.001	2.161
	2	<0.001	2.156
	4	<0.001	2.145
Long-term	7	<0.001	2.128
	14	<0.001	2.090
	21	<0.001	2.053
	28	<0.001	2.017
	42	<0.001	1.945
	50	<0.001	1.906
	100	<0.001	1.676

Table 9.1.3- 7: TWA_{soil} of fosetyl-Al and its degradation product for the use in <u>grapes (3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)</u>

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		TWA_{soil} [mg/kg]	
Initial	0	-	-
Short-term	1	0.154	2.164
	2	0.077	2.161
	4	0.038	2.156
Long-term	7	0.022	2.148
	14	0.011	2.128
	21	0.007	2.109
	28	0.005	2.091
	42	0.004	2.054
	50	0.003	2.034
	100	0.002	1.911

As requested by the RMS France, new PEC_{soil} calculations were performed using the input parameters as provided by ANSES (see Table 9.1.3- 9).

Report:	KCP 9.1.3/02 [redacted].; [redacted]; 2016; M-563138-01-1
Title:	Fosetyl-Al (FEA) and metabolite: PECsoil EUR - Use in pome fruit and grapes in Europe
Report No.:	EnSa-16-0659 v1
Document No.:	M-563138-01-1
Guideline(s):	none
Guideline deviation(s):	none
GLP/GEP:	**no**

Methods and Materials:
In the present study, predicted environmental concentrations in soil (PEC_{soil}) of the active substance fosetyl-aluminium (fosetyl-Al) and its major soil metabolite phosphonic acid were calculated based on a first tier approach using a Microsoft® Excel spreadsheet.
The use of fosetyl-Al in grapes was assessed according to Good Agricultural Practice (GAP) under European cropping conditions. Detailed application data used for simulation of PEC_{soil} were compiled in Table 9.1.3- 8.

Table 9.1.3- 8: Application pattern used for PEC_{soil} calculations of fosetyl-Al

Individual Crop	FOCUS crop used for Interception	Application				Amount reaching the soil per application
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	[g a.s./ha]
Grapes	Vines	3 × 2000	10	3 × 60	15-81	3 × 800.00

On 2016-07-27 the RMS France requested additional PEC calculations during the approval renewal process of the active substance fosetyl-Al. Amalgamated data from three applicants should be used for fosetyl-Al and its metabolite. The input parameters proposed by ANSES are summarised in Table 9.1.3- 9.

Table 9.1.3- 9: List of the main parameters as proposed by RMS for the risk assessment

Parameter	Input		Remarks (Concerning phosphonic acid parameters)
	Fosetyl-Al	Phosphonic acid	
DT_{50} soil (days)	0.1	1000	Maximum estimated DT_{50} for phosphonic acid was > 1000 days. 1000 days is taken as a worst-case reasonable assumption[a].
Maximum occurrence in soil (%)	-	100	-

a) [redacted], W.; 2015; M-532341-01-1; BCS; please refer to Document MCA, Section 7, chapter CA 7.1.2.1.2

Remark notifier: ANSES proposes a value of 1000 days as worst case non-normalised DT_{50} for calculation of PEC in soil including accumulation. BCS used originally the worst case DT_{50} of 264 days for the exposure assessment together with a worst case assumption of 100% formation, which is still deemed more appropriate by BCS.
Despite this point, the PEC calculations were carried out with the input parameters proposed by ANSES.

Findings:

The maximum PEC_{soil} values for fosetyl-Al and its metabolite phosphonic acid are summarized in Table 9.1.3- 10. The accumulation potential of fosetyl-Al and its metabolite phosphonic acid after long term use was also assessed. The results are presented in Table 9.1.3- 11. Detailed PEC_{soil} and TWA_{soil} values for the individual uses are listed in Table 9.1.3- 12 and Table 9.1.3- 13.

Table 9.1.3- 10: Maximum PEC_{soil} of fosetyl-Al and its metabolite for the uses assessed

Use pattern	Fosetyl-Al	Phosphonic acid
	PEC_{soil} [mg/kg]	
Grapes, 3×2000 g a.s./ha	1.067	2.207

Table 9.1.3- 11: PEC_{soil} of fosetyl-Al and its metabolite for the uses assessed, considering accumulation - mixing depth of 5 cm for plateau calculation

		Fosetyl-Al	Phosphonic acid
Use Pattern	PEC_{soil}	[mg/kg]	[mg/kg]
Grapes, 3×2000 g a.s./ha	plateau total	<0.001 1.067	7.668 9.875

Table 9.1.3- 12: PEC_{soil} of fosetyl-Al and its metabolite for the use in grapes (3×2000 g a.s./ha, 3×60% interception, 10 days app. interval)

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		PEC_{soil} [mg/kg]	
Initial	0	1.067	2.207
Short-term	1	0.001	2.206
	2	<0.001	2.204
	4	<0.001	2.201
Long-term	7	<0.001	2.197
	14	<0.001	2.186
	21	<0.001	2.176
	28	<0.001	2.165
	42	<0.001	2.144
	50	<0.001	2.132
	100	<0.001	2.060

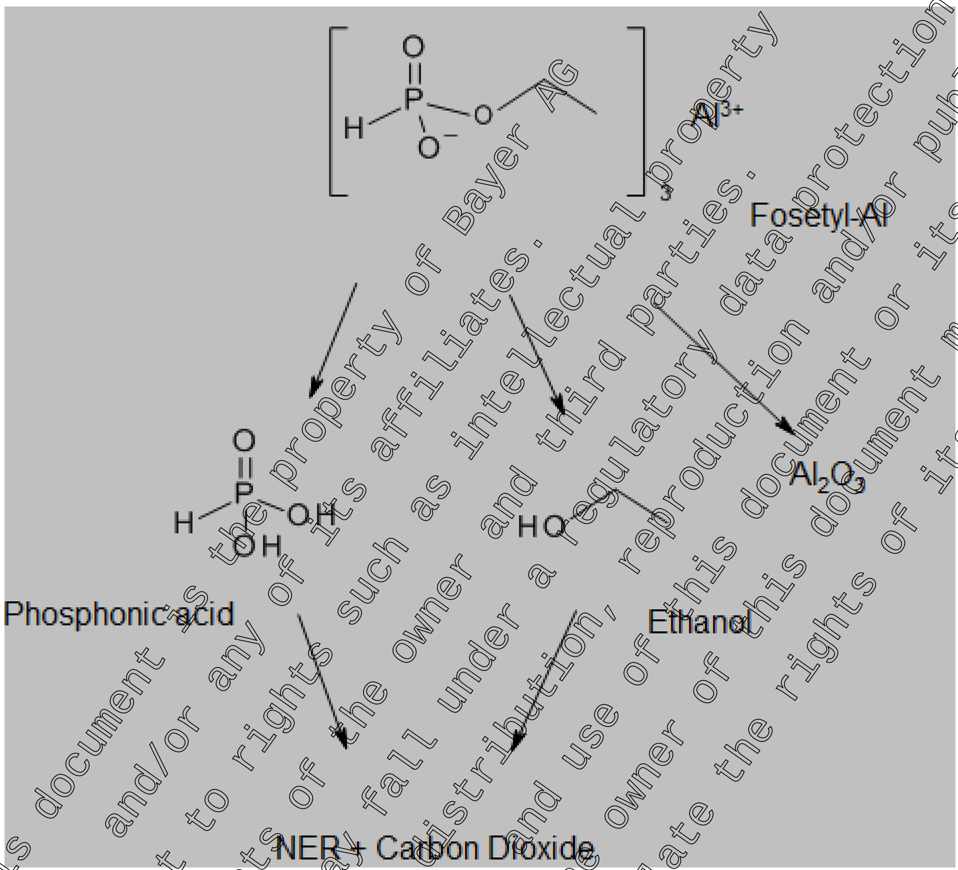
Table 9.1.3- 13: TWA_{soil} of fosetyl-Al and its metabolite for the use in grapes (3×2000 g a.s./ha, 3×60% interception, 10 days app. interval)

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		TWA_{soil} [mg/kg]	
Initial	0	-	-
Short-term	1	0.154	2.207
	2	0.077	2.206
	4	0.038	2.204
Long-term	7	0.022	2.202
	14	0.011	2.197
	21	0.007	2.191
	28	0.005	2.186
	42	0.004	2.176
	50	0.003	2.170
	100	0.002	2.133

CP 9.2 Fate and behaviour in water and sediment

The proposed degradation pathway of fosetyl-aluminium (fosetyl-Al) in water and sediment is shown in Figure 9.2- 1.

Figure 9.2- 1: Proposed degradation pathway of fosetyl-Al in water and sediment



For further information on the fate and behavior in water and sediment please refer to Document MCA, Section 7.2.

CP 9.2.1 Aerobic mineralisation in surface water

For information on aerobic mineralisation in surface water studies please refer to Document MCA, Section 7.2.2.2.

CP 9.2.2 Water/sediment study

For information on water/sediment studies please refer to Document MCA, Section 7.2.2.3.

CP 9.2.3 Irradiated water/sediment study

For information on irradiated water/sediment studies please refer to Document MCA, Section 7.2.2.4.

CP 9.2.4 Estimation of concentrations in groundwater

New calculations were performed, to reflect findings from new studies presented in Document MCA, Section 7, Fate and behavior in the environment. In addition these calculations consider the most recent guidance documents for exposure calculations.
Calculations of predicted environmental concentrations in groundwater (PEC_{gw}) are presented below.

Endpoints for PEC_{gw}

Table 9.2.4- 1: Modelling input parameters for fosetyl-aluminium (fosetyl-Al) and its metabolite

Endpoint	Fosetyl-Al and metabolite Value used for modelling
Fosetyl-Al	
Molar mass [g/mol]	354.14
Aqueous solubility [mg/L]	110 at 20 °C
Vapour pressure [Pa]	1.0×10^{-7} (25 °C)
DT_{50} soil [days]	0.1
K_{oc} [L/kg]	0.1
K_{om} [L/kg]	0.058
1/n	1.0
Phosphonic acid	
Molar mass [g/mol]	82
Aqueous solubility [mg/L]	110 at 20 °C
Vapour pressure [Pa]	1.0×10^{-7} (25 °C)
DT_{50} soil [days]	83.8
K_{oc} [L/kg]	-
K_f [L/kg]	39.1
1/n	1.0

PEC_{gw} modelling approach

The predicted environmental concentrations in groundwater (PEC_{gw}) for the active substance fosetyl-aluminium were calculated using the simulation models PEARL, PELMO and MACRO following the recommendations of the FOCUS working group on groundwater scenarios.
The leaching calculations were run over 26 years, as proposed for pesticides which may be applied every year. The simulation length increases to 46 and 66 years for pesticides which are applied only every second and third year, respectively. The first six years are a 'warm up' period; only the last 20 years were considered for the assessment of the leaching potential. The 80th percentile of the average annual groundwater concentrations in the percolate at 1 m depth under a treated plantation were evaluated and were taken as the relevant PEC_{gw} values. In respect to the assessment of a potential groundwater contamination this shallow depth reflects a worst case. The effective long-term groundwater concentrations will be even lower due to dilution in the groundwater layer.
According to FOCUS, the calculations were conducted based on mean soil half-lives, referenced to standard temperature and moisture conditions. Crop interception will reduce the amount of a compound reaching the soil and therefore this has been taken into account depending on the growth stage at application. The interception rates follow the FOCUS recommendations (see Table 9.2.4- 2).

Table 9.2.4- 2: FOCUS groundwater crop interception values

Crop	Crop stage Interception [%]				
BBCH	BBCH 0-9	BBCH 11-13	BBCH 14-19	BBCH 53-69	BBCH 71-89
Vines	without leaves 40	first leaves 50	leaf development 60	flowering 60	ripening 75

Derivation of kinetic modelling input values is presented in Document MCA Section 7.1.2, a summary of modelling input parameters is given in the report KCP 9.2.4.1/01.

CP 9.2.4.1 Calculation of concentrations in groundwater

Predicted environmental concentrations in groundwater (PEC_{gw}) of fosetyl-aluminium and its major degradation product

For fosetyl-aluminium, the major degradation product phosphonic-acid was considered.

Report:	KCP 9.2.4.1/01 [redacted], 2015; M-532542-01-1
Title:	Fosetyl-Al (FEA) and metabolite: PECgw FOCUS PEARL, PELMO, MACRO EUR - Use in pome fruits and grapes in Europe
Report No.:	EnSa-15-0553
Document No.:	M-532542-01-1
Guideline(s):	EU Commission, 2000, Guidance Document on Persistence in Soil (Working Document), 9188/VI/97 rev.8; FOCUS 1997, Soil persistence models and EU registration; FOCUS, 2014: Generic Guidance for Tier 1 FOCUS Groundwater Assessments, Version 2.2
Guideline deviation(s):	none
GLP/GEP:	**no**

Methods and Materials:
Predicted environmental concentrations of the active substance fosetyl-aluminium (fosetyl-Al) and its major soil degradation product in groundwater recharge (PEC_{gw}) were calculated for the use in Europe, using the simulation models FOCUS PEARL 4.4.4 (Leistra et al., 2001), FOCUS PELMO 5.5.3 (Jene 1998; Klein 1995, 1999, 2011) and FOCUS MACRO 5.5.4 (Jarvis, 1994, Jarvis and Larsbo, 2012). PEC_{gw} were evaluated as the 80th percentile of the mean annual leachate concentration at 1 m soil depth. Model parameters and scenarios consisting of weather, soil, and crop data were used as proposed by FOCUS (2009, 2014).

The use of fosetyl-Al in grapes was assessed according to Good Agricultural Practice (GAP) under European cropping conditions. Detailed application data used for simulation of PEC_{gw} were compiled in Table 9.2.4.1- 1.

Table 9.2.4.1- 1: Application pattern used for PEC_{gw} calculations of fosetyl-Al

Individual Crop	FOCUS crop used for Interception	Application				Amount reaching the soil per application [g a.s./ha]
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	
Grapes	Vines	3 × 2000	10	3 × 60	15-81	3 × 800.000

Further input parameters for PEC_{gw} modelling of fosetyl-Al and its degradation product are summarised in Table 9.2.4.1- 2.

Table 9.2.4.1- 2: Substance specific and model related input parameter for PECgw calculation of fosetyl-Al and its degradation product

Parameter	Unit	Fosetyl-Al	Phosphonic acid
Common			
Molar Mass	[g/mol]	354.1	82.0
Solubility	[mg/L]	110000	110000
Vapour Pressure	[Pa]	1.00E-07	1.00E-07
Freundlich Exponent		1.000	1.000
Plant Uptake Factor		0.0	0.0
Walker Exponent		0.7	0.7
PEARL Parameters			
Substance Code		FEA	H3PO3
DT_{50}	[days]	0.1	83.8
Molar Activ. Energy	[kJ/mol]	65.4	65.4
K_{om}	[mL/g]	0.058	-
K_f	[mL/g]	-	39.1
PELMO Parameters			
Substance Code		AS	A1
Rate Constant	[1/day]	6.93147	0.00827
Q_{10}		2.58	2.58
K_{oc}	[mL/g]	0.1	-
Degradation fraction from → to (FOCUS PEARL & MACRO)		3 FEA -> H3PO3	
Degradation rate from → to (FOCUS PELMO)		6.9314720 Active Substance -> A1 0.0082710 A1 -> <BR/CO2	

Application dates for the simulation runs were defined following the crop event dates of the respective crop and scenario (see Table 9.2.4.1- 3) as given by FOCUS (2009). Crop interception was taken into account according to the BBCH growth stage, as recommended by FOCUS (2014).

Table 9.2.4.1- 3: First application dates and related information for fosetyl-Al as used for the simulation runs; offset is relevant only for relative application dates, two sets of data are provided for crops with two seasons

Individual crop	Grapes
Repeat Interval for App. Events	Every Year
Application Technique	Spray
Absolute / Relative to	Absolute
Scenario	1st App. Date (Julian day) Offset
[redacted]	02 May (122) -
[redacted]	24 May (144) -
[redacted]	- - -
[redacted]	24 May (144) -
[redacted]	- - -
[redacted]	02 May (122) -
[redacted]	20 Apr (110) -
[redacted]	20 Apr (110) -
[redacted]	12 Apr (102) -

Findings:

PEC_{gw} were evaluated as the 80th percentile of the mean annual leachate concentration at 1 m soil depth. PEC_{gw} values for fosetyl-Al and its metabolite are given in the following tables.

Grapes, 3×2000 g a.s./ha

Table 9.2.4.1- 4: FOCUS PEARL PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Grapes, 3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)

Scenario	Fosetyl-Al	Phosphonic acid
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001

Table 9.2.4.1- 5: FOCUS PELMO PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Grapes, 3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)

Scenario	Fosetyl-Al	Phosphonic acid
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001

Table 9.2.4.1- 6: FOCUS MACRO PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Grapes, 3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)

Scenario	Fosetyl-Al	Phosphonic acid
[redacted]	<0.001	<0.001

Conclusion:

There are no concerns for groundwater from the active substance fosetyl-Al and its metabolite in accordance with the use pattern for the current formulation.

As requested by the RMS France, new PEC_{gw} calculations were performed using the input parameters as provided by ANSES (see Table 9.2.4.1- 8).

Report:	KCP 9.2.4.1/02 [redacted] E; [redacted]; 2016; M-563145-01-1
Title:	Fosetyl-Al (FEA) and metabolite: PECgw FOCUS PEARL, PELMO, MACRO EUR - Use in pome fruit and grapes in Europe
Report No.:	EnSa-16-0660 v1
Document No.:	M-563145-01-1
Guideline(s):	none
Guideline deviation(s):	none
GLP/GEP:	**no**

Methods and Materials:

Predicted environmental concentrations of the active substance fosetyl-aluminium (fosetyl-Al) and its major soil metabolite phosphonic acid in groundwater recharge (PECgw) were calculated for the use in Europe, using the simulation models FOCUS PEARL 4.4.4 (Leistra et al. 2001), FOCUS PELMO 5.5.3 (Jene 1998; Klein 1995, 1999, 2011), and FOCUS MACRO 5.5.4 (Jarvis 1994; Jarvis and Larsbo 2012). PECgw were evaluated as the 80th percentile of the mean annual leachate concentration at 1 m soil depth. Model parameters and scenarios consisting of weather, soil, and crop data were used as proposed by FOCUS (2009, 2014b).

The use of fosetyl-Al in grapes was assessed according to Good Agricultural Practice (GAP) under European cropping conditions. Detailed application data used for simulation of PEC_{gw} were compiled in Table 9.2.4.1- 7.

Table 9.2.4.1- 7: Application pattern used for PEC_{gw} calculations of fosetyl-Al

Individual Crop	FOCUS crop used for Interception	Application				Amount reaching the soil per application
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	[g a.s./ha]
Grapes	Vines	3 × 2000	10	3 × 60	15-81	3 × 800.000

On 2016-07-27 the RMS France requested additional PEC calculations during the approval renewal process of the active substance fosetyl-Al. Amalgamated data from three applicants should be used for fosetyl-Al and its metabolite. The input parameters proposed by ANSES are summarised in Table 9.2.4.1- 8.

Table 9.2.4.1- 8: List of the main parameters as proposed by RMS for the risk assessment

Parameter	**Input**		**Remarks**
	Fosetyl-Al	**Phosphonic acid**	**(Concerning phosphonic acid parameters)**
DT_{50} soil (days)	0.1	133.7	Geometric mean of all acceptable values [a),b),c)]
Formation fraction in soil (-)	-	1	-
K_{foc} (L/kg)	0.1	-	-
K_f (L/kg)	-	15.9 [f)]	Geometric mean of all acceptable values derived from batch studies [d),e)]
1/n	1	0.69	Arithmetic mean of all acceptable values derived from batch studies [d),e)]
Crop uptake factor	0	0	Conservative assumption

a) [redacted]; 2015; M-532341-01-1; BCS; please refer to Document MCA, Section 7, chapter CA 7.1.2.1.2
b) [redacted]; [redacted]; 1999; M-184316-01-1; BCS; please refer to Document MCA, Section 7, chapter CA 7.1.2.1.2
c) [redacted]; 2015; S15-00506; Fosetyl-Al Task Force
d) [redacted]; 2008; B30701; ISK Biosciences Europe S.A.
e) [redacted]; 2007; GAB-014/7-13; Fosetyl-Al Task Force
f) In PEC_{gw} calculations, K_f and Freundlich exponent should be implemented in the different soil horizons by manually editing the input files.

Remark notifier: ANSES proposes to use 133.7 days as geometric mean DT_{50} of all acceptable values for calculation of PEC in groundwater. The value of 133.7 days is presumably based on using 1000 days for the [redacted] soil based on the slow phase of the DFOP model ([redacted]; 2015; M-532341-01-1), and 532 days for the LUFA soil submitted by the FAIRITF task force ([redacted]; 2015; S15-00506) based on the HS model. Since both soils show a similar pattern, the HS model is more appropriate for [redacted] soil in this light, instead of a very conservative estimation of 1000 days based on only the few last data points, which was deemed unreliable by BCS.
Despite this point, the PEC calculations were carried out with the input parameters proposed by ANSES.

Further input parameters for PEC_{gw} modelling of fosetyl-Al and its metabolite are summarised in Table 9.2.4.1- 9.

Table 9.2.4.1- 9: Compound input parameters for fosetyl-Al and its metabolite

Parameter	**Unit**	**Fosetyl-Al**	**Phosphonic acid**
Common			
Molar mass	(g/mol)	354.14	246.0 [a]
Solubility	(mg/L)	110000	110000
at temp.	(°C)	20	20
Vapour pressure	(Pa)	1.00E-07	1.00E-07
at temp.	(°C)	25	25
Freundlich exponent	(-)	1.000	0.690
Plant uptake factor	(-)	0.0	0.0
Walker exponent	(-)	0.7	0.7
PEARL parameters			
Substance code	(-)	FEA	H3PO3
DT_{50}	(days)	0.1	133.7
Molar activ. energy	(kJ/mol)	65.4	65.4
Kom	(mL/g)	0.058	-
Kf	(mL/g)	-	15.9
PELMO parameters	(-)		
Substance code	(1/day)	AS	A1
Rate constant	(-)	6.93147	0.00518
Q_{10}	(mL/g)	2.58	2.58
K_{oc}		0.1	-
MACRO parameters			
Substance code	(-)	FEA	H3PO3
Exponent moisture	(-)	0.49	0.49
Exponent temperature	(1/K)	0.0948	0.0948

[a] 3 × 82.0 g/mol, one mole of fosetyl-Al is forming 3 moles of phosphonic acid

Degradation fraction from → to (-) (FOCUS PEARL)	FEA -> H3PO3: 1
Degradation rate from → to (1/day) (FOCUS PELMO) [a]	Active Substance -> A1: 6.9314718 A1 -> BR/CO2: 0.0051843
Conversion factor from → to (-) (FOCUS MACRO) [b]	FEA -> H3PO3: 0.6946405

[a] Calculated as ln(2) / DT50 × formation fraction
[b] Calculated as molar mass / molar mass predecessor × formation fraction

Application dates for the simulation runs were defined following the crop event dates of the respective crop and scenario (see Table 9.2.4.1- 10) as given by FOCUS (2009). Crop interception was taken into account according to the BBCH growth stage, as recommended by FOCUS (2014).

Table 9.2.4.1- 10: First application dates and related information for fosetyl-Al as used for the simulation runs; offset is relevant only for relative application dates, two sets of data are provided for crops with two seasons

Individual crop	**Grapes**
Repeat Interval for App. Events	**Every Year**
Application Technique	**Spray**
Absolute / Relative to	**Absolute**
Scenario	**1st App. Date (Julian day) Offset**
[redacted]	02 May (122) -
[redacted]	24 May (144) -
[redacted]	- - -
[redacted]	24 May (144) -
[redacted]	- -
[redacted]	02 May (122) -
[redacted]	20 Apr (110) -
[redacted]	20 Apr (110) -
[redacted]	12 Apr (102) -

Findings:
Overview of the PEC_{gw} values obtained with individual FOCUS models is given in Table 9.2.4.1- 11 (PEARL), Table 9.2.4.1- 12 (PELMO), and Table 9.2.4.1- 13 (MACRO).

Table 9.2.4.1- 11: FOCUS PEARL PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Grapes, 3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)

Scenario	Fosetyl-Al	Phosphonic acid
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001

Table 9.2.4.1- 12: FOCUS PELMO PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Grapes, 3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)

Scenario	Fosetyl-Al	Phosphonic acid
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001

Table 9.2.4.1- 13: FOCUS MACRO PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Grapes, 3×2000 g a.s./ha, 3×60% interception, 10 d app. interval)

Scenario	Fosetyl-Al	Phosphonic acid
[redacted]	<0.001	<0.001

CP 9.2.4.2 Additional field tests

No additional field studies were performed due to low PEC_{gw} values calculated (see Section CP 9.2.4.1).

CP 9.2.5 Estimation of concentrations in surface water and sediment

New calculations were performed, to reflect findings from new studies presented in Document MCA, Section 7, Fate and behavior in the environment. In addition these calculations consider the most recent guidance documents for exposure calculations.
Calculations of predicted environmental concentrations in surface water (PEC_{sw}) and sediment (PEC_{sed}) are presented below.

Endpoints for PEC_{sw}

Table 9.2.5- 1: Modelling input parameters for fosetyl-aluminium (fosetyl-Al) and its metabolite

Endpoint	Fosetyl-Al and metabolite Value used for modelling
Fosetyl-Al	
Molecular weight [g/mol]	354.14
Aqueous solubility [g/L]	110 at 20 °C
Vapour pressure [Pa]	1.0×10^{-7} (25 °C)
K_{oc} [L/kg]	0.1
K_{om} [L/kg]	0.058
1/n	1.0
DT_{50} soil [days]	0.1
DT_{50} total system [days]	3.0
DT_{50} water [days]	3.0
DT_{50} sediment [days]	1000 (default)
Maximum occurrence in water/sediment	100%
Phosphonic acid	
Molecular weight [g/mol]	246 (Step 1, 2); 82 (Step 3, 4)
Aqueous solubility [g/L]	110 at 20 °C
Vapour pressure [Pa]	1.0×10^{-7} (25 °C)
DT_{50} soil [days]	83.8
K_d [L/kg]	39.1
K_{oc} [L/kg]	782 (assumption: 5% OC in soil) [a)]
K_{om} [L/kg]	434 (assumption: 9% OM in soil) [b)]
1/n	1.0
Maximum occurrence in soil	100%
DT_{50} total system [days]	102
DT_{50} water [days]	102
DT_{50} sediment [days]	102
Maximum occurrence in water/sediment	100%

a) Using the K_d parameter instead of K_{oc} requires the following changes in the FOCUS surface water calculations: a pseudo-K_{oc} of 782 mL/g has been derived from the effective K_d of 39.1 mL/g, assuming an OC content of 5% (FOCUS Steps 1-2).

b) Using the K_d parameter instead of K_{oc} requires the following changes in the FOCUS surface water calculations: A pseudo-K_{om} of 489 L/kg has been derived from the effective K_d of 44 L/kg, assuming an OM content of 9% (FOCUS TOXSWA).

PEC_{sw} modelling approach

Calculation of PEC values for the active substance according to FOCUS

$FOCUS_{sw}$ is a four step tiered approach:

Step 1: All inputs are considered as a single loading to the water body and a worst-case PEC_{sw} and PEC_{sed} is calculated (most conservative step).

Step 2: Individual loadings into the water body from different entry routes according to the number of applications are considered. Scenarios are also considered for Northern and Southern Europe separately but no specific crop scenarios are defined.

Step 3: An exposure assessment using realistic worst-case scenarios is performed. The scenarios are representative for agricultural conditions in Europe and consider weather, soil, crop and different water-bodies. Simulations use the models PRZM, MACRO and TOXSWA.

Step 4: PEC values are refined by considering mitigation measures according to the FOCUS Landscape and Mitigation Factors, i.e. drift reduction or vegetated filter strips, which intercept runoff water and eroded sediment prior to entry into surface water.

Derivation of kinetic modelling input values is presented in Document MCA, Section 7.1.2, a summary of modelling input parameters is given in the report KCP 9.2.5/01.

Predicted environmental concentrations in surface water (PEC_{sw}) and in sediment (PEC_{sed}) of fosetyl-aluminium and its major degradation product

For fosetyl-aluminium, the major degradation product phosphonic acid was considered.

Report:	KCP 9.2.5/01 [redacted]<; 2015; M-532543-01-1
Title:	Fosetyl-Al (FEA) and metabolite: PECsw,sed FOCUS EUR - Use in pome fruits, pome fruits, grapes (early), grapes (late), grapes (early) and grapes (late) in Europe
Report No.:	EnSa-15-0554
Document No.:	M-532543-01-1
Guideline(s):	FOCUS 2007, SANCO/10422/2005 v. 2.0; FOCUS 2015, Generic guidance for FOCUS surface water Scenarios, version 1.4, May 2015
Guideline deviation(s):	none
GLP/GEP:	**no**

Methods and Materials:

Predicted environmental concentrations of the active substance fosetyl-aluminium (fosetyl-Al) and its metabolite phosphonic acid in surface water (PEC_{sw}) and sediment (PEC_{sed}) were calculated for the use in Europe, employing the tiered FOCUS Surface Water (SW) approach (FOCUS 2001, 2015). All relevant entry routes of a compound into surface water (principally a combination of spray drift and runoff/erosion or drain flow) were considered in these calculations.

The use of fosetyl-Al in grapes was assessed according to the Good Agricultural Practice (GAP) in Europe. Detailed application parameters are presented in Table 9.2.5- 2.

Table 9.2.5- 2: General and FOCUS-specific data on the use pattern of fosetyl-Al in Europe (for FOCUS Step 1&2)

Individual Crop	FOCUS crop used for interception	Application				
		Rate per season [g a.s./ha]	BBCH stage	Interval [days]	Plant Interception [%]	Season
Grapes (early)	vines, late applns (vines / late)	3 × 2000	15-59	10	minimal crop cover (40%)	Mar. - May.
Grapes (late)	vines, late applns (vines / late)	3 × 2000	59-81	10	full canopy (60%)	June - Sep.

For fosetyl-Al and its metabolite phosphonic acid, FOCUS Step 3 and Step 4 values were calculated in addition to FOCUS Step 1 and Step 2 values.

Compound specific input data are summarised below for (see Table 9.2.5- 3).

Table 9.2.5- 3: Substance parameters used for fosetyl-Al and its metabolite

Parameter	Unit	Parent	Metabolite
Substance		Fosetyl-Al	Phosphonic Acid
Company code		LS 74783	AE 0540099
SWASH code		FEA	H3PO3
General			
Molar mass	g/mol	354.14	82
Water solubility (temp.)	mg/L	110000 (20 °C)	110000 (20 °C)
Vapour pressure (temp.)	Pa	1E-07 (25 °C)	1E-07 (25 °C)
Crop processes			
Coefficient for uptake by plant (TSCF)	-	0	0
Wash-off factor	1/m	50	50
Sorption			
K_{OC}	mL/g	0.1	748.22
K_{OM}	mL/g	0.06	434
Freundlich exponent ($^1/_n$)	-	1	1
Transformation			
DT_{50} in soil	days	0.1	83.8
temperature	°C	20	20
pF	log(cm)	2	2
formation fraction in soil	-		3
DT_{50} in water	days	3	102
temperature	°C	20	20
formation fraction in water			3
DT_{50} in sediment	days	1000	102
temperature	°C	20	20
formation fraction in sediment	-		3
DT_{50} on canopy	days	10	10
Exponent for the effect of moisture			
PRZM and TOXSWA (Walker exp.)	-	0.7	0.7
MACRO (calibrated value)	-	0.49	0.49
Effect of temperature			
TOXSWA (molar activation energy)	kJ/mol	65.4	65.4
MACRO (effect of temperature)	1/K	0.0948	0.0948
PRZM (Q_{10})	-	2.58	2.58

In FOCUS Step 3, the application date for each scenario is determined by the Pesticide Application Timer (PAT), which is part of the FOCUS SW Scenarios. The user may only define an application time window. The actual application date is then set by the PAT in such a way that there are at least 10 mm of rainfall in the first 10 days after application, and at the same time less than 2 mm of rain per day in a five day period around the date of application. If no such date can be found within the application time window, the above rules are step-wise relaxed. Information on application dates can be found in Table 9.2.5- 4.

Table 9.2.5- 4: Application dates of fosetyl-Al for the FOCUS Step 3 calculations for the use in grape (early)

PMT Name **DGR / PMT Number** **Parameter**			**PMT01** **DGR II / PMT II**		
FOCUS model crop (crop group)			**Vines, Late Applns (vines / late)**		
Use pattern (single/seasonal appln. rate)			**3×2.0 kg a.s./ha, 10d int. (2.0/0 kg a.s./ha)**		
Appl. Method (Run off CAM, depth inc.)			**Air Blast (2 - appln foliar linear, 4 cm)**		
PAT start date (relative to crop event or absolute)			**absolute**		
PAT window range			**53 days - 95 days, scenario specific (min = 50 days)**		
Drainage Scenarios	PAT Start, Interval (Julian Day)	Application Date	**Runoff** Scenarios	PAT Start, Interval (Julian Day)	Application Date
D6 Ditch	24-Feb, 62 (55)	27 Feb 14 Mar 09 Apr	R1 Pond/Stream	05-May, 53 (125)	08 May 31 May 12 Jun
			R2 Stream	20-Apr, 95 (110)	22 Apr 07 May 20 May
			R3 Stream	02-May, 84 (122)	18 May 01 Jun 16 Jun
			R4 Stream	13-Apr, 91 (103)	04 May 20 May 30 May

Table 9.2.5- 5: Application dates of fosetyl-Al for the FOCUS Step 3 calculations for the use in grape (late)

PMT Name **DGR / PMT Number** **Parameter**			**PMT02** **DGR II / PMT III**		
FOCUS model crop (crop group)			**Vines, Late Applns (vines / late)**		
Use pattern (single/seasonal appln. rate)			**3×2.0 kg a.s./ha, 10d int. (2.0/0 kg a.s./ha)**		
Appl. Method (Run off CAM, depth inc.)			**Air Blast (2 - appln foliar linear, 4 cm)**		
PAT start date (relative to crop event or absolute)			**absolute**		
PAT window range			**50 days - 139 days, scenario specific (min = 50 days)**		
Drainage Scenarios	PAT Start, Interval (Julian Day)	Application Date	**Runoff** Scenarios	PAT Start, Interval (Julian Day)	Application Date
D6 Ditch	27-Apr, 139 (117)	27 Apr 07 May 17 May	R1 Pond/Stream	27-Jun, 89 (178)	29 Jun 11 Jul 28 Jul
			R2 Stream	24-Jul, 50 (205)	24 Jul 03 Aug 13 Aug
			R3 Stream	25-Jul, 71 (206)	31 Jul 13 Aug 28 Aug
			R4 Stream	13-Jul, 50 (194)	20 Jul 31 Jul 10 Aug

Findings:

FOCUS Step 1 and 2:

The maximum PEC values for FOCUS Step 1 and 2 are given in the tables below for fosetyl-Al and its major degradation product.

Table 9.2.5- 6: Summary of the maximum PEC_{sw} and PEC_{sed} values fosetyl-Al (FOCUS Steps 1-2)

Usage		Scenario	Fosetyl-Al (FEA)					
			PEC max		TWA 7 days		TWA 21 days	
			SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
grapes (early)	DGR I / PMT II	Step 1	720.1	0.667	357.3	0.354	147.4	0.146
		Step 2						
Vines, late applns		N-EU Multi	51.00	0.027	25.39	0.016	10.47	0.007
3×2000g a.s./ha, 10d int.		S-EU Multi	51.00	0.027	25.39	0.016	10.47	0.007
min crop cover		N-EU Single	53.52	0.028	26.64	0.016	10.99	0.007
Spring (Mar. - May)		S-EU Single	53.52	0.028	26.64	0.016	10.99	0.007
grapes (late)	DGR I / PMT III	Step 1	720.1	0.667	357.3	0.354	147.4	0.146
		Step 2						
Vines, late applns		N-EU Multi	51.00	0.027	25.39	0.016	10.47	0.007
3×2000g a.s./ha, 10d int.		S-EU Multi	51.00	0.027	25.39	0.016	10.47	0.007
full canopy		N-EU Single	53.52	0.028	26.64	0.016	10.99	0.007
Summer (Jun. - Sep.)		S-EU Single	53.52	0.028	26.64	0.016	10.99	0.007

Table 9.2.5- 7: Summary of the maximum PEC_{sw} and PEC_{sed} values phosphonic acid (FOCUS Steps 1-2)

Usage		Scenario	Phosphonic acid					
			PEC max		TWA 7 days		TWA 21 days	
			SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
grapes (early)	DGR I / PMT II	Step 1	1472	10991	1386	10776	1320	10302
		Step 2						
Vines, late applns		N-EU Multi	124.4	897.8	113.5	876.8	107.9	836.7
3×2000g a.s./ha, 10d int.		S-EU Multi	197.2	1464	184.7	1430	175.8	1364
min crop cover		N-EU Single	74.00	342.0	43.27	334.0	41.13	318.8
Spring (Mar. - May)		S-EU Single	74.00	546.5	68.97	533.7	65.66	509.3
grapes (late)	DGR I / PMT III	Step 1	1472	10991	1386	10776	1320	10302
		Step 2						
Vines, late applns		N-EU Multi	100.1	709.2	89.79	692.6	85.30	660.9
3×2000g a.s./ha, 10d int.		S-EU Multi	124.4	897.8	113.5	876.8	107.9	836.7
full canopy		N-EU Single	47.68	273.9	34.70	267.5	32.95	255.2
Summer (Jun. - Sep.)		S-EU Single	47.68	342.0	43.27	334.0	41.13	318.8

FOCUS Step 3 and 4:

The maximum PEC values for FOCUS Step 3 and 4 are given in the tables below for fosetyl-Al and its metabolite phosphonic acid considering the application in grapes early and late. Single and multiple application PEC_{sw} values are presented for all relevant scenarios in Step 3 and 4. PEC_{sed} values are only presented for FOCUS Step 3. For other PEC values please refer to the report.

<u>Grapes, early</u>

Table 9.2.5- 8: PEC_{sw} and PEC_{sed} values of fosetyl-Al (3×2.0 kg a.s./ha, 10d int.) in grapes (early) for all calculated scenarios according to FOCUS sw Step 3

Fosetyl-Al								
	Scenario	**Entry route** Spray drift Runoff Drainage	**PEC max**		**TWA 7 days**		**TWA 21 days**	
			SW [µg/L]	**Sed [µg/kg]**	**SW [µg/L]**	**Sed [µg/kg]**	**SW [µg/L]**	**Sed [µg/kg]**
Multiple applications	D6 (Ditch)	S	29.250	2.4640	7.7920	1.6790	3.2560	1.0410
	R1 (Pond)	S	1.1950	0.2446	0.7251	0.2363	0.5657	0.2035
	R1 (Stream)	S	21.410	0.6621	0.5898	0.1605	0.3164	0.1022
	R2 (Stream)	S	28.660	0.6336	0.4132	0.1245	0.2755	0.0946
	R3 (Stream)	S	30.250	1.2850	1.5570	0.4499	1.0380	0.3335
	R4 (Stream)	S	21.050	0.5425	0.4699	0.1282	0.2844	0.1024
Single application	D6 (Ditch)	S	33.700	1.3700	2.2690	0.5016	0.7814	0.2807
	R1 (Pond)	S	1.2220	0.1678	0.8460	0.1648	0.4721	0.1450
	R1 (Stream)	S	24.610	0.5638	0.4170	0.0929	0.1443	0.0513
	R2 (Stream)	S	33.140	0.5952	0.3876	0.0862	0.1292	0.0464
	R3 (Stream)	S	**35.120**	1.1370	1.2710	0.2799	0.4238	0.1513
	R4 (Stream)	S	24.700	0.5754	0.4496	0.1000	0.1788	0.0601

In bold: highest PECsw value

Table 9.2.5- 9: PEC_{sw} and PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10d int.) in grapes (early) for all calculated scenarios according to FOCUS SW Step 3

Phosphonic Acid								
	Scenario		**PEC max**		**TWA 7 days**		**TWA 21 days**	
			SW [µg/L]	**Sed [µg/kg]**	**SW [µg/L]**	**Sed [µg/kg]**	**SW [µg/L]**	**Sed [µg/kg]**
Multiple applications	D6 (Ditch)		2.2590	2.1060	0.9500	1.7480	0.3520	1.2780
	R1 (Pond)		1.5050	5.3240	1.4970	5.3220	1.4320	5.3020
	R1 (Stream)		8.5330	5.8350	0.9767	3.5090	0.3366	2.6070
	R2 (Stream)		**9.6120**	8.0980	1.4840	4.8570	0.4987	3.5720
	R3 (Stream)		3.0310	0.8856	0.1883	0.5348	0.1219	0.3969
	R4 (Stream)		4.7360	13.360	0.8157	10.670	0.2965	8.8540
Single application	D6 (Ditch)		0.5525	0.3739	0.1587	0.2700	0.1150	0.2504
	R1 (Pond)		0.6026	2.1790	0.6006	2.1780	0.5825	2.1700
	R1 (Stream)		2.5510	1.5690	0.2859	0.9228	0.1119	0.6818
	R2 (Stream)		2.7810	1.9030	0.4292	1.0230	0.1432	0.7015
	R3 (Stream)		3.1100	0.5235	0.1251	0.2059	0.0418	0.1206
	R4 (Stream)		3.2350	6.3650	0.7088	4.7590	0.2455	3.8610

In bold: highest PECsw value

Grapes, late

Table 9.2.5- 10: PEC_{sw} and PEC_{sed} values of fosetyl-Al (3×2.0 kg a.s./ha, 10d int.) in grapes (late) for all calculated scenarios according to FOCUS sw Step 3

Fosetyl-Al								
	Scenario	Entry route Spray drift Runoff Drainage	PEC max		TWA 7 days		TWA 21 days	
			Sw [µg/L]	Sed [µg/kg]	Sw [µg/L]	Sed [µg/kg]	Sw [µg/L]	Sed [µg/kg]
Multiple applns.	D6 (Ditch)	S	30.530	5.0100	16.520	4.6280	12.340	3.9750
	R1 (Pond)	S	1.1810	0.1962	0.6672	0.1885	0.4977	0.1617
	R1 (Stream)	S	21.400	0.6196	0.5794	0.1284	0.3389	0.1054
	R2 (Stream)	S	28.770	0.6667	0.4344	0.1429	0.4341	0.1127
	R3 (Stream)	S	30.250	1.2750	1.5240	0.4530	1.0160	0.3466
	R4 (Stream)	S	21.460	0.7240	0.6245	0.2032	0.4150	0.1594
Single appln.	D6 (Ditch)	S	34.330	3.8550	19.340	3.4710	7.0310	2.3380
	R1 (Pond)	S	1.2220	0.1362	0.7095	0.1309	0.3358	0.1072
	R1 (Stream)	S	25.100	0.7270	0.6798	0.1506	0.2573	0.0895
	R2 (Stream)	S	33.750	0.7161	0.5097	0.1133	0.1699	0.0609
	R3 (Stream)	S	**35.490**	1.3260	1.7740	0.3886	0.5913	0.2103
	R4 (Stream)	S	25.180	0.7527	0.7279	0.1609	0.2427	0.0867

In bold: highest PECsw value

Table 9.2.5- 11: PEC_{sw} and PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10d int.) in grapes (late) for all calculated scenarios according to FOCUS SW Step 3

Phosphonic Acid								
	Scenario		PEC max		TWA 7 days		TWA 21 days	
			SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
Multiple applns.	D6 (Ditch)		**11.010**	25.490	9.5450	24.520	8.1430	21.400
	R1 (Pond)		1.5860	5.9190	1.5780	5.9170	1.5260	5.9040
	R1 (Stream)		4.2990	6.4860	0.4822	4.8630	0.2439	4.2560
	R2 (Stream)		3.8780	2.9290	0.5334	1.7290	0.2384	1.3510
	R3 (Stream)		6.7380	14.370	1.6400	12.040	0.7134	10.040
	R4 (Stream)		5.7770	7.7820	0.9905	5.8420	0.3313	4.7330
Single appln.	D6 (Ditch)		9.7090	13.050	8.0970	12.270	3.9780	9.4620
	R1 (Pond)		0.8670	2.7770	0.8624	2.7760	0.8260	2.7700
	R1 (Stream)		3.8780	6.2890	0.4208	4.7500	0.1871	4.0040
	R2 (Stream)		1.5950	0.9547	0.1737	0.5636	0.0776	0.4402
	R3 (Stream)		4.0710	2.1810	0.3571	1.7850	0.1759	1.4680
	R4 (Stream)		1.9210	2.3980	0.3240	1.7810	0.1083	1.4350

In bold: highest PECsw value

FOCUS Step 4

FOCUS Step 4 calculations considering different buffer zones in combination with mitigation by drift reducing nozzles (where applicable) were conducted based on the Step 3 results. In the following a summary of PEC values resulting from single and multiple applications for relevant crops are given for fosetyl-Al and phosphonic acid.

Grapes, early

Table 9.2.5- 12: Summary of FOCUS Step 4 PEC_{sw} values of fosetyl-Al (3×2.0 kg a.s./ha, 10d int.). Entries marked with * result from single applications.

Fosetyl-Al PEC_{sw} [µg/L]													
Buffer Width & Type	**Scenario**	**Nozzle Reduction**											
		0%			**50%**			**75%**			**90%**		
5m Spray drift	D6 (Ditch)	S	20.390	*	S	10.210	*	S	5.1260	*	S	2.0730	*
	R1 (Pond)	S	1.4190	*	S	0.7093	*	S	0.3547	*	S	0.1419	*
	R1 (Stream)	S	17.930	*	S	8.9640	*	S	4.4820	*	S	1.7930	*
	R2 (Stream)	S	24.140	*	S	12.070	*	S	6.0350	*	S	2.4140	*
	R3 (Stream)	S	25.590	*	S	12.790	*	S	6.3970	*	S	2.5590	*
	R4 (Stream)	S	17.990	*	S	8.9960	*	S	4.4980	*	S	1.7990	*
10m Spray drift & Runoff	D6 (Ditch)	S	7.4100	*	S	3.7240	*	S	1.8810	*	S	0.7752	*
	R1 (Pond)	S	0.7811	*	S	0.3906	*	S	0.1953	*	S	0.0781	*
	R1 (Stream)	S	6.4940	*	S	3.2470	*	S	1.6230	*	S	0.6494	*
	R2 (Stream)	S	8.7440	*	S	4.3720	*	S	2.1860	*	S	0.8744	*
	R3 (Stream)	S	9.2680	*	S	4.6340	*	S	2.3170	*	S	0.9268	*
	R4 (Stream)	S	6.5170	*	S	3.2580	*	S	1.6290	*	S	0.6517	*
15m Spray drift & Runoff	D6 (Ditch)	S	4.0430	*	S	2.0410	*	S	1.0390	*	S	0.4386	*
	R1 (Pond)	S	0.5290	*	S	0.2645	*	S	0.1323	*	S	0.0529	*
	R1 (Stream)	S	3.5280	*	S	1.7640	*	S	0.8821	*	S	0.3528	*
	R2 (Stream)	S	4.7510	*	S	2.3750	*	S	1.1880	*	S	0.4751	*
	R3 (Stream)	S	5.0350	*	S	2.5180	*	S	1.2590	*	S	0.5035	*
	R4 (Stream)	S	3.5410	*	S	1.7700	*	S	0.8852	*	S	0.3541	*
20m Spray drift & Runoff	D6 (Ditch)	S	2.6240	*	S	1.3310	*	S	0.6845	*	S	0.2966	*
	R1 (Pond)	S	0.3930	*	S	0.1965	*	S	0.0983	*	S	0.0393	*
	R1 (Stream)	S	2.2770	*	S	1.1390	*	S	0.5694	*	S	0.2277	*
	R2 (Stream)	S	3.0670	*	S	1.5330	*	S	0.7667	*	S	0.3067	*
	R3 (Stream)	S	3.2500	*	S	1.6250	*	S	0.8126	*	S	0.3250	*
	R4 (Stream)	S	2.2860	*	S	1.1430	*	S	0.5714	*	S	0.2286	*

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Table 9.2.5- 13: Summary of FOCUS Step 4 PEC_{sed} values of Fosetyl-Al (3×2.0 kg a.s./ha, 10d int.); Entries marked with * result from single applications.

Fosetyl-Al PEC_{sed} [µg/kg]									
Buffer Width & Type	**Scenario**	**Nozzle Reduction**							
		0%		**50%**		**75%**		**90%**	
5m Spray drift	D6 (Ditch)	1.4860		0.7502		0.3824		0.1617	
	R1 (Pond)	0.2847		0.1424		0.0713		0.0286	
	R1 (Stream)	0.4807		0.2406		0.1206		0.0486	
	R2 (Stream)	0.4598		0.2299		0.1150		0.0460	
	R3 (Stream)	0.9326		0.4663		0.2332		0.0933	
	R4 (Stream)	0.4192	*	0.2096	*	0.1139		0.0581	
10m Spray drift & Runoff	D6 (Ditch)	0.5406		0.2776		0.1461		0.0672	
	R1 (Pond)	0.1552		0.0776		0.0388		0.0156	
	R1 (Stream)	0.1719		0.0861		0.0432		0.0174	
	R2 (Stream)	0.1644		0.0822		0.0411		0.0164	
	R3 (Stream)	0.3335		0.1667		0.0834		0.0334	
	R4 (Stream)	0.1518	*	0.0759	*	0.0425		0.0226	
15m Spray drift & Runoff	D6 (Ditch)	0.2982		0.1564		0.0855		0.0437	
	R1 (Pond)	0.1045		0.0523		0.0262		0.0105	
	R1 (Stream)	0.0928		0.0465		0.0234		0.0095	
	R2 (Stream)	0.0886		0.0443		0.0222		0.0114	
	R3 (Stream)	0.1798		0.0899		0.0449		0.0180	
	R4 (Stream)	0.0825	*	0.0451		0.0272		0.0186	*
20m Spray drift & Runoff	D6 (Ditch)	0.1967		0.1057		0.0602		0.0339	
	R1 (Pond)	0.0773		0.0387		0.0193		0.0077	
	R1 (Stream)	0.0595		0.0298		0.0150		0.0061	
	R2 (Stream)	0.0569		0.0285		0.0142		0.0060	
	R3 (Stream)	0.1154		0.0577		0.0289		0.0115	
	R4 (Stream)	0.0533	*	0.0278		0.0163		0.0096	*

Table 9.2.5- 14: Summary of FOCUS Step 4 PEC_{sw} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10d int.); Entries marked with * result from single applications.

Phosphonic acid PEC_{sw} [µg/L]					
Buffer Width & Type	**Scenario**	**Nozzle Reduction**			
		0%	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	1.3860	1.3860	1.3860	1.3860
	R1 (Pond)	1.7300	0.9324	0.5350	0.2972
	R1 (Stream)	8.5330	8.5330	8.5330	8.5330
	R2 (Stream)	9.6120	9.6120	9.6120	9.6120
	R3 (Stream)	2.2650 *	1.4550	1.4550	1.4550
	R4 (Stream)	4.7360	4.7360	4.7360	4.7360
10m Spray drift & Runoff	D6 (Ditch)	1.3860	1.3860	1.3860	1.3860
	R1 (Pond)	0.9253	0.4894	0.2719	0.1420
	R1 (Stream)	3.7610	3.7610	3.7610	3.7610
	R2 (Stream)	4.3320	4.3320	4.3320	4.3320
	R3 (Stream)	0.8205 *	0.6548	0.6548	0.6548
	R4 (Stream)	2.1590	2.1590	2.1590	2.1590
15m Spray drift & Runoff	D6 (Ditch)	1.3860	1.3860	1.3860	1.3860
	R1 (Pond)	0.6404	0.3471	0.2012	0.1138
	R1 (Stream)	3.7610	3.7610	3.7610	3.7610
	R2 (Stream)	4.3320	4.3320	4.3320	4.3320
	R3 (Stream)	0.6548	0.6548	0.6548	0.6548
	R4 (Stream)	2.1590	2.1590	2.1590	2.1590
20m Spray drift & Runoff	D6 (Ditch)	1.3860	1.3860	1.3860	1.3860
	R1 (Pond)	0.4612	0.2439	0.1356	0.0709
	R1 (Stream)	1.9470	1.9470	1.9470	1.9470
	R2 (Stream)	2.2610	2.2610	2.2610	2.2610
	R3 (Stream)	0.3413	0.3413	0.3413	0.3413
	R4 (Stream)	1.1320	1.1320	1.1320	1.1320

Table 9.2.5- 15: Summary of FOCUS Step 4 PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10d int.); Entries marked with * result from single applications.

Phosphonic acid PEC_{sed} [µg/kg]					
Buffer Width & Type	**Scenario**	**Nozzle Reduction**			
		0%	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	1.3140	0.7187	0.4388	0.4348
	R1 (Pond)	6.1300	3.2710	1.8420	0.9843
	R1 (Stream)	5.8250	5.8130	5.8070	5.8030
	R2 (Stream)	8.0920	8.0860	8.0820	8.0800
	R3 (Stream)	0.8775	0.8667	0.8614	0.8582
	R4 (Stream)	13.360	13.360	13.350	13.350
10m Spray drift & Runoff	D6 (Ditch)	0.5491	0.4369	0.4345	0.4331
	R1 (Pond)	3.2760	1.7160	0.9359	0.4678
	R1 (Stream)	1.9620	1.9580	1.9550	1.9540
	R2 (Stream)	2.7570	2.7540	2.7530	2.7520
	R3 (Stream)	0.3581	0.3542	0.3523	0.3512
	R4 (Stream)	2.8080	2.8060	2.8060	2.8060
15m Spray drift & Runoff	D6 (Ditch)	0.4373	0.4347	0.4334	0.4327
	R1 (Pond)	2.2570	1.2060	0.6810	0.3662
	R1 (Stream)	1.9580	1.9550	1.9540	1.9540
	R2 (Stream)	2.7540	2.7530	2.7520	2.7520
	R3 (Stream)	0.3545	0.3525	0.3514	0.3508
	R4 (Stream)	2.8070	2.8060	2.8060	2.8050
20m Spray drift & Runoff	D6 (Ditch)	0.4354	0.4338	0.4330	0.4325
	R1 (Pond)	1.6320	0.8544	0.4657	0.2325
	R1 (Stream)	0.9559	0.9544	0.9536	0.9531
	R2 (Stream)	1.3540	1.3530	1.3530	1.3530
	R3 (Stream)	0.1824	0.1811	0.1804	0.1800
	R4 (Stream)	1.1660	1.1660	1.1660	1.1660

Grapes, late

Table 9.2.5- 16: Summary of FOCUS Step 4 PEC_{sw} values of Fosetyl-Al (3×2.0 kg fosetyl-Al/ha, 10d int.). Entries marked with * result from single applications.

Fosetyl-Al PEC_{sw} [µg/L]													
Buffer Width & Type	Scenario	Nozzle Reduction											
		0%			50%			75%			90%		
5m Spray drift	D6 (Ditch)	S	20.760	*	S	10.380	*	S	5.1890	*	S	2.0760	*
	R1 (Pond)	S	1.4190	*	S	0.7095	*	S	0.3730		S	0.1742	
	R1 (Stream)	S	18.290	*	S	9.1450	*	S	4.5720	*	S	1.8290	*
	R2 (Stream)	S	24.590	*	S	12.290	*	S	6.1470	*	S	2.4590	*
	R3 (Stream)	S	25.860	*	S	12.930	*	S	6.4640	*	S	2.5860	*
	R4 (Stream)	S	18.340	*	S	9.1710	*	S	4.5850	*	S	1.8340	*
10m Spray drift & Runoff	D6 (Ditch)	S	7.5180	*	S	3.7590	*	S	1.8800	*	S	0.7518	*
	R1 (Pond)	S	0.7813	*	S	0.3906	*	S	0.1976		S	0.0891	
	R1 (Stream)	S	6.6250	*	S	3.3120	*	S	1.6560	*	S	0.6625	*
	R2 (Stream)	S	8.9060	*	S	4.4530	*	S	2.2270	*	S	0.8906	*
	R3 (Stream)	S	9.3660	*	S	4.6830	*	S	2.3410	*	S	0.9366	*
	R4 (Stream)	S	6.6440	*	S	3.3220	*	S	1.6610	*	S	0.6644	*
15m Spray drift & Runoff	D6 (Ditch)	S	4.0850	*	S	2.0420	*	S	1.0210	*	S	0.4085	*
	R1 (Pond)	S	0.5291	*	S	0.2646	*	S	0.1385		S	0.0654	
	R1 (Stream)	S	3.5990	*	S	1.8000	*	S	0.8998	*	R	0.3854	
	R2 (Stream)	S	4.8390	*	S	2.4200	*	S	1.2100	*	S	0.4839	*
	R3 (Stream)	S	5.0890	*	S	2.5440	*	S	1.2720	*	S	0.5089	*
	R4 (Stream)	S	3.6100	*	S	1.8050	*	S	0.9024	*	S	0.3610	*
20m Spray drift & Runoff	D6 (Ditch)	S	2.6370	*	S	1.3180	*	S	0.6593	*	S	0.2637	*
	R1 (Pond)	S	0.3931	*	S	0.1965	*	S	0.0985		S	0.0444	
	R1 (Stream)	S	2.3230	*	S	1.1620	*	S	0.5808	*	S	0.2323	*
	R2 (Stream)	S	3.1240	*	S	1.5620	*	S	0.7809	*	S	0.3124	*
	R3 (Stream)	S	3.2850	*	S	1.6420	*	S	0.8212	*	S	0.3285	*
	R4 (Stream)	S	2.3300	*	S	1.1650	*	S	0.5825	*	S	0.2330	*

S, R and D denote main entry route via spray drift, runoff or drainage, respectively

Table 9.2.5- 17: Summary of FOCUS Step 4 PEC_{sed} values of Fosetyl-Al (3×2.0 kg fosetyl-Al/ha, 10d int.). Entries marked with * result from single applications.

Fosetyl-Al PEC_{sed} [µg/kg]									
Buffer Width & Type	Scenario	Nozzle Reduction							
		0%		50%		75%		90%	
5m Spray drift	D6 (Ditch)	3.0100		1.5050		0.7524		0.3010	
	R1 (Pond)	0.2278		0.1155		0.0593		0.0276	
	R1 (Stream)	0.5296	*	0.2648	*	0.1324	*	0.0639	*
	R2 (Stream)	0.5217	*	0.2609	*	0.1304	*	0.0522	*
	R3 (Stream)	0.9660	*	0.4830	*	0.2415	*	0.0966	*
	R4 (Stream)	0.5484	*	0.2742	*	0.1371	*	0.0548	*
10m Spray drift & Runoff	D6 (Ditch)	1.0760		0.5380		0.2690		0.1076	
	R1 (Pond)	0.1238		0.0625		0.0319		0.0141	
	R1 (Stream)	0.1918	*	0.0959	*	0.0480	*	0.0284	*
	R2 (Stream)	0.1890	*	0.0945	*	0.0472	*	0.0189	*
	R3 (Stream)	0.3499	*	0.1750	*	0.0875	*	0.0350	*
	R4 (Stream)	0.1986	*	0.0993	*	0.0497	*	0.0199	*
15m Spray drift & Runoff	D6 (Ditch)	0.5801		0.2901		0.1450		0.0580	
	R1 (Pond)	0.0838		0.0425		0.0220		0.0104	
	R1 (Stream)	0.1042	*	0.0521	*	0.0290	*	0.0278	*
	R2 (Stream)	0.1027	*	0.0513	*	0.0257	*	0.0103	*
	R3 (Stream)	0.1901	*	0.0951	*	0.0475	*	0.0190	*
	R4 (Stream)	0.1079	*	0.0540	*	0.0270	*	0.0108	*
20m Spray drift & Runoff	D6 (Ditch)	0.3724		0.1862		0.0931		0.0372	
	R1 (Pond)	0.0617		0.0312		0.0159		0.0070	
	R1 (Stream)	0.0673	*	0.0336	*	0.0168	*	0.0146	*
	R2 (Stream)	0.0663	*	0.0331	*	0.0166	*	0.0066	*
	R3 (Stream)	0.1227	*	0.0614	*	0.0307	*	0.0123	*
	R4 (Stream)	0.0697	*	0.0348	*	0.0174	*	0.0070	*

Table 9.2.5- 18: Summary of FOCUS Step 4 PEC_{sw} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10d int.); Entries marked with * result from single applications.

Phosphonic acid PEC_{sw} [µg/L]					
Buffer Width & Type	**Scenario**	**Nozzle Reduction**			
		0%	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	6.6170	3.3090	1.6540	1.3930
	R1 (Pond)	1.8080	1.0210	0.6286	0.4096
	R1 (Stream)	4.2990	4.2990	4.2990	4.2990
	R2 (Stream)	3.8780	3.8780	3.8780	3.8780
	R3 (Stream)	6.7380	6.7370	6.7370	6.7370
	R4 (Stream)	5.7770	5.7770	5.7770	5.7770
10m Spray drift & Runoff	D6 (Ditch)	2.3660	1.3930	1.3930	1.3930
	R1 (Pond)	0.9539	0.5235	0.3088	0.1810
	R1 (Stream)	1.9430	1.9430	1.9430	1.9430
	R2 (Stream)	1.7500	1.7500	1.7500	1.7500
	R3 (Stream)	3.0490	3.0490	3.0490	3.0490
	R4 (Stream)	2.5850	2.5850	2.5850	2.5850
15m Spray drift & Runoff	D6 (Ditch)	1.3930	1.3930	1.3930	1.3930
	R1 (Pond)	0.6727	0.3831	0.2389	0.1607
	R1 (Stream)	1.9430	1.9430	1.9430	1.9430
	R2 (Stream)	1.7500	1.7500	1.7500	1.7500
	R3 (Stream)	3.0490	3.0490	3.0490	3.0490
	R4 (Stream)	2.5850	2.5850	2.5850	2.5850
20m Spray drift & Runoff	D6 (Ditch)	1.3930	1.3930	1.3930	1.3930
	R1 (Pond)	0.4757	0.2612	0.1541	0.0905
	R1 (Stream)	1.0160	1.0160	1.0160	1.0160
	R2 (Stream)	0.9137	0.9137	0.9137	0.9137
	R3 (Stream)	1.5940	1.5940	1.5940	1.5940
	R4 (Stream)	1.3460	1.3460	1.3460	1.3460

Table 9.2.5- 19: Summary of FOCUS Step 4 PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10d int.); Entries marked with * result from single applications.

Phosphonic acid PEC_{sed} [µg/kg]					
Buffer Width & Type	**Scenario**	**Nozzle Reduction**			
		0%	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	15.320	7.6660	3.8390	1.5440
	R1 (Pond)	6.7340	3.8430	2.3980	1.5470
	R1 (Stream)	6.4800	6.4720	6.4690	6.4660
	R2 (Stream)	2.9260	2.9220	2.9200	2.9190
	R3 (Stream)	14.340	14.290	14.270	14.260
	R4 (Stream)	7.7740	7.7650	7.7600	7.7570
10m Spray drift & Runoff	D6 (Ditch)	5.4850	2.7490	1.3810	0.5604
	R1 (Pond)	3.5270	1.9470	1.1560	0.6828
	R1 (Stream)	1.5220	1.5190	1.5180	1.5170
	R2 (Stream)	0.9948	0.9934	0.9927	0.9922
	R3 (Stream)	3.4510	3.4360	3.4280	3.4230
	R4 (Stream)	2.0710	2.0680	2.0660	2.0650
15m Spray drift & Runoff	D6 (Ditch)	2.9630	1.4880	0.7507	0.3223
	R1 (Pond)	2.4950	1.4300	0.8984	0.5980
	R1 (Stream)	1.5190	1.5180	1.5170	1.5160
	R2 (Stream)	0.9935	0.9928	0.9924	0.9922
	R3 (Stream)	3.4370	3.4280	3.4240	3.4210
	R4 (Stream)	2.0680	2.0660	2.0650	2.0650
20m Spray drift & Runoff	D6 (Ditch)	1.9070	0.9601	0.4867	0.3184
	R1 (Pond)	1.7580	0.9697	0.5758	0.3397
	R1 (Stream)	0.6620	0.6611	0.6606	0.6604
	R2 (Stream)	0.4883	0.4878	0.4876	0.4874
	R3 (Stream)	1.5160	1.5100	1.5070	1.5060
	R4 (Stream)	0.9456	0.9444	0.9438	0.9434

As requested by the RMS France, new PEC_{sw} calculations were performed using the input parameters as provided by ANSES (see Table 9.2.5- 21).

Report:	KCP 9.2.5/02 [redacted],; [redacted]; 2016; M-563432-01-1
Title:	Fosetyl-Al (FEA) and metabolite: PECsw,sed FOCUS EUR: Use in pome fruit and grapes in Europe
Report No.:	EnSa-16-0661 v1
Document No.:	M-563432-01-1
Guideline(s):	none
Guideline deviation(s):	none
GLP/GEP:	**no**

Methods and Materials:

Predicted environmental concentrations of the active substance fosetyl-aluminium (fosetyl-Al) and its metabolite phosphonic acid in surface water (PEC_{sw}) and sediment (PEC_{sed}) were calculated for the use in Europe, employing the tiered FOCUS Surface Water (SW) approach (FOCUS 2001, 2015). All relevant entry routes of a compound into surface water (principally a combination of spray drift and runoff/erosion or drain flow) were considered in these calculations.

The use of fosetyl-Al in grapes was assessed according to the Good Agricultural Practice (GAP) in Europe. Detailed application parameters are presented in Table 9.2.5- 20.

Table 9.2.5- 20: General and FOCUS-specific data on the use pattern of fosetyl-Al in Europe (for FOCUS Step 1&2)

Individual Crop	FOCUS crop used for interception	Application				
		Rate per season [g a.s./ha]	BBCH stage	Interval [days]	Plant Interception [%]	Season
Grapes (early)	vines, late applns (vines / late)	3 × 2000	15-59	10	minimal crop cover (40%)	Mar. - May.
Grapes (late)	vines, late applns (vines / late)	3 × 2000	59-81	10	full canopy (60%)	June - Sep.

For fosetyl-Al and its metabolite phosphonic acid, FOCUS Step 3 and Step 4 values were calculated in addition to FOCUS Step 1 and Step 2 values.

On 2016-07-27 the RMS France requested additional PEC calculations during the approval renewal process of the active substance fosetyl-Al. Amalgamated data from three applicants should be used for fosetyl-Al and its metabolite. The input parameters proposed by ANSES are summarised in Table 9.2.5- 21.

Table 9.2.5- 21: List of the main parameters as proposed by RMS for the risk assessment

Parameter	**Input**		**Remarks**
	Fosetyl-Al	**Phosphonic acid**	**(Concerning phosphonic acid parameters)**
DT_{50} soil (days)	0.1	133.7	Geometric mean of all acceptable values[a),b),c)]
Maximum occurrence in soil (%)	-	100	-
Maximum occurrence in water (%)	-	100	
DT_{50} water/sed system (days) (STEP 1)	3	1000	-
DT_{50} water (days) (STEP 2,3,4)	3	1000	-
DT_{50} sediment (days) (STEP 2, 3, 4)	1000	1000	-
K_{foc} (L/kg)	0.1	-	-
K_f (L/kg)	-	15.9	Geometric mean of all acceptable values derived from batch studies[d),e)]
1/n	1	0.69	Arithmetic mean of all acceptable values derived from batch studies[d),e)]
Crop uptake factor	0	0	Conservative assumption

a) [redacted]; 2015; M-532341-01-1; BCS; please refer to Document MCA, Section 7, chapter CA 7.1.2.1.2
b) [redacted]; [redacted]; 1999; M-184316-01-1; BCS; please refer to Document MCA, Section 7, chapter CA 7.1.2.1.2
c) [redacted]; 2015; S15-00506; Fosetyl-Al Task Force
d) [redacted]; 2008; B30701; ISK Biosciences Europe S.A.)
e) [redacted]; 2007; GAB-014/7-13; Fosetyl-Al Task Force

Remark notifier: ANSES proposes to use 133.7 days as geometric mean DT_{50} of all acceptable values for calculation of PEC in groundwater. The value of 133.7 days is presumably based on using 1000 days for the [redacted] soil based on the slow phase of the DFOP model ([redacted]; 2015; M-532341-01-1), and 532 days for the LUFA soil submitted by the FAIRITF task force ([redacted]; 2015; S15-00506) based on the HS model. Since both soils show a similar pattern, the HS model is more appropriate for [redacted] soil in this light, instead of a very conservative estimation of 1000 days based on only the few last data points, which was deemed unreliable by BCS.
ANSES proposes additionally values of 1000 days to be used as DT_{50} for PEC in total water/sediment systems (FOCUS Step 1) and, each to be used in surface water and sediment (FOCUS Steps 2, 3, 4). However, the study of [redacted] and [redacted] (2005; M-251520-01-1) shows that phosphonic acid clearly declines in sediment with a DT_{50} of 102 days. Thus, the degradation half-live estimated from the sediment compartment should be used as a conservative endpoint for FOCUS modelling.
Despite these points, the PEC calculations were carried out with the input parameters proposed by ANSES.

For the metabolite phosphonic acid adsorption/desorption studies suggested significant retention of phosphonic acid by soil indicating a very low leaching potential. The observed sorption behaviour of phosphonic acid or its phosphonate salts involved the formation of insoluble salts and/or complexes with soil. No correlation of sorption with the organic carbon content was found. This is in contrast to the behaviour of carbon containing, i.e. 'organic' compounds. The interaction of phosphonic acid with the organic carbon of soil was thus not regarded to be the main mechanism for sorption. Consequently, the use of a standard K_{oc} value as model input in standard exposure models is scientifically not justified. In the absence of relation between sorption of the compound and soil properties, constant distribution coefficients (K_f or K_d) should be employed instead.

For exposure modelling the sorption in terms of the Freundlich adsorption coefficient K_f is adequately represented by the use of the geometric mean of the total set of sorption data available (geometric mean K_f = 15.9 mL/g).
Using the K_f parameter instead of K_{oc} requires the following changes in the FOCUS surface water calculations:
FOCUS Steps 1-2 requires a K_{oc} value as input, which was calculated as a pseudo K_{oc} value of 318 mL/g from the scenario specific organic carbon content of 5% in the sediment.
FOCUS TOXSWA requires a K_{om} value as input, which was calculated as a pseudo K_{om} value of 177 mL/g from the scenario specific organic matter content of 9% in the sediment of all FOCUS Step 3 scenarios.
For FOCUS PRZM and FOCUS MACRO simulation runs the K_f value has to be implemented manually in the input files for each soil layer.

Compound specific input data are summarised below for FOCUS Step 3/4 (see Table 9.2.5- 22).

Table 9.2.5- 22: Substance parameters used for fosetyl-Al and its metabolite

Parameter	**Unit**	**Parent**	**Metabolite**
Substance		Fosetyl-Al	Phosphonic acid
SWASH code		FEA	H3PO3
General			
Molar mass	(g/mol)	354.14	82
Water solubility (temp.)	(mg/L)	110000 (20 °C)	110000 (20 °C)
Vapour pressure (temp.)	(Pa)	1E-07 (25 °C)	1E-07 (25 °C)
Crop processes			
Coefficient for uptake by plant (TSCF)	(-)	0	0
Wash-off factor	(1/m)	50	50
Sorption			
K_{OC}	(mL/g)	0.1	305.15 [a]
K_{OM}	(mL/g)	0.06	177 [a]
Freundlich exponent ($^1/_n$)	(-)	1	0.69
Transformation			
DT_{50} in soil	(days)	0.1	133.7
temperature	(°C)	20	20
moisture content (pF)	(log(cm))	2	2
formation fraction in soil	(-)	-	3
DT_{50} in water	(days)	3	1000
temperature	(°C)	20	20
formation fraction in water	(-)	-	3
DT_{50} in sediment	(days)	1000	1000
temperature	(°C)	20	20
formation fraction in sediment	(-)	-	3
DT_{50} on canopy	(days)	10	10
Exponent for the effect of moisture			
PRZM and TOXSWA (Walker exp.)	(-)	0.7	0.7
MACRO (calibrated value)	(-)	0.49	0.49
Effect of temperature			
TOXSWA (molar activation energy)	(kJ/mol)	65.4	65.4
MACRO (effect of temperature)	(1/K)	0.0948	0.0948
PRZM (Q_{10})	(-)	2.58	2.58

[a] K_f value used for Step 3 modelling with MACRO and PRZM

In FOCUS Step 3, the application date for each scenario is determined by the Pesticide Application Timer (PAT), which is part of the FOCUS SW Scenarios. The user may only define an application time window. The actual application date is then set by the PAT in such a way that there are at least 10 mm of rainfall in the first 10 days after application, and at the same time less than 2 mm of rain per day in a five day period around the date of application. If no such date can be found within the application time window, the above rules are step-wise relaxed. Information on application dates can be found in Table 9.2.5- 23 and Table 9.2.5- 24.

Table 9.2.5- 23: Application dates of fosetyl-Al for the FOCUS Step 3 calculations for the use in grape (early)

Run IDs **GAP Name (DGR)** **Assessment name (PMT)**			**DGR III / PMT III** **Grapes (threefold appln, early)** **Grapes (threefold appln, early)**		
FOCUS model crop (crop group)			**Vines, late applns (vines / late)**		
Use pattern			**3×2 kg a.s./ha, 10 days int.**		
Appl. method (Run off CAM, depth inc.)			**Air blast (2 - appln foliar linear, 4 cm)**		
PAT start date (relative to crop event or absolute)			**Absolute**		
PAT window range			**53 days - 95 days, scenario specific (min = 50 days)**		
Drainage scenarios	**PAT start/end date (Jul. day, range)**	**Application date**	**Runoff scenarios**	**PAT start/end date (Jul. day, range)**	**Application date**
D6 Ditch	24-Feb/27-Apr (55/117, 62)	27-Feb 14-Mar 09-Apr	R1 Pond/Stream	05-May/27-Jun (125/178, 53)	08-May 31-May 12-Jun
			R2 Stream	20-Apr/24-Jul (110/205, 95)	22-Apr 07-May 20-May
			R3 Stream	02-May/25-Jul (122/206, 84)	18-May 01-Jun 16-Jun
			R4 Stream	13-Apr/13-Jul (103/194, 91)	04-May 20-May 30-May

Table 9.2.5- 24: Application dates of fosetyl-Al for the FOCUS Step 3 calculations for the use in grape (late)

Run IDs **GAP Name (DGR)** **Assessment name (PMT)**			**DGR IV / PMT IV** **Grapes (threefold appln, late)** **Grapes (threefold appln, late)**		
FOCUS model crop (crop group)			**Vines, late applns (vines / late)**		
Use pattern			**3×2 kg a.s./ha, 10 days int.**		
Appl. method (Run off CAM, depth inc.)			**Air blast (2 - appln foliar linear, 4 cm)**		
PAT start date (relative to crop event or absolute)			**Absolute**		
PAT window range			**50 days - 139 days, scenario specific (min = 50 days)**		
Drainage scenarios	**PAT start/end date (Jul. day, range)**	**Application date**	**Runoff scenarios**	**PAT start/end date (Jul. day, range)**	**Application date**
D6 Ditch	27-Apr/13-Sep (117/256, 139)	27-Apr 07-May 17-May	R1 Pond/Stream	27-Jun/24-Sep (178/267, 89)	29-Jun 14-Jul 28-Jul
			R2 Stream	24-Jul/12-Sep (205/255, 50)	24-Jul 03-Aug 13-Aug
			R3 Stream	25-Jul/04-Oct (206/277, 71)	31-Jul 13-Aug 28-Aug
			R4 Stream	13-Jul/01-Sep (194/244, 50)	20-Jul 31-Jul 10-Aug

Findings:

FOCUS Step 1 and 2:
The maximum PEC values for FOCUS Step 1 and 2 are given in the tables below for fosetyl-Al and its major metabolite phosphonic acid.

Table 9.2.5- 25: Summary of the maximum PEC_{sw} and PEC_{sed} values fosetyl-Al (FOCUS Steps 1-2)

Usage	Scenario	Fosetyl-Al (FEA)					
		PEC max		TWA 7 days		TWA 21 days	
		SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
Vines, early 3×2000g a.s./ha, 10 days int. min crop cover Spring (Mar. - May)	Step 1	720.10	0.6666	357.29	0.3535	147.39	0.1461
	Step 2						
	N-EU Multi	51.002	0.0340	25.389	0.0195	10.476	0.0085
	S-EU Multi	51.002	0.0340	25.389	0.0195	10.476	0.0085
	N-EU Single	53.520	0.0357	26.642	0.0205	10.993	0.0089
	S-EU Single	53.520	0.0357	26.642	0.0205	10.993	0.0089
Vines, late 3×2000g a.s./ha, 10 days int. full canopy Summer (Jun. - Sep.)	Step 1	720.10	0.6666	357.29	0.3535	147.39	0.1461
	Step 2						
	N-EU Multi	51.002	0.0340	25.389	0.0195	10.476	0.0085
	S-EU Multi	51.002	0.0340	25.389	0.0195	10.476	0.0085
	N-EU Single	53.520	0.0357	26.642	0.0205	10.993	0.0089
	S-EU Single	53.520	0.0357	26.642	0.0205	10.993	0.0089

Table 9.2.5- 26: Summary of the maximum PEC_{sw} and PEC_{sed} values phosphonic acid (FOCUS Steps 1-2)

Usage	Scenario	Phosphonic acid					
		PEC max		TWA 7 days		TWA 21 days	
		SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
Vines, early 3×2000g a.s./ha, 10 days int. min crop cover Spring (Mar. - May)	Step 1	2062.8	6449.5	2027.0	6420.6	2015.7	6401.3
	Step 2						
	N-EU Multi	182.97	558.10	175.72	556.75	174.53	554.06
	S-EU Multi	291.94	904.40	284.44	902.21	282.71	897.85
	N-EU Single	67.129	204.20	64.308	203.71	63.862	202.72
	S-EU Single	105.35	325.67	102.44	324.88	101.81	323.31
Vines, late 3×2000g a.s./ha, 10 days int. full canopy Summer (Jun. - Sep.)	Step 1	2062.8	6449.5	2027.0	6420.6	2015.7	6401.3
	Step 2						
	N-EU Multi	146.64	442.67	139.49	441.59	138.47	439.46
	S-EU Multi	182.97	558.10	175.72	556.75	174.53	554.06
	N-EU Single	54.387	163.71	51.598	163.32	51.213	162.53
	S-EU Single	67.129	204.20	64.308	203.71	63.862	202.72

FOCUS Step 3 and 4:
The maximum PEC values for FOCUS Step 3 and 4 are given in the tables below for fosetyl-Al and its metabolite phosphonic acid considering the application in grapes early and late. Single and multiple application PEC_{sw} and PEC_{sed} values are presented for all relevant scenarios in Step 3 and 4.

Grapes, early

Table 9.2.5- 27: PEC_{sw} and PEC_{sed} values of fosetyl-Al (3×2.0 kg a.s./ha, 10 days int.) in grapes (early) for all calculated scenarios according to FOCUS SW Step 3

Fosetyl-Al								
	Scenario	Entry route Spray drift Runoff Drainage	PEC max		TWA 7 days		TWA 21 days	
			SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
Multiple applications	D6 (Ditch)	S	29.250	2.4640	7.7920	1.6790	3.2560	1.0410
	R1 (Pond)	S	1.1950	0.2446	0.7251	0.2363	0.5657	0.2035
	R1 (Stream)	S	21.410	0.6621	0.5898	0.1605	0.3164	0.1022
	R2 (Stream)	S	28.660	0.6336	0.4132	0.1245	0.2755	0.0946
	R3 (Stream)	S	30.250	1.2850	1.5570	0.4499	1.0380	0.3335
	R4 (Stream)	S	21.050	0.5425	0.4699	0.1282	0.2844	0.1024
Single application	D6 (Ditch)	S	33.700	1.3700	2.2690	0.5016	0.7814	0.2807
	R1 (Pond)	S	1.2220	0.1678	0.8460	0.1648	0.4721	0.1450
	R1 (Stream)	S	24.610	0.5638	0.4170	0.0929	0.1443	0.0513
	R2 (Stream)	S	33.140	0.5952	0.3876	0.0862	0.1292	0.0464
	R3 (Stream)	S	**35.120**	1.1370	1.2710	0.2799	0.4238	0.1513
	R4 (Stream)	S	24.700	0.5754	0.4496	0.1000	0.1788	0.0601

In bold: highest PECsw value

Table 9.2.5- 28: PEC_{sw} and PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10 days int.) in grapes (early) for all calculated scenarios according to FOCUS SW Step 3

Phosphonic Acid								
	Scenario		PEC max		TWA 7 days		TWA 21 days	
			SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
Multiple applications	D6 (Ditch)		2.2240	4.0090	0.9229	3.6530	0.3548	3.0500
	R1 (Pond)		1.5770	13.810	1.5710	13.810	1.5110	13.800
	R1 (Stream)		14.560	10.230	1.6650	6.9180	0.5664	5.3720
	R2 (Stream)		**16.390**	13.020	2.5280	8.2920	0.8454	6.2390
	R3 (Stream)		3.0750	3.3980	0.3293	2.8300	0.1230	2.4250
	R4 (Stream)		8.8200	21.460	1.4540	20.190	0.4866	19.310
Single application	D6 (Ditch)		0.5346	0.6987	0.1194	0.6143	0.0851	0.5468
	R1 (Pond)		0.5837	5.9400	0.5821	5.9400	0.5645	5.9380
	R1 (Stream)		3.3610	2.9880	0.3678	2.3280	0.1502	1.8980
	R2 (Stream)		3.3860	3.0940	0.5221	2.2090	0.1743	1.7050
	R3 (Stream)		3.1630	1.3140	0.1264	1.1580	0.0423	1.0200
	R4 (Stream)		4.1590	8.4980	0.9081	8.1410	0.3120	7.8810

In bold: highest PECsw value

Grapes, late

Table 9.2.5- 29: PEC_{sw} and PEC_{sed} values of fosetyl-Al (3×2.0 kg a.s./ha, 10 days int.) in grapes (late) for all calculated scenarios according to FOCUS SW Step 3

Fosetyl-Al								
	Scenario	Entry route Spray drift Runoff Drainage	PEC max		TWA 7 days		TWA 21 days	
			Sw [µg/L]	Sed [µg/kg]	Sw [µg/L]	Sed [µg/kg]	Sw [µg/L]	Sed [µg/kg]
Multiple applications	D6 (Ditch)	S	30.530	5.0100	16.520	4.6280	12.340	3.9750
	R1 (Pond)	S	1.1810	0.1962	0.6672	0.1885	0.4977	0.1617
	R1 (Stream)	S	21.400	0.6196	0.5794	0.1284	0.3389	0.1054
	R2 (Stream)	S	28.770	0.6667	0.4344	0.1429	0.4341	0.1127
	R3 (Stream)	S	30.250	1.2750	1.5240	0.4530	1.0160	0.3466
	R4 (Stream)	S	21.460	0.7240	0.6245	0.2032	0.4150	0.1594
Single application	D6 (Ditch)	S	34.330	3.8550	19.340	3.4710	7.0310	2.3380
	R1 (Pond)	S	1.2220	0.1362	0.7095	0.1309	0.3358	0.1072
	R1 (Stream)	S	25.100	0.7270	0.6798	0.1506	0.2573	0.0895
	R2 (Stream)	S	33.750	0.7161	0.5097	0.1133	0.1699	0.0609
	R3 (Stream)	S	**35.490**	1.3260	1.7740	0.3886	0.5913	0.2103
	R4 (Stream)	S	25.180	0.7528	0.7279	0.1609	0.2427	0.0867

In bold: highest PECsw value

Table 9.2.5- 30: PEC_{sw} and PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10 days int.) in grapes (late) for all calculated scenarios according to FOCUS SW Step 3

Phosphonic Acid								
	Scenario		PEC max		TWA 7 days		TWA 21 days	
			SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]	SW [µg/L]	Sed [µg/kg]
Multiple applications	D6 (Ditch)		**11.030**	37.300	9.5610	36.320	8.0850	32.350
	R1 (Pond)		1.6610	15.160	1.6550	15.150	1.6120	15.150
	R1 (Stream)		5.2960	8.2610	0.5891	6.9840	0.3071	6.7340
	R2 (Stream)		6.0510	4.9430	0.7942	4.2660	0.3418	3.6600
	R3 (Stream)		9.1210	25.610	2.4270	22.390	0.8422	19.870
	R4 (Stream)		8.3750	13.350	1.5470	10.770	0.5175	9.9130
Single application	D6 (Ditch)		9.4060	18.470	7.8460	17.760	3.8950	15.000
	R1 (Pond)		0.9132	7.8280	0.9094	7.8280	0.8751	7.8260
	R1 (Stream)		4.9440	8.0260	0.5350	6.7620	0.2350	6.2600
	R2 (Stream)		1.6010	2.0520	0.1994	1.8850	0.0886	1.6700
	R3 (Stream)		4.1210	7.2150	0.3319	6.6540	0.1576	6.1380
	R4 (Stream)		2.2520	5.3770	0.3940	5.1020	0.1319	4.8860

In bold: highest PECsw value

FOCUS Step 4

FOCUS Step 4 calculations considering different buffer zones in combination with mitigation by drift reducing nozzles (where applicable) were conducted based on the Step 3 results. In the following a summary of PEC values resulting from single and multiple applications for relevant crops are given for fosetyl-Al and phosphonic acid.

Grapes, early

Table 9.2.5- 31: Summary of FOCUS Step 4 PEC_{sw} values of fosetyl-Al (3×2.0 kg a.s./ha, 10 days int.). Entries marked with * result from single applications.

Fosetyl-Al PEC_{sw} [µg/L]													
Buffer Width & Type	**Scenario**	**Nozzle Reduction**											
		0%			**50%**			**75%**			**90%**		
5m Spray drift	D6 (Ditch)	S	20.390	*	S	10.210	*	S	5.1260	*	S	2.0730	*
	R1 (Pond)	S	1.4190	*	S	0.7093	*	S	0.3547	*	S	0.1419	*
	R1 (Stream)	S	17.930	*	S	8.9640	*	S	4.4820	*	S	1.7930	*
	R2 (Stream)	S	24.140	*	S	12.070	*	S	6.0350	*	S	2.4140	*
	R3 (Stream)	S	25.590	*	S	12.790	*	S	6.3970	*	S	2.5590	*
	R4 (Stream)	S	17.990	*	S	8.9960	*	S	4.4980	*	S	1.7990	*
10m Spray drift & Runoff	D6 (Ditch)	S	7.4100	*	S	3.7240	*	S	1.8810	*	S	0.7752	*
	R1 (Pond)	S	0.7811	*	S	0.3906	*	S	0.1953	*	S	0.0781	*
	R1 (Stream)	S	6.4940	*	S	3.2470	*	S	1.6230	*	S	0.6494	*
	R2 (Stream)	S	8.7440	*	S	4.3720	*	S	2.1860	*	S	0.8744	*
	R3 (Stream)	S	9.2680	*	S	4.6340	*	S	2.3170	*	S	0.9268	*
	R4 (Stream)	S	6.5170	*	S	3.2580	*	S	1.6290	*	S	0.6517	*
15m Spray drift & Runoff	D6 (Ditch)	S	4.0430	*	S	2.0410	*	S	1.0390	*	S	0.4386	*
	R1 (Pond)	S	0.5290	*	S	0.2645	*	S	0.1323	*	S	0.0529	*
	R1 (Stream)	S	3.5280	*	S	1.7640	*	S	0.8821	*	S	0.3528	*
	R2 (Stream)	S	4.7510	*	S	2.3750	*	S	1.1880	*	S	0.4751	*
	R3 (Stream)	S	5.0350	*	S	2.5180	*	S	1.2590	*	S	0.5035	*
	R4 (Stream)	S	3.5410	*	S	1.7700	*	S	0.8852	*	S	0.3541	*
20m Spray drift & Runoff	D6 (Ditch)	S	2.6240	*	S	1.3310	*	S	0.6845	*	S	0.2966	*
	R1 (Pond)	S	0.3930	*	S	0.1965	*	S	0.0983	*	S	0.0393	*
	R1 (Stream)	S	2.2770	*	S	1.1390	*	S	0.5694	*	S	0.2277	*
	R2 (Stream)	S	3.0670	*	S	1.5330	*	S	0.7667	*	S	0.3067	*
	R3 (Stream)	S	3.2500	*	S	1.6250	*	S	0.8126	*	S	0.3250	*
	R4 (Stream)	S	2.2860	*	S	1.1430	*	S	0.5714	*	S	0.2286	*

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Table 9.2.5- 32: Summary of FOCUS Step 4 PEC_{sed} values of fosetyl-Al (3×2.0 kg a.s./ha, 10 days int.); Entries marked with * result from single applications.

Fosetyl-Al PEC_{sed} [µg/kg]									
Buffer Width & Type	**Scenario**	**Nozzle Reduction**							
		0%		**50%**		**75%**		**90%**	
5m Spray drift	D6 (Ditch)	1.4860		0.7502		0.3824		0.1617	
	R1 (Pond)	0.2847		0.1424		0.0713		0.0286	
	R1 (Stream)	0.4807		0.2406		0.1206		0.0488	
	R2 (Stream)	0.4598		0.2299		0.1150		0.0460	
	R3 (Stream)	0.9326		0.4663		0.2332		0.0933	
	R4 (Stream)	0.4192	*	0.2096	*	0.1139		0.0581	
10m Spray drift & Runoff	D6 (Ditch)	0.5406		0.2776		0.1461		0.0672	
	R1 (Pond)	0.1552		0.0776		0.0388		0.0156	
	R1 (Stream)	0.1719		0.0861		0.0432		0.0174	
	R2 (Stream)	0.1644		0.0822		0.0411		0.0164	
	R3 (Stream)	0.3335		0.1667		0.0834		0.0334	
	R4 (Stream)	0.1518	*	0.0759	*	0.0425		0.0226	
15m Spray drift & Runoff	D6 (Ditch)	0.2982		0.1564		0.0855		0.0437	
	R1 (Pond)	0.1045		0.0523		0.0262		0.0105	
	R1 (Stream)	0.0928		0.0465		0.0234		0.0095	
	R2 (Stream)	0.0886		0.0443		0.0222		0.0114	
	R3 (Stream)	0.1798		0.0899		0.0449		0.0180	
	R4 (Stream)	0.0825	*	0.0451		0.0272		0.0186	*
20m Spray drift & Runoff	D6 (Ditch)	0.1967		0.1057		0.0602		0.0339	
	R1 (Pond)	0.0773		0.0387		0.0193		0.0077	
	R1 (Stream)	0.0595		0.0298		0.0150		0.0061	
	R2 (Stream)	0.0569		0.0285		0.0142		0.0060	
	R3 (Stream)	0.1154		0.0577		0.0289		0.0115	
	R4 (Stream)	0.0533	*	0.0278		0.0163		0.0096	*

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Table 9.2.5- 33: Summary of FOCUS Step 4 PEC_{sw} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10 days int.); Entries marked with * result from single applications.

Buffer Width & Type	Scenario	Phosphonic acid PEC_{sw} [µg/L] Nozzle Reduction 0%	50%	75%	90%
5m Spray drift	D6 (Ditch)	1.9820	1.9820	1.9820	1.9820
	R1 (Pond)	1.8070	0.9988	0.6042	0.3712
	R1 (Stream)	14.560	14.560	14.560	14.560
	R2 (Stream)	16.390	16.390	16.390	16.390
	R3 (Stream)	2.7130	2.7130	2.7130	2.7130
	R4 (Stream)	8.8200	8.8200	8.8200	8.8200
10m Spray drift & Runoff	D6 (Ditch)	1.9820	1.9820	1.9820	1.9820
	R1 (Pond)	0.9408	0.5055	0.2932	0.1682
	R1 (Stream)	6.4150	6.4150	6.4150	6.4150
	R2 (Stream)	7.3840	7.3840	7.3840	7.3840
	R3 (Stream)	1.2160	1.2160	1.2160	1.2160
	R4 (Stream)	4.0190	4.0190	4.0190	4.0190
15m Spray drift & Runoff	D6 (Ditch)	1.9820	1.9820	1.9820	1.9820
	R1 (Pond)	0.6552	0.3664	0.2248	0.1414
	R1 (Stream)	6.4150	6.4150	6.4150	6.4150
	R2 (Stream)	7.3840	7.3840	7.3840	7.3840
	R3 (Stream)	1.2160	1.2160	1.2160	1.2160
	R4 (Stream)	4.0190	4.0190	4.0190	4.0190
20m Spray drift & Runoff	D6 (Ditch)	1.9820	1.9820	1.9820	1.9820
	R1 (Pond)	0.4605	0.2477	0.1439	0.0828
	R1 (Stream)	3.3190	3.3190	3.3190	3.3190
	R2 (Stream)	3.8530	3.8530	3.8530	3.8530
	R3 (Stream)	0.6334	0.6334	0.6334	0.6334
	R4 (Stream)	2.1070	2.1070	2.1070	2.1070

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Table 9.2.5- 34: Summary of FOCUS Step 4 PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10 days int.); Entries marked with * result from single applications.

		Phosphonic acid PEC_{sed} [µg/kg]			
		Nozzle Reduction			
Buffer Width & Type	**Scenario**	**0%**	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	2.6850	1.6190	1.1330	1.0610
	R1 (Pond)	15.500	9.3840	6.1440	4.1010
	R1 (Stream)	10.200	10.170	10.150	10.140
	R2 (Stream)	13.000	12.970	12.960	12.950
	R3 (Stream)	3.3350	3.2490	3.2040	3.1760
	R4 (Stream)	21.450	21.440	21.440	21.440
10m Spray drift & Runoff	D6 (Ditch)	1.2970	1.0990	1.0560	1.0290
	R1 (Pond)	8.8350	5.1790	3.2510	2.0290
	R1 (Stream)	4.0890	4.0740	4.0660	4.0620
	R2 (Stream)	5.4890	5.4760	5.4690	5.4650
	R3 (Stream)	1.3140	1.2780	1.2590	1.2480
	R4 (Stream)	5.5890	5.5830	5.5800	5.5790
15m Spray drift & Runoff	D6 (Ditch)	1.1060	1.0600	1.0350	1.0210
	R1 (Pond)	6.4630	3.9310	2.5930	1.7530
	R1 (Stream)	4.0750	4.0670	4.0630	4.0600
	R2 (Stream)	5.4770	5.4700	5.4660	5.4630
	R3 (Stream)	1.2810	1.2610	1.2500	1.2440
	R4 (Stream)	5.5840	5.5810	5.5790	5.5780
20m Spray drift & Runoff	D6 (Ditch)	1.0730	1.0420	1.0270	1.0170
	R1 (Pond)	4.7730	2.7920	1.7500	1.0910
	R1 (Stream)	2.1240	2.1190	2.1160	2.1140
	R2 (Stream)	2.8980	2.8920	2.8890	2.8870
	R3 (Stream)	0,6836	0.6694	0.6620	0.6574
	R4 (Stream)	2.5950	2.5930	2.5920	2.5910

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Grapes, late

Table 9.2.5- 35: Summary of FOCUS Step 4 PEC_{sw} values of fosetyl-Al (3×2.0 kg fosetyl-Al/ha, 10 days int.). Entries marked with * result from single applications.

Fosetyl-Al PEC_{sw} [µg/L]													
Buffer Width & Type	Scenario	Nozzle Reduction											
		0%			50%			75%			90%		
5m Spray drift	D6 (Ditch)	S	20.760	*	S	10.380	*	S	5.1890	*	S	2.0760	*
	R1 (Pond)	S	1.4190	*	S	0.7095	*	S	0.3730		S	0.1742	
	R1 (Stream)	S	18.290	*	S	9.1450	*	S	4.5720	*	S	1.8290	*
	R2 (Stream)	S	24.590	*	S	12.290	*	S	6.1470	*	S	2.4590	*
	R3 (Stream)	S	25.860	*	S	12.930	*	S	6.4640	*	S	2.5860	*
	R4 (Stream)	S	18.340	*	S	9.1710	*	S	4.5850	*	S	1.8340	*
10m Spray drift & Runoff	D6 (Ditch)	S	7.5180	*	S	3.7590	*	S	1.8800	*	S	0.7518	*
	R1 (Pond)	S	0.7813	*	S	0.3906	*	S	0.1976		S	0.0891	
	R1 (Stream)	S	6.6250	*	S	3.3120	*	S	1.6560	*	S	0.6625	*
	R2 (Stream)	S	8.9060	*	S	4.4530	*	S	2.2270	*	S	0.8906	*
	R3 (Stream)	S	9.3660	*	S	4.6830	*	S	2.3410	*	S	0.9366	*
	R4 (Stream)	S	6.6440	*	S	3.3220	*	S	1.6610	*	S	0.6644	*
15m Spray drift & Runoff	D6 (Ditch)	S	4.0850	*	S	2.0420	*	S	1.0210	*	S	0.4085	*
	R1 (Pond)	S	0.5291	*	S	0.2646	*	S	0.1385		S	0.0654	
	R1 (Stream)	S	3.5990	*	S	1.8000	*	S	0.8998	*	R	0.3854	
	R2 (Stream)	S	4.8390	*	S	2.4200	*	S	1.2100	*	S	0.4839	*
	R3 (Stream)	S	5.0890	*	S	2.5440	*	S	1.2720	*	S	0.5089	*
	R4 (Stream)	S	3.6100	*	S	1.8050	*	S	0.9024	*	S	0.3610	*
20m Spray drift & Runoff	D6 (Ditch)	S	2.6370	*	S	1.3180	*	S	0.6593	*	S	0.2637	*
	R1 (Pond)	S	0.3931	*	S	0.1965	*	S	0.0985		S	0.0444	
	R1 (Stream)	S	2.3230	*	S	1.1620	*	S	0.5808	*	S	0.2323	*
	R2 (Stream)	S	3.1240	*	S	1.5620	*	S	0.7809	*	S	0.3124	*
	R3 (Stream)	S	3.2850	*	S	1.6420	*	S	0.8212	*	S	0.3285	*
	R4 (Stream)	S	2.3300	*	S	1.1650	*	S	0.5825	*	S	0.2330	*

S, R and D denote main entry route via spray drift, runoff or drainage, respectively

Table 9.2.5- 36: Summary of FOCUS Step 4 PEC$_{sed}$ values of fosetyl-Al (3×2.0 kg fosetyl-Al/ha, 10 days int.). Entries marked with * result from single applications.

Fosetyl-Al PEC$_{sed}$ [µg/kg]									
Buffer Width & Type	**Scenario**	**Nozzle Reduction**							
		0%		**50%**		**75%**		**90%**	
5m Spray drift	D6 (Ditch)	3.0100		1.5050		0.7524		0.3010	
	R1 (Pond)	0.2278		0.1155		0.0593		0.0276	
	R1 (Stream)	0.5296	*	0.2648	*	0.1324	*	0.0639	*
	R2 (Stream)	0.5217	*	0.2609	*	0.1304	*	0.0522	*
	R3 (Stream)	0.9660	*	0.4830	*	0.2415	*	0.0966	*
	R4 (Stream)	0.5484	*	0.2742	*	0.1371	*	0.0548	*
10m Spray drift & Runoff	D6 (Ditch)	1.0760		0.5380		0.2690		0.1076	
	R1 (Pond)	0.1238		0.0625		0.0319		0.0141	
	R1 (Stream)	0.1918	*	0.0959	*	0.0480	*	0.0284	*
	R2 (Stream)	0.1890	*	0.0945	*	0.0472	*	0.0189	*
	R3 (Stream)	0.3499	*	0.1750	*	0.0875	*	0.0350	*
	R4 (Stream)	0.1986	*	0.0993	*	0.0497	*	0.0199	*
15m Spray drift & Runoff	D6 (Ditch)	0.5801		0.2901		0.1450		0.0580	
	R1 (Pond)	0.0838		0.0425		0.0220		0.0104	
	R1 (Stream)	0.1042	*	0.0521	*	0.0290	*	0.0278	*
	R2 (Stream)	0.1027	*	0.0513	*	0.0257	*	0.0103	*
	R3 (Stream)	0.1901	*	0.0951	*	0.0475	*	0.0190	*
	R4 (Stream)	0.1079	*	0.0540	*	0.0270	*	0.0108	*
20m Spray drift & Runoff	D6 (Ditch)	0.3724		0.1862		0.0931		0.0372	
	R1 (Pond)	0.0617		0.0312		0.0159		0.0070	
	R1 (Stream)	0.0673	*	0.0336	*	0.0168	*	0.0146	*
	R2 (Stream)	0.0663	*	0.0331	*	0.0166	*	0.0066	*
	R3 (Stream)	0.1227	*	0.0614	*	0.0307	*	0.0123	*
	R4 (Stream)	0.0697	*	0.0348	*	0.0174	*	0.0070	*

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Table 9.2.5- 37: Summary of FOCUS Step 4 PEC_{sw} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10 days int.); Entries marked with * result from single applications.

		Phosphonic acid PEC_{sw} [µg/L]			
		Nozzle Reduction			
Buffer Width & Type	**Scenario**	**0%**	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	6.5870	3.2680	1.9350	1.9350
	R1 (Pond)	1.8930	1.0750	0.6729	0.4565
	R1 (Stream)	5.2960	5.2960	5.2960	5.2960
	R2 (Stream)	6.0510	6.0510	6.0510	6.0510
	R3 (Stream)	9.1210	9.1200	9.1200	9.1200
	R4 (Stream)	8.3750	8.3750	8.3750	8.3750
10m Spray drift & Runoff	D6 (Ditch)	2.3280	1.9350	1.9350	1.9350
	R1 (Pond)	0.9754	0.5355	0.3190	0.1955
	R1 (Stream)	2.3940	2.3940	2.3940	2.3940
	R2 (Stream)	2.7290	2.7290	2.7290	2.7290
	R3 (Stream)	4.1260	4.1260	4.1260	4.1260
	R4 (Stream)	3.7450	3.7450	3.7450	3.7450
15m Spray drift & Runoff	D6 (Ditch)	1.9350	1.9350	1.9350	1.9350
	R1 (Pond)	0.6872	0.3936	0.2494	0.1765
	R1 (Stream)	2.3940	2.3940	2.3940	2.3940
	R2 (Stream)	2.7290	2.7290	2.7290	2.7290
	R3 (Stream)	4.1260	4.1260	4.1260	4.1260
	R4 (Stream)	3.7450	3.7450	3.7450	3.7450
20m Spray drift & Runoff	D6 (Ditch)	1.9350	1.9350	1.9350	1.9350
	R1 (Pond)	0.4768	0.2614	0.1556	0.0964
	R1 (Stream)	1.2510	1.2510	1.2510	1.2510
	R2 (Stream)	1.4250	1.4250	1.4250	1.4250
	R3 (Stream)	2.1560	2.1560	2.1560	2.1560
	R4 (Stream)	1.9490	1.9490	1.9490	1.9490

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

Table 9.2.5- 38: Summary of FOCUS Step 4 PEC_{sed} values of phosphonic acid (3×2.0 kg fosetyl-Al/ha, 10 days int.); Entries marked with * result from single applications.

		Phosphonic acid PEC_{sed} [µg/kg]			
		Nozzle Reduction			
Buffer Width & Type	**Scenario**	**0%**	**50%**	**75%**	**90%**
5m Spray drift	D6 (Ditch)	24.110	13.320	7.3620	3.3760
	R1 (Pond)	16.830	10.790	7.6210	5.6450
	R1 (Stream)	8.2420	8.2170	8.2030	8.1950
	R2 (Stream)	4.9240	4.8980	4.8840	4.8750
	R3 (Stream)	25.510	25.380	25.310	25.260
	R4 (Stream)	13.330	13.290	13.270	13.260
10m Spray drift & Runoff	D6 (Ditch)	9.9960	5.5300	3.0710	1.4320
	R1 (Pond)	9.4070	5.7910	3.8910	2.6990
	R1 (Stream)	2.1750	2.1640	2.1580	2.1550
	R2 (Stream)	1.9380	1.9270	1.9210	1.9170
	R3 (Stream)	7.4270	7.3690	7.3400	7.3220
	R4 (Stream)	4.4370	4.4210	4.4130	4.4080
15m Spray drift & Runoff	D6 (Ditch)	5.8960	3.2730	1.8340	0.8730
	R1 (Pond)	7.0640	4.5600	3.2480	2.4330
	R1 (Stream)	2.1650	2.1590	2.1560	2.1540
	R2 (Stream)	1.9280	1.9220	1.9180	1.9160
	R3 (Stream)	7.3740	7.3420	7.3260	7.3160
	R4 (Stream)	4.4220	4.4130	4.4090	4.4060
20m Spray drift & Runoff	D6 (Ditch)	4.0440	2.2550	1.2730	0.7148
	R1 (Pond)	5.0850	3.1260	2.0970	1.4540
	R1 (Stream)	0.9987	0.9944	0.9922	0.9909
	R2 (Stream)	0.9974	0.9929	0.9905	0.9889
	R3 (Stream)	3.6420	3.6190	3.6080	3.6010
	R4 (Stream)	2.2410	2.2350	2.2320	2.2300

S, R and D denote main entry route via spray drift, runoff or drainage, respectively.

CP 9.3 Fate and behavior in air

For information on the fate and behavior in air please refer to Document MCA, Section 7.3.

CP 9.3.1 Route and rate of degradation in air and transport via air

For information on route and rate of degradation in air and transport via air please refer to Document MCA, Sections 7.3.1 and 7.3.2.

CP 9.4 Estimation of concentrations for other routes of exposure

There are no other routes of exposure if the product is used according to good agricultural practice. Therefore no further estimations are considered necessary.