REGISTRATION REPORT

Part B

Section 8

Environmental Fate

Detailed summary of the risk assessment

Product code: Salaman 510

Product name(s): **FOSIKA**

Chemical active substance:

potassium phosphonates (510 g/L, expr. as phosphorous acid)

Central Zone

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

(authorization)

Applicant: Lainco, S.A. / Exclusivas Sarabia S.A / Biovert S.L.

Submission date: October 2021

MS Evaluation date: July 2022

MS Finalisation date: dd/mm/yyyy

Version history

When	What
October 2021	Application for the first approval of the product’s code SALAMAN 510 in Poland.
July 2022	Version evaluated by zRMS Poland

Table of Contents

8 Fate and behaviour in the environment (KCP 9)

8.1 Critical GAP and overall conclusions

Table 8.1-1: Critical use pattern of the formulated product

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Application				**Application rate**					**Conclusion**
Use-No. *	Member state(s)	Crop and/or situation (crop destination/ purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I **	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applic. (days)	L product/ha a) max. rate per appl. b) max. total rate per crop/season	kg a.s./ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max	PHI (days)	Remarks: e.g. g safener/ synergist per ha	Groundwater
Zonal uses (field or outdoor uses, certain types of protected crops)														
1	PL	Pome fruits	F	*Venturia inaequalis* *Venturia pyrina*	Foliar spray	BBCH 53-81	a) 3 b) 3	5	a) 1.50-2.50 b) 4.50-7.50	a) 0.765-1.275 b) 2.295-3.825	500-1000	35	-	

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1.

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application.

Explanation for column 15 "Conclusion"

A	Safe use
R	Further refinement and/or risk mitigation measures required
C	To be confirmed by cMS
N	No safe use

Table 8.1-2: Assessed (critical) uses during approval of potassium phosphonates concerning the Section Environmental Fate (Source: *EFSA Journal 2012;10(12):2963)*

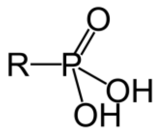
1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Application				**Application rate**				
Use-No. *	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I **	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applic. (days)	L product/ha a) max. rate per appl. b) max. total rate per crop/season	g a.s./ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max	PHI (days)	Remarks: e.g. g safener/ synergist per ha
-	North and South EU	Grapes	F	Oomicetes Peronosporales and Pythium	Foliar spray (motor-, knap-sack- and hand sprayer)	-	6	9±1	-	2904	200-1000	60	

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application.

8.2 Metabolites considered in the assessment

Table 8.2-1: Metabolites of phosphonic acid potentially relevant for exposure assessment

Metabolite	**Molar mass**	**Chemical structure**	**Maximum observed occurence in compartements**	**Exposue assessment required due to**
Phosphonic acid	82		Maximum occurrence observed in soil: 100%	PEC_{gw}: leaching potential to groundwater PEC_{soil}: if not covered by EU assessment $PEC_{sw/sed}$: if not covered by EU assessment
Phosphate	94.9 g/mol	PO_4^{3-}	No reliable quantitative data available	$PEC_{SW/SED}$

Phosphonic acid is not regarded as metabolite, but as active substance for risk assessments, as potassium phosphonate will be found in the environment as salts of phosphonic acid.

From EFSA conclusions (2012), the following is known:

> *"Levels of potassium ions added to soil from the representative use assessed will be within naturally occurring levels of potassium in mineral soils (0.4-30 g/kg, according to Sparks, 1987). […] The levels of phosphate ions that will be produced by this oxidation are within recommendations for the addition of inorganic phosphate fertiliser to agricultural soils."*

This is also applicable for the intended use as presented in 8.1. As a consequence, no further evaluation is performed for potassium ions.

8.3 Rate of degradation in soil (KCP 9.1.1)

Studies on degradation in soil with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substance.

8.3.1 Aerobic degradation in soil (KCP 9.1.1.1)

Please refer to *EFSA journal (2012)*.

In the following table, summary of aerobic degradation rates of phosphonic acid in laboratory studies are reported.

Table 8.3-1: Summary of aerobic degradation rates for phosphonic acid - laboratory studies

Phosphonic acid, Laboratory studies, aerobic conditions									
Soil type (x)	**pH [x]**	**T.ºC**	**MWHC [%]**	**DT_{50} [d]**	**DT_{90} [d]**	**DT_{50} [d] 20°C pF2/10kPa[a)]**	**St (r^2)**	**Kinetic model**	**Evaluated on EU level y/n Reference**
Clay loam	-	28	Field capacity	96	319	**196**	r^2 = 0.96	SFO	Y EFSA Journal 2012
Sandy loam	5	20	75% of 33 kPa	133	442	88	0.68	SFO	Y EFSA Journal 2012

[a)] Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7.

8.3.2 Anaerobic degradation in soil (KCP 9.1.1.1)

Please refer to EFSA (2012).

8.4 Field studies (KCP 9.1.1.2)

8.4.1 Soil dissipation testing on a range of representative soils (KCP 9.1.1.2.1)

No data available on the active substance Potassium phosphonates (*EFSA Journal 2012*). No further data provided.

8.4.2 Soil accumulation testing (KCP 9.1.1.2.2)

No data available on the active substance Potassium phosphonates (*EFSA Journal 2012*). No further data provided.

As soil DT_{50} is estimated at a maximum of 196 days, accumulation of residues in soil is possible due to multiple applications over years, and a $PEC_{soil\ accumulation}$ was calculated. See section 8.7.

8.5 Mobility in soil (KCP 9.1.2)

Studies on mobility in soil with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substance. Please refer to *EFSA Journal (2012)*.

Table 8.5-1: Summary of soil adsorption/desorption for phosphonic acid metabolite

Phosphonic acid								
Soil type	**OC (%)**	**Soil pH ($CaCl_2$))**	**Kd (mL/g)**	**Koc (mL/g)**	**Kf (mL/g)**	**Kfoc (mL/g)**	**1/n (-)**	**Evaluated on EU level/ Reference**
Loam	1.36	6.80	3.10	228				Yes (*EFSA Journal 2012*;10(12):2963)
Clay loam	4.13	7.55	10.37	251				
Silty clay loam	2.67	5.00	15.67	587				
Sandy loam	2.3	5.6	5.30	230				
Silt loam	1.95	5.52	18.96	972				
Arithmetic mean (n=5)			10.7					
Geometric mean (n=5)			8.7*					
pH-dependency					No			
The adsorption values of the lowest test concentrations are included here (85 mg/L)								

*zRMS indicates that according to EFSA (2014), the geomean Kd should be used instead of arithmetic mean in PEC_{gw} and PEC_{sw} calculation.

8.5.1 Column leaching (KCP 9.1.2.1)

No studies submitted, not required.

8.5.2 Lysimeter studies (KCP 9.1.2.2)

No studies submitted, not required.

8.5.3 Field leaching studies (KCP 9.1.2.3)

No studies submitted, not required.

8.6 Degradation in the water/sediment systems (KCP 9.2, KCP 9.2.1, KCP 9.2.2, KCP 9.2.3)

Studies on degradation in water/sediment systems with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substance.

No data, not required, please refer to *EFSA (2012)*.

8.7 Predicted Environmental Concentrations in soil (PEC_{soil}) (KCP 9.1.3)

<table>
<tr><td>zRMS Comments:</td><td>Calculations of PEC_S for phosphonic acid as an equivalent for active substance potassium phoshonate were accepted.
The single and multiple applications were taken into consideration and the DT_{50} of 196 d was used.

The relevant endpoint used for PECs assessment was agreed at the EU level.

The maximum PEC_S value for active substance and formulation at multiple application for the worst case (0% interception, 5 cm tillage depth) is presented in following table:

Pome fruits, 3 x 1275 g a.s./ha
<table><tr><th>Compound</th><th>PECs ini mg/kg soil</th><th>PECs accum mg/kg soil</th></tr><tr><td>Phosphonic acid</td><td>5.011</td><td>6.912</td></tr></table>
Formulation. The PECs for formulation was assessed using the 2.5 L product/ha and density of 1.45 g/mL; PECs = 4.833 mg/kg soil. The only single application and crop interception of 0% were taken into consideration.

These values will be used in further risk assessment.</td></tr>
</table>

8.7.1 Justification for new endpoints

EU agreed endpoints were used for PEC_{SOIL} calculations of phosphonic acid.

8.7.2 Active substance(s) and relevant metabolite(s)

The PEC_{SOIL} values calculated for pome fruits are presented below.

Table 8.7-1: Input parameters related to application for PEC_{soil} calculations

Use No.	1
Crop	Pome fruits
Application rate (g as/ha)	Potassium phosphate: 1275 g a.s./ha
Number of applications/interval	3 / 5 days
Crop interception (%)	50
Depth of soil layer (relevant for plateau concentration) (cm)	5 cm

Table 8.7-2: Input parameter for phosphonic acid for PEC_{soil} calculation

Compound	Molecular weight (g/mol)	Max. occurrence (%)	DT_{50} (days)	Value in accordance to EU endpoint y/n/Reference
Phosphonic acid	80.5	100%	196	*EFSA Journal 2012*;10(12):2963

Results

PEC_{SOIL} values (5 cm soil depth) are summarized in Table 8.7-3.

Accumulated PEC_{SOIL} are calculated with the ESCAPE model by considering background concentration in soil for tillage depths of 5 cm and 20 cm and initial concentrations. See spreadsheets in Doc K.

Table 8.7-3: PEC_{soil} for potassium phosphonates on pome fruits

PEC_{soil} (mg/kg)		0 % interception				50 % interception			
		Single application		Multiple applications		Single application		Multiple applications	
		Actual	TWA	Actual	TWA	Actual	TWA	Actual	TWA
Initial (5 cm soil depth)		1.700	-	5.011	-	0.850	-	2.506	-
Short term (5 cm soil depth)	24h	1.694	1.697	4.993	5.002	0.847	0.848	2.497	2.501
	2d	1.688	1.694	4.976	4.993	0.844	0.847	2.488	2.497
	4d	1.676	1.688	4.941	4.976	0.838	0.844	2.470	2.488
Long term (5 cm soil depth)	7d	1.658	1.679	4.889	4.950	0.829	0.840	2.444	2.475
	14d	1.618	1.659	4.769	4.889	0.809	0.829	2.385	2.445
	21d	1.578	1.638	4.652	4.830	0.789	0.819	2.326	2.415
	28d	1.540	1.619	4.539	4.771	0.770	0.809	2.269	2.386
	50d	1.435	1.564	4.229	4.609	0.717	0.782	2.114	2.304
	100d	1.194	1.432	3.518	4.221	0.597	0.716	1.759	2.110
Background concentration (5 cm tillage depth) after year 10		0.645	-	1.901	-	0.322	-	0.950	-
$PEC_{accumulation}$ 5 cm tillage depth ($PEC_{initial}$ +$PEC_{background}$)		2.345	-	6.912	-	1.172	-	3.456	-
Background concentration (20 cm tillage depth) after year 10		0.161	-	0.475	-	0.080	-	0.237	-
$PEC_{accumulation}$ 20 cm tillage depth ($PEC_{initial}$ +$PEC_{background}$)		1.861	-	5.486	-	0.930	-	2.743	-

8.7.2.1 PEC$_{soil}$ of Salaman 510 (510 g/L phosphonic acid)

Table 8.7-4: PEC$_{soil}$ for Salaman 510 (510 g/L phosphonic acid)

Crop	Number of app.	Maximum use rate [L f.p./ha]	Crop interception [%]	Effective soil exposure rate* [g fp/ha]	PEC$_S$ [mg fpkg]
Pome fruits	Single (1)	2.5 L fp/ha	0%	3625 g fp/ha	4.833 mg/Kg soil
	Multiple (3)	7.5 L fp/ha		10875 g fp/ha	14.500 mg/Kg soil
	Single (1)	2.5 L fp/ha	50%	1812.5 g fp/ha	2.417 mg/Kg soil
	Multiple (3)	7.5 L fp/ha		5437.5 g fp/ha	7.250 mg/Kg soil

* Density considered for Salaman 510: 1.45 g/mL (Study E12078).

The above PEC$_{SOIL}$ can be used to finalise the risk assessment for non-target organisms.

8.8 Predicted Environmental Concentrations in groundwater (PEC$_{gw}$) (KCP 9.2.4)

zRMS Comments:	The submitted information and PECgw assessment were accepted. The recommended models FOCUS PEARL and FOCUS PELMO were used, although their use is not recommended for inorganic substances. The used endpoints were agreed at the EU level. The arithmetic mean of Kd was used in accordance with LoEP, 2012. This value was accepted although the geometric mean should have been used in accordance with EFSA, 2014 guidance. The difference does not affect the final PECgw assessment. The application dates are not consistent with proposed by AppDate ver. 3.06 dates. The difference in the dates of application of the plant protection product does not affect the final modeling result. The proposed intended use in pome fruits (multiple application) was considered. The maximum PECgw values for active substance phosphonic acid were below the trigger value of 0.1 µg/L in all considered scenarios

8.8.1 Justification for new endpoints

EU agreed endpoints were used for PEC$_{GW}$ calculations of phosphonic acid.

8.8.2 Active substance(s) and relevant metabolite(s) (KCP 9.2.4.1)

The PECs of active substance and its metabolites in groundwater have been assessed with FOCUS (FOCUS, 2009) scenarios and the models PEARL 4.4.4 and PELMO 5.5.3, for phosphonic acid (in practice the species in the environment will be salts of phosphonic acid). As the standard FOCUS model parameterizations are not designed for the simulation of the leaching of inorganic compounds, the parametrization was adapted.

The standard substance transformation rate factor reductions with depth down the soil profile and routines for adjusting substance transformation rate with changing soil moisture content and temperature were maintained.

As soil adsorption is not expected to be well correlated with organic carbon content down the soil profile the parameterisation for adsorption was modified. Adsorption in that topsoil layer was implemented based on the Kd.

The input parameters used for the modelling are summarised in Table 8.8-1 and Table 8.8-2. The application dates according to the AppDate (Michael Klein) for each scenario used in the simulations has been indicated in Tables 8.8-3. PEC_{GW} for all intended uses are summarized in tables 8.8-4.

Table 8.8-1: Input parameters related to application for PEC_{GW} calculations

Use No.	1
Crop	Pome fruits[1]
Representative scenario	Pome fruits
Application rate (g as/ha)	1275
Timing / Growth stage of crop & season	BBCH 53-81
Crop interception (%) PEARL	Interception calculated by model
Crop interception (%) PELMO	0 %
Number of applications/interval (d)	3 / 5 days
Absolute application date	See table 8.8-3. Dates have been calculated with AppDAte (Michaek Klein)
Frequency of application	Annual
Models used for calculation	FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3

* Crop interception according to the BBCH stage in which the product is applied (FOCUS 2014). PEC_{GW} values were calculated with interception, if the PEC_{GW} values resulting without interception were above the trigger values of 0.1 µg/L.

Table 8.8-2: Input parameters related to active substance phosphonic acid for PELMO/PEARL PEC_{GW} calculations

Compound	Phosphonic acid	Value in accordance with EU endpoint y/n/ (Reference)
Molecular weight (g/mol)	80.5	*EFSA Journal 2012*;10(12):2963
Water solubility (mg/L):	1000000	Max. value for the model
Saturated vapour pressure (Pa):	0	*EFSA Journal 2012*;10(12):2963
DT_{50} in soil (d)	196 (20ºC, pF2/10 kPa)	*EFSA Journal 2012*;10(12):2963
K_d (mL/g)	10.7	Arithmetic mean at minimum
1/n	0.90	*EFSA Journal 2012*;10(12):2963
Plant uptake factor	0.0	*EFSA Journal 2012*;10(12):2963

Table 8.8-3: Application dates used for modelling – Pome fruits (FOCUS scenario: Pome fruits)

Crop	Scenario	1st application	2nd application	3rd application
Pome fruits (BBCH53)	Châteaudun	17.05.01	22.05.01	27.05.01
	Hamburg	05.05.01	10.05.01	15.05.01
	Jokioinen	22.05.01	27.05.01	01.06.01
	Kremsmünster	05.05.01	10.05.01	15.05.01
	Okehampton	27.05.01	01.06.01	06.06.01

	Piacenza	17.05.01	22.05.01	27.05.01
	Porto	06.06.01	11.06.01	16.06.01
	Sevilla	14.05.01	19.05.01	24.05.01
	Thiva	06.06.01	11.06.01	16.06.01

<u>Results and conclusions</u>

The PEC_{GW} values generated by FOCUS PEARL 4.4.4 and FOCUS PELMO 5.5.3 simulations are given in Tables 8.8-4 and 8.8-5.

Table 8.8-4: PEC_{GW} for phosphonic acid on pome fruits – (FOCUS scenario: pome fruits) (FOCUS PEARL 4.4.4/PELMO 5.5.3)

Crop	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)	
		PEARL 4.4.4	PELMO 5.5.3
Pome fruits	Châteaudun	<0.001	0.005
	Hamburg	<0.001	<0.001
	Jokioinen	<0.001	<0.001
	Kremsmünster	0.001	<0.001
	Okehampton	0.009	<0.001
	Piacenza	<0.001	<0.001
	Porto	0.003	<0.001
	Sevilla	<0.001	<0.001
	Thiva	<0.001	<0.001

According to PELMO and PEARL modelling, the PEC_{GW} of phosphonic acid in leachate did not exceed the groundwater threshold value of 0.1 µg/L in all simulations.

Despite, as an inorganic fungicide, the parametric drinking water limit of 0.1 µg/L does not apply to potassium phosphonates / phosphonic acid. According to EFSA 2012, a maximum acceptable concentration (MAC) in drinking water of 3 mg/L for phosphonic acid was calculated following the WHO 2009 guideline[1], using 20% of the phosphonic acid ADI (2.25 mg/kg bw/day), an infant bodyweight of 5 kg and daily water consumption value of 0.75L. The PEC_{GW} calculated for all intended crops are below the MAC for phosphonic acid. No unacceptable risk of groundwater contamination is expected from the intended use.

8.9 Predicted Environmental Concentrations in surface water (PEC_{sw}) (KCP 9.2.5)

zRMS Comments:	The PECsw and PECsed was calculated in Step 1 and Step 2 and phosphonic acid was considered. For phosphonic acid the submitted calculations and justification were accepted. The further exposure assessment considers also phosphate ions. This approach was accepted.

[1] WHO (World Health Organization), 2009. WHO Guidelines for Drinking-water Quality, Policies and Procedures used in updating the WHO Guidelines for Drinking-water Quality, 33 pp.

FOCUS Scenario	PECsw (µg/L)
October-February	351.32
March-May	284.34
June-September	223.45

The PECsw/sed assessment using Exposit calculator was not evaluated.

Formulation. Considering the proposed application rate of 2.5 L/ha at single application was taken into consideration.
The Drift calculator in SWASH model was used and non-spray buffer strips were proposed.

Crop	Application rate g product./ha	No spray buffer (m)	Max PEC_{sw} (µg/L)
Pome fruits	3625	3	158.8

The PECsw values will be used in risk assessment.

8.9.1 Justification for new endpoints

EU agreed endpoints were used for $PEC_{SW/SED}$ calculations of phosphonic acid.

8.9.2 Active substance(s), relevant metabolite(s) and the formulation (KCP 9.2.5)

The predicted environmental concentrations of phosphonic acid in surface water (PEC_{SW}) and sediment (PEC_{SED}) in applications of Salaman 510 were assessed with the FOCUS model STEPS 1-2[2].

It should be noted that FOCUS models at Step 3 and Step 4 are not suitable to describe the run-off and drainage of inorganic compounds. Therefore, runoff and drainage PEC_{SW} values for the phosphate ion was calculated separately using the EXPOSIT 3 (German model) instead of FOCUS Step 3 and Step 4.

Table 8.9-1: Input parameters related to application for $PEC_{SW/SED}$ calculations

Plant protection product	**Salaman 510**
Use No.	1
Crop	Pome fruits
Focus Scenario	Pome fruits (late applications)
Application rate (g as/ha)	Phosphonic acid equivalent: 1275 / Phosphonates ions: 1503**
Number of applications/interval (d)	3 / 5 days
Season of application (Step 2)	Oct-Feb; Mar-May; June-Sept (late)***
Crop intercep. (%) (Step 2)*	March-May: Average crop cover (40%) June-Sep / Oct-Feb: Full canopy (65 %)

[2] STEPS 1-2 in FOCUS. Surface water Tool for Exposure Predictions - Step 1 and 2. Version 3.2. Developed by FOCUS. Programmed by M. Klein, Fraunhofer - Institut, Schmallenberg.

Plant protection product	**Salaman 510**
Use No.	1
Crop	Pome fruits
Crop intercep. (Exposit)	60%
BBCH stage application	BBCH 53-81

* Crop interception has been considered according to the BBCH stage in which the product is applied (FOCUS 2014).
** corrected with the molecular weight correction factor (94.9/80.5)
*** Stage application BBCH 53-81. Oct-Feb is calculated to cover October. Despite some varieties of apple can be picked up also in November, it is unlikely that Salaman 510 is applied in November, as the PHI is of 35 days.

Table 8.9-2: Input parameters related to active substance phosphonic acid for $PEC_{sw/sed}$ calculations STEP 1/2

Compound	**Phosphonic acid**	**Phosphate ions**	**Value in accordance with EU endpoint y/n/ (Reference)**
Molecular weight (g/mol)	80.5	94.9	Molecular weight of phosphonic acid / phosphate
Water solubility (mg/L): (Step 1&2, Exposit)	1,875,000 (20ºC)	1,875,000 (20ºC)	EFSA Journal 2012;10(12):2963
Saturated vapour pressure (Pa):	0 (20ºC)	0 (20ºC)	EFSA Journal 2012;10(12):2963
DT_{50} in soil (d) (Step 1&2, Exposit)	196	1000 (default)	EFSA Journal 2012;10(12):2963
Kf_{oc} [mL g^{-1}] (values for two sets of simulations)	10.7 (surface water)	10 (surface water)	LoEP (see EFSA Journal 2012; 10(12): 2963)
	10000 (sediment)	10000 (sediment)	
DT_{50} total system [d]	1000 (default)	1000 (default)	LOEP, conservative default value EFSA Journal 2012;10(12):2963
DT_{50} water [d]	1000 (default)	1000 (default)	LOEP, conservative default value EFSA Journal 2012;10(12):2963
DT_{50} sediment [d]	1000 (default)	1000 (default)	LOEP, conservative default value EFSA Journal 2012;10(12):2963

Step 1&2 $PEC_{SW/SED}$ – Results

Step 1&2 PEC_{SW} and PEC_{SED} values were calculated by STEPS 1-2 in FOCUS Model (Surface water Tool for Exposure Predictions - Step 1 and 2. Version 3.2) and are summarized from Table 8.9-3 (phosphonic acid) to Table 8.9-4 (phosphate ion).

Table 8.9-3: FOCUS Step 1&2 PEC_{SW} and PEC_{SED} for PHOSPHONIC ACID following single / multiple application(s) of SALAMAN 510 to (FOCUS scenario: pome fruits, late applns.)

Method of calculation	**STEP 1 and 2 in FOCUS: Phosphonic acid** **K_{oc} = 10.7 mL/g (PEC_{SW} - surface waters)** **K_{oc}= 10000 mL/g (PEC_{SED} - sediment)** Pome fruits (late applns.): 3 x 1.275 kg a.s./ha Interception: March-May: average canopy: 40%; June-Sep / Oct-Feb: Full canopy (65 %)

Step	Nº of applns (interval)	Appln rate [kg a.s./ha]	Season of application	Drift [%] (single/multiple)	Max PEC_{SW} actual [µg /L]		Max PEC_{SED} actual [µg /kg]	
					Single	Multiple	Single	Multiple
1	1 / 3 (5)	1.275	n.r.	15.725 / 11.011	485.85	1460	3430	10300
2 NEU	1 / 3 (5)	1.275	Oct-Feb	15.725 / 11.011	138.32	351.32	975.90	2480
	1 / 3 (5)	1.275	March-May	15.725 / 11.011	115.59	284.34	815.22	2010
	1 / 3 (5)	1.275	June-Sep	15.725 / 11.011	94.94	223.45	669.15	1580

Table 8.9-4: FOCUS Step 1&2 PEC_{SW} and PEC_{SED} for PHOSPHATE ION following single / multiple application(s) of Salaman 510 to (FOCUS scenario: pome fruits, late applns.)

Method of calculation	**STEP 1 and 2 in FOCUS: Phosphate ion** **K_{oc} = 10 mL/g (PEC_{SW} - surface waters)** **K_{oc}= 10000 mL/g (PEC_{SED} - sediment)** Pome fruits (late applns.): 3 x 1.503 kg a.s./ha Interception: March-May: average canopy: 40%; June-Sep / Oct-Feb: Full canopy (65 %)

Step	Nº of applns (interval)	Appln rate [kg a.s./ha]	Season of application	Drift [%] (single/multiple)	Max PEC_{SW} actual [µg /L]		Max PEC_{SED} actual [µg /kg]	
					Single	Multiple	Single	Multiple
1	1 / 3 (5)	1.503	n.r.	15.725 / 11.011	573.19	1720	4040	12100
2 NEU	1 / 3 (5)	1.503	Oct-Feb	15.725 / 11.011	164.15	420.97	1160	2970
	1 / 3 (5)	1.503	March-May	15.725 / 11.011	137.04	339.90	965.73	2400
	1 / 3 (5)	1.503	June-Sep	15.725 / 11.011	112.38	226.20	791.57	1880

EXPOSIT $PEC_{SW/SED}$ – Results

Table 8.9-5: EXPOSIT PEC_{SW} for PHOSPHONIC ACID and PHOSPHATE ION multiple application(s) of Salaman 510 to (FOCUS scenario: pome fruits, late applns.)

Method of calculation	**EXPOSIT: Phosphonic acid / Phosphate ion** **K_{oc} = 10 mL/g** **DT_{50}** (d) = 1000 Pome fruits (late applns.): - Phosphonic acid: 3 x 1275 kg /ha - Phosphate ion: 3 x 1.503 kg /ha Interception: 60 %

Substance	Nº of applns (interval)	Appln rate [kg a.s./ha]	Max PEC_{SW} [µg /L]		
			Runoff	Drainage (April-October)	Drainage (Nov.-March)
Phosphonic acid	3 (5)	1275	6.44	4.75	14.63
Phosphate ion	3 (5)	1.503	7.59	5.61	17.25

The derived PEC_{SW} and PEC_{SED} were used for aquatic risk assessment of SALAMAN 510 in its intended uses (Please refer to the core assessment, section 9.5).

Potential risk of eutrophication

The use of potassium phosphonates leads to addition of phosphorous in the environment, high phosphorous content in surface waters causes eutrophication at moderate to higher temperatures that means exaggerate algae growth accompanied with a decline of dissolved oxygen. Therefore, an evaluation of the potential risk of eutrophication of surface water (OECD, 1982) should by performed.

It has been evaluated the potential risk of eutrophication following the use of Salaman 510 (potassium phosphonates). Indicative values for phosphorous levels in still waters are shown below (OECD, 1982):

Indicative limit values for phosphorus in still waters

Description	Annual average concentration (µg P/L)
Ultra-oligatrophic	< 4
Oligatrophic	4 – 10
Mesotrophic	10 – 35
Eutrophic	35 – 100
Hypereutrophic	> 100

Source: OECD (1982), as cited by EEA (1999).
[1] Vollenweider, R.A. and J. Kerekes. 1982. Eutrophication of Waters. Monitoring Assessment and Control. Organization for Economic Co-Operation and Development (OECD), Paris. 156 pp.

As one of the main routes of entry of phosphorous to surface water is runoff, PEC_{SW} for Phosphorous were obtained adjusting the max EXPOSIT PEC_{SW} values of Phosphonic acid for the difference in the molecular weight of each substance (m.w. Phosphonic acid = 82; m.w Phosphorous = 30.974), resulting in a molar ratio of 0.378).

Maximum PEC_{SW} of phosphorous acid and Phosphorous assessed with EXPOSIT model

PEC_{SW} [µg/L]	Date	POME FRUITS	
		Phosphonic acid	Phosphorous
EXPOSIT	April-October	4.75	**1.82**
	Nov-March	14.63	**5.53**

The risk of eutrophication by phosphorous entering the surface water bodies is discussed in more detail in the core assessment, section 9.5.

8.10 Fate and behaviour in air (KCP 9.3, KCP 9.3.1)

Phosphonic acid is an inorganic substance with a very low vapour pressure due to its ionic properties. Therefore, no significant volatilization is to be expected. Therefore, the investigation of the route and rate of degradation is deemed not necessary (see EFSA 2012).

Appendix 1 Lists of data considered in support of the evaluation

List of data submitted by the applicant and relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

List of data submitted or referred to by the applicant and relied on, but already evaluated at EU peer review

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

List of data submitted by the applicant and not relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

List of data relied on not submitted by the applicant but necessary for evaluation

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

Appendix 2 Detailed evaluation of the new Annex II studies

None.

Appendix 3 Additional information provided by the applicant (e.g., detailed modelling data)

The following Reports / spreadsheets are presented in Doc K:

- PEC_{SOIL}: Spreadsheets of ESCAPE model.
- PEC_{GW}: Spreadsheets and run PEARL and PELMO models.
- PEC_{SW} / PEC_{SED}: Spreadsheets of STEPS 1-2 in FOCUS / EXPOSIT models.