European Food Safety Authority

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REASONED OPINION OF EFSA

Setting of new MRLs for pyridalyl in tomatoes, aubergines (egg plants), peppers, cucurbits (inedible peel), lettuce and cotton seed[1]

Prepared by the Pesticides Unit (PRAPeR)

(Question No EFSA-Q-2009-00218)

Issued on 17 April 2009

SUMMARY

According to Article 6(2) of Regulation (EC) No 396/2005, the Netherlands received an application from Sumitomo to set new MRLs for pyridalyl in several vegetable crops and in cottonseed, in order to grant provisional authorizations for the plant protection product evaluated in the DAR. The applicant requested the following MRLs: 1 mg/kg for tomatoes and aubergines, 2 mg/kg for peppers, 0.2 mg/kg for cucurbits (inedible peel), 3 mg/kg for lettuce and 0.1 mg/kg for cotton seed. No information is provided by the Evaluating Member State whether the applicant has already submitted an application for provisional authorisation for the crops concerned. The evaluation report drafted by the Netherlands was forwarded to EFSA on 14 January 2009 according to Article 9 of the Regulation.

Based on this evaluation report and the Draft Assessment Report (DAR) prepared by The Netherlands as the designated Rapporteur Member State (RMS) under Directive 91/414/EEC, EFSA derives the following conclusions regarding this application.

Metabolism of pyridalyl in plant was investigated for foliar applications in fruiting crops, (tomato), leafy crops (Chinese cabbage) and oilseed/pulse crops (cotton). The parent compound pyridalyl was shown to be the main compound accounting for 43% to 84% of the TRR in cotton gin trash, cabbage and tomato. In cottonseed the active substance was metabolised more extensively; the parent compound accounted only for 6% to 13% TRR. The additional metabolites observed in cotton are considered to be of no toxicological relevance. Based on these studies, the proposed residue definition is pyridalyl for all plant commodities for monitoring and risk assessment. EFSA is of the opinion that this plant residue definition is appropriate for the crops under consideration in this application, and that the parent pyridalyl is a good marker for the residues in plants. A validated multi-residue method for enforcement of pyridalyl in high water content and oily matrices is available. The LOQ achievable by routine monitoring laboratories is 0.01 mg/kg for commodities with high water content and 0.02 mg/kg for high fat content matrices.

[1] For citation purposes: Reasoned opinion of EFSA prepared by the Pesticides Unit (PRAPeR) on the setting of new MRLs for pyridalyl in tomatoes, aubergines (egg plants), cucurbits inedible peel, lettuce and cotton seeds. *EFSA Scientific Report* (2009) 270, 1-21

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A sufficient number of supervised residue trials performed according the proposed GAPs were submitted to derive MRLs for tomato, pepper, melon, lettuce and cottonseed. In addition, MRLs can be derived for aubergine and the whole group of cucurbits (inedible peel) by extrapolation from tomatoes and melons, respectively. For outdoor uses, it is noted that the MRLs proposed for the different crops under evaluation are based on studies performed in Southern European Member States. No data are available in support of outdoor uses of pyridalyl in the Northern European region.

Pyridalyl residues in rotational crops were also investigated. Based on the confined rotational crop studies, it was concluded that the metabolism of pyridalyl proceeds mainly by a selective uptake of the metabolite HTPF (3-hydroxy-5-trifluoromethylpyridine) from the soil which is further metabolised the HPDO (3-hydroxy-5-trifluoromethyl-2-pyridone). Considering the field rotational crop studies where pyridalyl was applied on a primary crop according to the GAPs, it was conclude that no significant levels of pyridalyl, HTPF and HPDO (>0.02 mg/kg) are expected in succeeding/rotational crops when the active substance is used according to the proposed GAPs.

Pyridalyl was shown to be stable under standard hydrolytic conditions simulating, pasteurization, boiling/backing and sterilization. Studies on the magnitude of residues in processed commodities were submitted for tomatoes, peppers and cottonseed and processing factors were proposed. However, in most of the cases, these processing factors were derived from a single study and they should be considered as provisional.

Residues in commodities of animal origin were not assessed in the framework of this application considering that the residue levels observed in the cottonseed, the only crop under consideration that might be fed to livestock, do not lead to a significant intake by animals (<0.002 mg/kg DM).

Finally, the chronic intake calculation considering the STMR values derived from the supervised residue trials was performed with the EFSA PRIMo rev.2. No chronic intake concern was identified for any of the available European diets. Therefore, the proposed MRLs are not expected to pose any risk to the European consumer. No acute intake calculation was performed since the setting of an ARfD was considered not necessary for pyridalyl.

EFSA concludes that the intended uses of pyridalyl in tomatoes, aubergines, peppers, curcurbits (inedible peel), lettuce and cottonseed are acceptable with regard to consumer safety. The recommendations resulting from the assessment are summarized in the table below. These recommended MRLs should be considered for inclusion in Annex III of the Regulation as temporary MRLs.

As the DAR has not yet been peer reviewed by EFSA, the conclusions reached in this reasoned opinion have to be considered as provisional and might be reconsidered in the light of the conclusion taken in the peer review.

Overview of the proposed EC MRLs

Commodities	Existing EC MRL (mg/kg)	Proposed EC MRL (mg/kg)	Justification for the proposal
Enforcement residue definition: **Pyridalyl**			
Tomatoes	-	1	Outdoor (SEU) and indoor uses
Aubergine (extrapolation from tomato)	-	1	Outdoor (SEU) and indoor uses
Peppers	-	2	Outdoor (SEU) and indoor uses
Cucurbits (inedible peel)	-	0.3	MRLs supported by data representing uses in Southern EU for outdoor uses only.
Lettuce	-	3	
Cottonseed	-	0.1	

Key words: Pyridalyl, tomatoes, aubergines (egg plants), peppers, cucurbits inedible peel, lettuce and cotton seed, MRL application, Regulation (EC) No 396/2005, consumer risk assessment, insecticide.

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BACKGROUND

Regulation (EC) No 396/2005 establishes the rules governing the setting of pesticide MRLs at Community level. Article 6 of that regulation lays down that a party requesting an authorisation for the use of a plant protection product in accordance with Directive 91/414/EEC, shall submit to a Member State, when appropriate, an application to set or modify an MRL in accordance with the provisions of Article 7 of that regulation.

The Netherland, hereafter referred to as the Evaluating Member State (EMS), received an application from the company Sumitomo[2] to set new MRLs for the active substance pyridalyl in tomatoes, aubergines, peppers, cucurbits (inedible peel), lettuce and cotton seed. This application was notified to the European Commission and EFSA and subsequently evaluated by the EMS in accordance with Article 8 of the Regulation.

After completion, the evaluation report of the EMS was submitted to the European Commission who forwarded the application, the evaluation report and the supporting dossier to EFSA 14 January 2009. The application was included in the EFSA Register of Question with the reference number EFSA-Q-2009-00218 and the following subject:

Pyridalyl - Application to set new MRLs for pyridalyl in tomatoes at 1 mg/kg, in aubergines (egg plants) at 1 mg/kg, in peppers at 2 mg/kg, in cucurbits (inedible peel) at 0.2 mg/kg, in lettuce at 3 mg/kg and in cotton seed at 0.1 mg/kg.

EFSA then proceeded with the assessment of the application as required by Article 10 of the Regulation.

TERMS OF REFERENCE

According to Article 10 of Regulation (EC) No 396/2005, EFSA shall, based on the evaluation report provided by the Evaluating Member State, provide a reasoned opinion on the risks to the consumer associated with the application.

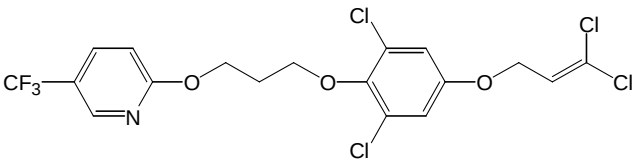
According to Article 11 of that Regulation, the reasoned opinion shall be provided as soon as possible and at the latest within 3 months from the data of receipt of the application. Where EFSA requests supplementary information, the time limit laid down shall be suspended until that information has been provided.

In this particular case the calculated deadline for providing the reasoned opinion was 14 April 2009.

[2] Sumitomo, Parc d'affaires de Crécy, 2 rue Claude Chappe, 69370 Saint Didier au Mont d'Or, France

THE ACTIVE SUBSTANCE AND ITS USE PATTERN

Pyridalyl is the provisional ISO common name for 2,6-dichloro-4-(3,3-dichloroallyloxy) phenyl 3-[5-(trifluoromethyl)-2-pyridyloxy]propyl ether (IUPAC).



Pyridalyl is a new active substance which is currently not allocated to any class of insecticides. Its biochemical mode of action is not fully elucidated. Pyridalyl acts by contact and ingestion and shows cytotoxicity to cells of lepidopterous insects. Pyridalyl is intended to be used to control noctuids, in particular loopers (*Chrysodeixis spp.*), armyworms (*Spodoptera spp.*) and bollworms (*Heliothis spp.* or *Helicoverpa spp.*) which are key pest insects in cotton and in protected and field vegetables such as fruiting vegetables, cucurbits and lettuce.

Pyridalyl is being evaluated in the framework of the Directive 91/414/EEC as a new active substance, the Netherlands being the designated Rapporteur Member State (RMS). The representative uses supported for the peer review process are foliar applications on tomato, aubergine, pepper, cucurbits (inedible peel), lettuce and cotton. Outdoor agricultural practices were defined for Southern European MS only; indoor uses are supported on tomato, aubergine and pepper only. The peer review of this active substance by EFSA is currently in its early beginning and a final decision concerning an inclusion in Annex I of the Directive is not expected within the next months.

The RMS Netherlands evaluated the requested MRLs that have been supported as representative uses in the DAR in the framework of the Regulation (EC) No 396/2005 in view of setting of temporary EC MRLs for the crops. The establishment of MRLs is a precondition for granting provisional authorizations for the plant protection product containing pyridalyl. A detailed overview of the proposed GAPs is available in Appendix A to this document. It concerns foliar applications with a total of 1 to 4 treatments at a rate of 0.125 to 0.150 kg a.s./ha and a pre-harvest interval (PHI) of 3 days. For lettuce the PHI is 14 days. It should be noted that the applicant did not provide information whether provisional authorisations according to the GAPs summarized in Appendix A have already been requested in EU Member States.

In addition to the MRL application and evaluation report submitted by the RMS, EFSA also relied on the DAR prepared under the Directive 91/414/EEC (NL, 2008). **Since the DAR has not yet been peer reviewed, the conclusions reached in this reasoned opinion have to be taken as provisional and might be reconsidered in the light of the conclusions reached in the peer review process of the active substance.**

Currently no Codex MRLs are established for pyridalyl.

ASSESSMENT

1. Methods of analysis

1.1. Methods for enforcement of residues in food of plant origin

The applicant proposed the multi-residue method DFG-S19 (modified) for the determination of pyridalyl in various crops (NL, 2008). This analytical method involves an acetone extraction followed by an ethyl acetate/cyclohexan partition, a clean up by gel permeation and a final determination with GC/MS. This method was considered sufficiently validated on tomato, lettuce and cottonseed, achieving an LOQ of 0.01 mg/kg for all crops considered, except for cottonseed for which a LOQ of 0.02 mg/kg is achievable. In addition, an independent laboratory validation (ILV) was reported for tomato, representative for high water content matrices, and cottonseed belonging to the high fat content matrix.

Considering that all the crops supported in the framework of this application belong to the crop groups with high water content and high fat content, it is concluded that the proposed analytical method (DFG-S19 modified) is suitable to enforce pyridalyl MRLs.

1.2. Methods for enforcement of residues in food of animal origin

The availability of an analytical method for enforcement of residues in the products of animal origin was not considered in the framework of this application. The crops under evaluation do not lead to a significant intake of pyridalyl residues by animals and residues in animal commodities resulting from the proposed GAPs are therefore not expected.

2. Mammalian toxicology

The toxicological properties of pyridalyl have been evaluated in the DAR prepared under the Directive 91/414/EEC (NL, 2008) and reference values have been proposed. Awaiting the peer review to be finalized by EFSA, it is proposed to rely on the conclusions of the RMS. The toxicological reference values derived by the Netherlands are summarized in the table below.

Table 2-1. **Overview of the toxicological reference values**

	Source	**Year**	**Value** (mg/kg bw/d)	**Study relied upon**	**Safety factor**
Parent compound: **pyridalyl**					
ADI	DAR	2008	0.03	Rat, 2 generation reproduction	100
ARfD	DAR	2008	Not necessary		

3. Residues

3.1. Nature and magnitude of residues in plant

3.1.1. Primary crops

3.1.1.1. Nature of residues

The plant metabolism of pyridalyl has been investigated with foliar applications in the following three plant groups with the active substance radio labelled on the phenyl- and propenyl- moiety.:

- the fruit crop group (tomato),
- leafy crop group (chinese cabbage) and
- oilseed/pulse crop group (cotton).

For cotton, a third labelling on the pyridyl ring was used.

In tomatoes and cabbage the metabolism was shown to be limited, the parent pyridalyl being the major compound of the radioactive residues, accounting for 74% to 84% of the TRR in tomato fruits and cabbage leaves 3 and 7 days after the last application. The metabolism was more intensive in cotton, the parent pyridalyl representing 43-65% of the TRR in gin trash and 6-13% of the TRR only in the seeds 21 days after the last application and the metabolites resulting from the cleavage of the ether bound accounting for 2% to 11% of the TRR.

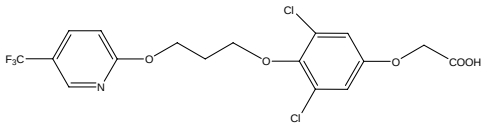
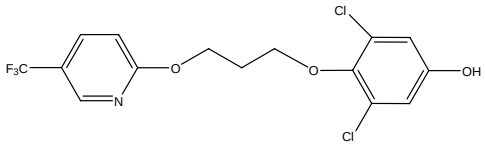
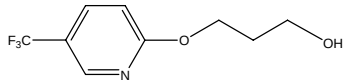
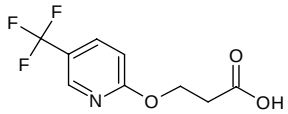
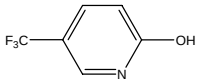
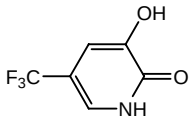
The structure of the main metabolites observed in these metabolism studies are presented in the table 3-1 overleaf.

The metabolic pathway was found to be similar in the three plant groups. Globally, pyridalyl is first metabolised to primary metabolites S-1812-DP and S-1812-Ph-CH_2COOH by loss of the propenyl moiety. In addition, in cotton, cleavage of the ether linkage results in pyridyl containing metabolites S-1812-PYP, TPPA, HTFP, HPDO followed by conjugation and incorporation into natural products. The cleavage of the ether linkage could not be observed in tomato and cabbage, as these studies were performed with phenyl- and propenyl-labels only.

The most important metabolites detected in plants were also observed in rat. The metabolism pathways in plant and animal are comparable, starting with the formation of primary metabolites S-1812-DP and S-1812-PhCH_2COOH, followed by cleavage of ether linkage. The metabolites S-1812-PYP and TPPA observed in cotton were not detected in the rodent metabolism. Considering an expected level in cottonseed below 0.01 mg/kg when pyridalyl is used in compliance with the supported GAP and the similarity of the structures to other animal metabolites (*e.g.* HTFP), these metabolites were considered of no toxicological relevance and the residue definition for enforcement in risk assessment was limited to the parent pyridalyl only. Awaiting the peer review of pyridalyl to be finalised, EFSA is in agreement with the residue definitions proposed by the RMS in the DAR: the parent compound pyridalyl is a good marker for the residues in plants.

As presented in the section 1-1, a multi-residue method is available to enforce pyridalyl MRLs in the crops under consideration in this application.

Table 3-1. **Overview of the metabolites identified in primary crops**

Metabolite Trivial name	**Chemical name (CAS)**	**Structural formula**
S-1812-Ph-CH_2COOH	2-[3,5-dichloro-4-[3-(5-trifluoro methyl-2-pyridyloxy)propoxy] phenoxy] acetic acid	
S-1812-DP	3,5-dichloro-4-[3-(5-trifluoromethyl-2-pyridyloxy]propoxy phenol	
S-1812-PYP	3-(5-trifluoromethyl-2-pyridyloxy) propanol	
TPPA	3-(5-trifluoromethyl-2-pyridyloxy)propionic acid	
HTFP	3-hydroxy-5-trifluoromethylpyridine	
HPDO	3-hydroxy-5-trifluoromethyl-2-pyridone	

3.1.1.2. Magnitude of residues

Sufficient numbers of supervised residue trials complying with the GAPs and performed over several years were submitted to derive MRLs for the different crops. Samples were analysed using the DFG-S19 described in section 1-1. The method was considered sufficiently validated, showing acceptable recoveries at the LOQ and at higher levels. Results of the residue trials and MRL proposals are summarized in the table 3-1. These proposals were derived using the statistical methodologies agreed at European level.

On tomatoes, 10 indoor trials and 4 Southern outdoor trials were submitted. A MRL of 1 mg/kg was derived from the indoor trials. The levels measured in outdoor trials are in the same order of magnitude. Since the data set is complete for tomatoes, an extrapolation to aubergines (eggplants) grown indoor and outdoor (SEU) is acceptable.

On peppers, residue levels detected in the indoor trials were generally lower than the residues in outdoor trials. Therefore the proposed MRL of 2 mg/kg was calculated from the values measured in the outdoor trials performed in the southern European region.

Enough trials were available to support the outdoor GAP defined for southern MS on melon and the extrapolation of the MRL 0.3 mg/kg to the whole group “cucurbits inedible peel” is then acceptable.

On lettuce and cotton a sufficient number of trials was submitted to support Southern outdoor uses and to propose an MRL of 3 mg/kg and 0.1 mg/kg, respectively. On cotton the MRL was derived taking into account the trials where the last application was performed before the growth stage BBCH 80 “first bolls opened” as requested in the GAPs.

Concerning the outdoor uses, it must be noted that only Southern GAPs have been defined for the crops evaluated in the framework of this application. Consequently, the MRLs proposed for the different crops under evaluation in this evaluation are relevant for outdoor uses in Southern European Member States only and do not support any outdoor uses of pyridalyl in the Northern European region.

Concerning the indoor uses (tomato, aubergine and pepper), in the proposed GAPs, pyridalyl uses are restricted to Northern EU crops grown on artificial substrates only. Since the trials on tomatoes were performed on artificial substrate (5 trials) and in soil (5 trials) and the residue levels were similar between these two practices (mean value 0.40 mg/kg), EFSA is of the opinion that the MRL proposed for tomato is applicable for tomatoes grown indoor either on artificial substrate or in natural soil.

According to the DAR (NL, 2008), storage stability of pyridalyl residues has been demonstrated at -20°C for a period of 10 months in high water containing commodities (tomato, pepper) and over 20 months in oil containing matrices (cotton seed). All samples collected in the supervised residue trials were analysed within these two periods and degradation of residues in trial samples during storage is then not expected.

Table 3-1. **Overview of the available residues trials data**

Commodity	Region (a)	Outdoor /Indoor	Individual trial results (mg/kg)		STMR (mg/kg) (b)	HR (mg/kg) (c)	MRL proposal (mg/kg)	Median CF (d)	Comments
			Enforcement	Risk assessment					
Enforcement residue definition 1									
Tomatoes	S+NEU	Indoor	0.11; 0.20; 0.23; 0.25; 0.33; 0.36; 0.37; 0.47; 0.81; 0.88	0.11; 0.20; 0.23; 0.25; 0.33; 0.36; 0.37; 0.47; 0.81; 0.88	0.35	0.88	**1**	1.0	R_{max}: 1.14 R_{ber}: 0.89 Extrapolation to aubergines is possible.
	SEU	Outdoor	0.09; 0.11; 0.17; 0.53	0.09; 0.11; 0.17; 0.53	0.14	0.53	1	1	R_{max}: 1.29 R_{ber}: 0.5
Peppers	S+NEU	Indoor	0.20; 0.22; 2x 0.23, 0.27; 0.33; 0.36; 0.41	0.20; 0.22; 2x 0.23, 0.27; 0.33; 0.36; 0.41	0.25	0.41	0.7	1	R_{max}: 0.525 R_{ber}: 0.675
	SEU	Outdoor	0.28; 0.31; 0.42; 0.46; 2x 0.94; 0.99; 1.09	0.28; 0.31; 0.42; 0.46; 2x 0.94; 0.99; 1.09	0.65	1.09	**2**	1.0	R_{max}: 1.76 R_{ber}: 1.96
Melon	SEU	Outdoor	0.01; 0.05; 0.06; 3x 0.07; 0.10; 0.18	0.01; 0.05; 0.06; 3x 0.07; 0.10; 0.18	0.07	0.18	**0.3**	1.0	R_{max}: 0.23 R_{ber}: 0.16
Lettuce	SEU	Outdoor	2x <0.01; 0.08; 2x 0.64; 0.76; 0.87; 1.7	2x <0.01; 0.08; 2x 0.64; 0.76; 0.87; 1.7	0.64	1.7	**3**	1.0	R_{max}: 2.41 R_{ber}: 1.58
Cottonseed	SEU	Outdoor	3x <0.02; 2x 0.03; 0.04; 0.06; 0.07	3x <0.02; 2x 0.03; 0.04; 0.06; 0.07	0.03	0.07	**0.1**	1.0	R_{max}: 0.10 R_{ber}: 0.09

(a): NEU, SEU, EU or Import (country code). In the case of indoor uses there is no necessity to differentiate between NEU and SEU.
(b): Median value of the individual trial results according to the enforcement residue definition.
(c): Highest value of the individual trial results according to the enforcement residue definition.
(d): The median conversion factor for enforcement to risk assessment is obtained by calculating the median of the individual conversion factors for each residues trial.

3.1.1.3. Effect of industrial processing and/or household preparation

A study investigating the effect of processing on the nature of residues is reported in the DAR (NL, 2008). Pyridalyl was shown to be stable in buffer solutions under conditions simulating pasteurisation (pH 4, 90°C), baking/boiling (pH 5, 100°C) and sterilisation (pH 6, 120°C). In all cases the recovered radioactivity was unchanged parent compound, the unknown fractions/components being less than 0.5% of the TRR. A change in the nature of the residues after industrial or household processing is therefore not expected.

The effect of processing on the magnitude of residues was reported by the RMS in the DAR (NL, 2008) and the evaluation report. Studies were conducted on tomatoes, peppers and cottonseed. The processing factors derived from these studies are summarized in the table 3-2. A processing factor of <0.10 was derived for cotton meal. Although, the factor is based on a single study, it was used for the calculation of the expected dietary burden of livestock (see section 3-2). It should be noted that washing is without effect on the residue level, the median PF calculated from the three studies performed on tomato and pepper being 0.94.

Table 3-2. **Overview of the available processing studies**

Processed commodity		Number of studies	Median PF [(a)]	Median CF [(b)]	Comments
Enforcement residue definition: **Pyridalyl**					
Tomato	Washed fruits	2	0.84	1.0	The proposed processing factors have to be considered provisional and should not be recommended for enforcement purposes since they rely on 1 or 2 studies only for each type of processing. However it can be conclude that the washing is of no effect on the residue levels since the median PF derived from the three studies performed on tomato and pepper is 0.94.
	peel	1	3.5	1.0	
	Peeled fruits	1	0.11	1.0	
	Canned fruits	2	<0.3	1.0	
	Juice	2	<0.3	1.0	
	Puree	3	0.8	1.0	
	Ketchup	2	0.5	1.0	
	Paste	1	1.3	1.0	
Pepper	Washed fruits	1	0.94	1.0	
	Canned fruit	1	0.6	1.0	
	Canned chili pepper (solid)	1	2.4	1.0	
	Canned chili pepper (liquid)	1	<0.01	1.0	
	Canned sweet pepper (solid)	1	0.4	1.0	
Cotton	Hulls	1	0.8	1.0	
	Oil	1	0.2	1.0	
	Meal	1	<0.1	1.0	

(a): The median processing factor is obtained by calculating the median of the individual processing factors of each processing study.

(b): The median conversion factor for enforcement to risk assessment is obtained by calculating the median of the individual conversion factors of each processing study.

3.1.2. Rotational crops

3.1.2.1. Preliminary considerations

All the crops supported in the framework of this application might be grown in rotation with other crops. Since the DT_{90} of pyridalyl in the aerobic field studies is in the range of 176 to 350 days, investigation of residues in rotational crops is required.

3.1.2.2. Nature of residues

Confined rotational crop studies are reported in the DAR (NL, 2008). Carrots, lettuce and wheat were grown in plots 30, 120 and circa 390 days after ^{14}C-Pyridalyl was applied to bare soil at a rate of 1.120 kg a.s./ha (ca. 2N). Studies were performed using ^{14}C-labelled pyridalyl labelled either on the pyridalyl-, propenyl- or the phenyl- moiety.

Uptake of radioactive residues by plants was highly dependant on the ^{14}C-label position:

- Total radioactive residues (TRR) were low (<0.05 mg eq./kg) with the propenyl- and phenyl-labels at all sowing intervals; the only identified compound was the parent representing 27% of the TRR in wheat hay sown 30 days after application but accounting for a low absolute level (0.011 mg/kg).
- In contrast, significant radioactive residues were observed with the pyridalyl-label, the TRRs being in the range of 0.076 to 3.32 mg eq./kg in the crops planted 30 and 120 days after treatment and decreasing to 0.024-0.512 mg eq./kg in the 390-day crops. For all intervals, the metabolite HTFP (free and in conjugated form), was identified as the main compound of the radioactive residues, accounting for 40 to 87% of the TRR in wheat forage, wheat hay, carrot tops, carrot roots and lettuce, up to a maximum absolute level of 1.89 mg eq./kg in the carrot tops (120-day interval). In addition the metabolite HPDO was also detected but only in low amounts, accounting for 3% to 25% of the TRR depending on the crops and the sowing intervals, the highest amount being observed in wheat straw (0.54 mg eq./kg, DAT 30) and carrot tops (0.45 mg eq./kg, DAT 390). Minor identified metabolites were N-methyl-HTFP in wheat forage only (<5.2% TRR) and N-methyl-HPDO (up to 11% TRR) in wheat straw.

All the metabolites identified in these rotational crop studies were also detected in the rat metabolism and in the metabolism studies in cotton where the ^{14}C-pyridalyl label was also investigated. Based on these studies, it was concluded that the metabolism of pyridalyl in rotational crops proceeds mainly by a selective uptake of the metabolite HTPF from the soil which is further metabolised by oxidation, N-methylation to HPDO and in a lower extent to N-methyl-HTFP, N-methyl-HPDO.

3.1.2.3. Magnitude of residues

Considering the significant residues levels of HTFP and HPDO observed in the confined rotational studies, three field studies on the residues in rotational crops were submitted (NL, 2008). These studies were performed in Spain and Italy, pyridalyl being applied four times on a primary crop (cotton, tomato or pepper), at a total rate of ca. 600 g/ha as recommended in the GAPs. Depending on the study, carrots, tomatoes, broccoli, barley and/or lettuce were sown 1, 3, 6 or 11-12 months after the last application. Samples were collected at harvest time and analysed for the parent pyridalyl and metabolites HTPF and HPDO (free and conjugated) achieving an LOQ of 0.01 or 0.02 mg/kg for each individual compound. No residues of

pyridalyl, HTPF and HPDO above le LOQ were detected in any of the rotational crop investigated.

Considering these field studies it is concluded that no significant residue levels (>0.02 or >0.01 mg/kg) of pyridalyl, HTPF or HPDO will occur in rotational crops provided that the active substance is applied according to the proposed GAP (total maximum application rate of 0.600 kg a.s./ha/year).

3.2. Nature and magnitude of residues in livestock

Nature and magnitude of pyridalyl residues in livestock was not assessed because the crops under consideration except cottonseed are normally not feed to animals. The expected residue level of 0.003 mg/kg in cotton meal (STMR cottonseed 0.03 mg/kg * processing factor (<0.1)) does not lead to a significant intake by animals (<0.002 mg/kg DM).

4. Consumer risk assessment

No MRLs are currently established for pyridalyl at EU level. The consumer risk assessment was performed with the EFSA PRIMo rev.2, using the STMR values derived from the supervised residue trials as summarized in table 4-1 for the chronic risk assessment.

Table 4-1. **Input values for the consumer risk assessment**

Commodity	Chronic risk assessment		Acute risk assessment	
	Input value (mg/kg)	**Comment**	**Input value** (mg/kg)	**Comment**
Risk assessment residue definition: **Pyridalyl**				
Tomato	0.35	STMR (Indoor trials)	n.n.	
Aubergine	0.35	Extrapolation from tomato	n.n.	
Pepper	0.65	STMR (Outdoor trials)	n.n.	
Cucurbits inedible peel	0.07	STMR (melon trials)	n.n.	
Lettuce	0.64	STMR	n.n.	
Cotton seed	0.03	STMR	n.n.	

The summary of the chronic intake calculation can be found in Appendix C. The chronic dietary risk assessment did not identify any consumer concerns for any of the European diets, the maximum intake being 6.1% of the ADI (WHO Cluster B diet). Tomatoes are the main contributor accounting for 3.6% of the ADI.

No acute intake calculation was performed since the setting of an ARfD was considered not necessary for pyridalyl.

CONCLUSIONS AND RECOMMENDATIONS

According to Article 6(2) of Regulation (EC) No 396/2005, the Netherlands received an application from Sumitomo to set new MRLs for pyridalyl in several vegetable crops and in cottonseed, in order to grant provisional authorizations for the plant protection product evaluated in the DAR. The applicant requested the following MRLs: 1 mg/kg for tomatoes and aubergines, 2 mg/kg for peppers, 0.2 mg/kg for cucurbits (inedible peel), 3 mg/kg for lettuce and 0.1 mg/kg for cotton seed. No information is provided by the Evaluating Member State whether the applicant has already submitted an application for provisional authorisation for the crops concerned. The evaluation report drafted by the Netherlands was forwarded to EFSA on 14 January 2009 according to Article 9 of the Regulation.

Based on this evaluation report and the Draft Assessment Report (DAR) prepared by the Netherlands as the designated Rapporteur Member State (RMS) under Directive 91/414/EEC, EFSA derives the following conclusions regarding this application.

Metabolism of pyridalyl in plant was investigated for foliar applications in fruiting crops, (tomatoes), leafy crops (Chinese cabbage) and oilseed/pulse crops (cotton). The parent compound pyridalyl was shown to be the main compound accounting for 43% to 84% of the TRR in cotton gin trash, cabbage and tomato. In cottonseed the active substance was metabolised more extensively; the parent compound accounted only for 6% to 13% TRR. The additional metabolites observed in cotton are considered to be of no toxicological relevance. Based on these studies, the proposed residue definition is pyridalyl for all plant commodities for monitoring and risk assessment. EFSA is of the opinion that this plant residue definition is appropriate for the crops under consideration in this application, and that the parent pyridalyl is a good marker for the residues in plants. A validated multi-residue method for enforcement of pyridalyl in high water content and oily matrices is available. The LOQ achievable by routine monitoring laboratories is 0.01 mg/kg for commodities with high water content and 0.02 mg/kg for high fat content matrices.

A sufficient number of supervised residue trials performed according the proposed GAPs were submitted to derive MRLs for tomato, pepper, melon, lettuce and cottonseed. In addition, MRLs can be derived for aubergine and the whole group of cucurbits (inedible peel) by extrapolation from tomatoes and melons, respectively. For outdoor uses, it is noted that the MRLs proposed for the different crops under evaluation are based on studies performed in Southern European Member States. No data are available in support of outdoor uses of pyridalyl in the Northern European region.

Pyridalyl residues in rotational crops were also investigated. Based on the confined rotational crop studies, it was concluded that the metabolism of pyridalyl proceeds mainly by a selective uptake of the metabolite HTPF (3-hydroxy-5-trifluoromethylpyridine) from the soil which is further metabolised the HPDO (3-hydroxy-5-trifluoromethyl-2-pyridone). Considering the field rotational crop studies where pyridalyl was applied on a primary crop according to the GAPs, it was conclude that no significant levels of pyridalyl, HTPF and HPDO (>0.02 mg/kg) are expected in succeeding/rotational crops when the active substance is used according to the proposed GAPs.

Pyridalyl was shown to be stable under standard hydrolytic conditions simulating, pasteurization, boiling/backing and sterilization. Studies on the magnitude of residues in processed commodities were submitted for tomatoes, peppers and cottonseed and processing factors were proposed. However, in most of the cases, these processing factors were derived from a single study and they should be considered as provisional.

Residues in commodities of animal origin were not assessed in the framework of this application considering that the residue levels observed in the cottonseed, the only crop under consideration that might be fed to livestock, do not lead to a significant intake by animals (<0.002 mg/kg DM).

Finally, the chronic intake calculation considering the STMR values derived from the supervised residue trials was performed with the EFSA PRIMo rev.2. No chronic intake concern was identified for any of the available European diets. Therefore, the proposed MRLs are not expected to pose any risk to the European consumer. No acute intake calculation was performed since the setting of an ARfD was considered not necessary for pyridalyl.

EFSA concludes that the intended uses of pyridalyl in tomatoes, aubergines, peppers, curcurbits (inedible peel), lettuce and cottonseed are acceptable with regard to consumer safety. The recommendations resulting from the assessment are summarized in the table below. These recommended MRLs should be considered for inclusion in Annex III of the Regulation as temporary MRLs.

As the DAR has not yet been peer reviewed by EFSA, the conclusions reached in this reasoned opinion have to be considered as provisional and might be reconsidered in the light of the conclusion taken in the peer review.

Overview of the proposed EC MRLs

Commodities	**Existing EC MRL** (mg/kg)	**Proposed EC MRL** (mg/kg)	**Justification for the proposal**
Enforcement residue definition: **Pyridalyl**			
Tomatoes	-	1	Outdoor (SEU) and indoor uses
Aubergine (extrapolation from tomato)	-	1	Outdoor (SEU) and indoor uses
Peppers	-	2	Outdoor (SEU) and indoor uses
Cucurbits (inedible peel)	-	0.3	MRLs supported by data representing uses in Southern EU for outdoor uses only.
Lettuce	-	3	
Cottonseed	-	0.1	

DOCUMENTATION PROVIDED TO EFSA

1. Evaluation report on the setting of new MRLs for pyridalyl in several crops under Regulation (EC) No 396/2005. November 2008. Prepared by the CtgB, The Netherlands.

REFERENCES

NL, 2008. Draft Assessment Report on pyridalyl prepared by the CTgB, Netherlands, under Directive 91/414/EEC. December 2008.

APPENDIX A – GOOD AGRICULTURAL PRACTICES (GAPS)

Crop and/or situation	Member State or Country	F, G or I[3]	Group of pests controlled	Formulation		Application				Application rate/treatment			PHI (days)	Remarks:
				Type	Conc. (as g/l)	Method kind	growth stage	Number (range)	Interval (days)	as (kg/.hl)	water (l/ha)	as (kg/ha)		
Tomato (including. cherry tomato)	North EU	G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 2	7	0.010	1500	0.15	3	EU: cultivation on artificial substrate only
	South EU	F/G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 4	7	0.015	1000	0.15	3	
Aubergine (Eggplant)	North EU	G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 2	7	0.010	1500	0.15	3	EU: cultivation on artificial substrate only
	South EU	F/G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 4	7	0.015	1000	0.15	3	
Sweet pepper	North EU	G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 2	7	0.010	1500	0.15	3	Cultivation on artificial substrate only
	South EU	F/G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 4	7	0.015	1000	0.15	3	
Chili pepper	South EU	F/G	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 4	7	0.015	1000	0.15	3	
Cucurbits inedible peel	South EU	F	noctuids	EW	100	Foliar spray (high volume)	11-89	1 - 4	7	0.015	1000	0.15	3	
Lettuce	South EU	F	noctuids	EW	100	Foliar spray (high volume)	11-47	1 - 2	7	0.025	500	0.125	14	
Cotton	South EU	F	noctuids	EW	100	Foliar spray (high volume)	11-79	1 - 4	7	0.038	400	0.15	n.a.	Apply before boll opening

[3]Outdoor or field uses (F), glasshouse application (G) or indoor application (I)

APPENDIX B – EXISTING EC MRLS

Pyridalyl is a new active substance not currently authorized within the EU Member States and to date, no MRLs have been set at EU level.

APPENDIX C – PESTICIDE RESIDUES INTAKE MODEL (PRIMO)

Pyridalyl

Status of the active substance:		Code no.	
LOQ (mg/kg bw):	0.01	proposed LOQ:	
Toxicological end points			
ADI (mg/kg bw/day):	**0.03**	ARfD (mg/kg bw):	**n.n.**
Source of ADI:	**DAR**	Source of ARfD:	**DAR**
Year of evaluation:	**2008**	Year of evaluation:	**2008**

Intake calculation performed with the STMR values derived from the supervised residue trials on tomato, aubergine, pepper,cucurbits inedible peel, lettuce and cotton seeds

The risk assessment has been performed on the basis of the MRLs collected from Member States in April 2006. For each pesticide/commodity the highest national MRL was identified (proposed temporary MRL = pTMRL).

The pTMRLs have been submitted to EFSA in September 2006.

Chronic risk assessment

	TMDI (range) in % of ADI minimum - maximum
	0 6
No of diets exceeding ADI:	---

Highest calculated TMDI values in % of ADI	MS Diet	Highest contributor to MS diet (in % of ADI)	Commodity / group of commodities	2nd contributor to MS diet (in % of ADI)	Commodity / group of commodities	3rd contributor to MS diet (in % of ADI)	Commodity / group of commodities	pTMRLs at LOQ (in % of ADI)
6.1	WHO Cluster diet B	3.6	Tomatoes	1.1	Peppers	0.8	Lettuce	
2.6	WHO regional European diet	1.3	Tomatoes	0.8	Lettuce	0.4	Peppers	
2.6	IT kids/toddler	1.7	Tomatoes	0.6	Lettuce	0.1	Peppers	
2.5	IT adult	1.4	Tomatoes	0.8	Lettuce	0.2	Peppers	
2.5	ES adult	1.1	Lettuce	0.9	Tomatoes	0.3	Peppers	
2.4	ES child	1.1	Tomatoes	0.9	Lettuce	0.2	Peppers	
2.0	DE child	1.1	Tomatoes	0.6	Peppers	0.1	Lettuce	
1.6	WHO cluster diet D	1.2	Tomatoes	0.2	Peppers	0.2	Cucurbits - inedible peel	
1.6	WHO Cluster diet F	0.8	Tomatoes	0.6	Lettuce	0.1	Peppers	
1.5	DK child	0.6	Tomatoes	0.5	Peppers	0.3	Lettuce	
1.5	PT General population	1.0	Tomatoes	0.4	Peppers	0.0	Cucurbits - inedible peel	
1.5	IE adult	0.5	Tomatoes	0.3	Aubergines (egg plants)	0.3	Peppers	
1.4	SE general population 90th percentile	0.9	Tomatoes	0.4	Peppers	0.1	Aubergines (egg plants)	
1.3	UK vegetarian	0.7	Tomatoes	0.3	Lettuce	0.2	Peppers	
1.2	PL general population	1.0	Tomatoes	0.2	Peppers	0.0	Lettuce	
1.1	NL child	0.7	Tomatoes	0.2	Lettuce	0.1	Peppers	
1.1	WHO cluster diet E	0.6	Tomatoes	0.2	Peppers	0.2	Lettuce	
0.9	LT adult	0.7	Tomatoes	0.1	Lettuce	0.0	Peppers	
0.9	FR toddler	0.9	Tomatoes	0.0	Cucurbits - inedible peel		FRUIT (FRESH OR FROZEN)	
0.9	NL general	0.5	Tomatoes	0.3	Lettuce	0.1	Peppers	
0.9	FR all population	0.5	Tomatoes	0.2	Lettuce	0.1	Peppers	
0.9	UK Adult	0.5	Tomatoes	0.2	Lettuce	0.1	Peppers	
0.8	UK Toddler	0.7	Tomatoes	0.0	Peppers	0.0	Lettuce	
0.8	FI adult	0.5	Tomatoes	0.2	Lettuce	0.1	Peppers	
0.8	DK adult	0.5	Tomatoes	0.2	Peppers	0.0	Cucurbits - inedible peel	
0.4	UK Infant	0.4	Tomatoes	0.0	Cucurbits - inedible peel		FRUIT (FRESH OR FROZEN)	
0.2	FR infant	0.2	Tomatoes	0.0	Peppers	0.0	Cucurbits - inedible peel	

Conclusion:

The estimated Theoretical Maximum Daily Intakes (TMDI), based on pTMRLs were below the ADI.

A long-term intake of residues of Pyridalyl is unlikely to present a public health concern.

GLOSSARY / ABBREVIATIONS

a.s.	active substance
ADI	acceptable daily intake
ARfD	acute reference dose
BBCH	Federal Biological Research Centre for Agriculture and Forestry (Germany)
bw	body weight
CAC	Codex Alimentarius Commission
CAS	Chemical Abstract Service
CXL	codex maximum residue limit
d	day
DAR	Draft Assessment Report (prepared under Directive 91/414/EEC)
DAT	days after treatment
DM	dry matter
DT_{90}	period required for 90 percent dissipation (define method of estimation)
EC	European Community
EFSA	European Food Safety Authority
EMS	Evaluating Member State
eq.	equivalent
EU	European union
GAP	good agricultural practice
GC	gas chromatography
GS	growth stage
ha	hectare
hl	hectolitre
HPLC	high performance liquid chromatography
HR	highest residue
ILV	independent laboratory validation
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
L	litre
LOQ	limit of quantification
MRL	maximum residue limit
MS	Member States
PF	processing factor
PHI	pre harvest interval
PRIMo	Pesticide Residues Intake Model
RMS	Rapporteur Member State
SC	Suspension concentrate
SEU	Southern European Union
STMR	supervised trials median residue
TMDI	theoretical maximum daily intake
TRR	total radioactive residue