

FINAL REGISTRATION REPORT

Part B

Section 8

Environmental Fate

Detailed summary of the risk assessment

Product code: SAP09I

Product name(s): VOLKETE MAX

Chemical active substance:

Spinosad, 480 g/L

Central Zone

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

(New product authorization according to article 33 and 34 of
Regulation (EC) 1107/2009)

Applicant: Albaugh TKI d.o.o.

Submission date: January 2025

MS Finalisation date: 12/2025

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Version history

When	What
January 2025	V0 – Original dRR version from applicant Albaugh TKI d.o.o. for submission to zRMS Poland in the frame of a new authorization according to Article 33/34 of Regulation (EC) No. 1107/2009.
April 2025	Dossier sent for evaluation
October 2025	zRMS evaluation of dRR
November 2025	RR update with additional PECs modelling
December 2025	Final RR

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zRMS comments:

The text highlighted in grey was provided by the zRMS.

8 Fate and behaviour in the environment (KCP 9)

This document reviews the environmental fate studies and modelling for the product SAP09I, a suspension concentrate formulation containing 480 g/L of Spinosad.

Spinosad were first included in Annex I (Commission Directive 2007/6/EC of 14 February 2007).

The Spinosad SANCO/1428/2001 – rev. final from 14 July 2006 is considered to provide the relevant review information or a reference to where such information can be found.

SAP09I was not a representative formulation in the EU review process. The product has not been previously evaluated in any European member state according to Uniform Principles.

A full risk assessment according to Uniform Principles is provided which demonstrates that the product is safe for the environment.

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8.1 Critical GAP and overall conclusions

Table 8.1-1: Critical use pattern of the formulated product SAP09I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Use- No.	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, G or I	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	App. Method / Kind	App timing / Growth stage of crop & season	Max app n° a) per use b) per crop/ season	Min. interval between applications (days)	L product / ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha (min / max)	PHI (days)	Remarks: Effective rates (L/ha)	zRMS Conclusions (Groundwater)
Zonal uses (field or outdoor uses)														
1	PL	Head cabbage [BRSOL]	F	<i>Pieris brassicae</i> [PIERBR] <i>Artogeia rapae</i> [PIERRA] <i>Mamestra brassicae</i> [BARABR]	Spray	Young caterpillars / first damages	a) 3 b) 3	7-10	a) 0.2 L/ha b) 0.6 L/ha	a) 96 b) 288	200-600	3	Dose rate 0.1-0.2 L/ha	
2	PL	Broccoli [BRSOK] Cauliflower [BRSOB]	F	<i>Artogeia rapae</i> [PIERRA] <i>Mamestra brassicae</i> [BARABR]	Spray	Young caterpillars / first damages	a) 3 b) 3	7-10	a) 0.2 L/ha b) 0.6 L/ha	a) 96 b) 288	200-600	3	Dose rate 0.1-0.2 L/ha	
3	PL	Onion [ALLCE]	F	<i>Thrips tabaci</i> [THRITB]	Spray	Notice of the pest / first damages	a) 3 b) 3	10	a) 0.2 L/ha b) 0.6 L/ha	a) 96 b) 288	200-600	7	Dose rate 0.15-0.2 L/ha	
4	PL	Leek [ALLCE]	F	<i>Thrips tabaci</i> [THRITB]	Spray	Young caterpillars / first damages	a) 3 b) 3	10	a) 0.2 L/ha b) 0.6 L/ha	a) 96 b) 288	200-600	7	Dose rate 0.15-0.2 L/ha	
5	PL	Apple [MABSD]	F	<i>Adoxophyes orana</i> [CAPURE]	Spray	<BBCH 59 (up to 1 treatment) >BBCH 70	a) 2 b) 2	10	a) 0.3 L/ha b) 0.6 L/ha	a) 144 b) 288	300-1500	14	Maximum number of treatments per growing season: 2	

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						(up to 2 treatments)							0.23 L/1000 m ² of LWA Orchard max. 9780 m ² LWA	
Minor uses according to Article 51														
6	PL	Pear [PYUCO] Crab apple [MABSY] Quince [CYDOB]	F	<i>Adoxophyes orana</i> [CAPURE]	Spray	<BBCH 59 (up to 1 treatment) >BBCH 70 (up to 2 treatments)	a) 2 b) 2	10	a) 0.3 L/ha b) 0.6 L/ha	a) 144 b) 288	300-1500	14	Maximum number of treatments per growing season: 2 0.23 L/1000 m ² of LWA	
7	PL	Garlic [ALLSA] Shallot [ALLAS]	F	<i>Thrips</i> sp. [THRISP]	Spray	Notice of the pest / first damages	a) 3 b) 3	10	a) 0.2 L/ha b) 0.6 L/ha	a) 96 b) 288	200-600	7	Dose rate 0.15-0.2 L/ha	

Table 8.1-2a: Critical use pattern of the formulated product SAP09I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Use- No.	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, G or I	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	App. Method / Kind	App timing / Growth stage of crop & season	Max application a) per use b) per crop/season	Min. interval between applications (days)	L product / ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha (min / max)	PHI (days)	Remarks: Effective rates (L/ha)	zRMS Conclusions (Groundwater)
Zonal uses (field or outdoor uses)														
1	PL	Head cabbage [BRSOL]	F	<i>Pieris brassicae</i> [PIERBR] <i>Artogeia rapae</i> [PIERRA] <i>Mamestra</i>	Spraying	Young caterpillars / first damages BBCH 10-49	a) 2-3 b) 2-3	10	a) 0.2 b) 0.6	a) 96 b) 288	200-600	3	Dose range 0.1-0.2 L/ha If higher tier assessment in Folsomia is	

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				brassicaceae [BARABR]									not accepted please refer to Use No. 1a,b	
1a	PL	Head cabbage [BRSOL]	F	Pieris brassicae [PIERBR] Artogeia rapae [PIERRA] Mamestra brassicaceae [BARABR]	Spraying	Young caterpillars / first damages BBCH 20-49	a) 2 b) 2	10	a) 0.16 b) 0.32	a) 76.8 b) 153.6	200-600	3	Dose range 0.1-0.16 L/ha Intended Use just in case higher tier assessment in Folsomia is not accepted	
1b	PL	Head cabbage [BRSOL]	F	Pieris brassicae [PIERBR] Artogeia rapae [PIERRA] Mamestra brassicaceae [BARABR]	Spraying	Young caterpillars / first damages BBCH 10-49	a) 2-3 b) 2-3	10	a) 0.1 b) 0.3	a) 48 b) 144	200-600	3	Intended Use just in case higher tier assessment in Folsomia is not accepted	
2	PL	Broccoli [BRSOK] Cauliflower [BRSOB]	F	Artogeia rapae [PIERRA] Mamestra brassicaceae [BARABR]	Spraying	Young caterpillars / first damages BBCH 10-49	a) 2-3 b) 2-3	10	a) 0.2 b) 0.6	a) 96 b) 288	200-600	3	Dose range 0.1-0.2 L/ha If higher tier assessment in Folsomia is not accepted, please refer to Use No. 2a	
2a	PL	Broccoli [BRSOK] Cauliflower [BRSOB]	F	Artogeia rapae [PIERRA] Mamestra brassicaceae [BARABR]	Spraying	Young caterpillars / first damages BBCH 20-49	a) 2 b) 2	10	a) 0.16 b) 0.32	a) 96 b) 288	200-600	3	Dose range 0.1-0.16 L/ha Intended Use just in case higher tier assessment in Folsomia is not accepted	
2b	PL	Broccoli [BRSOK] Cauliflower [BRSOB]	F	Artogeia rapae [PIERRA] Mamestra brassicaceae [BARABR]	Spraying	Young caterpillars / first damages BBCH 20-49	a) 2-3 b) 2-3	10	a) 0.1 b) 0.3	a) 48 b) 144	200-600	3	Intended Use just in case higher tier assessment in	

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													Folsomia is not accepted	
3	PL	Onion [ALLCE]	F	<i>Thrips tabaci</i> [THRITB]	Spraying	Notice of the pest / first damages BBCH 10-49	a) 1 b) 1	na	a) 0.15 b) 0.15	a) 72 b) 72	200-600	7	If higher tier assessment in Folsomia is not accepted please refer to Use No. 3a	
3a	PL	Onion [ALLCE]	F	<i>Thrips tabaci</i> [THRITB]	Spraying	Notice of the pest / first damages BBCH 40-49	a) 1 b) 1	na	a) 0.16 b) 0.16	a) 76.8 b) 76.8	200-600	7	Dose range 0.15-0.16 L/ha Intended Use just in case high-er tier assessment in Folsomia is not accepted	
4	PL	Leek [ALLPO]	F	<i>Thrips tabaci</i> [THRITB]	Spraying	Notice of the pest / first damages BBCH 10-49	a) 1 b) 1	na	a) 0.15 b) 0.15	a) 72 b) 72	200-600	7	If higher tier assessment in Folsomia is not accepted please refer to Use No. 4a	
4a	PL	Leek [ALLPO]	F	<i>Thrips tabaci</i> [THRITB]	Spraying	Notice of the pest / first damages BBCH 40-49	a) 1 b) 1	na	a) 0.16 b) 0.16	a) 76.8 b) 76.8	200-600	7	Dose range 0.15-0.16 L/ha Intended Use just in case high-er tier assessment in Folsomia is not accepted	
5	PL	Apple [MABSD]	F	<i>Adoxophyes orana</i> [CAPURE]	Spraying	BBCH 40-59 (up to 1 treatment) >BBCH 70 (up to 2 treatments)	a) 2 b) 2	10-21	a) 0.3 b) 0.6	a) 144 b) 288	300-1500	14	Dose range 0.18-0.3 L/ha If higher tier assessment in Folsomia is not accepted please refer to	

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6	PL	Pear [PYUCO] Crab apple [MABSY] Quince [CYDOB]	F	<i>Adoxophyes</i> <i>orana</i> [CAPURE]	Spraying	BBCH 40-59 (up to 1 treatment) >BBCH 70 (up to 2 treatments)	a) 2 b) 2	10-21	a) 0.3 b) 0.6	a) 144 b) 288	300-1500	14	Dose range 0.18-0.3 L/ha If higher tier assessment in Folsomia is not accepted please refer to Use No. 6a,b,c	
6	PL	Pear [PYUCO] Crab apple [MABSY] Quince [CYDOB]	F	<i>Adoxophyes</i> <i>orana</i> [CAPURE]	Spraying	>BBCH 70 (up to 2 treatments)	a) 2 b) 2	10	a) 0.3 b) 0.6	a) 144 b) 288	300-1500	14	Dose range 0.18-0.3 L/ha If higher tier assessment in Folsomia is not accepted please refer to Use No. 6a,b,c	
6a	PL	Pear [PYUCO] Crab apple [MABSY] Quince [CYDOB]	F	<i>Adoxophyes</i> <i>orana</i> [CAPURE]	Spray	BBCH >70	a) 1 b) 1	NR	a) 0.3 b) 0.3	a) 144 b) 144	300-1500	14	Dose range 0.18-0.3 L/ha Intended Use just in case high-er tier assessment in Folsomia is not accepted	
6b	PL	Pear [PYUCO] Crab apple [MABSY] Quince [CYDOB]	F	<i>Adoxophyes</i> <i>orana</i> [CAPURE]	Spray	>BBCH 70 (up to 2 treatments)	a) 2 b) 2	10	a) 0.225 b) 0.450	a) 108 b) 216	300-1500	14	Dose range 0.18-0.225 Intended Use just in case high-er tier assessment in Folsomia is not accepted	
6c	PL	Pear [PYUCO] Crab apple [MABSY] Quince	F	<i>Adoxophyes</i> <i>orana</i> [CAPURE]	Spray	BBCH 40-59 (up to 1 treatment) >BBCH 70	a) 2 b) 2	10	a) 0.225 b) 0.450	a) 108 b) 216	300-1500	14	Dose range 0.18-0.225 Intended Use just in case	

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		[CYDOB]				(up to 2 treatments)							high-er tier assessment in Folsomia is not accepted	
7	PL	Garlic [ALLSA] Shallot [ALLAS]	F	Thrips sp. [THRISP]	Spraying	Notice of the pest / first damages BBCH 10-49	a) 1 b) 1	na	a) 0.15 b) 0.15	a) 72 b) 72	200-600	7	If higher tier assessment in Folsomia is not accepted please refer to Use No. 7a	
7a	PL	Garlic [ALLSA] Shallot [ALLAS]	F	Thrips sp. [THRISP]	Spraying	Notice of the pest / first damages BBCH 40-49	a) 1 b) 1	na	a) 0.16 b) 0.16	a) 76.8 b) 76.8	200-600	7	Dose range 0.15-0.16 L/ha Intended Use just in case high-er tier assessment in Folsomia is not accepted	

* 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

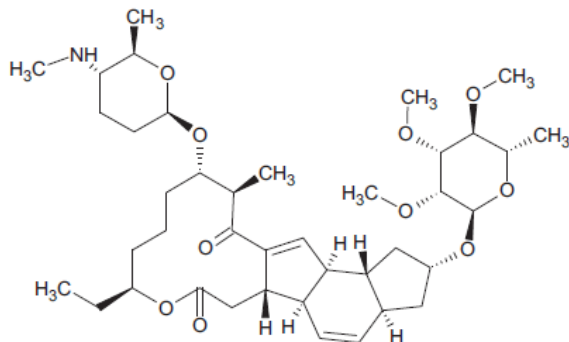
Explanation for column 15 "Conclusion"

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

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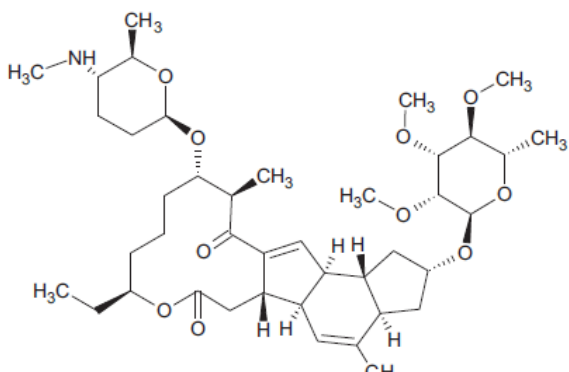
8.2 Metabolites considered in the assessment

Table 8.2-1: Metabolites of spinosyn A potentially relevant for exposure assessment

Metabolite	Molar mass	Chemical structure	Maximum observed occurrence in compartments	Exposure assessment required due to
Spinosyn B*	718		Soil: 67% AR after 182 d Water: - Sediment: 9% AR after 120 d	PEC _{soil} PEC _{gw} PEC _{sw}

*(2*R*,3*aS*,5*aR*,5*bS*,9*S*,13*S*,14*R*,,16*aS*,16*bR*)-2-(6-deoxy-2,3,4-,tri-O-methyl-a-L-mannopyranosyloxy)-13-(4-methylamino-2,3,4,6-tetra-deoxy-b-D-erythro-pyranosyloxy)-9-ethyl-2,3,3*a*,5*a*,5*b*,6,7,9,10,11,12,13,14,15,16*a*,16*b*-hexadeca-hydro-14-methyl-1H-asindaceno[3,2-d]oxacyclododecine-7,15-dione

Table 8.2-2: Metabolites of spinosyn D potentially relevant for exposure assessment

Metabolite	Molar mass	Chemical structure	Maximum observed occurrence in compartments	Exposure assessment required due to
N-demethylated spinosyn D*	732		Soil: 68% AR after 237 d Water: - Sediment: 10% AR after 120 d	PEC _{soil} PEC _{gw} PEC _{sw}

*(2*S*,3*aR*,5*aS*,5*bS*,9*S*,13*S*,14*R*,16*aS*,16*bS*)-2-(6-deoxy-2,3,4-tri-O-methyl-a-L-mannopyranosyloxy)-13-(4-methylamino-2,3,4,6-tetra-deoxy-b-D-erythro-pyranosyloxy)-9-ethyl-2,3,3*a*,5*a*,5*b*,6,7,9,10,11,12,13,14,15,16*a*,16*b*-hexadeca-hydro-4,14-dimethyl-1H-as-indaceno[3,2-d]oxacyclododecine-7,15-dione

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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)

Rate of degradation studies of the active substances in soil are discussed in detail in the corresponding documents of the EU review dossiers.

Under aerobic laboratory conditions maintained in the dark, both spinosyn A and spinosyn D are rapidly N-demethylated in soil to form spinosyn B and N-demethylated spinosyn D reaching maximum levels of 67% AR and 68% AR, respectively.

From soils treated with spinosyn A, after 80 to 91 days, the amount of AR trapped as CO₂ ranged from not detectable to 6.3%. From soils treated with spinosyn D, after 84 to 91 days, 1.3 to 8.7% of AR was trapped as CO₂.

The formation of unextractable residues ranged from 8.1 to 39% AR after 80 – 91 days for spinosyn A and from 12 to 33% AR after 84 – 91 days for spinosyn D.

Table 8.3-1: Summary of aerobic degradation rates for spinosyn A - laboratory studies

Spinosyn A, Laboratory studies, aerobic conditions										
Soil name	Soil type	pH ^{a)}	t.oC	MWHC %	DT50 (d)	DT90 (d)	DT50 (d) 20°C pF2/10kPa ^{b)}	Chi2 (%)	Kinetic model ^{c)}	Evaluated on EU level / Reference
Commerce	Silt loam	7.7	20±1°C	26	46.3	163.3	23.2	9.24	SFO	Y, Osborne et al. (1993); Hale, K., (1994)
Marcham	Sandy clay loam	7.2	20±1°C	31	28.6	94.6	16.6	7.45	SFO	
Cecil	Sandy loam	6.7	20±1°C	39	40.3	129.4	26.6	7.45	SFO	
Hanford	Sandy loam	6.8	20±1°C	40	22.6	74.9	11.3	8.14	SFO	
Commerce	Silt loam	7.7	25±2°C	75	15.9	54.4	17.9	7.18	SFO	
Hanford	Sandy loam	7.5	25±2°C	75	6.55	22.6	7.28	5.61	SFO	
Geometric mean (n=6)							15.7			
pH-dependency							No			

^{a)} Measured in KCl solution

^{b)} Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7

^{c)} The kinetic evaluation in the DAR (2001) was not performed according to the current guidance, so the DT50 values presented were obtained from Yon, D. (2015) study – “Summary of the degradation kinetics of Spinosad and its metabolites in laboratory aerobic soil experiments”

Bold value will be used in modelling

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Table 8.3-2: Summary of aerobic degradation rates for spinosyn D - laboratory studies

Spinosyn D, Laboratory studies, aerobic conditions										
Soil name	Soil type	pH ^{a)}	t.oC	MWHC %	DT50 (d)	DT90 (d)	DT50 (d) 20°C pF2/10kPa ^{b)}	Chi2 (%)	Kinetic model ^{c)}	Evaluated on EU level / Reference
Commerce	Silt loam	6.8	20±1°C	26	62.6	209.6	31.3	4.65	SFO	Y, Osborne et al. (1993); Hale, K., (1994)
Marcham	Sandy clay loam	7.7	20±1°C	31	19.07	186.64	32.8 ^{d)}	11.8	FOMC	
Cecil	Sandy loam	6.7	20±1°C	39	47.7	159.0	31.5	9.80	SFO	
Hanford	Sandy loam	7.2	20±1°C	40	16.5	54.6	8.3	15.8	SFO	
Commerce	Silt loam	7.7	25±2°C	75	11.3	40.5	12.7	6.39	SFO	
Geometric mean (n=5)							20.3			
pH-dependency							No			

^{a)} Measured in KCl solution

^{b)} Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7

^{c)} The kinetic evaluation in the DAR (2001) was not performed according to the current guidance, so the DT50 values presented were obtained from Yon, D. (2015) study – “Summary of the degradation kinetics of Spinosad and its metabolites in laboratory aerobic soil experiments”

^{d)} Pseudo DT₅₀ FOMC (DT₉₀/3.32)

Bold value will be used in modelling

Table 8.3-3: Summary of aerobic degradation rates for spinosyn B - laboratory studies

Spinosyn B, Laboratory studies, aerobic conditions (formation fraction derived from spinosyn A)												
Soil name	Soil type	pH ^{a)}	t.oC	MWHC %	DT50 (d)	DT90 (d)	f.f. kg/kg _{dp}	DT50 (d) 20°C pF2/10kPa _{b)}	Chi2 (%)	Kinetic model ^{c)}	Evaluated on EU level / Reference	
Commerce	Silt loam	7.7	20±1°C	26	291	966	0.934	146	16.3	SFO	Y, Osborne et al. (1993); Hale, K., (1994)	
Marcham	Sandy clay loam	7.2	20±1°C	31	109	363.8	0.852	63.2	6.63	SFO		
Cecil	Sandy loam	6.7	20±1°C	39	63.3	207.5	1.000	41.8	12.4	SFO		
Hanford	Sandy loam	6.8	20±1°C	40	66.6	220.9	0.669	33.3	13.5	SFO		
Commerce	Silt loam	7.7	25±2°C	75	86.1	286	0.811	96.8	16.7	SFO		
Hanford	Sandy loam	7.5	25±2°C	75	82.6	275	0.846	91.5	7.64	SFO		
Geometric mean (n=6)							-	69.6				
Arithmetic mean (n=6)							0.85	-				
pH-dependency								No				

^{a)} Measured in KCl solution

^{b)} Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7

^{c)} The kinetic evaluation in the DAR (2001) was not performed according to the current guidance, so the DT50 values presented

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were obtained from Yon, D. (2015) study – “Summary of the degradation kinetics of Spinosad and its metabolites in laboratory aerobic soil experiments”

Bold value will be used in modelling

Table 8.3-4: Summary of aerobic degradation rates for N-demethylated spinosyn D - laboratory studies

N-demethylated spinosyn D, Laboratory studies, aerobic conditions (formation fraction derived from spinosyn D)											
Soil name	Soil type	pH ^{a)}	t.oC	MWHC %	DT50 (d)	DT90 (d)	f.f. k _r /k _{dp}	DT50 (d) 20°C pF2/10kPa ^{b)}	Chi2 (%)	Kinetic model ^{c)}	Evaluated on EU level / Reference
Commerce	Sandy loam	6.8	20±1°C	26	-	-	-	-	-	-	Y, Osborne et al. (1993); Hale, K., (1994)
Marcham	Silt loam	7.7	20±1°C	31	145	481	0.719	84.1	18.7	SFO	
Cecil	Sandy loam	6.7	20±1°C	39	165	547	0.86	108.7	-	SFO	
Hanford	Sandy clay loam	7.2	20±1°C	40	-	-	-	-	-	SFO	
Commerce	Silt loam	7.7	25±2°C	75	179	0.804	0.804	201	13.5	SFO	
Hanford	Sandy loam	7.5	25±2°C	75	-	-	-	-	-	SFO	
Geometric mean (n=3)							-	122.5			
Arithmetic mean (n=3)							0.79	-			
pH-dependency							No				

^{a)}Measured in KCl solution

^{b)}Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7

^{c)}The kinetic evaluation in the DAR (2001) was not performed according to the current guidance, so the DT50 values presented were obtained from Yon, D. (2015) study – “Summary of the degradation kinetics of Spinosad and its metabolites in laboratory aerobic soil experiments”

Bold value will be used in modelling

8.3.2 Anaerobic degradation in soil (KCP 9.1.1.1)

Anaerobic degradation in soil of the active substance spinosad was not investigated in the EU DAR and related documents and SANCO/1428/2001 – rev. final, 14 July 2006.

8.4 Field studies (KCP 9.1.1.2)

Data to address this point were presented in the EU DAR (2001) and related documents and SANCO/1428/2001 – rev. final, 14 July 2006).

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

Table 8.4-1: Summary of aerobic degradation rates for Spinosyn A - field studies

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Spinosyn A, Field studies								
Soil type	Location	pH ^{a)}	Depth (cm)	DT50 (d) actual	DT90 (d) actual	St. (χ^2) ^{b)}	DT50 (d) 20°C, pF2	Evaluated on EU level / Reference
Sandy loam	UK	7.25	20	2.37	-	0.98	-	Y, Devine H. C. (2003); Knowles, S. (2003)
Sandy loam	Italy	7.3	20	0.77	-	0.91	-	
Silty clay loam	S-France	5.3	20	4.82	-	0.89	-	

^{a)} Measured in KCl, average of 2 different depths

^{b)} Coefficient of determination (r^2)

Table 8.4-2: Summary of aerobic degradation rates for Spinosyn D - field studies

Spinosyn D, Field studies								
Soil type	Location	pH ^{a)}	Depth (cm)	DT50 (d) actual	DT90 (d) actual	St. (χ^2) ^{b)}	DT50 (d) 20°C, pF2	Evaluated on EU level / Reference
Sandy loam	UK	7.25	20	3.51	-	0.95	-	Y, Devine H. C. (2003); Knowles, S. (2003)
Silty clay loam	N-France	6.6	20	4.91	-	0.72	-	
Sandy loam	Italy	7.3	20	1.92	-	0.88	-	
Silty clay loam	S-France	5.3	20	5.41	-	0.89	-	

^{a)} Measured in KCl, average of 2 different depths

^{b)} Coefficient of determination (r^2)

Table 8.4-3: Summary of aerobic degradation rates for Spinosyn B - field studies

Spinosyn B, Field studies								
Soil type	Location	pH ^{a)}	Depth (cm)	DT50 (d) actual	DT90 (d) actual	St. (χ^2) ^{b)}	DT50 (d) 20°C, pF2	Evaluated on EU level / Reference
Sandy loam	UK	7.25	20	2.11	-	0.99	-	Y, Devine H. C. (2003); Knowles, S. (2003)

^{a)} Measured in KCl, average of 2 different depths

^{b)} Coefficient of determination (r^2)

Table 8.4-4: Summary of aerobic degradation rates for N-demethylated spinosyn D - field studies

N-demethylated spinosyn D, Field studies								
Soil type	Location	pH ^{a)}	Depth (cm)	DT50 (d) actual	DT90 (d) actual	St. (χ^2) ^{b)}	DT50 (d) 20°C, pF2	Evaluated on EU level / Reference
Sandy loam	UK	7.25	20	3.77	-	0.99	-	Y, Devine H. C. (2003); Knowles, S. (2003)

^{a)} Measured in KCl, average of 2 different depths

^{b)} Coefficient of determination (r^2)

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8.4.2 Soil accumulation testing (KCP 9.1.1.2.2)

Soil accumulation of the active substances were not investigated during the Annex I Inclusion. No additional studies have been performed since it is not required.

8.5 Mobility in soil (KCP 9.1.2)

Data to address this point were presented in the EU DAR (2001) and related documents and SANCO/1428/2001 – rev. final, 14 July 2006).

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

Table 8.5-1: Summary of soil adsorption/desorption for spinosyn A

Spinosyn A							
Soil name	Soil type	OM (%)	pH (-)	Kf (mL/g)	Kfoc (mL/g)	1/n (-)	Evaluated on EU level / Reference
Nueces	Sand	0.5	7.7	8.5	2890	0.92	Y, Saunders, D. G. & Powers, F. L., 1994a
Cecil	Loamy sand	1.1	6.3	5.4	835	0.84	
Hanford	Sandy loam	1.0	7.5	25	4250	0.87	
Commerce	Silt loam	0.4	7.8	337	143225	0.93	
Brookston	Clay loam	2.0	6.9	312	26520	0.91	
Geometric mean (n=5)					8281.6	-	
Arithmetic mean (n=5)					-	0.89	

Bold values were used in modelling

For spinosyn D no data is available. Therefore, it was assumed that spinosyn D has sorption characteristics equal to spinosyn A. Meaning that a geometric mean Kfoc of 8281.6 mL/g and an arithmetic mean 1/n of 0.89 were used for modelling.

Table 8.5-2: Summary of soil adsorption/desorption for spinosyn B

Spinosyn B							
Soil Name	Soil Type	OM (%)	pH (-)	Kf (mL/g)	Kfoc (mL/g)	1/n (-)	Evaluated on EU level / Reference
Nueces	Sand	0.5	7.7	6.2	2108	0.90	Y, Saunders, D. G. & Powers, F. L., 1994b
Cecil	Loamy sand	1.1	6.3	4.3	665	0.77	
Hanford	Sandy loam	1.0	7.5	17	2890	0.85	
Commerce	Silt loam	0.4	7.8	178	75650	0.88	
Geometric mean (n=4)					4184.1	-	

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Spinosyn B							
Soil Name	Soil Type	OM (%)	pH (-)	Kf (mL/g)	Kfoc (mL/g)	1/n (-)	Evaluated on EU level / Reference
Arithmetic mean (n=4)					-	0.85	

Bold values were used in modelling

For N-demethylated spinosyn D no data is available. Therefore, it was assumed that N-demethylated spinosyn D has sorption characteristics equal to Spinosyn B. Meaning that a geometric mean Kfoc of 4184.1 mL/g and an arithmetic mean 1/n of 0.85 were used for modelling.

8.5.1 Column leaching (KCP 9.1.2.1)

Data to address this point were presented in the EU DAR and related documents and SANCO/1428/2001 – rev. final, 14 July 2006.

Non-aged column leaching of spinosyn A and D, performed in a sand soil, showed 87 and 97% respectively, of AR remaining in the top 5 cm of soil, less than 1% of AR below 5 cm, and less than 1% of AR recovered from the leachate.

For aged columns, with parent spinosyn A and D reduced to 36 and 31% of AR respectively, and 39 and 41% of AR transformed into metabolites, there was slightly greater movement of radioactivity down the soil profile, but still 86 and 84% of AR for spinosyn A and D respectively, remained in the top 5 cm soil layer; 1.7 and 1.8% of AR are detected in the leachate.

Most leaching was found after two days of photolitically aged soil, in which parent spinosyn A and D were reduced to 15 and 10% of AR respectively and metabolites were present at levels of 46 and 54% of AR. For spinosyn A and D respectively, 61 and 67% of AR remained in the 0 – 5 cm soil layer, 18 and 13% in the 5 – 30 cm layer, and 10 and 7.0% of AR were detected in the leachate.

8.5.2 Lysimeter studies (KCP 9.1.2.2)

Data to address this point were presented in the EU DAR and related documents and SANCO/1428/2001 – rev. final, 14 July 2006.

To investigate the leaching behaviour of spinosyn A and D, a field lysimeter study was conducted in Münster, Germany. Four applications of spinosyn A and D were conducted (216 g spinosyn A/ha and 108 g spinosyn D/ha per application). Two lysimeters per test substance were used. No spinosyn A and D were detected in any of the leachate samples. None of the potential metabolites available as reference standards were detected in the leachate samples.

However, the mobility of Spinosad and its metabolites in soil will be assessed with FOCUS groundwater modelling tools (KCP 9.2.4). Therefore, lysimeter studies are not required.

8.5.3 Field leaching studies (KCP 9.1.2.3)

Data to address this point were presented in the EU DAR and related documents and SANCO/1428/2001 – rev. final, 14 July 2006. Please refer to point 8.5.2 (KCP 9.1.2.2).

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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.

Hydrolysis

Spinosyn A and D are not susceptible to hydrolysis. At pH 9 and 25°C, 9.0% of spinosyn A and 5.1% of spinosyn D was hydrolyzed after 30 days. At pH 5 and 7, hydrolysis was even slower.

Photolysis

Spinosyn A and D were demonstrated to be susceptible to photolysis. In distilled water buffer (pH 7), exposed to sunlight (at 40° northern latitude), the half-lives were 0.96 and 0.84 days respectively. In pond water, exposed to sunlight (at 40° northern latitude), spinosyn A and D both showed a half-life of 0.18 days.

Biodegradability

Spinosad is classified as not readily biodegradable. Spinosad did not degrade beyond 1% over the course of the 28-day incubation.

In an anaerobic water-sediment study, ¹⁴C-spinosyn A and D dissipated from the water and adsorbed to the sediment within a few days. DT₅₀ values were not recalculated for the water phase, as the main dissipation process was sorption to sediment, causing recoveries to fall below 10% of AR. Consequently, DT₅₀ values (converted to 20°C, assuming a Q₁₀ value of 2.2) for the water phase are set to <10 d for both spinosyn A and D. DT₅₀ values (converted to 20°C) for the sediment phase were 398 days for spinosyn A and 804 days for spinosyn D. DT₅₀ values (20°C) for the whole system were 357 and 661 days for spinosyn A and D respectively. Mineralisation was 0.3% and 1.9% of AR for spinosyn A and D respectively. Bound residue was maximal at the end of the test (364 days) and amounted 17 and 16% of AR for spinosyn A and D respectively.

Furthermore, the dissipation of spinosyn A and D was studied in an aquatic microcosm in August and September 1994 in Indiana (USA), after application of a single dose of 207 g as/ha. The water temperature during the test was 20 – 21°C. Dissipation of spinosyn A from the water phase occurred with a DT₅₀ of 27 hours. Spinosyn D concentrations were lower and decreased in the water phase with a DT₅₀ of 18 hours. Sediment concentrations of spinosyn A, D and the metabolites B and N-demethylated D were rather low, and together they amounted never more than 7% of the applied dose (w/w). Bound residue was not analysed. A mass balance was not established and the test should be repeated with radiolabelled compounds to do so, and to get better insight in mineralisation, and formation of metabolites. None of the metabolites analysed, spinosyn B and N-demethylated spinosyn D, reached more than 10% of the amount of spinosad applied, in either the water or the sediment phase.

The experiment should be repeated with radiolabelled compounds in a laboratory water-sediment system, making possible the proper identification of metabolites in both the water and sediment phase, and the quantification of bound residue and mineralisation.

The degradation of ¹⁴C-spinosyn A and D was investigated in an aerobic water-sediment study. A summary of the study is described in the tables 8.6-1 and -2.

Table 8.6-1: Summary of degradation in water/sediment of spinosyn A and spinosyn D

Spinosyn A (max. sediment 68.8% AR after 30 days; max. water 7.2% AR at the end) Spinosyn D (max. sediment 61.7% AR after 58 days; max. water 3.8% AR at the end)			
	Italian System	English system	Evaluated on

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	DT ₅₀	r ²	DT ₅₀	r ²	EU level y/n/ Reference
Whole system					Y, Kennard, L. M., 2001
Spinosyn A	169	0.74	176	0.85	
Spinosyn D	261	0.44	103	0.71	
Water					
Spinosyn A	27	0.94	16	0.91	
Spinosyn D	26	0.86	14	0.87	

Table 8.6-2: Summary of observed metabolites

Spinosyn B Water/sediment system	Max. in sediment 9% AR after 120 d	Evaluated on EU level Y, Kennard, L. M., 2001
N-demethylated spinosyn D Water/sediment system	Max. in sediment 10% AR after 120 d	Evaluated on EU level Y, Kennard, L. M., 2001

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

Evaluator's Comments:	The Applicant's approach and submitted PECs assessment was accepted. Calculations of PEC _s for active substance and its relevant metabolite were accepted.				
	The tiered approach was used for PECs assessment: Tier I based on laboratory studies and Tier II based on field studies.				
	The maximum PEC _s for active substance for multiple applications are presented below:				
	Crop	Approach	Active substances		
			PEC _{soil} mg/kg		
			Spinosyn A	Spinosyn D	Total
	Leafy vegetables (use No 1 and 2) 3 x 96 g a.s./ha	Tier I	0.158	0.028	0.186
		Tier II	0.067	0.012	0.079
	Bulb vegetables (use No 3, 4 and 7) 3 x 96 g a.s./ha	Tier I	0.208	0.029	0.237
		Tier II	0.090	0.029	0.119
	Pome fruits (use No 5 and 6) 2 x 144 g a.s./ha	Tier I	0.113	0.020	0.133
Tier II		0.073	0.020	0.093	
Additional, new PECs assessment was provided for proposed uses (in the table below). The PECs values at Tier 1 and Tier 2 are presented in the table below:					
	Compound		Spinosyn A	Spinosyn D	Total Spinosad

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Crop	Application rate g a.s./ha	PECs mg/kg soil		
Cabbage, Broccoli, Cauliflower BBCH 20-49	2 x 72 Tier II	0.049	0.012	0.061
	2 x 76.8 Tier II	0.052	0.013	0.065
Cabbage, Broccoli, Cauliflower BBCH 10-49	1 x 48 Tier I	0.041	0.007	0.048
	1 x 48 Tier II	0.041	0.007	0.048
	3 x 48 Tier I 7 d	0.079	0.014	0.093
	3 x 48 Tier II 7 d	0.034	0.014	0.048
	3 x 48 Tier I 10 d	0.075	0.014	0.089
	3 x 48 Tier II 10 d	0.026	0.014	0.040

Compound		Spinosyn A	Spinosyn D	Total Spinosad
Crop	Application rate g a.s./ha	PECs mg/kg soil		
Onion, leek, garlic BBCH 40-49	1 x 76.8 Tier II	0.052	0.009	0.061
Onion, leek, garlic BBCH 10-49	1 x 72 Tier I	0.073	0.011	0.084
	1 x 72 Tier II	0.073	0.011	0.084
	3 x 72 Tier I 10 d	0.156	0.021	0.177
	3 x 72 Tier II 10 d	0.068	0.021	0.089
Onion, leek, garlic BBCH 10-39	1 x 72 Tier I	0.073	0.013	0.086
	1 x 72 Tier II	0.073	0.013	0.086
	3 x 72 Tier I 10 d	0.168	0.031	0.199
	3 x 72 Tier II 10 d	0.080	0.031	0.111

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In case of orchards an application rate in g a.s./ha was used in PECs assessment and additionally the Applicant has added the information of LWA: max. orchard 9780 m² LWA. No additional information concerning the LWA approach was provided. LWA is a function of tree height, treated area and distance among trees – this approach could be considered as a supportive information. There is no harmonized guidance on how to deal with.

The PECs were recalculated for relevant application rates and presented in the table below.

PECs reassessed for:

- BBCH 10-59 (interception of 60% or 2 x 60%)
- multiple application: first at BBCH 10-59 (interception 60%) and second application at BBCH >70 (interception of 65%) or
- multiple application: first at BBCH 40 (interception 60%) and second application at BBCH >70 (interception of 65%)
- multiple application: both at BBCH >70 (interception of 65%)

Compound		Spinosyn A	Spinosyn D	Total Spinosad
Crop	Application rate g a.s./ha	PECs ini mg/kg soil		
Orchard BBCH 10-59 (60%+60%)	1 x 108 Tier I	0.049	0.009	0.058
	1 x 108 Tier II	0.049	0.009	0.058
	2 x 108 Tier I 10 d	0.091	0.016	0.107
	2 x 108 Tier II 10 d	0.060	0.016	0.076
Orchard BBCH 10-59/ BBCH 70 and BBCH ≥ 40/ BBCH 70 (60%+65%)	1 x 108 Tier I	0.049	0.009	0.058
	1 x 108 Tier II	0.049	0.009	0.058
	2 x 108 Tier I 10 d	0.085	0.015	0.100
	2 x 108 Tier II 10 d	0.054	0.015	0.069
	2 x 108 Tier I 21 d	0.078	0.014	0.093
	2 x 108 Tier II 21 d	0.045	0.014	0.059

PECs reassessed for BBCH 70; interception of 65% or 2 x 65%

Compound		Spinosyn A	Spinosyn D	Total Spinosad
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Crop	Application rate g a.s./ha	PECs ini mg/kg soil		
Orchard BBCH > 70 (65%+65%)	1 x 108 Tier I	0.043	0.008	0.051
	1 x 108 Tier II	0.043	0.008	0.051
	2 x 108 Tier I 10 d	0.080	0.014	0.094
	2 x 108 Tier II 10 d	0.053	0.014	0.067
	2 x 108 Tier I 21 d	0.074	0.014	0.088
	2 x 108 Tier II 21 d	0.045	0.014	0.059
The other PECs assessment was provided in accordance with EU requirements, with no leaf area consideration. The PECs were corrected by evaluator. This approach will be used in further risk assessment.				
Compound		Spinosyn A	Spinosyn D	Total Spinosad
Crop	Application rate g a.s./ha	PECs mg/kg soil		
Orchard BBCH > 70	1 x 144 Tier I	0.057	0.010	0.067
	1 x 144 Tier II	0.057	0.010	0.067
The PECs for orchards at BBCH 40-59 is covered by BBCH 10-59 as the interception of 60% is for both growth stages.				
Metabolites of spinosad. The relevant metabolites were considered, and the maximum values of PECs (at Tier I) are presented below: • Spinosyn B: PECs, accum = 0.187 mg/kg • N-demethylated spinosyn D: PECs, accum = 0.031 mg/kg				
Formulation. The single application was considered. The following PECs, ini were obtained for proposed pattern use:				
Crop	Applicati on rate	No. of Applicati ons	Uses/Crops	PEC _{soil initial} (mg/kg)
Leafy vegetables	218 g/ha (0.2 l/ha)	1	Cabbage, Broccoli, Cauliflower	0.218

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		Bulb vegetables	218 g/ha (0.2 l/ha)	1	Onion, Leek, Garlic	0.262
		Pome fruits	327 g/ha (0.3 l/ha)	1	Pear, Wild apple, Quince	0.174
		These values will be used in further risk assessment.				

8.7.1 Justification for new endpoints

No new active substance data have been submitted as part of this application for authorisation/re-registration.

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

The Predicted Environmental Concentrations in soil (PEC_{soil}) of the active substance spinosad and associated metabolites were based on the excel spreadsheet modelling approach. A soil depth of 5 cm and a bulk density of 1.5 g/cm³ were assumed. Application rates and crop interception (EFSA Journal 2014; 12(5):3662) were selected in concordance with the GAP.

Spinosad is a mixture of two components: spinosyn A and spinosyn D. Exposure assessments were done separately for the two components, using application rates calculated by correcting for the occurrence of each component considering only a ratio of 85:15 in the technical material. Overall, PEC_{soil} values for Spinosad were derived summing PEC values from the individual spinosyn components.

The input parameters used for PEC_{soil} calculations of spinosad and its metabolites are presented in tables below.

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

Use No.	1, 2	1a,b- 2a,b	3, 4, 7	3a, 4a, 7a
Crop	Cabbage, Broccoli Cauliflower	Cabbage, Broccoli Cauliflower	Onion, Leek, Garlic, Shallot	Onion, Leek, Garlic, Shallot
Application rate (g as/ha)	48-96	48-76.8	72-96	76.8
Number of applications/interval	3/710	2-3/10	3/10 1	1
Crop interception (%)	BBCH 10-19: 25% BBCH 20-39: 40% BBCH 40-49: 70%	BBCH 10-19: 25% BBCH 20-39: 40% BBCH 40-49: 70%	BBCH 10-19: 10% BBCH 20-39: 25% BBCH 40-49: 40%	BBCH 40-49: 40%
Depth of soil layer (relevant for plateau concentration) (cm)	5	5	5	

Table 8.7-2a: Input parameters related to application for PEC_{soil} calculations

Use No.	5, 6	5a, 6a	5b, 6b	5c, 5c
Crop	Pear, Wild apple, Quince	Pear, Wild apple, Quince	Pear, Wild apple, Quince	Pear, Wild apple, Quince
Application rate (g as/ha)	86-144	86-144	86-108	86-108
Number of applications/interval	2/10	1/NR	2/10	2/10
Crop interception (%)	BBCH 10-59: 60% BBCH>70: 65%	BBCH 10-59: 60% or BBCH>70: 65%	BBCH>70: 65%	BBCH 10-59: 60% BBCH>70: 65%
Depth of soil layer (relevant for plateau concentration) (cm)	5	5	5	5

For the application rate calculation of each metabolite, it was assumed that the respective maximum occurrence transformation, multiplying by a conversion factor (metabolite molecular weight ÷ parent molecular weight) to correct the molecular weight, was performed.

Table 8.7-3: Application rates considered for PEC_{soil} calculations

Crops	Application rate (g a.s./ha)* - without considering the crop interception				
	Spinosad	Spinosyn A	Spinosyn D	Spinosyn B	N-demethylated spinosyn D
1, 1a, 1b, 2, 2a, 2b Cabbage, Broccoli,	Max. dose: 96	Max. dose: 81.6	Max. dose: 14.4	Max. dose: 53.63	Max. dose: 9.61

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Cauliflower,	Dose: 76.8	Med. Dose: 65.28	Med. Dose: 11.52	NA	NA
	Med. Dose: 72	Med. Dose: 61.2	Med. Dose: 10.8	Med. Dose: 40.22	Med. Dose: 45.9
	Min. dose: 48	Min. dose: 40.8	Min. dose: 7.2	Min. dose: 26.82	Min. dose: 4.80
3, 3a, 4, 4a, 7, 7a Onion, Leek, Garlic, Shallot	Max. dose: 96	Max. dose: 81.6	Max. dose: 14.4	Max. dose: 53.63	Max. dose: 9.61
	Dose: 76.8	Med. Dose: 65.28	Med. Dose: 11.52	NA	NA
	Min. dose: 72	Min. dose: 61.2	Min. dose: 10.8	Min. dose: 40.22	Min. dose: 7.20
5, 6, 5a, 5b, 5c, 6a, 6b, 6c Pear, Wild apple, Quince	Max. dose: 144	Max. dose: 122.4	Max. dose: 21.6	Max. dose: 80.45	Max. dose: 14.41
	Min. dose: 108	Min. dose: 91.8	Min. dose: 16.2	Min. dose: 60.33	Min. dose: 11.02

*the ratio of spinosyn A and D is 85:15

Table 8.7-4: Input parameter for active substance(s) and relevant metabolite(s) for PEC_{soil} calculation

Compound	Molecular weight (g/mol)	Max. occurrence (%)	DT ₅₀ (days)	Value in accordance to EU endpoint y/n/ Reference
Spinosyn A	731.98	-	46.3 d - Tier I (Maximum, non-normalised value from laboratory study) 4.82 d - Tier II (Maximum, non-normalised value from field study)	SANCO/1428/2001 – rev. final, 14 July 2006
Spinosyn D	745.98	-	62.6 d (Maximum, non-normalised value from laboratory study)	
Spinosyn B	718	67	291 d (Maximum, non-normalised value from laboratory study)	
N-demethylated spinosyn D	732	68	201 d (Maximum, normalised value from laboratory study)	

Predicted Environmental Concentrations in soil have been carried out with the worst-case DT₅₀ approach for Spinosyn A, Spinosyn D and its metabolites Spinosyn B and N-demethylated spinosyn D. Therefore, the DT₅₀ considered were the maximum non-normalised values from laboratory study.

Table 8.7-5: PEC_{soil} for spinosad on cabbage, broccoli, cauliflower (uses no. 1, 2)

PEC _{soil} (mg/kg)	Cabbage, Broccoli, Cauliflower					
	Spinosyn A		Spinosyn D		Total Spinosad	
	Actual	TWA	Actual	TWA	Actual	TWA
Application rate: 1 x 96 g a.s./ha -Tier I						
Initial	0.082	-	0.014	-	0.096	-

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Short term	24h	0.080	0.081	0.014	0.014	0.094	0.095
	2d	0.079	0.080	0.014	0.014	0.093	0.094
	4d	0.077	0.079	0.014	0.014	0.091	0.093
Long term	7d	0.073	0.077	0.013	0.014	0.086	0.091
	14d	0.066	0.074	0.012	0.013	0.078	0.087
	21d	0.060	0.070	0.011	0.012	0.071	0.082
	28d	0.054	0.067	0.009	0.012	0.063	0.079
	50d	0.039	0.057	0.007	0.010	0.046	0.067
	100d	0.018	0.042	0.003	0.007	0.021	0.049
Application rate: 3 x 96 g a.s./ha, interval: 7d -Tier I							
Initial		0.158	-	0.028	-	0.186	-
Short term	24h	0.155	0.156	0.027	0.028	0.182	0.184
	2d	0.153	0.155	0.027	0.027	0.180	0.182
	4d	0.148	0.153	0.026	0.027	0.174	0.180
Long term	7d	0.142	0.150	0.025	0.026	0.167	0.176
	14d	0.128	0.142	0.023	0.025	0.151	0.167
	21d	0.115	0.135	0.020	0.024	0.135	0.159
	28d	0.104	0.129	0.018	0.023	0.122	0.152
	50d	0.075	0.111	0.013	0.020	0.088	0.131
	100d	0.035	0.082	0.006	0.014	0.041	0.096
Application rate: 1 x 96 g a.s./ha -Tier II							
Initial		0.082	-	0.014	-	0.096	-
Short term	24h	0.071	0.076	0.012	0.013	0.083	0.089
	2d	0.061	0.071	0.011	0.013	0.072	0.084
	4d	0.046	0.062	0.008	0.011	0.054	0.073
Long term	7d	0.030	0.051	0.005	0.009	0.035	0.060
	14d	0.011	0.035	0.002	0.006	0.013	0.041
	21d	0.004	0.026	0.001	0.005	0.005	0.031
	28d	0.001	0.020	0.000	0.004	0.001	0.024
	50d	0.000	0.011	0.000	0.002	0.000	0.013
	100d	0.000	0.006	0.000	0.001	0.000	0.007
Application rate: 2 x 72 g a.s./ha -Tier II, interval 10 d-Tier II BBCH 20-49							
Initial		0.049	!	0.012	!	0.061	!
Short term	24h	0.042	0.046	0.012	0.012	0.054	0.058
	2d	0.037	0.043	0.012	0.012	0.049	0.055
	4d	0.028	0.037	0.012	0.012	0.040	0.049

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Long term	7d	0,018	0,031	0,011	0,012	0,029	0,043
	14d	0,007	0,021	0,010	0,011	0,017	0,032
	21d	0,002	0,015	0,010	0,011	0,012	0,026
	28d	0,001	0,012	0,009	0,010	0,010	0,022
	50d	0,000	0,007	0,007	0,009	0,007	0,016
	100d	0,000	0,003	0,004	0,007	0,004	0,010
Application rate: 2 x 76.8 g a.s./ha -Tier II, interval 10 d-Tier II BBCH 20-49							
Initial		0,052	--	0,013	--	0,065	--
Short term	24h	0,045	0,049	0,013	0,013	0,058	0,062
	2d	0,039	0,045	0,013	0,013	0,052	0,058
	4d	0,029	0,040	0,012	0,013	0,041	0,053
Long term	7d	0,019	0,033	0,012	0,012	0,031	0,045
	14d	0,007	0,022	0,011	0,012	0,018	0,034
	21d	0,003	0,016	0,010	0,011	0,013	0,027
	28d	0,001	0,013	0,009	0,011	0,010	0,024
	50d	0,000	0,008	0,008	0,010	0,008	0,018
	100d	0,000	0,004	0,004	0,008	0,004	0,012
Application rate: 3 x 96 g a.s./ha, interval: 7d -Tier II							
Initial		0.067	-	0.012	-	0.079	-
Short term	24h	0.058	0.063	0.010	0.011	0.068	0.074
	2d	0.051	0.059	0.009	0.010	0.060	0.069
	4d	0.038	0.051	0.007	0.009	0.045	0.060
Long term	7d	0.025	0.042	0.004	0.007	0.029	0.049
	14d	0.009	0.029	0.002	0.005	0.011	0.034
	21d	0.003	0.021	0.001	0.004	0.004	0.025
	28d	0.001	0.016	0.000	0.003	0.001	0.019
	50d	0.000	0.009	0.000	0.002	0.000	0.011
	100d	0.000	0.005	0.000	0.001	0.000	0.006
Application rate: 1 x 48 g a.s./ha -Tier I, BBCH 10-49							
Initial		0,041	!	0,007	!	0,048	!
Short term	24h	0,040	0,040	0,007	0,007	0,047	0,047
	2d	0,040	0,040	0,007	0,007	0,047	0,047
	4d	0,038	0,040	0,007	0,007	0,045	0,047
Long term	7d	0,037	0,039	0,007	0,007	0,044	0,046
	14d	0,033	0,037	0,006	0,007	0,039	0,044
	21d	0,030	0,035	0,006	0,006	0,036	0,041

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	28d	0.027	0.033	0.005	0.006	0.032	0.039
	50d	0.019	0.029	0.004	0.006	0.023	0.035
	100d	0.009	0.021	0.002	0.004	0.011	0.025
Application rate: 3 x 48 g a.s./ha, interval: 7d -Tier I, BBCH 10-49							
Initial		0.079	!	0.014	!	0.093	!
Short term	24h	0.078	0.078	0.014	0.014	0.092	0.092
	2d	0.076	0.078	0.014	0.014	0.090	0.092
	4d	0.074	0.076	0.014	0.014	0.088	0.090
Long term	7d	0.071	0.075	0.013	0.014	0.084	0.089
	14d	0.064	0.071	0.012	0.013	0.076	0.084
	21d	0.058	0.068	0.011	0.013	0.069	0.081
	28d	0.052	0.064	0.011	0.012	0.063	0.076
	50d	0.037	0.055	0.008	0.011	0.045	0.066
	100d	0.018	0.041	0.005	0.009	0.023	0.050
Application rate: 1 x 48 g a.s./ha -Tier II, BBCH 10-49							
Initial		0.041	!	0.007	!	0.048	!
Short term	24h	0.035	0.038	0.007	0.007	0.042	0.045
	2d	0.031	0.035	0.007	0.007	0.038	0.042
	4d	0.023	0.031	0.007	0.007	0.030	0.038
Long term	7d	0.015	0.026	0.007	0.007	0.022	0.033
	14d	0.005	0.018	0.006	0.007	0.011	0.025
	21d	0.002	0.013	0.006	0.006	0.008	0.019
	28d	0.001	0.010	0.005	0.006	0.006	0.016
	50d	0.000	0.006	0.004	0.006	0.004	0.012
	100d	0.000	0.003	0.002	0.004	0.002	0.007
Application rate: 3 x 48 g a.s./ha, interval: 7d -Tier II, BBCH 10-49							
Initial		0.034	!	0.014	!	0.048	!
Short term	24h	0.029	0.031	0.014	0.014	0.043	0.045
	2d	0.025	0.029	0.014	0.014	0.039	0.043
	4d	0.019	0.026	0.014	0.014	0.033	0.040
Long term	7d	0.012	0.021	0.013	0.014	0.025	0.035
	14d	0.005	0.015	0.012	0.013	0.017	0.028
	21d	0.002	0.011	0.011	0.013	0.013	0.024
	28d	0.001	0.008	0.011	0.012	0.012	0.020
	50d	0.000	0.005	0.008	0.011	0.008	0.016
	100d	0.000	0.002	0.005	0.009	0.005	0.011

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Application rate: 1 x 48 g a.s./ha, Tier I, BBCH 10-49							
Initial		0.041	!	0.007	!	0.048	!
Short term	24h	0.040	0.040	0.007	0.007	0.047	0.047
	2d	0.040	0.040	0.007	0.007	0.047	0.047
	4d	0.038	0.040	0.007	0.007	0.045	0.047
Long term	7d	0.037	0.039	0.007	0.007	0.044	0.046
	14d	0.033	0.037	0.006	0.007	0.039	0.044
	21d	0.030	0.035	0.006	0.006	0.036	0.041
	28d	0.027	0.033	0.005	0.006	0.032	0.039
	50d	0.019	0.029	0.004	0.006	0.023	0.035
	100d	0.009	0.021	0.002	0.004	0.011	0.025
Application rate: 3 x 48 g a.s./ha, interval: 10d -Tier I, BBCH 10-49							
Initial		0.075	!	0.014	!	0.089	!
Short term	24h	0.074	0.074	0.014	0.014	0.088	0.088
	2d	0.072	0.074	0.014	0.014	0.086	0.088
	4d	0.070	0.072	0.013	0.014	0.083	0.086
Long term	7d	0.067	0.071	0.013	0.013	0.080	0.084
	14d	0.061	0.067	0.012	0.013	0.073	0.080
	21d	0.055	0.064	0.011	0.012	0.066	0.076
	28d	0.049	0.061	0.010	0.012	0.059	0.073
	50d	0.035	0.053	0.008	0.011	0.043	0.064
	100d	0.017	0.039	0.005	0.008	0.022	0.047
Application rate: 1 x 48 g a.s./ha -Tier II, BBCH 10-49							
Initial		0.041	!	0.007	!	0.048	!
Short term	24h	0.035	0.038	0.007	0.007	0.042	0.045
	2d	0.031	0.035	0.007	0.007	0.038	0.042
	4d	0.023	0.031	0.007	0.007	0.030	0.038
Long term	7d	0.015	0.026	0.007	0.007	0.022	0.033
	14d	0.005	0.018	0.006	0.007	0.011	0.025
	21d	0.002	0.013	0.006	0.006	0.008	0.019
	28d	0.001	0.010	0.005	0.006	0.006	0.016
	50d	0.000	0.006	0.004	0.006	0.004	0.012
	100d	0.000	0.003	0.002	0.004	0.002	0.007
Application rate: 3 x 48 g a.s./ha, interval: 10d -Tier II, BBCH 10-49							
Initial		0.026	!	0.014	!	0.040	!
Short term	24h	0.023	0.025	0.014	0.014	0.037	0.039

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	2d	0.020	0.023	0.014	0.014	0.034	0.037
	4d	0.015	0.020	0.013	0.014	0.028	0.034
Long term	7d	0.010	0.017	0.013	0.013	0.023	0.030
	14d	0.004	0.011	0.012	0.013	0.016	0.024
	21d	0.001	0.008	0.011	0.012	0.012	0.020
	28d	0.000	0.006	0.010	0.012	0.010	0.018
	50d	0.000	0.004	0.008	0.011	0.008	0.015
	100d	0.000	0.002	0.005	0.008	0.005	0.010

Table 8.7-6: PEC_{soil} for spinosad on onion, leek, garlic (uses no. 3, 4, 7)

PEC_{soil} (mg/kg)		Onion, Leek, Garlic					
		Spinosyn A		Spinosyn D		Total Spinosad	
		Actual	TWA	Actual	TWA	Actual	TWA
Application rate: 1 x 96 g a.s./ha – Tier I							
Initial		0.098	-	0.014	-	0.112	-
Short term	24h	0.096	0.097	0.014	0.014	0.110	0.111
	2d	0.095	0.096	0.014	0.014	0.109	0.110
	4d	0.092	0.095	0.014	0.014	0.106	0.109
Long term	7d	0.088	0.093	0.013	0.014	0.101	0.107
	14d	0.079	0.088	0.012	0.013	0.091	0.101
	21d	0.072	0.084	0.011	0.013	0.083	0.097
	28d	0.064	0.080	0.011	0.012	0.075	0.092
	50d	0.046	0.069	0.008	0.011	0.054	0.080
	100d	0.022	0.051	0.005	0.009	0.027	0.060
Application rate: 3 x 96 g a.s./ha, interval: 10d – Tier I							
Initial		0.208	-	0.029	-	0.237	-
Short term	24h	0.205	0.207	0.028	0.029	0.233	0.236
	2d	0.202	0.205	0.028	0.028	0.230	0.233
	4d	0.196	0.202	0.028	0.028	0.224	0.230
Long term	7d	0.187	0.198	0.027	0.028	0.214	0.226
	14d	0.169	0.188	0.025	0.027	0.194	0.215
	21d	0.152	0.179	0.023	0.026	0.175	0.205
	28d	0.137	0.170	0.021	0.025	0.158	0.195
	50d	0.098	0.147	0.017	0.022	0.115	0.169
	100d	0.047	0.108	0.010	0.017	0.057	0.125

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Application rate: 1 x 96 g a.s./ha – Tier II							
Initial		0.098	-	0.014	-	0.112	-
Short term	24h	0.085	0.091	0.014	0.014	0.099	0.105
	2d	0.073	0.085	0.014	0.014	0.087	0.099
	4d	0.055	0.074	0.014	0.014	0.069	0.088
Long term	7d	0.036	0.062	0.013	0.014	0.049	0.076
	14d	0.013	0.042	0.012	0.013	0.025	0.055
	21d	0.005	0.031	0.011	0.013	0.016	0.044
	28d	0.002	0.024	0.011	0.012	0.013	0.036
	50d	0.000	0.014	0.008	0.011	0.008	0.025
	100d	0.000	0.007	0.005	0.009	0.005	0.016
Application rate: 3 x 96 g a.s./ha, interval: 10d – Tier II							
Initial		0.090	-	0.029	-	0.119	-
Short term	24h	0.078	0.084	0.028	0.029	0.106	0.113
	2d	0.068	0.078	0.028	0.028	0.096	0.106
	4d	0.051	0.069	0.028	0.028	0.079	0.097
Long term	7d	0.033	0.057	0.027	0.028	0.060	0.085
	14d	0.012	0.039	0.025	0.027	0.037	0.066
	21d	0.004	0.028	0.023	0.026	0.027	0.054
	28d	0.002	0.022	0.021	0.025	0.023	0.047
	50d	0.000	0.013	0.017	0.022	0.017	0.035
	100d	0.000	0.006	0.010	0.017	0.010	0.023
Application rate: 1 x 72 g a.s./ha – Tier I, BBCH 10-49							
Initial		0.073	!	0.011	!	0.084	!
Short term	24h	0.072	0.073	0.011	0.011	0.083	0.084
	2d	0.071	0.072	0.011	0.011	0.082	0.083
	4d	0.069	0.071	0.010	0.011	0.079	0.082
Long term	7d	0.066	0.070	0.010	0.010	0.076	0.080
	14d	0.060	0.066	0.009	0.010	0.069	0.076
	21d	0.054	0.063	0.009	0.010	0.063	0.073
	28d	0.048	0.060	0.008	0.009	0.056	0.069
	50d	0.035	0.052	0.006	0.008	0.041	0.060
	100d	0.016	0.038	0.004	0.007	0.020	0.045
Application rate: 3 x 72 g a.s./ha, interval: 10d – Tier I, BBCH 10-49							
Initial		0.156	!	0.021	!	0.177	!
Short term	24h	0.154	0.155	0.020	0.021	0.174	0.176

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	2d	0.151	0.154	0.020	0.020	0.171	0.174
	4d	0.147	0.152	0.020	0.020	0.167	0.172
Long term	7d	0.141	0.148	0.019	0.020	0.160	0.168
	14d	0.127	0.141	0.018	0.019	0.145	0.160
	21d	0.114	0.134	0.016	0.018	0.13	0.152
	28d	0.103	0.128	0.015	0.018	0.118	0.146
	50d	0.074	0.110	0.012	0.016	0.086	0.126
	100d	0.035	0.081	0.007	0.013	0.042	0.094
Application rate: 1 x 72 g a.s./ha – Tier II, BBCH 10-49							
Initial		0.073	!	0.011	!	0.084	!
Short term	24h	0.064	0.068	0.011	0.011	0.075	0.079
	2d	0.055	0.064	0.011	0.011	0.066	0.075
	4d	0.041	0.056	0.010	0.011	0.051	0.067
Long term	7d	0.027	0.046	0.010	0.010	0.037	0.056
	14d	0.010	0.032	0.009	0.010	0.019	0.042
	21d	0.004	0.023	0.009	0.010	0.013	0.033
	28d	0.001	0.018	0.008	0.009	0.009	0.027
	50d	0.000	0.010	0.006	0.008	0.006	0.018
	100d	0.000	0.005	0.004	0.007	0.004	0.012
Application rate: 3 x 72 g a.s./ha, interval: 10d – Tier II, BBCH 10-49							
Initial		0.068	!	0.021	!	0.089	!
Short term	24h	0.059	0.063	0.020	0.021	0.079	0.084
	2d	0.051	0.059	0.020	0.020	0.071	0.079
	4d	0.038	0.051	0.020	0.020	0.058	0.071
Long term	7d	0.025	0.043	0.019	0.020	0.044	0.063
	14d	0.009	0.029	0.018	0.019	0.027	0.048
	21d	0.003	0.021	0.016	0.018	0.019	0.039
	28d	0.001	0.016	0.015	0.018	0.016	0.034
	50d	0.000	0.009	0.012	0.016	0.012	0.025
	100d	0.000	0.005	0.007	0.013	0.007	0.018
Application rate: 1 x 72 g a.s./ha – Tier I, BBCH 10-39							
Initial		0.073	!	0.013	!	0.086	!
Short term	24h	0.072	0.073	0.013	0.013	0.085	0.086
	2d	0.071	0.072	0.013	0.013	0.084	0.085
	4d	0.069	0.071	0.012	0.013	0.081	0.084
Long term	7d	0.066	0.070	0.012	0.012	0.078	0.082

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	14d	0.060	0.066	0.011	0.012	0.071	0.078
	21d	0.054	0.063	0.010	0.012	0.064	0.075
	28d	0.048	0.060	0.010	0.011	0.058	0.071
	50d	0.035	0.052	0.007	0.010	0.042	0.062
	100d	0.016	0.038	0.004	0.008	0.02	0.046
Application rate: 3 x 72 g a.s./ha, interval: 10d – Tier I, BBCH 10-39							
Initial		0.168	!	0.031	!	0.199	!
Short term	24h	0.166	0.167	0.031	0.031	0.197	0.198
	2d	0.163	0.166	0.030	0.031	0.193	0.197
	4d	0.159	0.163	0.030	0.030	0.189	0.193
Long term	7d	0.152	0.160	0.029	0.030	0.181	0.19
	14d	0.137	0.152	0.026	0.029	0.163	0.181
	21d	0.123	0.144	0.024	0.028	0.147	0.172
	28d	0.111	0.138	0.023	0.027	0.134	0.165
	50d	0.080	0.118	0.018	0.024	0.098	0.142
	100d	0.038	0.087	0.010	0.019	0.048	0.106
Application rate: 1 x 72 g a.s./ha – Tier II, BBCH 10-39							
Initial		0.073	!	0.013	!	0.086	!
Short term	24h	0.064	0.068	0.013	0.013	0.077	0.081
	2d	0.055	0.064	0.013	0.013	0.068	0.077
	4d	0.041	0.056	0.012	0.013	0.053	0.069
Long term	7d	0.027	0.046	0.012	0.012	0.039	0.058
	14d	0.010	0.032	0.011	0.012	0.021	0.044
	21d	0.004	0.023	0.010	0.012	0.014	0.035
	28d	0.001	0.018	0.010	0.011	0.011	0.029
	50d	0.000	0.010	0.007	0.010	0.007	0.020
	100d	0.000	0.005	0.004	0.008	0.004	0.013
Application rate: 3 x 72 g a.s./ha, interval: 10d – Tier II, BBCH 10-39							
Initial		0.080	!	0.031	!	0.111	!
Short term	24h	0.069	0.074	0.031	0.031	0.100	0.105
	2d	0.060	0.069	0.030	0.031	0.090	0.100
	4d	0.045	0.061	0.030	0.030	0.075	0.091
Long term	7d	0.029	0.050	0.029	0.030	0.058	0.080
	14d	0.011	0.034	0.026	0.029	0.037	0.063
	21d	0.004	0.025	0.024	0.028	0.028	0.053
	28d	0.001	0.019	0.023	0.027	0.024	0.046

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	50d	0.000	0.011	0.018	0.024	0.018	0.035
	100d	0.000	0.006	0.010	0.019	0.010	0.025
Application rate: 1 x 76.8 g a.s./ha, Tier II, BBCH 40-49							
Initial		0.052	-	0.009	-	0.061	0.061
Short term	24h	0.045	0.049	0.009	0.009	0.054	0.058
	2d	0.039	0.045	0.009	0.009	0.048	0.054
	4d	0.029	0.040	0.009	0.009	0.038	0.049
Long term	7d	0.019	0.033	0.009	0.009	0.028	0.042
	14d	0.007	0.022	0.008	0.009	0.015	0.031
	21d	0.003	0.016	0.007	0.008	0.010	0.024
	28d	0.001	0.013	0.007	0.008	0.008	0.021
	50d	0.000	0.008	0.005	0.007	0.005	0.015
	100d	0.000	0.004	0.003	0.006	0.003	0.010
Application rate: 1 x 72 g a.s./ha, Tier II, BBCH 10-49							
Initial		0.073	-	0.013	-	0.086	
Short term	24h	0.064	0.068	0.013	0.013	0.077	0.081
	2d	0.055	0.064	0.013	0.013	0.068	0.077
	4d	0.041	0.056	0.012	0.013	0.053	0.069
Long term	7d	0.027	0.046	0.012	0.012	0.039	0.058
	14d	0.010	0.032	0.011	0.012	0.021	0.044
	21d	0.004	0.023	0.010	0.012	0.014	0.035
	28d	0.001	0.018	0.010	0.011	0.011	0.029
	50d	0.000	0.011	0.008	0.010	0.008	0.021
	100d	0.000	0.005	0.004	0.008	0.004	0.013

Table 8.7-7: PEC_{soil} for spinosad on pear, wild apple, quince (uses no. 5, 6, 5a, 6a, 5b, 6b)

PEC _{soil} (mg/kg)		Pear, Wild apple, Quince					
		Spinosyn A		Spinosyn D		Total Spinosad	
		Actual	TWA	Actual	TWA	Actual	TWA
Application rate: 1 x 144 g a.s./ha – Tier I							
Initial		0.065	-	0.012	-	0.077	-
Short term	24h	0.064	0.065	0.011	0.011	0.075	0.076
	2d	0.063	0.064	0.011	0.011	0.074	0.075
	4d	0.061	0.063	0.011	0.011	0.072	0.074
Long term	7d	0.059	0.062	0.011	0.011	0.070	0.073
	14d	0.053	0.059	0.010	0.011	0.063	0.070

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	21d	0.048	0.056	0.009	0.010	0.057	0.066
	28d	0.043	0.053	0.008	0.010	0.051	0.063
	50d	0.031	0.046	0.007	0.009	0.038	0.055
	100d	0.015	0.034	0.004	0.007	0.019	0.041
Application rate: 2 x 144 g a.s./ha, interval: 10d – Tier I							
Initial		0.113	-	0.020	-	0.133	-
Short term	24h	0.112	0.112	0.020	0.020	0.132	0.132
	2d	0.110	0.112	0.020	0.020	0.130	0.132
	4d	0.107	0.110	0.020	0.020	0.127	0.130
Long term	7d	0.102	0.108	0.019	0.020	0.121	0.128
	14d	0.092	0.102	0.017	0.019	0.109	0.121
	21d	0.083	0.097	0.016	0.018	0.099	0.115
	28d	0.075	0.093	0.015	0.018	0.090	0.111
	50d	0.054	0.080	0.012	0.016	0.066	0.096
	100d	0.025	0.059	0.007	0.012	0.032	0.071
Application rate: 1 x 144 g a.s./ha – Tier II							
Initial		0.065	-	0.012	-	0.077	-
Short term	24h	0.057	0.061	0.011	0.011	0.068	0.072
	2d	0.049	0.057	0.011	0.011	0.06	0.068
	4d	0.037	0.050	0.011	0.011	0.048	0.061
Long term	7d	0.024	0.041	0.011	0.011	0.035	0.052
	14d	0.009	0.028	0.010	0.011	0.019	0.039
	21d	0.003	0.021	0.009	0.010	0.012	0.031
	28d	0.001	0.016	0.008	0.010	0.009	0.026
	50d	0.000	0.009	0.007	0.009	0.007	0.018
	100d	0.000	0.005	0.004	0.007	0.004	0.012
Application rate: 2 x 144 g a.s./ha, interval: 10d – Tier II							
Initial		0.073	-	0.020	-	0.093	-
Short term	24h	0.063	0.068	0.020	0.020	0.083	0.088
	2d	0.054	0.063	0.020	0.020	0.074	0.083
	4d	0.041	0.055	0.020	0.020	0.061	0.075
Long term	7d	0.027	0.046	0.019	0.020	0.046	0.066
	14d	0.010	0.031	0.017	0.019	0.027	0.05
	21d	0.004	0.023	0.016	0.018	0.02	0.041
	28d	0.001	0.018	0.015	0.018	0.016	0.036
	50d	0.000	0.010	0.012	0.016	0.012	0.026

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	100d	0.000	0.005	0.007	0.012	0.007	0.017
Application rate: 1 x 10⁶ g a.s./ha → max. orchard 9780 m² LWA — Tier I, BBCH 10-59 / BBCH >= 70							
Initial		0.043	I	0.009	I	0.058	I
Short-term	E4c	0.043	0.043	0.009	0.009	0.054	0.053
	S2	0.043	0.043	0.009	0.009	0.056	0.054
	A2	0.046	0.043	0.008	0.008	0.054	0.056
Long-term	S2	0.044	0.046	0.008	0.008	0.052	0.054
	F4c	0.040	0.044	0.007	0.008	0.047	0.052
	B1c	0.036	0.042	0.007	0.009	0.042	0.050
	S3c	0.032	0.040	0.006	0.007	0.038	0.047
	S0c	0.024	0.034	0.005	0.007	0.028	0.041
	T00c	0.011	0.025	0.003	0.005	0.014	0.030
Application rate: 2 x 10⁶ g a.s./ha, interval: 10d → max. orchard 9780 m² LWA — Tier I, BBCH 10-59 / BBCH >= 70							
Initial		0.085	I	0.015	I	0.100	I
Short-term	E4c	0.084	0.084	0.015	0.015	0.096	0.096
	S2	0.082	0.084	0.015	0.015	0.097	0.096
	A2	0.080	0.082	0.015	0.015	0.095	0.097
Long-term	S2	0.077	0.081	0.014	0.015	0.091	0.096
	F4c	0.069	0.077	0.012	0.014	0.082	0.091
	B1c	0.062	0.075	0.012	0.014	0.074	0.087
	S3c	0.056	0.069	0.011	0.013	0.067	0.082
	S0c	0.040	0.060	0.009	0.012	0.049	0.072
	T00c	0.019	0.044	0.005	0.009	0.024	0.052
Application rate: 1 x 10⁶ g a.s./ha → max. orchard 9780 m² LWA — Tier II, BBCH 10-59 / BBCH >= 70							
Initial		0.043	I	0.009	I	0.058	I
Short-term	E4c	0.042	0.046	0.009	0.009	0.054	0.053
	S2	0.037	0.043	0.008	0.009	0.045	0.052
	A2	0.029	0.032	0.008	0.009	0.036	0.045
Long-term	S2	0.018	0.031	0.008	0.008	0.026	0.036
	F4c	0.007	0.021	0.007	0.008	0.014	0.028
	B1c	0.002	0.015	0.007	0.009	0.009	0.022
	S3c	0.001	0.012	0.006	0.007	0.007	0.019
	S0c	0.000	0.007	0.005	0.007	0.005	0.014
	T00c	0.000	0.002	0.003	0.005	0.003	0.008
Application rate: 2 x 10⁶ g a.s./ha, interval: 10d → max. orchard 9780 m² LWA — Tier II, BBCH 10-59 / BBCH >= 70							

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Initial		0.052	I	0.015	I	0.062	I
Short term	24h	0.047	0.051	0.015	0.015	0.062	0.066
	2d	0.041	0.047	0.015	0.015	0.056	0.062
	4d	0.034	0.041	0.015	0.015	0.046	0.056
Long term	7d	0.026	0.034	0.014	0.015	0.034	0.043
	14d	0.009	0.023	0.013	0.014	0.026	0.034
	21d	0.006	0.017	0.012	0.014	0.018	0.024
	28d	0.004	0.012	0.011	0.012	0.012	0.026
	50d	0.000	0.008	0.009	0.012	0.009	0.020
	100d	0.000	0.004	0.005	0.009	0.005	0.013
Application rate: 1 x 100 g a.s./ha, max. orchard 9780 m ² LWA, Tier 1, BBCH $\geq$ 40, BBCH $\leq$ 70							
Initial		0.040	I	0.009	I	0.058	I
Short term	24h	0.038	0.040	0.009	0.009	0.052	0.058
	2d	0.038	0.038	0.008	0.009	0.056	0.057
	4d	0.046	0.038	0.008	0.008	0.052	0.056
Long term	7d	0.044	0.046	0.008	0.008	0.052	0.054
	14d	0.040	0.042	0.007	0.008	0.047	0.050
	21d	0.036	0.042	0.007	0.008	0.043	0.05
	28d	0.032	0.040	0.006	0.007	0.038	0.047
	50d	0.022	0.034	0.005	0.007	0.028	0.041
	100d	0.014	0.025	0.003	0.005	0.014	0.03
Application rate: 2 x 100 g a.s./ha, interval: 21d — max. orchard 9780 m ² LWA — Tier 1, BBCH $\geq$ 40, BBCH $\leq$ 70							
Initial		0.070	I	0.014	I	0.094	I
Short term	24h	0.072	0.078	0.014	0.014	0.094	0.093
	2d	0.076	0.072	0.014	0.014	0.096	0.094
	4d	0.074	0.076	0.014	0.014	0.088	0.090
Long term	7d	0.071	0.075	0.013	0.014	0.084	0.080
	14d	0.064	0.071	0.012	0.013	0.076	0.084
	21d	0.057	0.067	0.011	0.013	0.068	0.080
	28d	0.052	0.064	0.011	0.012	0.063	0.072
	50d	0.037	0.055	0.008	0.011	0.045	0.066
	100d	0.019	0.041	0.003	0.009	0.022	0.050
Application rate: 1 x 100 g a.s./ha — max. orchard 9780 m ² LWA — Tier 1, BBCH $\geq$ 40, BBCH $\leq$ 70							
Initial		0.040	I	0.009	I	0.058	I
Short term	24h	0.042	0.046	0.009	0.009	0.051	0.055
	2d	0.037	0.043	0.008	0.009	0.045	0.052

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	1d	0.028	0.027	0.008	0.008	0.036	0.045
Long term	7d	0.018	0.021	0.008	0.008	0.026	0.038
	14d	0.007	0.021	0.007	0.008	0.014	0.028
	21d	0.002	0.015	0.002	0.008	0.009	0.022
	28d	0.001	0.012	0.006	0.007	0.007	0.018
	50d	0.000	0.007	0.005	0.007	0.005	0.014
	100d	0.000	0.003	0.003	0.005	0.004	0.008
Application rate: 2 x 108 g a.s./ha, interval: 21d, max. orchard 0780 m ² L.N.A., Tier II, BBCH > 00, BBCH > 30							
Initial		0.045	!	0.014	!	0.056	!
Short term	24h	0.039	0.045	0.014	0.014	0.054	0.056
	2d	0.032	0.036	0.014	0.014	0.048	0.052
	4d	0.025	0.024	0.014	0.014	0.036	0.048
Long term	7d	0.017	0.020	0.013	0.014	0.034	0.042
	14d	0.006	0.019	0.012	0.013	0.018	0.032
	21d	0.002	0.012	0.011	0.013	0.013	0.027
	28d	0.001	0.011	0.011	0.012	0.012	0.023
	50d	0.000	0.006	0.008	0.011	0.008	0.017
	100d	0.000	0.003	0.005	0.009	0.005	0.012
Application rate: 1 x 144 g a.s./ha, Tier I, BBCH > 70							
Initial		0.057	!	0.010	!	0.067	!
Short term	24h	0.056	0.057	0.010	0.010	0.066	0.067
	2d	0.055	0.056	0.010	0.010	0.065	0.066
	4d	0.054	0.055	0.010	0.010	0.064	0.065
Long term	7d	0.051	0.054	0.009	0.010	0.06	0.064
	14d	0.046	0.052	0.009	0.009	0.055	0.061
	21d	0.042	0.049	0.008	0.009	0.05	0.058
	28d	0.038	0.047	0.007	0.009	0.045	0.056
	50d	0.027	0.040	0.006	0.008	0.033	0.048
	100d	0.013	0.030	0.003	0.006	0.016	0.036
Application rate: 1 x 144 g a.s./ha, Tier II, BBCH > 70							
Initial		0.057	!	0.010	!	0.056	!
Short term	24h	0.049	0.053	0.010	0.010	0.059	0.063
	2d	0.043	0.050	0.010	0.010	0.053	0.06
	4d	0.032	0.043	0.010	0.010	0.042	0.053
Long term	7d	0.021	0.036	0.009	0.010	0.030	0.046

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	14d	0.008	0.025	0.009	0.009	0.017	0.034
	21d	0.003	0.018	0.008	0.009	0.011	0.027
	28d	0.001	0.014	0.007	0.009	0.008	0.023
	50d	0.000	0.008	0.006	0.008	0.006	0.016
	100d	0.000	0.004	0.003	0.006	0.003	0.010
Application rate: 2 x 108 g a.s./ha, Tier II, BBCH >70							
Initial		0.053	0.053	0.014	I	0.067	0.067
Short-term	24h	0.046	0.049	0.014	0.014	0.066	0.067
	2d	0.040	0.046	0.014	0.014	0.054	0.060
	4d	0.030	0.040	0.014	0.014	0.044	0.054
Long-term	7d	0.019	0.025	0.013	0.014	0.032	0.047
	14d	0.007	0.023	0.012	0.013	0.019	0.036
	21d	0.002	0.017	0.011	0.012	0.014	0.030
	28d	0.001	0.012	0.011	0.012	0.012	0.025
	50d	0.000	0.008	0.008	0.011	0.008	0.019
	100d	0.000	0.004	0.003	0.009	0.005	0.014
Application rate: 1 x 96 g a.s./ha — max. orchard 9780 m ² LWA — Tier I, BBCH 10-59 / BBCH >70							
Initial		0.014	I	0.008	I	0.050	I
Short-term	24h	0.013	0.042	0.008	0.008	0.051	0.051
	2d	0.012	0.042	0.008	0.008	0.051	0.051
	4d	0.011	0.042	0.007	0.008	0.005	0.005
Long-term	7d	0.009	0.041	0.007	0.007	0.048	0.048
	14d	0.005	0.039	0.007	0.007	0.048	0.048
	21d	0.002	0.032	0.006	0.007	0.044	0.044
	28d	0.009	0.034	0.006	0.007	0.043	0.043
	50d	0.004	0.031	0.006	0.006	0.037	0.037
	100d	0.010	0.023	0.003	0.005	0.028	0.028
Application rate: 2 x 96 g a.s./ha, interval: 10d — max. orchard 9780 m ² LWA — Tier I, BBCH 10-59 / BBCH >70							
Initial		0.074	I	0.014	I	0.090	I
Short-term	24h	0.074	0.075	0.013	0.014	0.080	0.080
	2d	0.073	0.072	0.013	0.013	0.087	0.087
	4d	0.071	0.071	0.013	0.012	0.092	0.086
Long-term	7d	0.068	0.072	0.013	0.013	0.095	0.085
	14d	0.061	0.068	0.012	0.013	0.091	0.081
	21d	0.055	0.065	0.011	0.012	0.077	0.077
	28d	0.050	0.062	0.010	0.012	0.074	0.074

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		50g	0.036	0.057	0.008	0.010	0.063	0.063
		100g	0.017	0.029	0.004	0.005	0.047	0.047
Application rate: 1 x 96g a.s./ha → max. orchard 9780 m ² LVA – Tier II, BBCH 10-59 / BBCH >70								
Initial			0.044	!	0.008	!	0.052	!
Short-term	24h		0.033	0.041	0.008	0.008	0.046	0.046
	2d		0.033	0.033	0.008	0.008	0.041	0.040
	7d		0.034	0.033	0.008	0.008	0.041	0.041
Long-term	7d		0.016	0.027	0.005	0.005	0.023	0.033
	14d		0.006	0.013	0.003	0.003	0.013	0.026
	21d		0.005	0.011	0.004	0.005	0.008	0.021
	28d		0.004	0.011	0.004	0.005	0.007	0.013
	35d		0.006	0.006	0.004	0.005	0.004	0.011
	100d		0.000	0.001	0.003	0.005	0.003	0.005
Application rate: 2 x 96 g a.s./ha, interval: 10d → max. orchard 9780 m ² LVA – Tier II, BBCH 10-59 / BBCH >70								
Initial			0.010	!	0.013	!	0.062	!
Short-term	24h		0.012	0.045	0.013	0.013	0.055	0.050
	2d		0.036	0.042	0.013	0.013	0.040	0.053
	7d		0.027	0.037	0.013	0.013	0.040	0.050
Long-term	7d		0.013	0.031	0.013	0.013	0.031	0.044
	14d		0.006	0.021	0.012	0.013	0.013	0.034
	21d		0.002	0.013	0.011	0.012	0.013	0.021
	28d		0.004	0.011	0.010	0.012	0.011	0.024
	35d		0.000	0.005	0.003	0.010	0.008	0.011
	100d		0.000	0.001	0.003	0.003	0.004	0.011

PEC_{soil} of metabolites

Table 8.7-8: PEC_{soil} for spinosyn B on cabbage, broccoli, cauliflower (uses no. 1, 2)

PEC _{soil} (mg/kg)		Cabbage, Broccoli, Cauliflower	
		Actual	TWA
Application rate: 1 x 96 g a.s./ha			
Initial		0.054	-
Short term	24h	0.054	0.054
	2d	0.053	0.054
	4d	0.053	0.053
Long term	7d	0.053	0.053

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	14d	0.052	0.053
	21d	0.051	0.052
	28d	0.050	0.052
	50d	0.048	0.051
	100d	0.042	0.048
Plateau concentration (5 cm) after year 9		0.022	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.076	-
Application rate: 3 x 96 g a.s./ha, interval: 7d			
Initial		0.116	-
Short term	24h	0.115	0.115
	2d	0.115	0.115
	4d	0.114	0.115
Long term	7d	0.114	0.115
	14d	0.112	0.114
	21d	0.110	0.113
	28d	0.108	0.112
	50d	0.103	0.109
	100d	0.091	0.103
Plateau concentration (5 cm) after year 9		0.022	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.138	-
Application rate: 1 x 48 g a.s./ha, BBCH 10-49			
Initial		0.027	!
Short term	24h	0.027	0.027
	2d	0.027	0.027
	4d	0.027	0.027
Long term	7d	0.026	0.027
	14d	0.026	0.026
	21d	0.026	0.026
	28d	0.025	0.026
	50d	0.024	0.025
	100d	0.021	0.024
Plateau concentration (5 cm) after year 20 years		0.012	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.039	!

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Application rate: 3 x 48 g a.s./ha, interval: 7d, BBCH 10-49			
Initial		0.058	!
Short term	24h	0.058	0.058
	2d	0.057	0.058
	4d	0.057	0.057
Long term	7d	0.057	0.057
	14d	0.056	0.057
	21d	0.055	0.056
	28d	0.054	0.056
	50d	0.051	0.054
	100d	0.046	0.051
Plateau concentration (5 cm) after year 20 years		0.012	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.070	!
Application rate: 1 x 48 g a.s./ha, BBCH 10-49			
Initial		0.027	!
Short term	24h	0.027	0.027
	2d	0.027	0.027
	4d	0.027	0.027
Long term	7d	0.026	0.027
	14d	0.026	0.026
	21d	0.026	0.026
	28d	0.025	0.026
	50d	0.024	0.025
	100d	0.021	0.024
Plateau concentration (5 cm) after year 20 years		0.011	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.038	!
Application rate: 3 x 48 g a.s./ha, interval: 10d, BBCH 10-49			
Initial		0.057	!
Short term	24h	0.057	0.057
	2d	0.057	0.057
	4d	0.057	0.057
Long term	7d	0.056	0.057
	14d	0.055	0.056
	21d	0.054	0.056

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	28d	0.054	0.055
	50d	0.051	0.054
	100d	0.045	0.051
Plateau concentration (5 cm) after year 20 years		0.011	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.068	-

Table 8.7-9: PEC_{soil} for spinosyn B on onion, leek, garlic (uses no. 3, 4, 7)

PEC _{soil} (mg/kg)		Onion, Leek, Garlic	
		Actual	TWA
Application rate: 1 x 96 g a.s./ha			
Initial		0.064	-
Short term	24h	0.064	0.064
	2d	0.064	0.064
	4d	0.064	0.064
Long term	7d	0.063	0.064
	14d	0.062	0.063
	21d	0.061	0.063
	28d	0.060	0.062
	50d	0.057	0.061
	100d	0.051	0.057
Plateau concentration (5 cm) after year 9		0.030	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.094	-
Application rate: 3 x 96 g a.s./ha, interval: 10d			
Initial		0.157	-
Short term	24h	0.156	0.156
	2d	0.156	0.156
	4d	0.155	0.156
Long term	7d	0.154	0.155
	14d	0.151	0.154
	21d	0.149	0.153
	28d	0.147	0.152
	50d	0.139	0.148
	100d	0.123	0.139

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Plateau concentration (5 cm) after year 9		0.030	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.187	-
Application rate: 1 x 72 g a.s./ha, BBCH 10-49			
Initial		0.048	!
Short term	24h	0.048	0.048
	2d	0.048	0.048
	4d	0.048	0.048
Long term	7d	0.047	0.048
	14d	0.047	0.047
	21d	0.046	0.047
	28d	0.045	0.047
	50d	0.043	0.046
	100d	0.038	0.043
Plateau concentration (5 cm) after year 20 years		0.022	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.070	!
Application rate: 3 x 72 g a.s./ha, interval: 10d, BBCH 10-49			
Initial		0.117	!
Short term	24h	0.117	0.117
	2d	0.117	0.117
	4d	0.116	0.117
Long term	7d	0.116	0.116
	14d	0.114	0.116
	21d	0.112	0.115
	28d	0.110	0.114
	50d	0.104	0.111
	100d	0.093	0.105
Plateau concentration (5 cm) after 20 years		0.022	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.139	!
Application rate: 1 x 72 g a.s./ha, BBCH 10-39			
Initial		0.048	!
Short term	24h	0.048	0.048
	2d	0.048	0.048
	4d	0.048	0.048

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Long term	7d	0.047	0.048
	14d	0.047	0.047
	21d	0.046	0.047
	28d	0.045	0.047
	50d	0.043	0.046
	100d	0.038	0.043
Plateau concentration (5 cm) after year 20 years		0.022	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.070	!
Application rate: 3 x 72 g a.s./ha, interval: 10d, BBCH 10-39			
Initial		0.126	!
Short term	24h	0.125	0.125
	2d	0.125	0.125
	4d	0.124	0.125
Long term	7d	0.123	0.124
	14d	0.121	0.123
	21d	0.119	0.122
	28d	0.117	0.121
	50d	0.111	0.118
	100d	0.099	0.112
Plateau concentration (5 cm) after 20 years		0.024	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.150	!

Table 8.7-10: PEC_{soil} for spinosyn B on pear, wild apple, quince (uses no. 5, 6, 5a, 6a)

PEC _{soil} (mg/kg)		Pear, Wild apple, Quince	
		Actual	TWA
Application rate: 1 x 144 g a.s./ha			
Initial		0.043	-
Short term	24h	0.043	0.043
	2d	0.043	0.043
	4d	0.042	0.043
Long term	7d	0.042	0.043
	14d	0.041	0.042
	21d	0.041	0.042

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	28d	0.040	0.042
	50d	0.038	0.040
	100d	0.034	0.038
Plateau concentration (5 cm) after year 9		0.027	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.070	-
Application rate: 2 x 144 g a.s./ha, interval: 10d			
Initial		0.079	-
Short term	24h	0.079	0.079
	2d	0.079	0.079
	4d	0.079	0.079
Long term	7d	0.078	0.079
	14d	0.077	0.078
	21d	0.076	0.077
	28d	0.074	0.077
	50d	0.071	0.075
	100d	0.063	0.071
Plateau concentration (5 cm) after year 9		0.027	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.106	-
Application rate: 1 x 108 g a.s./ha → max. orchard 9780 m² LWA, BBCH 10-59 / BBCH >70			
Initial		0.032	!
Short term	24h	0.032	0.032
	2d	0.032	0.032
	4d	0.032	0.032
Long term	7d	0.032	0.032
	14d	0.031	0.032
	21d	0.031	0.031
	28d	0.030	0.031
	50d	0.029	0.030
	100d	0.025	0.029
Plateau concentration (5 cm) after 20 years		0.022	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.054	!
Application rate: 2 x 108 g a.s./ha, interval: 10d → max. orchard 9780 m² LWA, BBCH 10-59 / BBCH >70			
Initial		0.060	!

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Short term	24h	0.059	0.060
	2d	0.059	0.059
	4d	0.059	0.059
Long term	7d	0.059	0.059
	14d	0.058	0.059
	21d	0.057	0.058
	28d	0.056	0.058
	50d	0.053	0.056
	100d	0.047	0.053
Plateau concentration (5 cm) after 20 years		0.022	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.082	!
Application rate: 1 x 108 g a.s./ha → max. orchard 9780 m ² LWA, BBCH ≥ 40 / BBCH >70			
Initial		0.032	!
Short term	24h	0.032	0.032
	2d	0.032	0.032
	4d	0.032	0.032
Long term	7d	0.032	0.032
	14d	0.031	0.032
	21d	0.031	0.031
	28d	0.030	0.031
	50d	0.029	0.030
	100d	0.025	0.029
Plateau concentration (5 cm) after 20 years		0.023	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.055	!
Application rate: 2 x 108 g a.s./ha, interval: 21d → max. orchard 9780 m ² LWA, BBCH ≥ 40 / BBCH >70			
Initial		0.059	!
Short term	24h	0.059	0.059
	2d	0.058	0.059
	4d	0.058	0.058
Long term	7d	0.058	0.058
	14d	0.057	0.058
	21d	0.056	0.057
	28d	0.055	0.057
	50d	0.052	0.055

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	100d	0.046	0.052
Plateau concentration (5 cm) after 20 years		0.023	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.082	-
Application rate: 1 x 144 g a.s./ha, BBCH >70			
Initial		0.038	-
Short term	24h	0.037	0.037
	2d	0.037	0.037
	4d	0.037	0.037
Long term	7d	0.037	0.037
	14d	0.036	0.037
	21d	0.036	0.037
	28d	0.035	0.036
	50d	0.033	0.035
	100d	0.030	0.033
Plateau concentration (5 cm) after 20 years		0.020	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.058	-

Table 8.7-11: PEC_{soil} for N-demethylated spinosyn D on cabbage, broccoli, cauliflower (uses no. 1, 2)

PEC _{soil} (mg/kg)		Cabbage, Broccoli, Cauliflower	
		Actual	TWA
Application rate: 1 x 96 g a.s./ha			
Initial		0.010	-
Short term	24h	0.010	0.010
	2d	0.010	0.010
	4d	0.009	0.010
Long term	7d	0.009	0.009
	14d	0.009	0.009
	21d	0.009	0.009
	28d	0.009	0.009
	50d	0.008	0.009
	100d	0.007	0.008
Plateau concentration (5 cm)		0.002	-

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after year 9			
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.012	-
Application rate: 3 x 96 g a.s./ha, interval: 7d			
Initial		0.021	-
Short term	24h	0.020	0.020
	2d	0.020	0.020
	4d	0.020	0.020
Long term	7d	0.020	0.020
	14d	0.020	0.020
	21d	0.019	0.020
	28d	0.019	0.020
	50d	0.017	0.019
	100d	0.015	0.017
Plateau concentration (5 cm) after year 9		0.002	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.023	-
Application rate: 1 x 48 g a.s./ha, BBCH 10-49			
Initial		0.005	!
Short term	24h	0.005	0.005
	2d	0.005	0.005
	4d	0.005	0.005
Long term	7d	0.005	0.005
	14d	0.005	0.005
	21d	0.005	0.005
	28d	0.005	0.005
	50d	0.004	0.005
	100d	0.004	0.004
Plateau concentration (5 cm) after 20 years		0.001	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.006	!
Application rate: 3 x 48 g a.s./ha, interval: 7d, BBCH 10-49			
Initial		0.010	!
Short term	24h	0.010	0.010
	2d	0.010	0.010
	4d	0.010	0.010

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Long term	7d	0.010	0.010
	14d	0.010	0.010
	21d	0.010	0.010
	28d	0.009	0.010
	50d	0.009	0.009
	100d	0.007	0.009
Plateau concentration (5 cm) after 20 years		0.001	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.011	!
Application rate: 1 x 48 g a.s./ha, BBCH 10-49			
Initial		0.005	!
Short term	24h	0.005	0.005
	2d	0.005	0.005
	4d	0.005	0.005
Long term	7d	0.005	0.005
	14d	0.005	0.005
	21d	0.005	0.005
	28d	0.005	0.005
	50d	0.004	0.005
	100d	0.004	0.004
Plateau concentration (5 cm) after 20 years		0.001	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.006	!
Application rate: 3 x 48 g a.s./ha, interval: 10d, BBCH 10-49			
Initial		0.010	!
Short term	24h	0.010	0.010
	2d	0.010	0.010
	4d	0.010	0.010
Long term	7d	0.010	0.010
	14d	0.010	0.010
	21d	0.009	0.010
	28d	0.009	0.010
	50d	0.009	0.009
	100d	0.007	0.009
Plateau concentration (5 cm) after 20 years		0.001	!

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PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})	0.011	!
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Table 8.7-12: PEC_{soil} for N-demethylated spinosyn D on onion, leek, garlic (uses no. 3, 4, 7)

PEC _{soil} (mg/kg)		Onion, Leek, Garlic	
		Actual	TWA
Application rate: 1 x 96 g a.s./ha			
Initial		0.012	-
Short term	24h	0.011	0.012
	2d	0.011	0.011
	4d	0.011	0.011
Long term	7d	0.011	0.011
	14d	0.011	0.011
	21d	0.011	0.011
	28d	0.010	0.011
	50d	0.010	0.011
	100d	0.008	0.010
Plateau concentration (5 cm) after year 9		0.003	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.015	-
Application rate: 3 x 96 g a.s./ha, interval: 10d			
Initial		0.028	-
Short term	24h	0.028	0.028
	2d	0.028	0.028
	4d	0.027	0.028
Long term	7d	0.027	0.027
	14d	0.026	0.027
	21d	0.026	0.027
	28d	0.025	0.026
	50d	0.023	0.025
	100d	0.020	0.023
Plateau concentration (5 cm) after year 9		0.003	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.031	-
Application rate: 1 x 72 g a.s./ha, BBCH 10-49			
Initial		0.009	!

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Short term	24h	0.009	0.009
	2d	0.009	0.009
	4d	0.009	0.009
Long term	7d	0.008	0.009
	14d	0.008	0.008
	21d	0.008	0.008
	28d	0.008	0.008
	50d	0.007	0.008
	100d	0.006	0.007
Plateau concentration (5 cm) After 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.011	!
Application rate: 3 x 72 g a.s./ha, interval: 10d, BBCH 10-49			
Initial		0.021	!
Short term	24h	0.021	0.021
	2d	0.021	0.021
	4d	0.020	0.021
Long term	7d	0.020	0.021
	14d	0.020	0.020
	21d	0.019	0.020
	28d	0.019	0.020
	50d	0.017	0.019
	100d	0.015	0.018
Plateau concentration (5 cm) after 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.023	!
Application rate: 1 x 72 g a.s./ha, BBCH 10-39			
Initial		0.009	!
Short term	24h	0.009	0.009
	2d	0.009	0.009
	4d	0.009	0.009
Long term	7d	0.008	0.009
	14d	0.008	0.008
	21d	0.008	0.008
	28d	0.008	0.008
	50d	0.007	0.008

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	100d	0.006	0.007
Plateau concentration (5 cm) After 20 years		0.002	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.011	-
Application rate: 3 x 72 g a.s./ha, interval: 10d, BBCH 10-39			
Initial		0.022	-
Short term	24h	0.022	0.022
	2d	0.022	0.022
	4d	0.022	0.022
Long term	7d	0.022	0.022
	14d	0.021	0.022
	21d	0.021	0.021
	28d	0.020	0.021
	50d	0.019	0.020
	100d	0.016	0.019
Plateau concentration (5 cm) after 20 years		0.002	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.024	-

Table 8.7-13: PEC_{soil} for N-demethylated spinosyn D on pear, wild apple, quince (uses no. 5, 6, 5a, 6a)

PEC _{soil} (mg/kg)		Pear, Wild apple, Quince	
		Actual	TWA
Application rate: 1 x 144 g a.s./ha			
Initial		0.008	-
Short term	24h	0.008	0.008
	2d	0.008	0.008
	4d	0.008	0.008
Long term	7d	0.008	0.008
	14d	0.007	0.008
	21d	0.007	0.007
	28d	0.007	0.007
	50d	0.006	0.007
	100d	0.005	0.007
Plateau concentration (5 cm) after year 9		0.003	-

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PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.011	-
Application rate: 2 x 144 g a.s./ha, interval: 10d			
Initial		0.014	-
Short term	24h	0.014	0.014
	2d	0.014	0.014
	4d	0.014	0.014
Long term	7d	0.014	0.014
	14d	0.013	0.014
	21d	0.013	0.014
	28d	0.013	0.013
	50d	0.012	0.013
	100d	0.010	0.012
Plateau concentration (5 cm) after year 9		0.003	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.017	-
Application rate: 1 x 108 g a.s./ha → max. orchard 9780 m² LWA, BBCH 10-59 / BBCH >70			
Initial		0.006	!
Short term	24h	0.006	0.006
	2d	0.006	0.006
	4d	0.006	0.006
Long term	7d	0.006	0.006
	14d	0.006	0.006
	21d	0.005	0.006
	28d	0.005	0.006
	50d	0.005	0.005
	100d	0.004	0.005
Plateau concentration (5 cm) after 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.008	!
Application rate: 2 x 108 g a.s./ha, interval: 10d → max. orchard 9780 m² LWA, BBCH 10-59 / BBCH >70			
Initial		0.011	!
Short term	24h	0.011	0.011
	2d	0.011	0.011
	4d	0.011	0.011
Long term	7d	0.011	0.011

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	14d	0.010	0.011
	21d	0.010	0.010
	28d	0.010	0.010
	50d	0.009	0.010
	100d	0.008	0.009
Plateau concentration (5 cm) after 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.013	!
Application rate: 1 x 108 g a.s./ha → max. orchard 9780 m ² LWA, BBCH ≥ 40 / BBCH >70			
Initial		0.006	!
Short term	24h	0.006	0.006
	2d	0.006	0.006
	4d	0.006	0.006
Long term	7d	0.006	0.006
	14d	0.006	0.006
	21d	0.005	0.006
	28d	0.005	0.006
	50d	0.005	0.005
	100d	0.004	0.005
Plateau concentration (5 cm) after 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.008	!
Application rate: 2 x 108 g a.s./ha, interval: 21d → max. orchard 9780 m ² LWA, BBCH ≥ 40 / BBCH >70			
Initial		0.011	!
Short term	24h	0.011	0.011
	2d	0.011	0.011
	4d	0.010	0.011
Long term	7d	0.010	0.010
	14d	0.010	0.010
	21d	0.010	0.010
	28d	0.010	0.010
	50d	0.009	0.010
	100d	0.008	0.009
Plateau concentration (5 cm) after 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.013	!

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Application rate: 1 x 108 g a.s./ha, BBCH >70			
Initial		0.007	!
Short term	24h	0.007	0.007
	2d	0.007	0.007
	4d	0.007	0.007
Long term	7d	0.007	0.007
	14d	0.006	0.007
	21d	0.006	0.006
	28d	0.006	0.006
	50d	0.006	0.006
	100d	0.005	0.006
Plateau concentration (5 cm) after 20 years		0.002	!
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.009	!

The predicted environmental concentrations in soil were calculated for the active substance spinosad and its metabolites spinosyn B and N-demethylated spinosyn D according to recommendations by the “FOCUS” group (FOCUS report, 29.02.1997). Calculations were based on a simple first tier approach (Ctgb Excel sheet, January 2018).

Crop interception data, which correspond to the intended growth stages, were taken from the EFSA Journal 2014; 12(5):3662.

The maximum PEC_{soil} values will be used in the ecotoxicological risk assessment.

8.7.2.1 PEC_{soil} of SAP09I

Initial PEC_{soil} values were calculated for the formulation based on the maximum and minimum single application rates. The calculation was based on the crop interception for each use, soil depth of 5 cm, bulk density of 1.5 g/cm³ and specific density of 1090 g/L. Time-dependent PEC_{soil} values are not required to be calculated for the formulation since it is considered to be separated into its individual components by transport and dissipation processes.

Table 8.7-14: PEC_{soil} for SAP09I

Preparation	Application rate	No. of Applications	Uses/Crops	Crop Interception (%)	Tillage depth (cm)	PEC _{soil} initial (mg/kg)
SAP09I	218 g/ha (0.2 l/ha)	1	Cabbage, Broccoli, Cauliflower (uses no. 1, 2)	25	5	0.218
	109 g/ha (0.1 l/ha)	1		25	5	0.109
SAP09I	218 g/ha	1	Onion, Leek, Garlic	10	5	0.262

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Preparation	Application rate	No. of Applications	Uses/Crops	Crop Interception (%)	Tillage depth (cm)	PEC _{soil} initial (mg/kg)
	(0.2 l/ha)		(uses no. 3, 4, 7)			
	163.5 g/ha (0.15 l/ha)	1		10	5	0.196
SAP09I	327 g/ha (0.3 l/ha)	1	Pear, Wild apple, Quince (uses no. 5, 6)	60	5	0.174
	245.25 g/ha (0.225 l/ha)	1		60	5	0.131

8.8 Predicted Environmental Concentrations in groundwater (PEC_{gw}) (KCP 9.2.4)

zRMS Comments:	The submitted PEC_{gw} assessment was accepted. Calculations of PEC_{gw} for active substance and its relevant metabolite were provided in Tier 1 with PUF = 0. The recommended FOCUS models were used: FOCUS PELMO, FOCUS PEARL and FOCUS MACRO. The used endpoints were agreed at the EU level. The maximum PEC_{GW} values for active substance and its metabolites were below the trigger value of 0.1 µg/L.
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8.8.1 Justification for new endpoints

No new active substance data have been submitted as part of this application for authorisation/re-registration.

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

Report:	KCP 9.2.4/01, Tabor E., 2024
Title:	Predicted Environmental Concentrations of Spinosad and its metabolites in Groundwater (PEC _{gw}) for risk assessment of SAP09I
Document No:	EST/26/2024
Guidelines:	FOCUS (2000): FOCUS groundwater scenarios in the EU review of active substances. Report of the FOCUS Groundwater Scenarios Workgroup, EC Document Reference Sanco/321/2000, version 2002. FOCUS (2014): Assessing potential for movement of active substances and their metabolites to ground water in the EU. Report of the FOCUS Ground Water Work Group, EC Document Reference Sanco/13144/2010 version 3. FOCUS (2014): Generic guidance for Tier 1 FOCUS ground water assessments, version 2.3. FOCUS groundwater scenarios working group.
GLP	no

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Predicted environmental concentrations in groundwater (PEC_{gw}) were calculated for the active substance spinosad and its metabolites for all representative use patterns derived from GAP information using the leaching models FOCUS PELMO 6.6.4 and FOCUS PEARL 5.5.5.

Spinosad is a mixture of two components: spinosyn A and spinosyn D. PEC_{gw} modelling was done separately for the two components, using application rates calculated by correcting for the occurrence of each component considering only a ratio of 85:15 in the technical material. Overall, PEC_{gw} values for spinosad were derived summing PEC values from the individual spinosyn components.

The minimum dose advocated for the use of this product is covered by the simulations made with the maximum dose (risk envelope approach).

The following input parameters were considered for PEC_{gw} calculations.

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

Use No.	1, 2	3, 4, 7	5, 6
Crop	Cabbage, Broccoli Cauliflower	Onion, Leek, Garlic, Shallot	Apple, Pear, Wild apple, Quince
Crop scenario	Cabbage	Onion	Pome fruits
Max. application rate (g as/ha)	96	96	144
Number of applications/interval (d)	3/7	3/10	2/10
Growth stage of crop	BBCH 10-49	BBCH 10-49	BBCH 10-59 BBCH >70
Crop interception (%)	25% (worst case)	10% (worst case)	60% (worst case)
Total rate reaching soil (g as/ha)*	Spinosyn A: 61.20 Spinosyn D: 10.80	Spinosyn A: 73.44 Spinosyn D: 12.96	Spinosyn A: 48.96 Spinosyn D: 8.64
Frequency of application	annual		
Models used for calculation	FOCUS PELMO v6.6.4, FOCUS PEARL v5.5.5		

#Covered by the simulations made with the maximum dose (risk envelope approach)

*Considering the ratio of Spinosyn A and D is 85:15%, respectively, and the crop interception (%)

The dates from AppDate software v3.06 (M. Klein, 2006. Fraunhofer IME, Germany) were considered for each crop presented in the GAP. AppDate is a software that calculates consistent application dates which can be used in further FOCUS modelling. AppDate uses a database where suitable application dates for major development stages are collected.

Table 8.8-2: Application dates used for groundwater risk assessment

Crop	Scenario	Application dates (absolute)
Crop scenario: cabbage 1 st in season / cabbage 2 nd in season	Châteaudun	1 st possible application: 21/04 ^a / 01/08 ^b
	Hamburg	1 st possible application: 21/04 ^a / 01/08 ^b

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Crop	Scenario	Application dates (absolute)
1 st application at BBCH 10	Kremsmünster	1 st possible application: 21/04 ^a / 01/08 ^b
Crop scenario: cabbage 1 st in season / cabbage 2 nd in season 1 st application at BBCH 41	Châteaudun	1 st possible application: 05/06 ^a / 09/09 ^b
	Hamburg	1 st possible application: 05/06 ^a / 09/09 ^b
	Kremsmünster	1 st possible application: 05/06 ^a / 09/09 ^b
Crop scenario: onions 1 st application at BBCH 10	Châteaudun	1 st possible application: 26/04
	Hamburg	1 st possible application: 26/04
	Kremsmünster	1 st possible application: 26/04
Crop scenario: onions 1 st application at BBCH 41	Châteaudun	1 st possible application: 06/07
	Hamburg	1 st possible application: 06/07
	Kremsmünster	1 st possible application: 06/07
Crop scenario: pome fruit 1 st application at BBCH 10 (single application)	Châteaudun	02/04
	Hamburg	16/04
	Kremsmünster	16/04
Crop scenario: pome fruit 1 st application at BBCH 53 (single application)	Châteaudun	06/05
	Hamburg	30/05
	Kremsmünster	30/05
Crop scenario: pome fruit 1 st application at BBCH 71	Châteaudun	1 st possible application: 06/06
	Hamburg	1 st possible application: 07/07
	Kremsmünster	1 st possible application: 07/07

a) 1st in season b) 2nd in season

The input parameters of spinosad and its metabolites are presented in the table below.

Table 8.8-3: Input parameters related to active substance spinosad and its metabolites for PEC_{gw} calculations

Compound	Spinosyn A	Spinosyn D	Spinosyn B	N-demethylated spinosyn D	Value in accordance with EU endpoint y/n/ Reference*
Molecular weight (g/mol)	731.98	745.98	718	732	SANCO/1428/2001 – rev. final, 14 July 2006
Water solubility at (mg/L):	498 (20°C)	40 (20°C)	250000 (20°C)	512 (20°C)	
Saturated vapour pressure (Pa):	1x10 ⁻⁵ (25°C)	4x10 ⁻⁶ (25°C)	1x10 ⁻⁵ (25°C)	4x10 ⁻⁶ (25°C)	
DT ₅₀ in soil (d)	15.7 (geomean, n=6)	20.3 (geomean, n=5)	69.6 (geomean, n=6)	122.5 (geomean, n=3)	
Transformation rate	Spinosyn A →	Spinosyn D →	Spinosyn B →	N-demethylated	

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Compound	Spinosyn A	Spinosyn D	Spinosyn B	N-demethylated spinosyn D	Value in accordance with EU endpoint y/n/ Reference*
	Spinosyn B: 0.03753 Spinosyn A → BR/CO ₂ : 0.00662	N-demethylated spinosyn D: 0.02697 Spinosyn D → BR/CO ₂ : 0.00717	BR/CO ₂ : 0.009959	spinosyn D → BR/CO ₂ : 0.0056583	
K _{foc} (mL/g)/K _{fom}	8281.6 / 4803.7 (geomean, n=5)	8281.6 / 4803.7 (geomean, n=5)	4184.1 / 2426.97 (geomean, n=4)	4184.1 / 2426.97 (geomean, n=4)	
1/n	0.89 (arithmetic mean, n=5)	0.89 (arithmetic mean, n=5)	0.85 (arithmetic mean, n=4)	0.85 (arithmetic mean, n=4)	
Plant uptake factor	0	0	0	0	
Formation fraction	-	-	0.85 from Spinosyn A	0.79 from Spinosyn D	

Table 8.8-4: PEC_{gw} for spinosad and its metabolites (with FOCUS PEARL 5.5.5)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)				
		Spinosyn A	Spinosyn D	Total Spinosad	Spinosyn B	N-demethylated spinosyn D
Crop scenario: cabbage 1st in season 1 st application at BBCH 10	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: cabbage 2nd in season 1 st application at BBCH 10	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: cabbage 1st in season 1 st application at BBCH 41	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: cabbage 2nd in season 1 st application at BBCH 41	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: onions	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001

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1 st application at BBCH 10	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: onions 1 st application at BBCH 41	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: pome fruit 1 st application at BBCH 10 (single application)	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: pome fruit 1 st application at BBCH 53 (single application)	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: pome fruit 1 st application at BBCH 71	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001

Table 8.8-5: PEC_{gw} for spinosad and its metabolites (with FOCUS PELMO 6.6.4)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)				
		Spinosyn A	Spinosyn D	Total Spinosad	Spinosyn B	N-demethylated spinosyn D
Crop scenario: cabbage 1st in season 1 st application at BBCH 10	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: cabbage 2nd in season 1 st application at BBCH 10	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: cabbage 1st in season 1 st application at BBCH 41	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: cabbage 2nd in season 1 st application at BBCH 41	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001

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Crop scenario: onions 1 st application at BBCH 10	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: onions 1 st application at BBCH 41	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: pome fruit 1 st application at BBCH 10 (single application)	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: pome fruit 1 st application at BBCH 53 (single application)	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001
Crop scenario: pome fruit 1 st application at BBCH 71	Châteaudun	<0.001	<0.001	<0.001	<0.001	<0.001
	Hamburg	<0.001	<0.001	<0.001	<0.001	<0.001
	Kremsmünster	<0.001	<0.001	<0.001	<0.001	<0.001

The risk to groundwater is considered acceptable if the 80th percentile annual leaching concentration at 1m depth is < 0.1 µg/L.

The predicted Environmental Concentrations in groundwater (PEC_{gw}) calculated, using the FOCUS groundwater scenarios (through FOCUS PELMO 6.6.4 and FOCUS PEARL 5.5.5 models), are lower than the regulatory threshold of 0.1 µg/L for the active substance spinosad and its metabolites spinosyn B and N-demethylated spinosyn D, demonstrating a negligible risk of contamination of groundwater after application of SAP09I.

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

zRMS Comments:	The submitted PEC_{sw} and PEC_{sed} calculations/results were accepted. The AppDate tool was used in selection of application dates. The application dates were accepted. The recommended FOCUS models were used: FOCUS Step 1 & 2 and Step 3; The single and multiple applications were considered. The mitigation measures were proposed in Step 4 (in accordance with Landscape & Mitigation Guidance). The submitted PEC_{sw} assessment was accepted.
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Spinosad. The PEC_{sw} and PEC_{sd} assessment was provided in Step 1 to 4 for Spinosyn A and Spinosyn D; the Spinosad PEC_{sw} is equal to sum of both Spinosyns. The PEC_{sw} assessment provided was sufficient.

Crop	Spinosad		Spinosyn B
	5 m NSS	10 m NSS	5 m VFS + 10m NSS
	Step 4 L&M guidance		Step 4 VFS mod
	Max PEC _{sw} (µg/L)		
Cabbage, broccoli, cauliflower 3 x 96 g a.s./ha	0.1284 D4 stream	0.06803 D4 stream	0.007257 R1 stream 1st
Cabbage, broccoli, cauliflower 1 x 96 g a.s./ha	0.09355 D4 stream	0.61412 R1 stream 1st	0.01884 R1 stream 1st
Onion, leek, garlic 3 x 96 g a.s./ha	0.15097 D4 stream	0.07994 D4 stream	0.02035 R1 stream
Onion, leek, garlic 1 x 96 g a.s./ha	0.10735 D4 stream	0.08514 R1 stream	not required

Crop	Spinosad			Spinosyn B
	40 m NSS	20 m NSS + 95% DRT		5 m VFS + 10m NSS
	Step 4 L&M guidance			Step 4 VFS mod
	Max PEC _{sw} (µg/L)			
Pome fruits 1 x 144 g a.s./ha early	0.10404 D4 stream	0.026935 D4 stream	n. a	not required
Crop	30 m NSS	20 m NSS + 50% DRT	10 m NSS + 90% DRT	
Pome fruits 1 x 144 g a.s./ha late	0.10895 D4 stream	0.10963 D4 stream	0.07098 D4 stream	not required

* single application represents a worse case

For metabolite **N-demethylated spinosyn D** no mitigation is required. The PEC_{sw} and PEC_{sd} assessment was provided in Step 1 & 2 and Step 3.

Crop	N-demethylated spinosyn D
	Step 3
	Max PEC _{sw} (µg/L)
Cabbage, broccoli, cauliflower 3 x 96 g a.s./ha	0.0185 R1 stream 1st

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	Cabbage, broccoli, cauliflower 1 x 96 g a.s./ha	0.005791 R1 stream 1st
	Onion, leek, garlic 3 x 96 g a.s./ha	0.02564 R1 stream
	Onion, leek, garlic 1 x 96 g a.s./ha	0.007571 R1 stream 1st
	Pome fruits 1 x 144 g a.s./ha early	0.00349 R1 stream
	Pome fruits 2 x 144 g a.s./ha late	0.008646 R1 stream*

* multiple applications represent a worse case

Formulation. The non-spray buffer zones of 10 m width for single application in leafy and bulb vegetables with using of drift reduction nozzles were considered. The results are presented in the table below:

Uses/Crops	Application rate (g formul./ha)	PEC _{ini} (µg/L)		
		scenario	FOCUS values	10 m
Leafy vegetables	1 x 218	ditch	1.4006	0.2013
		pond	0.0478	0.0297
		stream	1.0394	0.2013
Bulb and onion like vegetables	1 x 218	ditch	1.4006	0.2013
		pond	0.0478	0.0297
		stream	1.0394	0.2013

For consistency, the PEC_{sw} for formulation used in orchards is presented below:

Uses/Crops	Application rate (g formul./ha)	PEC _{ini} (µg/L)		
		scenario	FOCUS values	10 m
Orchards, early applications	1 x 327	ditch	25.7225	12.4121
		pond	1.5466	0.9547
		stream	23.5251	12.4121
Orchards, late applications	1 x 327	ditch	9.6107	3.2102
		pond	0.4510	0.2830
		stream	8.4012	3.2102

The relevant PEC_{sw} and PEC_{sed} values will be used in further risk assessment.
The relevant mitigation measures will be recommended in the ecotoxicological section.

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8.9.1 Justification for new endpoints

No new active substance data have been submitted as part of this application for authorisation/re-registration.

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

Report:	KCP 9.2.5/01,Tabor E, 2024
Title:	Predicted Environmental Concentrations of spinosad and its metabolites in Surface Water and Sediment (PEC _{sw} and PEC _{sed}) for risk assessment of SAP09I
Document No:	EST/26/2024
Guidelines:	FOCUS (2001): FOCUS Surface Water Scenarios in the EU Evaluation Process under 91/414/EEC. Report of the FOCUS Working Group on Surface Water Scenarios. EC Document Reference SANCO/4802/2001 rev. 2, 245 pp. FOCUS (2015): Generic guidance for FOCUS surface water Scenarios, version 1.4.
GLP	no

The PEC_{sw/sed} values of spinosad and its metabolites were calculated at STEP 1-2, 3 and 4 (if necessary) using FOCUS STEP 1-2 v3.2, SWASH v.5.3, including TOXSWA v.5.5.3, MACRO v.5.5.4 and PRZM v.4.3.1 and SWAN v.5.0.1. For the uses in greenhouse no separate calculations were performed as the uses are covered by the field applications.

Spinosad is a mixture of two components: spinosyn A and spinosyn D. Exposure assessments were done separately for the two components, using application rates calculated by correcting for the occurrence of each component considering only a ratio of 85:15 in the technical material. Overall, PEC_{sw/sed} values for Spinosad were derived summing PEC values from the individual spinosyn components.

Further details on aquatic risk assessment can be found in Section 9 of this dRR.

The following input parameters were considered for PEC_{sw/sed} calculations.

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

Use No.	1, 2	3, 4, 7	5, 6	5, 6
Crop	cabbage, broccoli cauliflower	onion, leek, garlic, shallot	apple, pear, wild apple, quince	apple, pear, wild apple, quince
Crop scenario			early application	late application
Max. application rate (g as/ha)	Spinosyn A: 61.20 Spinosyn D: 10.80	Spinosyn A: 73.44 Spinosyn D: 12.96	Spinosyn A: 48.96 Spinosyn D: 8.64	Spinosyn A: 48.96 Spinosyn D: 8.64
Number of applications/interval (d)	3/7	3/10	1/-	2/10
Application window	Step 1-2: March-May; Step 3: please see table below	Step 1-2: March-May; Step 3: please see table below	Step 1-2: March-May; Step 3: please see table below	Step 1-2: March-May; Step 3: please see table below
Application method	Foliar spray	Foliar spray	Foliar spray	Foliar spray
Interception	Step 1-2: Minimal crop cover Step 3: included in	Step 1-2: Minimal crop cover Step 3: included in	Step 1-2: Minimal crop cover Step 3: included in	Step 1-2: Average crop cover Step 3: included in

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	the model	the model	the model	the model
CAM (Chemical application method)	2			
Soil depth (cm)	4			
Models used for calculation	FOCUS Step 1-2, v3.2, FOCUS SWASH v5.3, FOCUS PRZM v4.3.1, FOCUS MACRO v5.5.4, FOCUS TOXWA v5.5.3 and SWAN 5.0.1			

The dates from AppDate software v3.06 were considered accordingly with the BBCH and the number of applications for each crop presented in the GAP.

AppDate is a software that calculates consistent application dates which can be used in further FOCUS modelling. AppDate uses a database where suitable application dates for major development stages are collected.

Table 8.9-2: FOCUS Step 3 Scenario related input parameters for PEC_{sw/sed} calculations for the application of SAP09I

Crop	Scenario	Application window used in modelling
Crop scenario: vegetables, leafy 1 st in season BBCH 10-49 3 x 96 g as/ha	D3	1 st in season: 26/04 – 16/07 2 nd in season: 06/08 – 16/10
	D4	1 st in season: 11/05 – 19/09
	R1	1 st in season: 21/04 – 11/07 2 nd in season: 01/08 – 11/10
Crop scenario: vegetables, bulb 1 st in season BBCH 10-49 3 x 96 g as/ha	D3	26/04 – 26/08
	D4	24/04 – 07/09
	R1	21/04 – 19/08
Crop scenario: pome fruit BBCH 10-53 1 x 144 g as/ha	D3	16/04 – 30/05
	D4	21/04 – 03/06
	R1	16/04 – 30/05
Crop scenario: pome fruit BBCH 71-85 2 x 144 g as/ha	D3	07/07 – 30/09
	D4	11/07 – 01/10
	R1	07/07 – 30/09

Table 8.9-3: Input parameters related to active substance spinosad and its metabolites for PEC_{sw/sed} calculations STEP 1/2 and 3(4) (if necessary)

Compound	Spinosyn A	Spinosyn D	Spinosyn B	N-demethylated spinosyn D	Value in accordance to EU endpoint y/n/ Reference
Molecular weight (g/mol)	731.98	745.98	718	732	SANCO/1428/2001 – rev. final, 14 July 2006
Saturated vapour pressure (Pa)	1x10 ⁻⁵ (25°C)	4x10 ⁻⁶ (25°C)	1x10 ⁻⁵ (25°C)	4x10 ⁻⁶ (25°C)	

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Compound	Spinosyn A	Spinosyn D	Spinosyn B	N-demethylated spinosyn D	Value in accordance to EU endpoint y/n/ Reference
Water solubility (mg/L)	498 (20°C)	40 (20°C)	250000 (20°C)	512 (20°C)	
Diffusion coefficient in water (m²/d)	not required for Step 1+2/ 4.3 x 10 ⁻⁵ (default)				
Diffusion coefficient in air (m²/d)	not required for Step 1+2/0.43 (default)				
K _{foc} (mL/g)	8281.6 / 4803.7 (geomean, n=5)	8281.6 / 4803.7 (geomean, n=5)	4184.1 / 2426.97 (geomean, n=4)	4184.1 / 2426.97 (geomean, n=4)	
Freundlich Exponent 1/n	0.89 (arithmetic mean, n=5)	0.89 (arithmetic mean, n=5)	0.85 (arithmetic mean, n=4)	0.85 (arithmetic mean, n=4)	
Plant Uptake	0	0	0	0	
Wash-Off factor from Crop (1/mm)	not required for Step 1+2/ 0.05 (MACRO) 0.50 (PRZM)				
DT _{50,soil} (d)	15.7 (geomean, n=6)	20.3 (geomean, n=5)	69.6 (geomean, n=6)	122.5 (geomean, n=3)	
DT _{50,water} (d)	1000 (default worst-case value)	1000 (default worst-case value)	1000 (default worst-case value)	1000 (default worst-case value)	
DT _{50,sed} (d)	176	103	1000 (default worst-case value)	1000 (default worst-case value)	
DT _{50,whole system} (d)	176	103	1000 (default worst-case value)	1000 (default worst-case value)	
Maximum occurrence observed (% molar basis with respect to the parent)*	-	-	Soil: 100 Water: 100 Sediment: 100	Soil: 100 Water: 100 Sediment: 100	
Formation fraction			Soil: 0.85 Water/Sediment: 1	Soil: 0.79 Water/Sediment: 1	

PEC_{sw/sed} Spinosad

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Table 8.9-4: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to cabbage, broccoli, cauliflower (uses no. 1, 2)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spynosin A					
Step 1	---	6.7707	---	5.0491	420.8838
Step 2 NEU	March-May	0.6305/0.5628	Runoff/drainage	0.5640/0.2444	48.1068/21.3741
Spynosin D					
Step 1	---	1.1948	---	0.8659	74.2736
Step 2 NEU	March-May	0.1195/0.0993	Runoff/drainage	0.1050/0.0436	9.1485/3.8818
Total Spinosad					
Step 1	---	7.9655	---	5.915	495.1574
Step 2 NEU	March-May	<u>0.7500/0.6621</u>	Runoff/drainage	0.6690/0.2880	57.2553/25.2559

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-5: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to cabbage, broccoli, cauliflower (uses no. 1, 2)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn A					
D3	ditch 1st	0.2794/0.3822	drift/drift	0.04426/0.02002	0.5639/0.3020
D3	ditch 2nd	0.2782/0.3805	drift/drift	0.03050/0.01277	0.4105/0.1983
D4	pond	0.02244/0.01309	drift/drift	0.000630/0.009537	0.3208/0.1573
D4	stream	0.2224/0.2995	drift/drift	0.002075/0.000819	0.03032/0.01342
R1	pond 1st	0.01893/0.01309	drift/drift	0.01629/0.009434	0.6475/0.2355
R1	pond 2nd	0.02289/0.01314	drift/drift	0.01857/0.009484	1.082/0.2756
R1	stream 1st	0.1831/0.2517	runoff/drift	0.004212/0.002296	6.597/1.549
R1	stream 2nd	0.1832/0.2526	runoff/drift	0.004578/0.002520	11.12/2.006
Spinosyn D					
D3	ditch 1st	0.04913/0.06724	drift/drift	0.007766/0.003508	0.1008/0.05336
D3	ditch 2nd	0.04892/0.06693	drift/drift	0.005353/0.002241	0.07336/0.03498
D4	pond	0.003931/0.002300	drift/drift	0.002990/0.001666	0.05593/0.02749
D4	stream	0.03911/0.05268	drift/drift	0.000365/0.000144	0.005394/0.002361
R1	pond 1st	0.003205/0.002300	drift/drift	0.002724/0.001648	0.1323/0.04581

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
R1	pond 2nd	0.003907/0.002322	drift/drift	0.003138/0.001669	0.2070/0.05555
R1	stream 1st	0.03219/0.04427	runoff/drift	0.000715/0.000403	1.772/0.4304
R1	stream 2nd	0.03221/0.04442	runoff/drift	0.000796/0.000443	2.476/0.5348
Total Spinosad					
D3	ditch 1st	<u>0.32853/0.44944</u>	drift/drift	0.052026/0.023528	0.6647/0.35536
D3	ditch 2nd	<u>0.32712/0.44743</u>	drift/drift	0.035853/0.015011	0.48386/0.23328
D4	pond	<u>0.026371/0.01539</u>	drift/drift	0.00362/0.011203	0.37673/0.18479
D4	stream	<u>0.26151/0.35218</u>	drift/drift	0.00244/0.000963	0.035714/0.015781
R1	pond 1st	<u>0.022135/0.01539</u>	drift/drift	0.019014/0.011082	0.7798/0.28131
R1	pond 2nd	<u>0.026797/0.015462</u>	drift/drift	0.021708/0.011153	1.289/0.33115
R1	stream 1st	<u>0.21529/0.29597</u>	runoff/drift	0.004927/0.002699	8.369/1.9794
R1	stream 2nd	<u>0.21541/0.29702</u>	runoff/drift	0.005374/0.002963	13.596/2.5408

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-6: FOCUS Step 4 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to cabbage, broccoli, cauliflower (uses no. 1, 2)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	
		5m buffer zone	10m buffer zone
Spinosyn A			
D3	ditch 1st	0.07376/0.1034	0.03860/0.05477
D3	ditch 2nd	0.07345/0.1029	0.03844/0.05452
D4	stream	0.07956/0.1092	0.04166/0.05786
R1	stream 1st	0.06552/0.09180	0.05409/0.04862
R1	stream 2nd	0.06552/0.09211	0.04614/0.04879
Spinosyn D			
D3	ditch 1st	0.01296/0.01818	0.006781/0.009625
D3	ditch 2nd	0.01291/0.01809	0.006754/0.009580
D4	stream	0.01399/0.01920	0.007322/0.01017
R1	stream 1st	0.01152/0.01614	0.007322/0.008546
R1	stream 2nd	0.01152/0.01619	0.007405/0.008575
Total Spinosad			
D3	ditch 1st	<u>0.08672/0.12158</u>	<u>0.045381/0.064395</u>
D3	ditch 2nd	<u>0.08636/0.12099</u>	<u>0.045194/0.0641</u>

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	
		5m buffer zone	10m buffer zone
D4	stream	<u>0.09355/0.1284</u>	<u>0.048982/0.06803</u>
R1	stream 1st	<u>0.07704/0.10794</u>	<u>0.061412/0.057166</u>
R1	stream 2nd	<u>0.07704/0.1083</u>	<u>0.053545/0.057365</u>

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-7: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following multiple/single application of SAP09I to cabbage, broccoli, cauliflower (uses no. 1, 2)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn B					
Step 1	---	<u>19.9061</u>	---	17.7907	763.5931
Step 2 NEU	March-May	<u>2.3496/0.9396</u>	Runoff/drainage	2.2036/0.8750	94.8697/37.6646
N-demethylated spinosyn D					
Step 1	---	<u>3.5141</u>	---	3.0518	134.8010
Step 2 NEU	March-May	<u>0.4399/0.1699</u>	Runoff/drainage	0.4044/0.1549	17.7743/6.7961

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-8: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following multiple/single application of SAP09I to cabbage, broccoli, cauliflower (uses no. 1, 2)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn B					
D3	ditch 1st	<u>< 1e-6/< 1e-6</u>	-/-	-/-	< 1e-6/< 1e-6
D3	ditch 2nd	<u>< 1e-6/< 1e-6</u>	-/-	-/-	< 1e-6/< 1e-6
D4	pond	<u>0.001462/0.000324</u>	drainage/drainage	0.001029/0.000226	0.01850/0.004327
D4	stream	<u>0.01146/0.002724</u>	drainage/drainage	0.000437/0.000096	0.006775/0.001499
R1	pond 1st	<u>0.05710/0.01603</u>	runoff/runoff	0.05209/0.01459	2.524/0.8191
R1	pond 2nd	<u>0.04678/0.01743</u>	runoff/runoff	0.03841/0.01408	1.941/0.7502
R1	stream 1st	<u>0.1049/0.03261</u>	runoff/runoff	0.01219/0.003407	26.26/9.282
R1	stream 2nd	<u>0.06950/0.02830</u>	runoff/runoff	0.007932/0.002915	9.374/4.328
N-demethylated spinosyn D					

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D3	ditch 1st	<u>< 1e-6/< 1e-6</u>	-/-	-/-	< 1e-6/< 1e-6
D3	ditch 2nd	<u>< 1e-6/< 1e-6</u>	-/-	-/-	< 1e-6/< 1e-6
D4	pond	<u>0.000448/0.000103</u>	drainage/drainage	0.000315/0.000072	0.005950/0.001439
D4	stream	<u>0.003181/0.000786</u>	drainage/drainage	0.000136/0.000031	0.002126/0.000487
R1	pond 1st	<u>0.01101/0.003312</u>	runoff/runoff	0.008940/0.002984	0.5843/0.2020
R1	pond 2nd	<u>0.009807/0.003307</u>	runoff/runoff	0.008290/0.002645	0.4269/0.1679
R1	stream 1st	<u>0.01850/0.005791</u>	runoff/runoff	0.002574/0.000778	6.173/2.315
R1	stream 2nd	<u>0.01357/0.005109</u>	runoff/runoff	0.001826/0.000591	2.029/0.9965

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-9: FOCUS Step 4 PEC_{sw} and PEC_{sed} for spinosyn B following multiple/single application of SAP09I to cabbage, broccoli, cauliflower (uses no. 1, 2)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)		
		5m buffer zone	10m buffer zone	10m buffer zone with 5m vegetated buffer zone (VFSmod)
Spinosyn B				
R1	stream 1st	<u>0.1049/0.03261</u>	<u>0.1049/0.03261</u>	<u>0.01884/0.007257</u>

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-10: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to onion, leek, garlic, shallot (uses no. 3, 4, 7)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spynosin A					
Step 1	---	8.1248	---	6.0589	505.0606
Step 2 NEU	March-May	0.8046/0.6754	Runoff/drainage	0.7237/0.3347	61.7336/29.8652
Spynosin D					
Step 1	---	1.4338	---	1.0391	89.1283
Step 2 NEU	March-May	0.1547/0.1192	Runoff/drainage	0.1368/0.0598	11.9285/5.4304
Total Spinosad					
Step 1	---	<u>9.5586</u>	---	7.098	594.1889
Step 2	March-May	<u>0.9593/0.7946</u>	Runoff/drainage	0.8605/0.3945	73.6621/35.2956

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Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
NEU					

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-11: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to onion, leek, garlic, shallot (uses no. 3, 4, 7)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Spinosyn A					
D3	ditch	0.3354/0.4589	drift/drift	0.04830/0.02425	0.6644/0.3651
D4	pond	0.02493/0.01572	drift/drift	0.01882/0.01135	0.3710/0.1833
D4	stream	0.2552/0.3520	drift/drift	0.001565/0.000813	0.02153/0.01119
R1	pond	0.02365/0.01572	drift/drift	0.02062/0.01135	0.5990/0.2534
R1	stream	0.2197/ 0.3019	runoff/drift	0.005661/0.003120	2.888/0.9396
Spinosyn D					
D3	ditch	0.05898/0.08072	drift/drift	0.008475/0.004249	0.1190/0.06452
D4	pond	0.004355/0.002761	drift/drift	0.003277/0.001983	0.06477/0.03227
D4	stream	0.04489/0.06191	drift/drift	0.000275/0.000143	0.003848/0.002345
R1	pond	0.003999/0.002762	drift/drift	0.003441/0.001983	0.1041/0.04490
R1	stream	0.03863/0.05311	runoff /drift	0.000921/0.000538	0.6091/0.1991
Total Spinosad					
D3	ditch	<u>0.39438/0.53962</u>	drift/drift	0.056775/0.028499	0.7834/0.42962
D4	pond	<u>0.029285/0.018481</u>	drift/drift	0.022097/0.013333	0.43577/0.21557
D4	stream	<u>0.30009/0.41391</u>	drift/drift	0.00184/0.000956	0.025378/0.013535
R1	pond	<u>0.027649/0.018482</u>	drift/drift	0.024061/0.013333	0.7031/0.2983
R1	stream	<u>0.25833/0.35501</u>	runoff /drift	0.006582/0.003658	3.4971/1.1387

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-12: FOCUS Step 4 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to onion, leek, garlic, shallot (uses no. 3, 4, 7)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	
FOCUS		5m buffer zone	10m buffer zone
Spinosyn A			
D3	ditch	0.08854/0.1241	0.04636/0.06575

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	
		5m buffer zone	10m buffer zone
D4	stream	0.09130/0.1284	0.04780/0.06799
R1	stream	0.07858/0.1101	0.07366/0.05828
Spinosyn D			
D3	ditch	0.01556/0.02182	0.008146/0.01156
D4	stream	0.01605/0.02257	0.008402/0.01195
R1	stream	0.01387/0.01942	0.01148/0.01028
Total Spinosad			
D3	ditch	<u>0.1041/0.14592</u>	<u>0.054506/0.07731</u>
D4	stream	<u>0.10735/0.15097</u>	<u>0.056202/0.07994</u>
R1	stream	<u>0.09245/0.12952</u>	<u>0.08514/0.06856</u>

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-13: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following multiple/single application of SAP09I to onion, leek, garlic, shallot (uses no. 3, 4, 7)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spynosin B					
Step 1	---	<u>23.8874</u>	---	21.3488	916.3118
Step 2 NEU	March-May	<u>3.1517/1.3245</u>	Runoff/drainage	2.9665/1.2406	127.7246/53.4076
N-demethylated spinosyn D					
Step 1	---	<u>4.2170</u>	---	3.6622	161.7612
Step 2 NEU	March-May	<u>0.5974/0.2396</u>	Runoff/drainage	0.5513/0.2197	24.2526/9.6496

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-14: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following multiple/single application of SAP09I to onion, leek, garlic, shallot (uses no. 3, 4, 7)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn B					
D3	ditch	< 1e-6/< 1e-6	-/-	-/-	< 1e-6/< 1e-6
D4	pond	<u>0.001982/0.000451</u>	drainage/drainage	0.001399/0.000316	0.02483/0.005962

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D4	stream	<u>0.01508/0.003703</u>	drainage/drainage	0.000595/0.000134	0.009193/0.001863
R1	pond	<u>0.04163/0.01097</u>	runoff/runoff	0.03670/0.009608	1.758/0.5346
R1	stream	<u>0.1454/ 0.04267</u>	runoff/runoff	0.01399/0.003676	8.504/2.979
N-demethylated spinosyn D					
D3	ditch	<u>< 1e-6/< 1e-6</u>	-/-	-/-	< 1e-6/< 1e-6
D4	pond	<u>0.000617/0.000140</u>	drainage/drainage	0.000434/0.000098	0.008114/0.001943
D4	stream	<u>0.004176/0.001035</u>	drainage/drainage	0.000189/0.000042	0.002943/0.000665
R1	pond	<u>0.009310/0.002604</u>	runoff/runoff	0.008091/0.002253	0.4239/0.1353
R1	stream	<u>0.02564/ 0.007571</u>	runoff/runoff	0.002894/0.000820	2.433/0.8865

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-15: FOCUS Step 4 PEC_{sw} and PEC_{sed} for spinosyn B following multiple/single application of SAP09I to onion, leek, garlic, shallot (uses no. 3, 4, 7)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)		
		5m buffer zone	10m buffer zone	10m buffer zone with 5m vegetated buffer zone (VFSmod)
Spinosyn B				
R1	stream	<u>0.1454/0.04267</u>	<u>0.1454/0.04267</u>	<u>0.02035/0.005346</u>

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-16: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosad following single application of SAP09I to apple, pear, wild apple, quince (uses no. 5, 6) – early application (BBCH <53)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spynosin A					
Step 1	---	6.1202	---	1.7845	112.2357
Step 2 NEU	March-May	4.7650	Runoff/drainage	0.7541	47.2122
Spynosin D					
Step 1	---	1.0800	---	0.3065	19.8063
Step 2 NEU	March-May	0.8409	Runoff/drainage	0.1321	8.3667
Total Spinosad					

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	<u>7.2002</u>	---	2.091	132.042
Step 2 NEU	March-May	<u>5.6059</u>	Runoff/drainage	0.8862	55.5789

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-17: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosad following single application of SAP09I to apple, pear, wild apple, quince – early application (uses no. 5, 6)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn A					
D3	ditch	3.758	drift	0.1982	2.938
D4	pond	0.2275	drift	0.1694	2.654
D4	stream	3.832	drift	0.01956	0.3185
R1	pond	0.2274	drift	0.1655	2.486
R1	stream	3.038	drift	0.02434	0.3958
Spinosyn D					
D3	ditch	0.6615	drift	0.03474	0.5215
D4	pond	0.04002	drift	0.02956	0.4567
D4	stream	0.6745	drift	0.003442	0.05610
R1	pond	0.04000	drift	0.02889	0.4385
R1	stream	0.5347	drift	0.004282	0.06974
Total Spinosad					
D3	ditch	<u>4.4195</u>	drift	0.23294	3.4595
D4	pond	<u>0.26752</u>	drift	0.19896	3.1107
D4	stream	<u>4.5065</u>	drift	0.023002	0.3746
R1	pond	<u>0.2674</u>	drift	0.19439	2.9245
R1	stream	<u>3.5727</u>	drift	0.028622	0.46554

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

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Table 8.9-18: FOCUS Step 4 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to apple, pear, wild apple, quince – early application (uses no. 5, 6)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)			
		30m buffer zone	40m buffer zone	20m buffer zone + 75% nozzle reduction	20m buffer zone + 95% nozzle reduction
Spinosyn A					
D3	ditch	0.1578	0.07934	0.1031	0.02054
D4	pond	0.02188	0.01273	0.01129	0.002247
D4	stream	0.1759	0.08848	0.1149	0.02291
R1	pond	0.02190	0.01273	0.01129	0.002248
R1	stream	0.1396	0.07021	0.09118	0.01817
Spinosyn D					
D3	ditch	0.02774	0.01395	0.01812	0.003610
D4	pond	0.003846	0.002235	0.001982	0.000394
D4	stream	0.03093	0.01556	0.02021	0.004025
R1	pond	0.003826	0.002223	0.001972	0.000392
R1	stream	0.02442	0.01227	0.01594	0.003176
Total Spinosad					
D3	ditch	<u>0.18554</u>	<u>0.09329</u>	<u>0.12122</u>	<u>0.02415</u>
D4	pond	<u>0.025726</u>	<u>0.014965</u>	<u>0.013272</u>	<u>0.002641</u>
D4	stream	<u>0.20683</u>	<u>0.10404</u>	<u>0.13511</u>	<u>0.026935</u>
R1	pond	<u>0.025726</u>	<u>0.014953</u>	<u>0.013262</u>	<u>0.00264</u>
R1	stream	<u>0.16402</u>	<u>0.08248</u>	<u>0.10712</u>	<u>0.021346</u>

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-19: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following single application of SAP09I to apple, pear, wild apple, quince (uses no. 5, 6) – early application (BBCH <53)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spynosin B					
Step 1	---	<u>9.5406</u>	---	5.4471	203.6248
Step 2 NEU	March-May	<u>4.6739</u>	Runoff/drainage	1.4733	58.4478
N-demethylated spinosyn D					

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	<u>1.6842</u>	---	0.9348	35.9469
Step 2 NEU	March-May	<u>0.8251</u>	Runoff/drainage	0.2587	10.3941

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-20: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following single application of SAP09I to apple, pear, wild apple, quince – early application (uses no. 5, 6)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn B					
D3	ditch	<u>≤ 1e-6</u>	-	-	< 1e-6
D4	pond	<u>0.000014</u>	drainage	0.000010	0.000202
D4	stream	<u>0.000201</u>	drainage	0.000004	0.000061
R1	pond	<u>0.000275</u>	runoff	0.000212	0.009544
R1	stream	<u>0.01692</u>	runoff	0.000628	0.04125
N-demethylated spinosyn D					
D3	ditch	<u>≤ 1e-6</u>	-	-	< 1e-6
D4	pond	<u>0.000004</u>	drainage	0.000003	0.000067
D4	stream	<u>0.000056</u>	drainage	0.000001	0.000020
R1	pond	<u>0.000066</u>	runoff	0.000050	0.002180
R1	stream	<u>0.003439</u>	runoff	0.000106	0.009888

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-21: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to apple, pear, wild apple, quince (uses no. 5, 6) – late application (BBCH >70)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spynosin A					
Step 1	---	7.8431	---	3.1226	224.4714
Step 2 NEU	March-May	2.2092/2.5663	Runoff/drainage	0.6020/0.4373	44.7777/28.5971
Spynosin D					
Step 1	---	1.3841	---	0.5360	39.6126

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 2 NEU	March-May	0.3891/0.4529	Runoff/drainage	0.1064/0.0768	8.0571/5.0867
Total Spinosad					
Step 1	---	<u>9.2272</u>	---	3.6586	264.084
Step 2 NEU	March-May	<u>2.5983/3.0192</u>	Runoff/drainage	0.7084/0.5141	52.8348/33.6838

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-22: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to apple, pear, wild apple, quince – late application (uses no. 5, 6)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn A					
D3	ditch	1.414/1.777	drift/drift	0.2622/0.1591	3.091/2.217
D4	pond	0.1097/0.07918	drift/drift	0.08469/0.05855	1.586 /0.9522
D4	stream	1.394/1.741	drift/drift	0.01764/0.01238	0.2405/0.2009
R1	pond	0.1049/0.07917	drift/drift	0.07932/0.05707	1.366/0.8222
R1	stream	1.070/1.336	drift/drift	0.01307/0.000015	0.1907/0.1361
Spinosyn D					
D3	ditch	0.2488/0.3128	drift/drift	0.04594/0.02783	0.5631/0.3955
D4	pond	0.01922/0.01392	drift/drift	0.01467/0.01023	0.2924/0.1753
D4	stream	0.2453/0.3064	drift/drift	0.003104/0.002178	0.04341/0.03540
R1	pond	0.01835/0.01392	drift/drift	0.01372/0.009967	0.2525/0.1519
R1	stream	0.1883/0.2352	runoff /drift	0.002292/0.001438	0.03474/0.02422
Total Spinosad					
D3	ditch	<u>1.6628/2.0898</u>	drift/drift	0.30814/0.18693	3.6541/2.6125
D4	pond	<u>0.12892/0.0931</u>	drift/drift	0.09936/0.06878	1.8784/1.1275
D4	stream	<u>1.6393/2.0474</u>	drift/drift	0.020744/0.014558	0.28391/0.2363
R1	pond	<u>0.12325/0.09309</u>	drift/drift	0.09304/0.067037	1.6185/0.9741
R1	stream	<u>1.2583/1.5712</u>	runoff /drift	0.015362/0.001453	0.22544/0.16032

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

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Table 8.9-23: FOCUS Step 4 PEC_{sw} and PEC_{sed} for spinosad following multiple/single application of SAP09I to apple, pear, wild apple, quince – late application (uses no. 5, 6)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)				
		20m buffer zone	30m buffer zone	10m buffer zone + 75% nozzle reduction	10m buffer zone + 90% nozzle reduction	20m buffer zone + 50% nozzle reduction
Spinosyn A						
D3	ditch	0.1335/0.1648	0.06150/0.08177	0.1175/0.1335	0.04692/0.05330	0.01147/0.08229
D4	pond	0.02834/0.02279	0.01598/0.01366	0.01707/0.01250	0.006804/0.004990	0.003653/0.01138
D4	stream	0.1507/0.1867	0.06942/0.09266	0.1326/0.1512	0.05295/0.06037	0.01296/0.09324
R1	pond	0.02716/0.02284	0.01535/0.01371	0.01640/0.01255	0.006585/0.005039	0.003578/0.01143
R1	stream	0.1158/0.1434	0.05332/0.07115	0.1019/0.1162	0.04068/0.04638	0.009951/0.07163
Spinosyn D						
D3	ditch	0.02347/0.02898	0.01081/0.01438	0.02066/0.02347	0.008244/0.009365	0.01172/0.01447
D4	pond	0.004963/0.004004	0.002798/0.002398	0.002990/0.002196	0.001191/0.000876	0.002475/0.001998
D4	stream	0.02650/0.03284	0.01220/0.01629	0.02332/0.02659	0.009310/0.01061	0.01323/0.01639
R1	pond	0.004722/0.003990	0.002667/0.002393	0.002850/0.002192	0.001143/0.000879	0.002359/0.001994
R1	stream	0.02024/0.02508	0.009321/0.01244	0.01782/0.02031	0.007109/0.008106	0.01010/0.01252
Total Spinosad						
D3	ditch	<u>0.15697/0.19378</u>	<u>0.07231/0.09615</u>	<u>0.13816/0.15697</u>	<u>0.055164/0.062665</u>	<u>0.02319/0.09676</u>
D4	pond	<u>0.033303/0.026794</u>	<u>0.018778/0.016058</u>	<u>0.02006/0.014696</u>	<u>0.007995/0.005866</u>	<u>0.006128/0.013378</u>
D4	stream	<u>0.1772/0.21954</u>	<u>0.08162/0.10895</u>	<u>0.15592/0.17779</u>	<u>0.06226/0.07098</u>	<u>0.02619/0.10963</u>
R1	pond	<u>0.031882/0.02683</u>	<u>0.018017/0.016103</u>	<u>0.01925/0.014742</u>	<u>0.007728/0.005918</u>	<u>0.005937/0.013424</u>

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Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)				
		20m buffer zone	30m buffer zone	10m buffer zone + 75% nozzle reduction	10m buffer zone + 90% nozzle reduction	20m buffer zone + 50% nozzle reduction
R1	stream	<u>0.13604/0.16848</u>	<u>0.062641/0.08359</u>	<u>0.11972/0.13651</u>	<u>0.047789/0.054486</u>	<u>0.020051/0.08415</u>

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Table 8.9-24: FOCUS Step 1-2 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following multiple/single application of SAP09I to apple, pear, wild apple, quince (uses no. 5, 6) – late application (BBCH >70)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn B					
Step 1	---	<u>14.7679</u>	---	10.1778	407.2497
Step 2 NEU	March-May	<u>2.3418/2.5173</u>	Runoff/drainage	1.4375/0.9138	62.9571/37.6506
N-demethylated spinosyn D					
Step 1	---	<u>2.6070</u>	---	1.7463	71.8939
Step 2 NEU	March-May	<u>0.4121/0.4444</u>	Runoff/drainage	0.2560/0.1608	11.4036/6.7153

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

Table 8.9-25: FOCUS Step 3 PEC_{sw} and PEC_{sed} for spinosyn B and N-demethylated spinosyn D following multiple/single application of SAP09I to apple, pear, wild apple, quince – late application (uses no. 5, 6)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Spinosyn B					
D3	ditch	< 1e-6/< 1e-6	-/-	-/-	< 1e-6/< 1e-6
D4	pond	0.000119/0.000040	drainage/drainage	0.000082/0.000027	0.001616/0.000562
D4	stream	0.001539/0.000522	drainage/drainage	0.000033/0.000011	0.000528/0.000178
R1	pond	0.002346/0.001128	runoff/runoff	0.001779/0.000852	0.06274/0.03139
R1	stream	0.04779/0.02313	runoff/runoff	0.001470/0.000002	0.1015/0.05631
N-demethylated spinosyn D					
D3	ditch	<u>< 1e-6/< 1e-6</u>	-/-	-/-	< 1e-6/< 1e-6
D4	pond	<u>0.000030/0.000011</u>	drainage/drainage	0.000021/0.000007	0.000429/0.000158
D4	stream	<u>0.000369/0.000135</u>	drainage/drainage	0.000008/0.000003	0.000135/0.000048
R1	pond	<u>0.000469/0.000226</u>	runoff/runoff	0.000345/0.000166	0.01306/0.006559
R1	stream	<u>0.008646/0.004209</u>	runoff/runoff	0.000282/0.000137	0.02569/0.01451

Bold values are above the RAC; Underline values will be used in aquatic risk assessment (see section B9)

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8.9.2.1 PEC_{sw/sed} of SAP09I

PEC_{sw} of the preparation is calculated with the spray drift calculator included in SWASH v5.3, based on specific density of 1090 g/L and maximum and minimum application rate of 0.2 L/ha and 0.3 L/ha, respectively. PEC_{sw} of the preparation via the spray drift route of contamination considering the maximum dose are presented below.

Table 8.9-29: PEC_{sw} for SAP09I – maximum dose

Uses/Crops	Application rate (g/ha)	PEC _{ini} (µg/L)		
		compartment	FOCUS values	10 m
Leafy vegetables	3 x 218	ditch	1.0212	0.1417
		pond	0.0366	0.0207
		stream	0.7536	0.1417
Bulb and onion like vegetables	3 x 218	ditch	1.0212	0.1417
		pond	0.0366	0.0207
		stream	0.7536	0.1417
Orchards, early applications	1 x 327	ditch	25.7225	12.4121
		pond	1.5466	0.9547
		stream	23.5251	12.4121
Orchards, late applications	2 x 327	ditch	9.6107	3.2102
		pond	0.4510	0.2830
		stream	8.4012	3.2102

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

Table 8.10-1 Summary of atmospheric degradation and behaviour

Compound	Spinosad
Direct photolysis in air	Not available; not required
Photochemical oxidative degradation in air	Spinosyn A: DT50: 20 min derived by the Atkinson model Spinosyn D: DT50: 19 min derived by the Atkinson model
Volatilisation	From plant surfaces: Spinosyn A: 1.6% after 24h Spinosyn D: 0.1% after 24h From soil: Spinosyn A: -0.1% after 24h Spinosyn D: -0.4% after 24h

Spinosyn A and D are regarded as non-volatiles. Therefore, exposure of adjacent surface waters and terrestrial ecosystems due to volatilization with subsequent deposition should not be considered.

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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
KCP 9.2.4/01	Tabor E	2024	Predicted Environmental Concentrations of Spinosad and its metabolites in Groundwater (PEC _{gw}) for risk assessment of SAP09I EST/25/2024 Non GLP Unpublished	N	Albaugh Europe Sàrl
KCP 9.2.5/01	Tabor E	2024	Predicted Environmental Concentrations of spinosad and its metabolites in Surface Water and Sediment (PEC _{sw} and PEC _{sed}) for risk assessment of SAP09I EST/26/2024 Non GLP Unpublished	N	Albaugh Europe Sàrl

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

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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

Nothing is presented under this appendix.

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

Nothing is presented under this appendix.