Document Title

Summary of the fate and behaviour in the environment for Fosetyl-aluminium WG 80 (800 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

M-534262-03-3

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-534262-02-1
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-534262-03-1

[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 behaviour.

The formulation Fosetyl-aluminium WG 80 (Fosetyl-Al WG 80) is a water dispersible granule (WG) formulation containing 800 g/kg of fosetyl-Al. This formulation is registered throughout Europe on a wide range of crops under trade names such as Aliette. Fosetyl-Al WG 80 was already a representative formulation of BCS for the Annex I inclusion of fosetyl under Directive 91/414/EEC.

Use patterns considered in this risk assessment

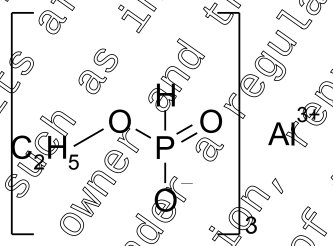
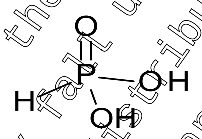
Table 9- 1: Intended application pattern

Crop	Timing of application (range)	Number of applications	Application interval [days]	Maximum label rate (range) [kg prod./ha]	Maximum application rate, individual treatment (ranges) [kg a.s./ha] Fosetyl-Al
Orchards (Pome fruits)	BBCH 55-85	1-3	7- 10	4.5	3.6

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.

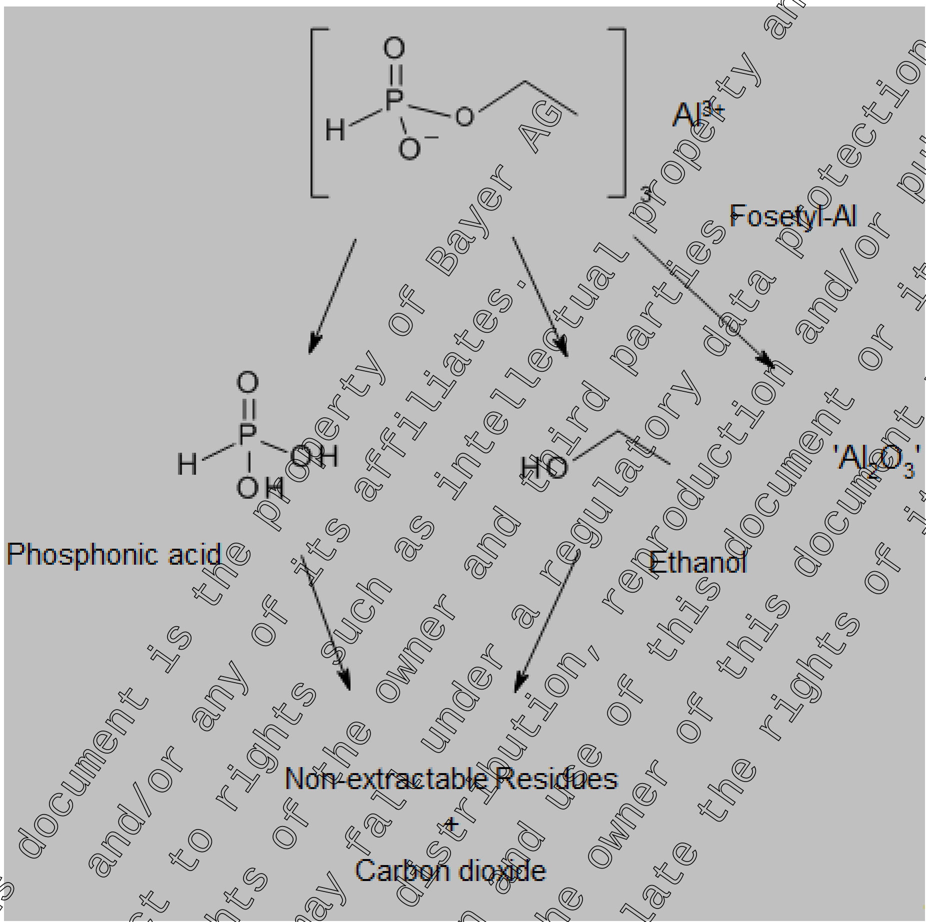
Table 9- 3: Definition of the residue for risk assessment

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/cm^3 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 pome fruits (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 9.1.3/02 [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-aluminium (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 pome fruits 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
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	[g a.s./ha]
Pome fruits	Apples	3 × 3600	7	3 × 60	55-85	3 × 1440.00

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 summarised 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]	
Pome fruits, 3×3600 g a.s./ha	1.920	3.930

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]**
Pome fruits 3×3600 g a.s./ha	plateau total	<0.001 1.920	2.532 6.462

Table 9.1.3- 6: PEC_{soil} of fosetyl-Al and its degradation product for the use in pome fruits (3×3600 g a.s./ha, 3×60% interception, 7 d app. interval)

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		**PEC_{soil} [mg/kg]**	
Initial	0	1.920	3.930
Short-term	1	0.002	3.920
	2	<0.001	3.910
	4	<0.001	3.890
Long-term	7	<0.001	3.860
	14	<0.001	3.791
	21	<0.001	3.724
	28	<0.001	3.657
	42	<0.001	3.528
	50	<0.001	3.457
	100	<0.001	3.040

Table 9.1.3- 7: TWA_{soil} of fosetyl-Al and its degradation product for the use in pome fruits (3×3600 g a.s./ha, 3×60% interception, 7 d app. interval)

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		**TWA_{soil} [mg/kg]**	
Initial	0	-	-
Short-term	1	0.277	3.925
	2	0.138	3.920
	4	0.069	3.910
Long-term	7	0.040	3.895
	14	0.020	3.860
	21	0.013	3.826
	28	0.010	3.792
	42	0.007	3.726
	50	0.006	3.688
	100	0.003	3.466

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 9.1.3/03 [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 pome fruit 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 [g a.s./ha]
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	
Pome fruits	Apples	3 × 3600	7	3 × 60	55-85	3 × 1440.00

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-532841-01-1; 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]	
Pome fruits, 3×3600 g a.s./ha	1.920	3.982

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]
Pome fruits 3×3600 g a.s./ha	plateau total	<0.001 1.920	13.83 17.81

Table 9.1.3- 12: PEC_{soil} of fosetyl-Al and its metabolite for the use in pome fruits (3×3600 g a.s./ha, 3×60% interception, 7 days app. interval)

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		PEC_{soil} [mg/kg]	
Initial	0	1.920	3.982
Short-term	1	0.002	3.979
	2	<0.001	3.976
	4	<0.001	3.971
Long-term	7	<0.001	3.962
	14	<0.001	3.943
	21	<0.001	3.924
	28	<0.001	3.905
	42	<0.001	3.867
	50	<0.001	3.846
	100	<0.001	3.715

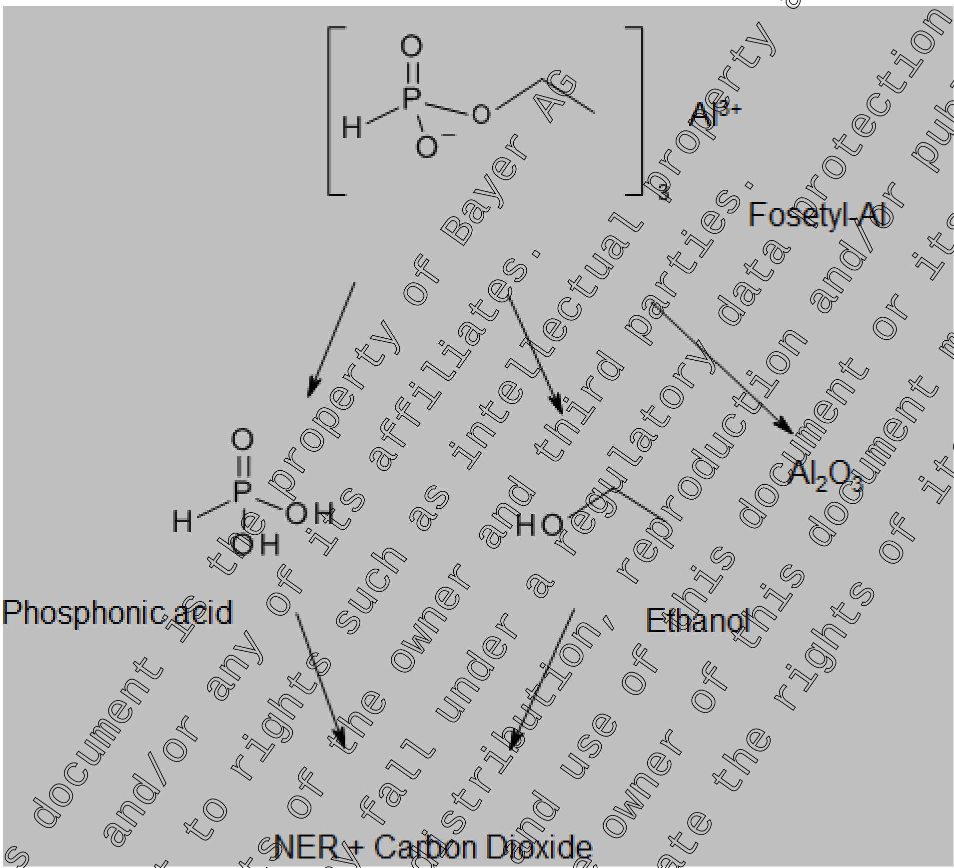
Table 9.1.3- 13: TWA_{soil} of fosetyl-Al and its metabolite for the use in pome fruits (3×3600 g a.s./ha, 3×60% interception, 7 days app. interval)

Substance		Fosetyl-Al	Phosphonic acid
Days after maximum		TWA_{soil} [mg/kg]	
Initial	0	-	-
Short-term	1	0.277	3.980
	2	0.138	3.979
	4	0.069	3.976
Long-term	7	0.040	3.972
	14	0.020	3.962
	21	0.013	3.953
	28	0.010	3.943
	42	0.007	3.924
	50	0.006	3.913
	100	0.003	3.847

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 behaviour 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 (fosetyl-Al) 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 10-69	BBCH 71-75	BBCH 76-89
Apples	without leaves 50	flowering 60	early fruit development 65	full canopy 65

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 9.2.4.1/03 [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 pome fruits 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
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	[g a.s./ha]
Pome fruits	Apples	3 × 3600	7	3 × 60	55-85	3 × 1440.00

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]	0.1	-
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	**Pome fruits**
Repeat Interval for App. Events	**Every Year**
Application Technique	**Spray**
Absolute / Relative to	**Absolute**
Scenario	**1st App. Date (Julian day) Offset**
[redacted]	21 May (141) -
[redacted]	08 May (128) -
[redacted]	23 May (143) -
[redacted]	08 May (128) -
[redacted]	02 Jun (153) -
[redacted]	21 May (141) -
[redacted]	13 Jun (164) -
[redacted]	19 May (139) -
[redacted]	13 Jun (164) -

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.

Pome fruits, 3×3600 g a.s./ha

Table 9.2.4.1- 4: FOCUS PEARL PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Pome fruits, 3×3600 g a.s./ha, 3×60% interception, 7 d app. interval)

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

Table 9.2.4.1- 5: FOCUS PELMO PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Pome fruits, 3×3600 g a.s./ha, 3×60% interception, 7 d app. interval)

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

Table 9.2.4.1- 6: FOCUS MACRO PEC_{gw} results of fosetyl-Al and its metabolite in µg/L (Pome fruits, 3×3600 g a.s./ha, 3×60% interception, 7 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 9.2.4.1/04 [redacted],; [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 (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, 2014b).

The use of fosetyl-Al in pome fruits 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 [g a.s./ha]**
		Rate per Season [g a.s./ha]	**Interval [days]**	**Plant Interception [%]**	**BBCH Stage**	
Pome fruits	Apples	3 × 3600	7	3 × 60	55-85	3 × 1440.00

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 9.2.4.1- 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 degradation product

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
K_{om}	(mL/g)	0.058	-
K_f	(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 -> H_3PO_3: 0.6946405		
[a] Calculated as ln(2) / DT_{50} × 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	Pome fruits
Repeat Interval for App. Events	Every Year
Application Technique	Spray
Absolute / Relative to	Absolute
Scenario	1st App. Date (Julian day) Offset
[redacted]	21 May (141) -
[redacted]	08 May (128) -
[redacted]	23 May (143) -
[redacted]	08 May (128) -
[redacted]	02 Jun (153) -
[redacted]	21 May (141) -
[redacted]	13 Jun (164) -
[redacted]	19 May (139) -
[redacted]	13 Jun (164) -

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 (Pome fruits, 3×3600 g a.s./ha, 3×60% interception, 7 days 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 (Pome fruits, 3×3600 g a.s./ha, 3×60% interception, 7 days 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 (Pome fruits, 3×3600 g a.s./ha, 3×60% interception, 7 days 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 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 9.2.5/02 [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 pome fruits 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
Pome fruits	pome / stone fruit, late applns (fruit crops / late)	3 × 3600	55-85	10	full canopy (65%)	Mar. - May

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 pome fruits

PMT Name **DGR / PMT Number** **Parameter**			**PMT00** **DGR I / PMT I**		
FOCUS model crop (crop group)			**Pome/Stone Fruit, Late Applns (fruit crops / late)**		
Use pattern (single/seasonal appln. rate)			**3×3.6 kg a.s./ha, 7d int. (3.6/0 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			**74 days - 141 days, scenario specific (min = 44 days)**		
Drainage Scenarios	**PAT Start, Interval (Julian Day)**	**Application Date**	**Runoff Scenarios**	**PAT Start, Interval (Julian Day)**	**Application Date**
D3 Ditch	08-May, 141 (128)	17 May 24 May 21 Jun	R1 Pond/Stream	08-May, 141 (128)	09 May 13 Jun 05 Jul
D4 Pond/Stream	23-Jun, 110 (174)	04 Jul 27 Aug 10 Sep	R2 Stream	08-Jul, 74 (189)	31 Jul 07 Aug 14 Aug
D5 Pond/Stream	21-May, 120 (141)	27 May 09 Jun 19 Jul	R3 Stream	21-May, 124 (141)	01 Jun 16 Jun 30 Jun
			R4 Stream	19-May, 126 (139)	27 May 12 Jun 25 Jun

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- 5: 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]
pome fruits	DGR I / PMT I	Step 1	4166	3.600	2067	2.026	852.6	0.839
		Step 2						
Pome / stone fruit, late applns		N-EU Multi	163.5	0.087	81.41	0.050	33.59	0.022
3×3600g a.s./ha, 7d int.		S-EU Multi	163.5	0.087	81.41	0.050	33.59	0.022
full canopy		N-EU Single	188.7	0.100	93.93	0.057	38.75	0.025
Spring (Mar. - May)		S-EU Single	188.7	0.100	93.93	0.057	38.75	0.025

Table 9.2.5- 6: 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]
pome fruits	DGR I / PMT I	Step 1	2842	20515	2594	20064	2466	19213
		Step 2						
Pome / stone fruit, late applns		N-EU Multi	229.2	1581	200.6	1544	190.3	1473
3×3600g a.s./ha, 7d int.		S-EU Multi	307.6	2189	277.1	2138	263.3	2040
full canopy		N-EU Single	131.1	699.8	90.11	683.4	86.18	652.1
Spring (Mar. - May)		S-EU Single	131.1	914.4	103.8	893.0	108.0	852.2

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 pome fruits.
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.

Table 9.2.5- 7: PEC_{sw} and PEC_{sed} values of fosetyl-Al in pome fruits (3x3600 g/ha – 7 day intervals) 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.	D3 (Ditch)	S	93.930	7.6890	19.810	4.9460	11.080	3.5740
	D4 (Pond)	S	4.9500	0.9342	3.3340	0.9138	2.3010	0.7890
	D4 (Stream)	S	94.640	3.1780	3.6060	0.7967	1.2020	0.4307
	D5 (Pond)	S	4.9440	0.8517	2.9990	0.8227	2.3000	0.6705
	D5 (Stream)	S	102.30	4.3700	5.4640	1.5020	3.6090	1.0630
	R1 (Pond)	S	4.4280	0.7465	2.9820	0.7156	1.6640	0.5737
	R1 (Stream)	S	72.520	2.3050	2.1370	0.5647	0.7183	0.3290
	R2 (Stream)	S	97.200	2.3120	1.4680	0.5256	1.4670	0.4329
	R3 (Stream)	S	102.20	4.4120	5.2620	1.5780	3.5080	1.2090
	R4 (Stream)	S	72.510	2.3740	2.1470	0.6249	1.4220	0.4649
Single application.	D3 (Ditch)	S	132.10	8.2860	22.830	4.7610	7.6190	2.6750
	D4 (Pond)	S	5.9290	0.6522	3.4020	0.6279	1.5670	0.5042
	D4 (Stream)	S	132.60	4.4530	5.0520	1.1160	1.6840	0.6033
	D5 (Pond)	S	5.9300	0.7446	3.8340	0.7206	1.8810	0.5958
	D5 (Stream)	S	143.20	5.5600	7.5120	1.6470	2.5050	0.8934
	R1 (Pond)	S	5.9250	0.8144	4.1040	0.7996	2.2900	0.7035
	R1 (Stream)	S	99.710	2.3460	1.8400	0.4092	0.6199	0.2219
	R2 (Stream)	S	136.20	2.8900	2.0570	0.4571	0.6856	0.2456
	R3 (Stream)	S	**143.20**	5.4840	7.3730	1.6160	2.4580	0.8759
	R4 (Stream)	S	99.320	2.2750	1.6850	0.3753	0.5617	0.2018

In bold: highest PECsw value

Table 9.2.5- 8: PEC_{sw} and PEC_{sed} values of phosphonic acid in pome fruits (3x3600 g fosetyl-Al/ha – 7 day intervals) 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.	D3 (Ditch)		8.8450	7.2530	2.9510	5.3680	1.1490	3.6100
	D4 (Pond)		5.4980	26.230	5.4860	26.190	5.3930	26.080
	D4 (Stream)		5.6110	1.1870	0.5726	0.8631	0.2063	0.5961
	D5 (Pond)		5.8410	25.360	5.8190	25.360	5.6710	25.310
	D5 (Stream)		8.9720	2.5190	0.5585	1.3200	0.3433	0.9981
	R1 (Pond)		5.4050	20.380	5.3760	20.370	5.1759	20.290
	R1 (Stream)		8.3720	4.8960	0.9340	2.7470	0.3533	2.0320
	R2 (Stream)		8.4230	6.3800	1.1700	3.7720	0.5201	2.9480
	R3 (Stream)		10.240	2.8990	0.6183	1.4910	0.4123	1.1500
	R4 (Stream)		11.720	10.160	2.4740	7.7200	1.5770	6.3040
Single application.	D3 (Ditch)		8.8060	5.2670	2.2870	3.3830	0.7687	2.0530
	D4 (Pond)		3.1720	11.190	3.1590	11.190	3.0720	11.180
	D4 (Stream)		7.8610	1.3980	0.3422	0.5467	0.1142	0.3155
	D5 (Pond)		3.3490	12.550	3.3390	12.550	3.2680	12.530
	D5 (Stream)		11.640	2.8900	0.6944	1.3550	0.2464	0.8708
	R1 (Pond)		2.8140	9.9670	2.8050	9.9620	2.7420	9.9270
	R1 (Stream)		4.6030	2.1120	0.4044	1.2020	0.1715	0.8728
	R2 (Stream)		6.4360	1.8740	0.3419	1.1120	0.1520	0.8688
	R3 (Stream)		**14.350**	3.2750	0.8651	1.3760	0.2888	0.7951
	R4 (Stream)		5.7100	2.1830	0.6250	1.6110	0.3799	1.4610

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.

Table 9.2.5- 9: Summary of FOCUS Step 4 PEC_{sw} values of fosetyl-Al (3×3.6 kg a.s./ha, 7d int.) Entries marked with * result from single applications. Pome/stone fruit, late applications

Fosetyl-Al PEC_{sw} [µg/L]													
Buffer Width & Type	**Scenario**	**Nozzle Reduction**											
		0%			**50%**			**75%**			**90%**		
5m Spray drift	D3 (Ditch)	S	89.130	*	S	44.570	*	S	22.280	*	S	8.9130	*
	D4 (Pond)	S	6.7810	*	S	3.3900	*	S	1.6950	*	S	0.6781	*
	D4 (Stream)	S	103.50	*	S	51.750	*	S	25.870	*	S	10.350	*
	D5 (Pond)	S	6.7820	*	S	3.3910	*	S	1.6960	*	S	0.6782	*
	D5 (Stream)	S	111.80	*	S	55.890	*	S	27.940	*	S	11.180	*
	R1 (Pond)	S	6.7760	*	S	3.3880	*	S	1.6940	*	S	0.6776	*
	R1 (Stream)	S	77.830	*	S	38.910	*	S	19.460	*	S	7.7830	*
	R2 (Stream)	S	106.30	*	S	53.150	*	S	26.580	*	S	10.630	*
	R3 (Stream)	S	111.80	*	S	55.890	*	S	27.950	*	S	11.180	*
	R4 (Stream)	S	77.520	*	S	38.760	*	S	19.380	*	S	7.7520	*
10m Spray drift & Runoff	D3 (Ditch)	S	39.830	*	S	19.920	*	S	9.9580	*	S	3.9830	*
	D4 (Pond)	S	3.7610	*	S	1.8800	*	S	0.9402	*	S	0.3761	*
	D4 (Stream)	S	46.250	*	S	23.120	*	S	11.560	*	S	4.6250	*
	D5 (Pond)	S	3.7620	*	S	1.8810	*	S	0.9404	*	S	0.3762	*
	D5 (Stream)	S	49.950	*	S	24.970	*	S	12.490	*	S	4.9950	*
	R1 (Pond)	S	3.7580	*	S	1.8790	*	S	0.9395	*	S	0.3758	*
	R1 (Stream)	S	34.780	*	S	17.390	*	S	8.6940	*	S	3.4780	*
	R2 (Stream)	S	47.500	*	S	23.750	*	S	11.880	*	S	4.7500	*
	R3 (Stream)	S	49.950	*	S	24.980	*	S	12.490	*	S	4.9950	*
	R4 (Stream)	S	34.640	*	S	17.320	*	S	8.6600	*	S	3.4640	*
15m Spray drift & Runoff	D3 (Ditch)	S	20.110	*	S	10.060	*	S	5.0280	*	S	2.0110	*
	D4 (Pond)	S	2.4030	*	S	1.2010	*	S	0.6007	*	S	0.2403	*
	D4 (Stream)	S	23.350	*	S	11.680	*	S	5.8380	*	S	2.3350	*
	D5 (Pond)	S	2.4030	*	S	1.2020	*	S	0.6008	*	S	0.2403	*
	D5 (Stream)	S	25.220	*	S	12.610	*	S	6.3050	*	S	2.5220	*
	R1 (Pond)	S	2.4010	*	S	1.2010	*	S	0.6003	*	S	0.2401	*
	R1 (Stream)	S	17.560	*	S	8.7800	*	S	4.3900	*	S	1.7560	*
	R2 (Stream)	S	23.980	*	S	11.990	*	S	5.9960	*	S	2.3980	*
	R3 (Stream)	S	25.220	*	S	12.610	*	S	6.3050	*	S	2.5220	*
	R4 (Stream)	S	17.490	*	S	8.7450	*	S	4.3730	*	S	1.7490	*
20m Spray drift & Runoff	D3 (Ditch)	S	12.290	*	S	6.1450	*	S	3.0730	*	S	1.2290	*
	D4 (Pond)	S	1.7110	*	S	0.8555	*	S	0.4277	*	S	0.1711	*
	D4 (Stream)	S	14.270	*	S	7.1360	*	S	3.5680	*	S	1.4270	*
	D5 (Pond)	S	1.7110	*	S	0.8556	*	S	0.4278	*	S	0.1711	*
	D5 (Stream)	S	15.410	*	S	7.7070	*	S	3.8530	*	S	1.5410	*
	R1 (Pond)	S	1.7100	*	S	0.8549	*	S	0.4274	*	S	0.1710	*
	R1 (Stream)	S	10.730	*	S	5.3660	*	S	2.6830	*	S	1.0730	*
	R2 (Stream)	S	14.660	*	S	7.3290	*	S	3.6650	*	S	1.4660	*
	R3 (Stream)	S	15.410	*	S	7.7070	*	S	3.8540	*	S	1.5410	*
	R4 (Stream)	S	10.690	*	S	5.3450	*	S	2.6720	*	S	1.0690	*

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

Table 9.2.5- 10: Summary of FOCUS Step 4 PEC_{sed} values of fosetyl-Al (3×3.6 kg a.s./ha, 7d int.); Entries marked with * result from single applications. Pome/stone fruit, late applications

Fosetyl-Al PEC_{sed} [µg/kg]									
Buffer Width & Type	**Scenario**	**Nozzle Reduction**							
		0%		**50%**		**75%**		**90%**	
5m Spray drift	D3 (Ditch)	5.5930	*	2.7960	*	1.3980	*	0.5593	*
	D4 (Pond)	1.0680		0.5341		0.2671		0.1068	
	D4 (Stream)	3.4750	*	1.7380	*	0.8688	*	0.3475	*
	D5 (Pond)	0.9739		0.4869		0.2435		0.0974	
	D5 (Stream)	4.3400	*	2.1700	*	1.0850	*	0.4340	*
	R1 (Pond)	0.9313	*	0.4657	*	0.2328	*	0.0931	*
	R1 (Stream)	1.8310	*	0.9157	*	0.4578	*	0.1831	
	R2 (Stream)	2.2560	*	1.1280	*	0.5639	*	0.2256	*
	R3 (Stream)	4.2800	*	2.1400	*	1.0700	*	0.4280	*
	R4 (Stream)	1.8720		0.9377		0.4706		0.1902	
10m Spray drift & Runoff	D3 (Ditch)	2.4990	*	1.2500	*	0.6248	*	0.2499	*
	D4 (Pond)	0.5861		0.2931		0.1465		0.0586	
	D4 (Stream)	1.5530	*	0.7765	*	0.3883	*	0.1553	*
	D5 (Pond)	0.5344		0.2672		0.1336		0.0534	
	D5 (Stream)	1.9390	*	0.9696	*	0.4848	*	0.1939	*
	R1 (Pond)	0.5165	*	0.2583	*	0.1291	*	0.0517	*
	R1 (Stream)	0.8469		0.4238		0.2122		0.0853	
	R2 (Stream)	1.0080	*	0.5040	*	0.2520	*	0.1008	*
	R3 (Stream)	1.9130	*	0.9563	*	0.4781	*	0.1913	*
	R4 (Stream)	0.8723		0.4368		0.2191		0.0885	
15m Spray drift & Runoff	D3 (Ditch)	1.2620	*	0.6309	*	0.3155	*	0.1262	*
	D4 (Pond)	0.3573		0.1787		0.0893		0.0358	
	D4 (Stream)	0.7841	*	0.3921	*	0.1960	*	0.0784	*
	D5 (Pond)	0.3257		0.1629		0.0814		0.0326	
	D5 (Stream)	0.9791	*	0.4896	*	0.2448	*	0.0979	*
	R1 (Pond)	0.3300	*	0.1650	*	0.0825	*	0.0330	*
	R1 (Stream)	0.4203		0.2105		0.1056		0.0426	
	R2 (Stream)	0.5089	*	0.2545	*	0.1272	*	0.0509	*
	R3 (Stream)	0.9657	*	0.4828	*	0.2414	*	0.0966	*
	R4 (Stream)	0.4332		0.2173		0.1094		0.0446	
20m Spray drift & Runoff	D3 (Ditch)	0.7712	*	0.3856	*	0.1928	*	0.0771	*
	D4 (Pond)	0.2450		0.1225		0.0613		0.0245	
	D4 (Stream)	0.4792	*	0.2396	*	0.1198	*	0.0479	*
	D5 (Pond)	0.2234		0.1117		0.0558		0.0223	
	D5 (Stream)	0.5984	*	0.2992	*	0.1496	*	0.0598	*
	R1 (Pond)	0.2350	*	0.1175	*	0.0588	*	0.0235	*
	R1 (Stream)	0.2525	*	0.1263	*	0.0631	*	0.0253	*
	R2 (Stream)	0.3110	*	0.1555	*	0.0778	*	0.0311	*
	R3 (Stream)	0.5902	*	0.2951	*	0.1475	*	0.0590	*
	R4 (Stream)	0.2523		0.1265		0.0636		0.0259	

Table 9.2.5- 11: Summary of FOCUS Step 4 PEC_{sw} values of phosphonic acid (3×3.6 kg fosetyl-Al/ha, 7d int.); Entries marked with * result from single applications - Pome/stone fruit, late applications

Phosphonic acid PEC_{sw} [µg/L]					
Buffer Width & Type	**Scenario**	**Nozzle Reduction**			
		0%	**50%**	**75%**	**90%**
5m Spray drift	D3 (Ditch)	6.0610	3.0300	1.5150	0.6061
	D4 (Pond)	6.2870	3.1440	1.5720	0.9134
	D4 (Stream)	6.1360 *	3.0680 *	2.8450	2.8450
	D5 (Pond)	6.6600	3.3970	1.7650	0.7866
	D5 (Stream)	9.0820 *	4.5420 *	2.2710 *	2.2060
	R1 (Pond)	6.1700	3.1230	1.6000	0.6861
	R1 (Stream)	8.3720	8.3720	8.3720	8.3720
	R2 (Stream)	8.4230	8.4230	8.4230	8.4230
	R3 (Stream)	11.200 *	5.6000 *	2.8000 *	2.4370
	R4 (Stream)	11.720	11.720	11.720	11.720
10m Spray drift & Runoff	D3 (Ditch)	2.8240	1.4120	0.7060	0.2824
	D4 (Pond)	3.4500	1.7250	1.0390	0.7609
	D4 (Stream)	2.8450	2.8450	2.8450	2.8450
	D5 (Pond)	3.7150	1.9240	1.0290	0.5739
	D5 (Stream)	4.0590 *	2.2060	2.2060	2.2060
	R1 (Pond)	3.3760	1.7030	0.8668	0.3651
	R1 (Stream)	3.6130	3.6130	3.6130	3.6130
	R2 (Stream)	3.8000	3.8000	3.8000	3.8000
	R3 (Stream)	5.0040 *	2.5020 *	1.2510 *	1.0970
	R4 (Stream)	5.1740	5.1740	5.1740	5.1740
15m Spray drift & Runoff	D3 (Ditch)	1.4000	0.7001	0.3501	0.1400
	D4 (Pond)	2.1030	1.1410	0.8580	0.6885
	D4 (Stream)	2.8450	2.8450	2.8450	2.8450
	D5 (Pond)	2.3160	1.2250	0.6798	0.5504
	D5 (Stream)	2.2060	2.2060	2.2060	2.2060
	R1 (Pond)	2.0690	1.0500	0.5403	0.2345
	R1 (Stream)	3.6130	3.6130	3.6130	3.6130
	R2 (Stream)	3.8000	3.8000	3.8000	3.8000
	R3 (Stream)	2.5270 *	1.2630 *	1.0970	1.0970
	R4 (Stream)	5.1740	5.1740	5.1740	5.1740
20m Spray drift & Runoff	D3 (Ditch)	0.8196 *	0.4098 *	0.2049 *	0.0820 *
	D4 (Pond)	1.4420	0.9631	0.7692	0.6530
	D4 (Stream)	2.8450	2.8450	2.8450	2.8450
	D5 (Pond)	1.6310	0.8824	0.5766	0.5389
	D5 (Stream)	2.2060	2.2060	2.2060	2.2060
	R1 (Pond)	1.4140	0.7145	0.3649	0.1551
	R1 (Stream)	1.8550	1.8550	1.8550	1.8550
	R2 (Stream)	1.9850	1.9850	1.9850	1.9850
	R3 (Stream)	1.5440 *	0.7722 *	0.5720	0.5720
	R4 (Stream)	2.6800	2.6800	2.6800	2.6800

Table 9.2.5- 12: Summary of FOCUS Step 4 PECsed values of phosphonic acid (3×3.6 kg fosetyl-Al/ha, 7d int.); Entries marked with * result from single applications - Pome/stone fruit, late applications

		Phosphonic acid PEC$_{sed}$ [µg/kg]			
Buffer Width & Type	**Scenario**	**Nozzle Reduction**			
		0%	**50%**	**75%**	**90%**
5m Spray drift	D3 (Ditch)	4.9700	2.4850	1.2420	0.4970
	D4 (Pond)	29.910	15.340	8.1820	4.0820
	D4 (Stream)	1.1740	1.1500	1.1370	1.1300
	D5 (Pond)	28.830	15.010	8.1140	4.0550
	D5 (Stream)	2.3140 *	1.2890 *	0.7767	0.7767
	R1 (Pond)	23.260	11.790	6.0580	2.6180
	R1 (Stream)	4.8750	4.8350	4.8150	4.8030
	R2 (Stream)	6.3720	6.3560	6.3490	6.3440
	R3 (Stream)	2.5580 *	1.4860	1.4610	1.4450
	R4 (Stream)	10.150	10.120	10.110	10.100
10m Spray drift & Runoff	D3 (Ditch)	2.3160	1.1580	0.5790	0.2316
	D4 (Pond)	16.750	8.8710	5.0540	2.9360
	D4 (Stream)	1.1480	1.1370	1.1310	1.1270
	D5 (Pond)	16.360	8.7850	5.0150	3.2030
	D5 (Stream)	1.1800 *	0.7767	0.7767	0.7767
	R1 (Pond)	12.720	6.4210	3.2730	1.3840
	R1 (Stream)	1.7890	1.7710	1.7610	1.7560
	R2 (Stream)	2.1690	2.1620	2.1580	2.1560
	R3 (Stream)	1.1430 *	0.6077	0.5959	0.5889
	R4 (Stream)	3.2780	3.2540	3.2420	3.2340
15m Spray drift & Runoff	D3 (Ditch)	1.1480	0.5741	0.2871	0.1148
	D4 (Pond)	10.580	5.8750	3.6640	2.3970
	D4 (Stream)	1.1360	1.1310	1.1280	1.1260
	D5 (Pond)	10.440	5.8380	3.7420	2.8080
	D5 (Stream)	0.7767	0.7767	0.7767	0.7767
	R1 (Pond)	7.8010	3.9630	2.0440	0.8929
	R1 (Stream)	1.7700	1.7610	1.7570	1.7540
	R2 (Stream)	2.1620	2.1580	2.1560	2.1550
	R3 (Stream)	0.6075	0.5958	0.5900	0.5865
	R4 (Stream)	3.2540	3.2420	3.2360	3.2320
20m Spray drift & Runoff	D3 (Ditch)	0.6692	0.3346	0.1673	0.0669
	D4 (Pond)	7.6030	4.4600	2.9990	2.1340
	D4 (Stream)	1.1320	1.1280	1.1270	1.1260
	D5 (Pond)	7.5450	4.4010	3.2490	2.6160
	D5 (Stream)	0.7767	0.7767	0.7767	0.7767
	R1 (Pond)	5.3270	2.6940	1.3780	0.5887
	R1 (Stream)	0.8788	0.8734	0.8707	0.8691
	R2 (Stream)	1.0630	1.0610	1.0600	1.0590
	R3 (Stream)	0.3537 *	0.3061	0.3027	0.3007
	R4 (Stream)	1.6020	1.5950	1.5920	1.5890

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- 14).

Report:	KCP 9.2.5/03[redacted]T;[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 pome fruits was assessed according to the Good Agricultural Practice (GAP) in Europe. Detailed application parameters are presented in Table 9.2.5- 13.

Table 9.2.5- 13: 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
Pome fruits	pome / stone fruit, late applns (fruit crops / late)	3 × 3600	55-85	10	full canopy (65%)	Mar. - May

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- 14.

Table 9.2.5- 14: 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- 15).

Table 9.2.5- 15: Substance parameters used for fosetyl-Al and its metabolite

Parameter	**Unit**	**Parent**	**Metabolite**
Substance SWASH code		Fosetyl-Al FEA	Phosphonic acid H3PO3
General Molar mass Water solubility (temp.) Vapour pressure (temp.)	 (g/mol) (mg/L) (Pa)	 354.14 110000 (20 °C) 1E-07 (25 °C)	 82 110000 (20 °C) 1E-07 (25 °C)
Crop processes Coefficient for uptake by plant (TSCF) Wash-off factor	 (-) (1/m)	 0 50	 0 50
Sorption K_{OC} K_{OM} Freundlich exponent ($^1/_n$)	 (mL/g) (mL/g) (-)	 0.1 0.06 1	 305.15 [a] 177 [a] 0.69
Transformation DT_{50} in soil temperature moisture content (pF) formation fraction in soil DT_{50} in water temperature formation fraction in water DT_{50} in sediment temperature formation fraction in sediment DT_{50} on canopy	 (days) (°C) (log(cm)) (-) (days) (°C) (-) (days) (°C) (-) (days)	 0.1 20 2 - 3 20 - 1000 20 - 10	 133.7 20 2 3 1000 20 3 1000 20 3 10
Exponent for the effect of moisture PRZM and TOXSWA (Walker exp.) MACRO (calibrated value)	 (-) (-)	 0.7 0.49	 0.7 0.49
Effect of temperature TOXSWA (molar activation energy) MACRO (effect of temperature) PRZM (Q_{10})	 (kJ/mol) (1/K) (-)	 65.4 0.0948 2.58	 65.4 0.0948 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- 16.

Table 9.2.5- 16: Application dates of fosetyl-Al for the FOCUS Step 3 calculations for the use in pome fruits

Run IDs GAP Name (DGR) Assessment name (PMT)			DGR I / PMT I Pome fruit (threefold appln) Pome fruit (threefold appln)		
FOCUS model crop (crop group)			Pome/stone fruit, late applns (fruit crops / late)		
Use pattern			3×3.6 kg a.s./ha, 7 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			74 days - 141 days, scenario specific (min = 44 days)		
Drainage scenarios	**PAT start/end date (Jul. day, range)**	**Application date**	**Runoff scenarios**	**PAT start/end date (Jul. day, range)**	**Application date**
D3 Ditch	08-May/26-Sep (128/269, 141)	17-May 24-May 21-Jun	R1 Pond/Stream	08-May/26-Sep (128/269, 141)	09-May 13-Jun 05-Jul
D4 Pond/Stream	23-Jun/11-Oct (174/284, 110)	04-Jul 27-Aug 10-Sep	R2 Stream	08-Jul/20-Sep (189/263, 74)	31-Jul 07-Aug 14-Aug
D5 Pond/Stream	21-May/18-Sep (141/261, 120)	27-May 09-Jun 19-Jul	R3 Stream	21-May/22-Sep (141/265, 124)	01-Jun 16-Jun 30-Jun
			R4 Stream	19-May/22-Sep (139/265, 126)	27-May 12-Jun 25-Jun

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- 17: 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]
Pome / stone fruit, late applns 3×3600g a.s./ha, 7 days int. full canopy Spring (Mar. - May)	Step 1	4165.6	3.5995	2066.9	2.0264	852.60	0.8391
	Step 2						
	N-EU Multi	163.56	0.1090	81.418	0.0625	33.594	0.0273
	S-EU Multi	163.56	0.1090	81.418	0.0625	33.594	0.0273
	N-EU Single	188.70	0.1257	93.934	0.0721	38.758	0.0315
	S-EU Single	188.70	0.1257	93.934	0.0721	38.758	0.0315

Table 9.2.5- 18: 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]
Pome / stone fruit, late applns 3×3600g a.s./ha, 7 days int. full canopy Spring (Mar. - May)	Step 1	3905.5	12039	3787.6	11955	3763.7	11939
	Step 2						
	N-EU Multi	329.21	978.96	308.83	976.59	306.34	971.87
	S-EU Multi	445.37	1348.1	424.71	1344.8	421.66	1338.3
	N-EU Single	142.05	449.25	132.33	418.23	131.22	416.21
	S-EU Single	182.18	546.79	172.37	545.46	171.06	542.83

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 pome fruits.

Single and multiple application PEC_{sw} and PEC_{sed} values are presented for all relevant scenarios in Step 3 and 4.

Table 9.2.5- 19: PEC_{sw} and PEC_{sed} values of fosetyl-Al in pome fruits (3x3600 g/ha – 7 day intervals) for all calculated scenarios according to FOCUS SW Step 3

Fosetyl-Al								
	Scenario	**Entry route** Spray drift **R**unoff **D**rainage	**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.	D3 (Ditch)	S	93.930	7.6890	19.810	4.9460	11.080	3.5740
	D4 (Pond)	S	4.9500	0.9342	3.3340	0.9138	2.3010	0.7890
	D4 (Stream)	S	94.640	3.1780	3.6060	0.7967	1.2020	0.4307
	D5 (Pond)	S	4.9440	0.8517	2.9990	0.8227	2.3000	0.6705
	D5 (Stream)	S	102.30	4.3700	5.4640	1.5020	3.6090	1.0630
	R1 (Pond)	S	4.4280	0.7465	2.9820	0.7156	1.6640	0.5737
	R1 (Stream)	S	72.520	2.3050	2.1370	0.5647	0.7183	0.3290
	R2 (Stream)	S	97.200	2.3120	1.4680	0.5256	1.4670	0.4329
	R3 (Stream)	S	102.20	4.4120	5.2620	1.5780	3.5080	1.2090
	R4 (Stream)	S	72.510	2.3740	2.1470	0.6249	1.4220	0.4649
Single application.	D3 (Ditch)	S	132.10	8.2860	22.830	4.7610	7.6190	2.6750
	D4 (Pond)	S	5.9290	0.6522	3.4020	0.6279	1.5670	0.5042
	D4 (Stream)	S	132.60	4.4530	5.0520	1.1160	1.6840	0.6033
	D5 (Pond)	S	5.9300	0.7446	3.8340	0.7206	1.8810	0.5958
	D5 (Stream)	S	**143.20**	5.5600	7.5120	1.6470	2.5050	0.8934
	R1 (Pond)	S	5.9250	0.8144	4.1040	0.7996	2.2900	0.7035
	R1 (Stream)	S	99.710	2.3460	1.8400	0.4092	0.6199	0.2219
	R2 (Stream)	S	136.20	2.8900	2.0570	0.4571	0.6856	0.2456
	R3 (Stream)	S	**143.20**	5.4840	7.3730	1.6160	2.4580	0.8759
	R4 (Stream)	S	99.320	2.2750	1.6850	0.3753	0.5617	0.2018

In bold: highest PEC_{sw} value

Table 9.2.5- 20: PEC_{sw} and PEC_{sed} values of phosphonic acid in pome fruits (3x3600 g fosetyl-Al/ha – 7 day intervals) 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.	D3 (Ditch)	-	8.7580	11.510	2.9140	9.6010	1.1400	7.4230
	D4 (Pond)		5.8420	54.340	5.8310	54.320	5.7520	54.260
	D4 (Stream)		8.7620	6.6470	2.1750	5.4850	0.7957	4.2690
	D5 (Pond)		15.550	170.70	15.390	170.40	14.810	169.70
	D5 (Stream)		14.840	31.570	8.3700	30.740	4.8920	28.370
	R1 (Pond)		5.7860	44.810	5.7640	44.810	5.6130	44.780
	R1 (Stream)		13.390	9.1500	1.4940	6.1590	0.5406	4.8450
	R2 (Stream)		15.990	11.130	2.0990	7.2340	0.8628	6.1530
	R3 (Stream)		10.400	5.3550	0.6249	4.4500	0.4170	3.8430
	R4 (Stream)		**23.460**	21.810	4.7130	18.750	2.9120	16.650
Single application.	D3 (Ditch)	-	8.7340	7.3500	2.2560	5.5530	0.7630	3.9420
	D4 (Pond)		3.1830	26.930	3.1740	26.910	3.1100	26.810
	D4 (Stream)		7.9020	1.6960	0.3422	1.1440	0.1144	0.8656
	D5 (Pond)		3.3450	32.690	3.3380	32.690	3.2890	32.640
	D5 (Stream)		11.770	3.9570	0.6988	2.7530	0.2449	2.0580
	R1 (Pond)		2.8030	22.150	2.7940	22.150	2.7370	22.140
	R1 (Stream)		6.8620	4.2040	0.5701	3.1340	0.2633	2.4940
	R2 (Stream)		6.4650	3.4460	0.4398	3.1150	0.1930	2.7050
	R3 (Stream)		14.560	4.1230	0.8732	2.6380	0.2921	1.8430
	R4 (Stream)		5.7640	7.0420	0.8553	6.6500	0.5171	6.3940

In bold: highest PEC_{sw} 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.

Table 9.2.5- 21: Summary of FOCUS Step 4 PEC_{sw} values of fosetyl-Al (3×3.6 kg a.s./ha, 7 days int.) Entries marked with * result from single applications. Pome/stone fruit, late applications

		Fosetyl-Al PEC_{sw} [µg/L]											
		Nozzle Reduction											
Buffer Width & Type	**Scenario**	**0%**			**50%**			**75%**			**90%**		
5m Spray drift	D3 (Ditch)	S	89.130	*	S	44.570	*	S	22.280	*	S	8.9130	*
	D4 (Pond)	S	6.7810	*	S	3.3900	*	S	1.6950	*	S	0.6781	*
	D4 (Stream)	S	103.50	*	S	51.750	*	S	25.870	*	S	10.350	*
	D5 (Pond)	S	6.7820	*	S	3.3910	*	S	1.6960	*	S	0.6782	*
	D5 (Stream)	S	111.80	*	S	55.890	*	S	27.940	*	S	11.180	*
	R1 (Pond)	S	6.7760	*	S	3.3880	*	S	1.6940	*	S	0.6776	*
	R1 (Stream)	S	77.830	*	S	38.910	*	S	19.460	*	S	7.7830	*
	R2 (Stream)	S	106.30	*	S	53.150	*	S	26.580	*	S	10.630	*
	R3 (Stream)	S	111.80	*	S	55.890	*	S	27.950	*	S	11.180	*
	R4 (Stream)	S	77.520	*	S	38.760	*	S	19.380	*	S	7.7520	*
10m Spray drift & Runoff	D3 (Ditch)	S	39.830	*	S	19.920	*	S	9.9580	*	S	3.9830	*
	D4 (Pond)	S	3.7610	*	S	1.8800	*	S	0.9402	*	S	0.3761	*
	D4 (Stream)	S	46.250	*	S	23.120	*	S	11.560	*	S	4.6250	*
	D5 (Pond)	S	3.7620	*	S	1.8810	*	S	0.9404	*	S	0.3762	*
	D5 (Stream)	S	49.950	*	S	24.970	*	S	12.490	*	S	4.9950	*
	R1 (Pond)	S	3.7580	*	S	1.8790	*	S	0.9395	*	S	0.3758	*
	R1 (Stream)	S	34.780	*	S	17.390	*	S	8.6940	*	S	3.4780	*
	R2 (Stream)	S	47.500	*	S	23.750	*	S	11.880	*	S	4.7500	*
	R3 (Stream)	S	49.950	*	S	24.980	*	S	12.490	*	S	4.9950	*
	R4 (Stream)	S	34.640	*	S	17.320	*	S	8.6600	*	S	3.4640	*
15m Spray drift & Runoff	D3 (Ditch)	S	20.110	*	S	10.060	*	S	5.0280	*	S	2.0110	*
	D4 (Pond)	S	2.4030	*	S	1.2010	*	S	0.6007	*	S	0.2403	*
	D4 (Stream)	S	23.350	*	S	11.680	*	S	5.8380	*	S	2.3350	*
	D5 (Pond)	S	2.4030	*	S	1.2020	*	S	0.6008	*	S	0.2403	*
	D5 (Stream)	S	25.220	*	S	12.610	*	S	6.3050	*	S	2.5220	*
	R1 (Pond)	S	2.4010	*	S	1.2010	*	S	0.6003	*	S	0.2401	*
	R1 (Stream)	S	17.560	*	S	8.7800	*	S	4.3900	*	S	1.7560	*
	R2 (Stream)	S	23.980	*	S	11.990	*	S	5.9960	*	S	2.3980	*
	R3 (Stream)	S	25.220	*	S	12.610	*	S	6.3050	*	S	2.5220	*
	R4 (Stream)	S	17.490	*	S	8.7450	*	S	4.3730	*	S	1.7490	*
20m Spray drift & Runoff	D3 (Ditch)	S	12.290	*	S	6.1450	*	S	3.0730	*	S	1.2290	*
	D4 (Pond)	S	1.7110	*	S	0.8555	*	S	0.4277	*	S	0.1711	*
	D4 (Stream)	S	14.270	*	S	7.1360	*	S	3.5680	*	S	1.4270	*
	D5 (Pond)	S	1.7110	*	S	0.8556	*	S	0.4278	*	S	0.1711	*
	D5 (Stream)	S	15.410	*	S	7.7070	*	S	3.8530	*	S	1.5410	*
	R1 (Pond)	S	1.7100	*	S	0.8549	*	S	0.4274	*	S	0.1710	*
	R1 (Stream)	S	10.730	*	S	5.3660	*	S	2.6830	*	S	1.0730	*
	R2 (Stream)	S	14.660	*	S	7.3290	*	S	3.6650	*	S	1.4660	*
	R3 (Stream)	S	15.410	*	S	7.7070	*	S	3.8540	*	S	1.5410	*
	R4 (Stream)	S	10.690	*	S	5.3450	*	S	2.6720	*	S	1.0690	*

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

Table 9.2.5- 22: Summary of FOCUS Step 4 PEC_{sed} values of fosetyl-Al (3×3.6 kg a.s./ha, 7 days int.); Entries marked with * result from single applications. Pome/stone fruit, late applications

		Fosetyl-Al PEC_{sed} [µg/kg]							
		Nozzle Reduction							
Buffer Width & Type	**Scenario**	**0%**		**50%**		**75%**		**90%**	
5m Spray drift	D3 (Ditch)	5.5930	*	2.7960	*	1.3980	*	0.5593	*
	D4 (Pond)	1.0680		0.5341		0.2671		0.1068	
	D4 (Stream)	3.4750	*	1.7380	*	0.8688	*	0.3475	*
	D5 (Pond)	0.9739		0.4869		0.2435		0.0974	
	D5 (Stream)	4.3400	*	2.1700	*	1.0850	*	0.4340	*
	R1 (Pond)	0.9313	*	0.4657	*	0.2328	*	0.0931	*
	R1 (Stream)	1.8310	*	0.9157	*	0.4578	*	0.1831	
	R2 (Stream)	2.2560	*	1.1280	*	0.5639	*	0.2256	*
	R3 (Stream)	4.2800	*	2.1400	*	1.0700	*	0.4280	*
	R4 (Stream)	1.8720		0.9377		0.4706		0.1902	
10m Spray drift & Runoff	D3 (Ditch)	2.4990	*	1.2500	*	0.6248	*	0.2499	*
	D4 (Pond)	0.5861		0.2931		0.1465		0.0586	
	D4 (Stream)	1.5530	*	0.7765	*	0.3883	*	0.1553	*
	D5 (Pond)	0.5344		0.2672		0.1336		0.0534	
	D5 (Stream)	1.9390	*	0.9696	*	0.4848	*	0.1939	*
	R1 (Pond)	0.5165	*	0.2583	*	0.1291	*	0.0517	*
	R1 (Stream)	0.8469		0.4238		0.2122		0.0853	
	R2 (Stream)	1.0080	*	0.5040	*	0.2520	*	0.1008	*
	R3 (Stream)	1.9130	*	0.9563	*	0.4781	*	0.1913	*
	R4 (Stream)	0.8723		0.4368		0.2191		0.0885	
15m Spray drift & Runoff	D3 (Ditch)	1.2620	*	0.6309	*	0.3155	*	0.1262	*
	D4 (Pond)	0.3573		0.1787		0.0893		0.0358	
	D4 (Stream)	0.7841	*	0.3921	*	0.1960	*	0.0784	*
	D5 (Pond)	0.3257		0.1629		0.0814		0.0326	
	D5 (Stream)	0.9791	*	0.4896	*	0.2448	*	0.0979	*
	R1 (Pond)	0.3300	*	0.1650	*	0.0825	*	0.0330	*
	R1 (Stream)	0.4203		0.2105		0.1056		0.0426	
	R2 (Stream)	0.5089	*	0.2545	*	0.1272	*	0.0509	*
	R3 (Stream)	0.9657	*	0.4828	*	0.2414	*	0.0966	*
	R4 (Stream)	0.4332		0.2173		0.1094		0.0446	
20m Spray drift & Runoff	D3 (Ditch)	0.7712	*	0.3856	*	0.1928	*	0.0771	*
	D4 (Pond)	0.2450		0.1225		0.0613		0.0245	
	D4 (Stream)	0.4792	*	0.2396	*	0.1198	*	0.0479	*
	D5 (Pond)	0.2234		0.1117		0.0558		0.0223	
	D5 (Stream)	0.5984	*	0.2992	*	0.1496	*	0.0598	*
	R1 (Pond)	0.2350	*	0.1175	*	0.0588	*	0.0235	*
	R1 (Stream)	0.2525	*	0.1263	*	0.0631	*	0.0253	*
	R2 (Stream)	0.3110	*	0.1555	*	0.0778	*	0.0311	*
	R3 (Stream)	0.5902	*	0.2951	*	0.1475	*	0.0590	*
	R4 (Stream)	0.2523		0.1265		0.0636		0.0259	

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

Table 9.2.5- 23: Summary of FOCUS Step 4 PEC$_{sw}$ values of phosphonic acid (3×3.6 kg fosetyl-Al/ha, 7 days int.); Entries marked with * result from single applications - Pome/stone fruit, late applications

Buffer Width & Type	Scenario	Phosphonic acid PEC$_{sw}$ [µg/L] – Nozzle Reduction 0%		50%		75%		90%	
5m Spray drift	D3 (Ditch)	5.9940		2.9900		1.4930		0.5959	
	D4 (Pond)	6.7030		4.0090		3.0120		2.4310	
	D4 (Stream)	8.7620		8.7620		8.7620		8.7620	
	D5 (Pond)	7.6130		3.9110		2.1780		1.8870	
	D5 (Stream)	9.1860	*	5.3930		5.3930		5.3930	
	R1 (Pond)	6.6180		3.3180		1.6910		0.7317	
	R1 (Stream)	13.390		13.390		13.390		13.390	
	R2 (Stream)	15.990		15.990		15.990		15.990	
	R3 (Stream)	11.370	*	5.6820	*	4.7060		4.7060	
	R4 (Stream)	23.460		23.460		23.460		23.460	
10m Spray drift & Runoff	D3 (Ditch)	2.7860		1.3910		0.6944		0.2773	
	D4 (Pond)	4.2050		3.1080		2.5730		2.2620	
	D4 (Stream)	8.7620		8.7620		8.7620		8.7620	
	D5 (Pond)	4.2690		2.2640		1.9580		1.8010	
	D5 (Stream)	5.3930		5.3930		5.3930		5.3930	
	R1 (Pond)	3.5630		1.7740		0.8941		0.3761	
	R1 (Stream)	5.7760		5.7760		5.7760		5.7760	
	R2 (Stream)	7.2110		7.2110		7.2110		7.2110	
	R3 (Stream)	5.0780	*	2.5380	*	2.0490		2.0490	
	R4 (Stream)	10.350		10.350		10.350		10.350	
15m Spray drift & Runoff	D3 (Ditch)	1.3790		0.6885		0.3438		0.1373	
	D4 (Pond)	3.3460		2.6890		2.3690		2.1830	
	D4 (Stream)	8.7620		8.7620		8.7620		8.7620	
	D5 (Pond)	2.7000		2.0160		1.8560		1.7610	
	D5 (Stream)	5.3930		5.3930		5.3930		5.3930	
	R1 (Pond)	2.1640		1.0860		0.5556		0.2438	
	R1 (Stream)	5.7760		5.7760		5.7760		5.7760	
	R2 (Stream)	7.2110		7.2110		7.2110		7.2110	
	R3 (Stream)	2.5630	*	2.0490		2.0490		2.0490	
	R4 (Stream)	10.350		10.350		10.350		10.350	
20m Spray drift & Runoff	D3 (Ditch)	0.8093	*	0.4042	*	0.2019	*	0.0807	*
	D4 (Pond)	2.9310		2.4870		2.2710		2.1450	
	D4 (Stream)	8.7620		8.7620		8.7620		8.7620	
	D5 (Pond)	2.1370		1.9150		1.8060		1.7410	
	D5 (Stream)	5.3930		5.3930		5.3930		5.3930	
	R1 (Pond)	1.4590		0.7272		0.3676		0.1563	
	R1 (Stream)	2.9650		2.9650		2.9650		2.9650	
	R2 (Stream)	3.7650		3.7650		3.7650		3.7650	
	R3 (Stream)	1.5660	*	1.0550		1.0550		1.0550	
	R4 (Stream)	5.3600		5.3600		5.3600		5.3600	

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

Table 9.2.5- 24: Summary of FOCUS Step 4 PECsed values of phosphonic acid (3×3.6 kg fosetyl-Al/ha, 7 days int.); Entries marked with * result from single applications - Pome/stone fruit, late applications

		Phosphonic acid PEC$_{sed}$ [µg/kg]			
		Nozzle Reduction			
Buffer Width & Type	**Scenario**	**0%**	**50%**	**75%**	**90%**
5m Spray drift	D3 (Ditch)	8.2770	4.5040	2.4380	1.0750
	D4 (Pond)	60.000	36.850	24.700	17.450
	D4 (Stream)	6.5890	6.4750	6.4120	6.3700
	D5 (Pond)	73.400	45.670	31.480	22.760
	D5 (Stream)	4.4020	4.1580	4.0290	3.9490
	R1 (Pond)	50.170	28.230	16.370	8.6790
	R1 (Stream)	9.0960	8.9930	8.9400	8.9080
	R2 (Stream)	11.090	11.010	10.970	10.940
	R3 (Stream)	5.1900	4.8690	4.6970	4.5870
	R4 (Stream)	21.770	21.700	21.660	21.640
10m Spray drift & Runoff	D3 (Ditch)	4.2320	2.2900	1.2330	0.5407
	D4 (Pond)	39.180	25.850	19.270	15.190
	D4 (Stream)	6.4660	6.4070	6.3750	6.3530
	D5 (Pond)	48.390	32.890	24.900	20.110
	D5 (Stream)	4.1410	4.0200	3.9580	3.9190
	R1 (Pond)	29.480	16.390	9.3240	4.7330
	R1 (Stream)	3.8190	3.7630	3.7340	3.7170
	R2 (Stream)	4.7310	4.6890	4.6650	4.6490
	R3 (Stream)	2.1950	2.0260	1.9350	1.8770
	R4 (Stream)	8.9630	8.9010	8.8690	8.8500
15m Spray drift & Runoff	D3 (Ditch)	2.2730	1.2240	0.6564	0.2865
	D4 (Pond)	28.750	20.740	16.640	14.100
	D4 (Stream)	6.4070	6.3740	6.3570	6.3450
	D5 (Pond)	36.340	26.620	21.800	18.830
	D5 (Stream)	4.0190	3.9570	3.9250	3.9060
	R1 (Pond)	19.350	10.920	6.3810	3.4590
	R1 (Stream)	3.7620	3.7340	3.7190	3.7110
	R2 (Stream)	4.6880	4.6650	4.6520	4.6440
	R3 (Stream)	2.0250	1.9350	1.8870	1.8560
	R4 (Stream)	8.9000	8.8690	8.8530	8.8440
20m Spray drift & Runoff	D3 (Ditch)	1.4040	0.7535	0.4030	0.1754
	D4 (Pond)	23.720	18.170	15.320	13.550
	D4 (Stream)	6.3800	6.3600	6.3490	6.3420
	D5 (Pond)	30.270	23.610	20.260	18.190
	D5 (Stream)	3.9680	3.9310	3.9120	3.9000
	R1 (Pond)	13.760	7.6690	4.3890	2.2710
	R1 (Stream)	1.9800	1.9620	1.9520	1.9460
	R2 (Stream)	2.4810	2.4660	2.4580	2.4530
	R3 (Stream)	1.0990	1.0420	1.0110	0.9917
	R4 (Stream)	4.8760	4.8560	4.8460	4.8390

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

CP 9.3 Fate and behaviour in air

For information on the fate and behaviour 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.