European Food Safety Authority

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REASONED OPINION

Reasoned opinion on the modification of the existing MRLs for bixafen in oilseed rape, linseed, poppy seed and mustard seed[1]

European Food Safety Authority[2,]

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

In accordance with Article 6 of Regulation (EC) No 396/2005, the United Kingdom, herewith referred to as the evaluating Member State (EMS), received an application from Bayer CropScience Limited to modify the existing MRLs for the active substance bixafen in oilseed rape, linseed, poppy seed and mustard seed. In order to accommodate for the intended use of bixafen in France, the United Kingdom proposed to raise the existing MRL for these crops from the value of 0.015 mg/kg to 0.1 mg/kg. The United Kingdom drafted an evaluation report according to Article 8 of Regulation (EC) No 396/2005, which was submitted to the European Commission and forwarded to EFSA. According to EFSA the available residues trials data are insufficient to propose MRLs for the proposed use in France on these oilseed crops. Adequate analytical enforcement methods are available to control the residues of bixafen in plant matrices under consideration at the validated LOQ of 0.01 mg/kg. EFSA concludes that the data available are insufficient to make a proposal to change any MRL.

KEY WORDS

Bixafen, oilseeds, MRL application, Regulation (EC) No 396/2005, consumer risk assessment, anilide pyrazole, desmethyl-bixafen.

[1] On request from European Commission, Question No EFSA-Q-2012-00018, approved on 23 July 2012.

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SUMMARY

In accordance with Article 6 of Regulation (EC) No 396/2005, the United Kingdom, herewith referred to as the evaluating Member State (EMS), received an application from Bayer CropScience Limited to modify the existing MRLs for the active substance bixafen in oilseed rape, linseed, poppy seed and mustard seed. In order to accommodate for the intended use of bixafen in France, the United Kingdom proposed to raise the existing MRL for these crops from the value of 0.015 mg/kg to 0.1 mg/kg. The United Kingdom drafted an evaluation report according to Article 8 of Regulation (EC) No 396/2005, which was submitted to the European Commission and forwarded to EFSA on 6 January 2012.

EFSA bases its assessment on the evaluation report submitted by the EMS, the updated Draft Assessment Report (DAR) prepared under Regulation (EC) No 1107/2009, as well as the conclusions from previous EFSA opinions on bixafen.

The toxicological profile of bixafen was assessed in the DAR by the rapporteur Member State the United Kingdom and the data were sufficient to propose an ADI of 0.02 mg/kg bw per day and an ARfD of 0.2 mg/kg bw. Pending the finalisation of the peer review process, the assessment and the derived toxicological reference values should be considered as provisional.

The metabolism of bixafen in primary crops was investigated in wheat and soybean. From these studies the RMS concluded to establish the residue definition for pulses and oilseeds for enforcement as bixafen and for risk assessment as bixafen and desmethyl-bixafen expressed as bixafen. For the use on the oilseed crops being assessed in this opinion, EFSA considers that the metabolism study on soybean was not dosed at an appropriate level to provide sufficient and reliable information on the metabolism of bixafen in pulses and oilseeds. Consequently EFSA concludes that these residue definitions should be considered provisional and should be further discussed in the framework of the review of MRLs under Art. 12 of Regulation (EC) No 396/2005, with a view to including bixafen-desmethyl-pyrazole-4-carboxylic acid and bixafen-pyrazolone-4-carboxylic acid in the residue definition for risk assessment for pulses and oilseeds.

EFSA considers that the submitted supervised residue trials are sufficient to derive a MRL proposal of 0.04 mg/kg for the proposed use on oilseed rape, extrapolated to linseed, poppy seed and mustard seed in the northern European residues trials zone for the proposed enforcement residue definition of bixafen. The intended use on these oilseed crops in the southern European residues trials zone is not adequately supported by residue data and therefore MRL proposals consequent to use in this zone cannot be derived. As the intended use is only in France, a proposal to change the MRL is not appropriate, as for authorisation in France of these oilseeds, it would need to be possible to propose MRLs for both the northern and southern residues trials zones. Adequate analytical enforcement methods are available to control the residues of bixafen in plant matrices under consideration at the validated LOQ of 0.01 mg/kg. In addition to lacking residues trials data for the southern residues zone, as the MRL proposal from the trials for the northern zone would be four times the LOQ and the available metabolism data are considered insufficient to conclude on a risk assessment residue definition in oilseeds and pulses when residues are significantly above the LOQ, EFSA has a second justification to propose the MRLs on oilseed rape linseed, poppy seed and mustard seed are left unchanged.

Under processing conditions simulating pasteurisation, baking/brewing/boiling and sterilisation bixafen residues are stable. Specific studies investigating the magnitude of bixafen residues in processed commodities are not required, as the residues expected in primary crops are low.

The occurrence of bixafen residues in rotational crops was investigated in the DAR. Based on the available information on the nature and magnitude of residues in succeeding crops, it was concluded that significant residue levels are unlikely to occur in rotational crops, provided that the compound is used on cereals and oilseeds according to the proposed pattern. However as indicated by a result on an immature lettuce head, the presence of detectable residues is not completely excluded.

Since these oilseed feed products and their by-products are used as feed products, a potential carry-over into food of animal origin has to be considered. However as EFSA is proposing the existing MRLs for these oilseed are not changed, the assessment from a previous EFSA opinion on bixafen (EFSA, 2011) regarding the potential carry-over into food of animal origin remains valid.

A consumer risk assessment was not performed as the data available are considered insufficient to make a proposal to change any MRL. The consumer risk assessment from a previous EFSA opinion on bixafen (EFSA, 2011) remains valid.

EFSA concludes that the data available are insufficient to make a proposal to change any MRL.

Since the peer review according to Commission Regulation (EU) No 188/2011 is not yet finalised, the conclusions reached in this reasoned opinion should be taken as provisional and might need to be reconsidered in the light of the outcome of the peer review.

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BACKGROUND

Regulation (EC) No 396/2005[3] establishes the rules governing the setting of pesticide MRLs at European Union level. Article 6 of that Regulation lays down that any party having a legitimate interest or requesting an authorisation for the use of a plant protection product in accordance with Council Directive 91/414/EEC[4], repealed by Regulation (EC) No 1107/2009[5], shall submit to a Member State, when appropriate, an application to modify an MRL in accordance with the provisions of Article 7 of that Regulation.

The United Kingdom, hereafter referred to as the evaluating Member State (EMS), received an application from the company Bayer CropScience Limited[6] to modify the existing MRL for the active substance bixafen in oilseed rape, linseed, poppy seed and mustard 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 was submitted to the European Commission, which forwarded the application, the evaluation report and the supporting dossier to EFSA on 6 January 2012.

The application was included in the EFSA Register of Questions with the reference number EFSA-Q-2012-00018 and the following subject:

Bixafen – Application to modify the existing MRLs in rape seed

The United Kingdom proposed to raise the existing MRLs of bixafen in oilseed rape from the value of 0.015 mg/kg to 0.1mg/kg.

Following a clarification from the EMS on the countries where this intended use on oilseed rape was being requested (just France) and that the applicant had also requested use on linseed, poppy and mustard crops, EFSA proceeded with the assessment of the application and the evaluation report as required by Article 10 of the Regulation.

TERMS OF REFERENCE

In accordance with 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.

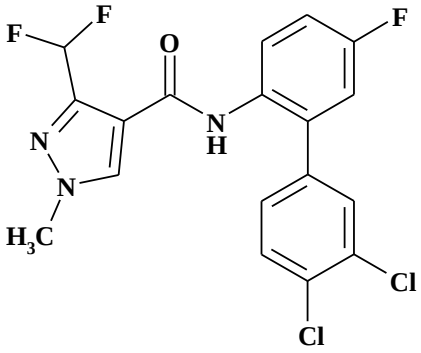
In accordance with Article 11 of that Regulation, the reasoned opinion shall be provided as soon as possible and at the latest within three months (which may be extended to six months where more detailed evaluations need to be carried out) from the date of receipt of the application. Where EFSA requests 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 is 6 April 2012.

[3] Regulation (EC) No 396/2005 of the Parliament and of the Council of 23 February 2005. OJ L 70, 16.03.2005, p. 1-16.
[4] Council Directive 91/414/EEC of 15 July 1991. OJ L 230, 19.8.1991, p. 1-32.
[5] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009. OJ L 309, 24.11.2009, p. 1-50.
[6] Bayer CropScience Ltd, 230, Cambridge Science Park, Milton Road, Cambridge, United Kingdom, CB4 0WB

THE ACTIVE SUBSTANCE AND ITS USE PATTERN

Bixafen is the ISO common name for *N*-(3′,4′-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1-methylpyrazole-4-carboxamide (IUPAC). The chemical structure of the compound is reported below.



Molecular weight: 414.2 g/mol

Bixafen is a fungicide with a broad spectrum of activity belonging to the group of anilides and pyrazoles. Data indicate bixafen has some systemicity, as it can be taken up from soil into plant tissues. Bixafen is fat soluble (log P_{ow} 3.3 at 40°C).

Bixafen is a new active substance currently not approved under Regulation (EC) No 1107/2009, for which the European Commission has established the completeness of the application dossier (Decision 2009/700/EC[7]) and according to the transitional measures provided for in Regulation (EC) No 1107/2009 and Commission Regulation (EU) No 188/2011[8], the procedure of Council Directive 91/414/EEC shall continue to apply. The United Kingdom is acting as the rapporteur Member State (RMS).

The representative uses supported by the applicant in the peer review were foliar applications on wheat, rye, triticale, barley and oats. The peer review is currently in progress and a final decision concerning the approval under Regulation (EC) No 1107/2009 is not expected imminently. The original Draft Assessment Report (DAR) was submitted to EFSA in December 2009, however an updated DAR (The United Kingdom, 2011a) was provided in accordance with the provisions of Commission Regulation (EU) No 188/201 in July 2011, an EFSA conclusion is not currently available.

The EU MRLs for bixafen are established in Regulations (EC) No 750/2010[9] and No 270/2012[10], taking into account the recommendations of EFSA (EFSA, 2009 and 2011). The existing EU MRLs for bixafen on oilseed rape, linseed, poppy seed and mustard seed are set at 0.015 mg/kg. No CXLs are established for bixafen.

The details of the intended GAP for bixafen are given in Appendix A.

[7] Commission Decision of 10 September 2009. OJ L 240, 11.09.2009, p. 32-33
[8] Commission Regulation (EU) No 188/2011 of 25 February 2011. OJ L 53, 26.02.2011, p. 51-55.
[9] Commission Regulation (EU) No 750/2010 of 7 July 2010, OJ L 220, 21.8.2010, p. 1-56.
[10] Commission Regulation (EU) No 270/2012 of 26 March 2012. OJ L 89, 27.3.2012, p. 5-63.

ASSESSMENT

EFSA bases its assessment on the evaluation report submitted by the EMS, the updated Draft Assessment Report (DAR) prepared under Regulation (EC) No 1107/2009, as well as the conclusions from previous EFSA opinions on bixafen.EFSA bases its assessment on the evaluation report submitted by the EMS (The United Kingdom, 2011b), the updated Draft Assessment Report (DAR) prepared under Regulation (EC) No 1107/2009 (The United Kingdom, 2011a), as well as the conclusions from previous EFSA opinions on bixafen (EFSA, 2009 and 2011). The assessment is performed in accordance with the legal provisions of the Uniform Principles for the Evaluation and the Authorisation of Plant Protection Products adopted by Commission Regulation (EU) No 546/2011[11] and the currently applicable guidance documents relevant for the consumer risk assessment of pesticide residues (EC, 1996, 1997a, 1997b, 1997c, 1997d, 1997e, 1997f, 1997g, 2000, 2010a, 2010b, 2011; OECD, 2011).

Since the peer review according to Commission Regulation (EU) No 188/2011 is not finalised yet, the conclusions reached in this reasoned opinion should be taken as provisional and might need to be reconsidered in the light of the outcome of the peer review**.**

1. Method of analysis

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

Analytical methods for the determination of bixafen residues in plant commodities were assessed in the DAR (The United Kingdom, 2011a).

The RMS reported an analytical method for the determination of bixafen residues in samples of plant origin. After a microwave extraction with acetonitrile/water the resulting extracts are filtered and analysed by LC/MS/MS, using a C18 column. Validation data in wheat grain, wheat foliage, orange and rape seed demonstrated that a LOQ of 0.01 mg/kg is achievable. The method was also tested in an independent laboratory validation.

The applicant stated that the German DFG method S19 was found to be inappropriate for enforcement purposes due to insufficient sensitivity.

EFSA concludes that an analytical method is available for dry plant commodities and plant commodities with high acid and high oil content, which can be used for enforcement of MRLs according to the residue definition. However, a multi-residue method, using standard extraction techniques would be desirable.

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

The analytical methods for the determination of bixafen and desmethyl-bixafen residues in commodities of animal origin were evaluated in the DAR under Directive 91/414/EEC (The United Kingdom, 2011a).

The extraction depends on the matrix: for fat and cream hexane/acetonitrile is used for extraction followed by partitioning back into acetonitrile; liver is extracted with acetonitrile/water by microwave extraction. For other tissues and milk an extraction with acetonitrile/water is sufficient. After having cleaned the extracts with a C18-cartridge, the eluant is analysed by LC/MS/MS. The method allows separate determination of bixafen and desmethyl-bixafen, each compound with a LOQ of 0.01 mg/kg. Validation data for bixafen and desmethyl-bixafen were presented for eggs, milk, muscle, kidney, fat and liver. An independent laboratory validation was also reported.

EFSA concludes that sufficiently validated analytical methods for enforcing the MRLs for the sum of bixafen and desmethyl-bixafen in animal tissues, milk and eggs are available.

[11] Commission Regulation (EU) No 546/2011 of 10 June 2011. OJ L 155, 11.06.2011, p. 127-175.

2. Mammalian toxicology

The toxicological profile of the active substance bixafen was assessed in the DAR prepared by the United Kingdom for the peer review (The United Kingdom, 2011a). The data were sufficient to derive toxicological reference values for bixafen which are compiled in Table 2-1. These toxicological reference values should be considered as provisional until they are confirmed by the peer review.

Table 2-1: Overview of the toxicological reference values

	Source	Year	Value	Study relied upon	Safety factor
Bixafen					
ADI	UK	2011	0.02 mg/kg bw per day	2 year male rat feeding study	100
ARfD	UK	2011	0.2 mg/kg bw	Rat developmental study	100

3. Residues

3.1. Nature and magnitude of residues in plant

3.1.1. Primary crops

3.1.1.1. Nature of residues

The metabolism of bixafen in primary crops was evaluated by the United Kingdom in the DAR (The United Kingdom, 2011a). The nature of the residues resulting from foliar applications was investigated in wheat and soybean. The studies were conducted using pyrazole-5-^{14}C-bixafen (pyrazol-label) and dichlorophenyl-UL-^{14}C-bixafen (dichlorophenyl-label).

The overview of the metabolism study designs is presented in the table below.

Table 3-1: Summary of available metabolism studies in plants

Group	Crop	Label position	Application details				
			Method, F or G[(a)]	Rate	No/ Interval	Sampling [(b)]	Remarks
Cereals	Wheat	Pyrazol-^{14}C	G	1st application: 0.13 kg/ha 2nd application: 0.15 kg/ha	2	GS 38: (forage) GS 77: (hay) GS 89: (mature grain/straw); 9 and 50 DALA respectively	Applications performed at GS 29-31 and 69, respectively
		Dichlorophenyl-^{14}C					
Pulses and oilseeds	Soybean	Pyrazol-^{14}C	G	0.06 kg/ha	3	GS 70-71: (forage) GS 75: (hay) GS 96: (mature seed/straw); 5,29 and 26 DALA respectively	Applications performed at GS 60, 69 and 88, respectively
		Dichlorophenyl-^{14}C					

(a): Outdoor/field experiment (F) or glasshouse/protected crops/indoor application (G)
(b): BBCH growth stage

In wheat, after application of the pyrazol labelled bixafen, at harvest the TRR was 0.16 mg eq./kg and 24 mg eq./kg in the grain and straw, respectively. In the dichlorophenyl-label study, comparable TRR values were measured (0.23 mg eq./kg for grain and 23 mg eq./kg in straw). On characterisation of the extractable radioactivity one major component was identified in the grain and straw at harvest as parent bixafen, which accounted for 90-93% of the TRR. Desmethyl-bixafen[12] was the only metabolite identified. This metabolite did not represent more than 2.5% (0.004 mg /kg) and 2% (0.43 mg /kg) of the total radioactivity in the grain and straw, respectively. In forage and hay, the ratio of bixafen and desmethyl-bixafen was comparable to the results observed in grain and straw. The remaining unextractable radioactivity in grain and straw as well as in forage and hay accounted for less than or equal to 6% of the TRR.

In soybean, the TRR measured in seed and straw was 0.02 mg eq./kg and 13 mg eq./kg, respectively in the pyrazole-label study. In the dichlorophenyl-label study the TRR was <0.01 mg eq./kg and 9.5 mg eq./kg for seed and straw, respectively. In straw more than 90% of the applied radioactivity was extractable with acetonitrile/water. In soybean seed, the extractability was significant lower: in the pyrazole-label study, after microwave extraction, 78% of the TRR was extractable, whereas in the dichlorophenyl-label study, using conventional extraction technique, only 53% of the TRR was extractable.

In the pyrazole-label study, the major component identified in seed and straw at harvest was the parent bixafen, which accounted for 30% of the TRR (<0.01 mg/kg) and 90% of the TRR (12 mg/kg), respectively. The metabolites identified in seed were bixafen-desmethyl-pyrazole-4-carboxylic acid[13] (19% of the TRR, <0.01 mg/kg) and bixafen-pyrazolone-4-carboxylic acid[14] (12% of the TRR, <0.01 mg/kg). In straw the only metabolite detected was the desmethyl-bixafen (0.5% of the TRR, 0.06 mg

[12] Desmethyl-bixafen– See Appendix D
[13] Bixafen-desmethyl-pyrazole-4-carboxylic acid– See Appendix D
[14] Bixafen-pyrazolone-4-carboxylic acid– See Appendix D

/kg). In addition, several other compounds could not be identified in soybeans but these occurred at a low concentration in seed (<0.1 mg/kg) and in straw (0.06 mg/kg).

In the dichlorophenyl-label study, neither the parent compound nor the metabolite desmethyl-bixafen were detected in the seed, whilst in straw bixafen was recovered at a high level (92% of TRR; 8.8 mg /kg) whilst its metabolite desmethyl-bixafen was only present at a trace level (0.6% of TRR; 0.06 mg /kg).

EFSA considers that further clarification is needed on the available metabolism data on soybean since the parent compound was identified in soybean seed for the pyrazole labelling whereas it was not detected in the seeds of dichlorophenyl labelled treated plants.

The metabolic pattern observed in soybean was quite different compared to the metabolism depicted in wheat, as besides the metabolic reaction of demethylation of the pyrazole ring to generate the desmethyl-bixafen identified in wheat grain and straw, hydrolytic cleavage of the bridge between the pyrazole ring and the dichlorophenyl ring of the parent molecule occurred in soybean and generated the bixafen-desmethyl-pyrazole-4-carboxylic acid with subsequent oxidative dealkylation to form the bixafen-pyrazolone-4-carboxylic acid. These 2 metabolites were recovered in significant amount in soybean seed only and were not detected in straw.

In the rat metabolism, the most important metabolic reaction was the demethylation of the pyrazole ring to form desmethyl-bixafen and numerous desmethyl-bixafen related metabolites. The metabolites bixafen-desmethyl-pyrazole-4-carboxylic acid and bixafen-pyrazolone-4-carboxylic acid were not observed as significant metabolites in rat metabolism.

It is noted that the desmethyl-bixafen metabolite was not detected in the seeds for the pyrazole labelled form although its presence is expected even at a very low level since the identified metabolites resulted from the demethylation of the parent compound followed by hydrolytic cleavage of the carboxamide bond of bixafen. No metabolite identification in the seeds was attempted for the dichlorophenyl labelling moiety due to the very low recovered residue levels (<0.01 mg/kg). EFSA is of the opinion that the metabolism study on soybean was not appropriately dosed (1N dose rate of intended use of soybeans) in order to provide sufficient and reliable information on the metabolism of bixafen in pulses and oilseeds.

Based on the plant metabolism data submitted on wheat and soybean, the RMS derived the following residue definitions for cereals and pulses/oilseeds:

Residue definition for risk assessment: sum of bixafen and its metabolite desmethyl-bixafen, expressed as bixafen

Residue definition for enforcement: bixafen

The RMS included the desmethyl-bixafen in the residue definition for risk assessment because similar toxicological properties as for the parent bixafen were considered likely from the toxicological assessment of the available data.

EFSA agrees to use the residue definitions derived by the RMS/EMS on a provisional basis, but recommends that the need to include the metabolites observed in soybeans (bixafen-desmethyl-pyrazole-4-carboxylic acid and bixafen-pyrazolone-4-carboxylic acid) in the residue definition for risk assessment should be considered further in the framework of the MRL review under Article 12 of Regulation (EC) No 396/2005.

3.1.1.2. Magnitude of residues

In support of the MRL application, 11 residues trials on rape seed, 8 in northern Europe (Belgium, northern France, Germany, the Netherlands and the UK) and 3 in southern Europe (southern France

and Italy) which complied with the intended GAP were available. The samples were analysed for bixafen and desmethyl-bixafen. The results were reported for the sum of bixafen and desmethyl-bixafen and the parent bixafen separately. Thus it is possible to consider a MRL proposal in compliance with the enforcement residue definition. The method used to analyse the samples of the supervised field trials was sufficiently validated for bixafen and its metabolite desmethyl-bixafen in commodities with high oil content (rape seed). For each analyte a LOQ of 0.01 mg/kg was achieved. The results for desmethyl-bixafen were not re-calculated to bixafen, but as the difference in molecular weight of the parent bixafen and desmethyl-bixafen is negligible (less than 4%), a correction would not alter the results significantly. According to the proposed residue definition for monitoring and risk assessment in pulses and oilseeds, no additional validation data are requested for the metabolite desmethyl-bixafen in high oil content matrices.

The results of the residue trials, the related risk assessment input values (highest residue, median residue, conversion factor) and the MRL proposal are summarised in Table 3-2. The extrapolation of residues trials results from oilseed rape to linseed, poppy seed and mustard seed is appropriate according to the relevant EU guidance document (EC, 2011).

The storage stability of bixafen in primary crops was investigated in the evaluation report (The United Kingdom, 2011b). Residues of bixafen and desmethyl-bixafen were found to be stable at ≤ -18°C for up to 24 months in matrices lettuce, potato, rape seed and wheat (foliage, grain and straw) which cover high water and high fat content as well as in dry matrices. As the supervised residue trial samples were stored under conditions for which integrity of the samples was demonstrated (15 months), it is concluded that the residue data are valid with regard to storage stability.

According to the EMS, the analytical methods used to analyse the supervised residue trial samples have been sufficiently validated and were proven to be fit for purpose (The United Kingdom, 2011b).

The intended use on oilseed rape, linseed, poppy seed and mustard seed in France is not adequately supported by residue data as insufficient residues trials were provided for the residues southern European climatic zone (8 trials are necessary and only 3 were available, it cannot be excluded with the available data, that residues in the south would not be higher than in the north). Consequently an MRL proposal to cover the intended uses in France cannot be derived.

Table 3-2: Overview of the available residues trials data

Commodity	Residue region (a)	Outdoor /Indoor	Individual trial results (mg/kg)		Median residue (mg/kg) (b)	Highest residue (mg/kg) (c)	MRL proposal (mg/kg)	Median CF (d)	Comments (e)
			Enforcement (bixafen)	**Risk assessment** (provisionally sum of bixafen and desmethyl bixafen, expressed as bixafen)(f)					
Oilseed rape seed →linseed, poppy seed and mustard seed	NEU	Outdoor	5 x <0.01, 0.01(g), 2 x 0.02	5 x <0.02, 0.02(g), 2 x 0.03	0.01	0.02	0.04	2	R_{ber}=0.035 R_{max}=0.027 MRL_{OECD} = 0.031/0.04
Oilseed rape seed →linseed, poppy seed and mustard seed	SEU	Outdoor	<0.01, 0.01, 0.04(h)	<0.02, 0.02, 0.02(h)	0.01	0.04	-	-	database insufficient to derive MRL proposal R_{ber}=not calculated R_{max}=0.153 MRL_{OECD} = 0.089/0.15

(a): NEU (Northern and Central Europe), SEU (Southern Europe and Mediterranean), EU (*i.e.* outdoor use) or Import (country code) (EC, 2011).
(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 residue trial.
(e): Statistical estimation of MRLs according to the EU methodology (R_{ber}, R_{max}; EC, 1997g) and unrounded/rounded values according to the OECD methodology (OECD, 2011).
(f): The results for desmethyl-bixafen were not re-calculated to bixafen since the difference in molecular weight of the parent bixafen and desmethyl-bixafen is negligible.
(g): Positive value measured at a longer PHI of 44 days
(h): Analysis results in the trial subsample analysed for bixafen and desmethyl bixafen gave a lower value for the sum of these compounds, than in the subsample from this trial where only bixafen was analysed

3.1.1.3. Effect of industrial processing and/or household preparation

The effect of processing on the nature of bixafen was investigated in studies performed at three test conditions representing pasteurisation, baking/brewing/boiling and sterilisation (20 minutes at 90°C, pH 4; 60 minutes at 100°C pH 5; 20 minutes at 120°C, pH 6). The studies were reported in the DAR (The United Kingdom, 2011a). The RMS concluded that the compound is hydrolytically stable under the representative processing conditions. Thus, for processed commodities the same residue definition as for raw agricultural commodities (RAC) is applicable (The United Kingdom, 2011a).

Specific studies to assess the magnitude of bixafen residues during the processing of oilseed rape (to produce crude and refined oil and meal) are not necessary as the residue levels in raw agricultural commodities (RAC) did not exceeded the trigger value of 0.1 mg/kg (EC, 1997d). Taking into account the log P_{ow} for bixafen (3.3), it is expected that residues in rape seed oil will be higher than in the whole seeds.

3.1.2. Rotational crops

3.1.2.1. Preliminary considerations

Oilseed and cereal crops can be grown in rotation with other plants and therefore the possible occurrence of residues in succeeding crops resulting from the use on primary crops has to be assessed. The soil degradation studies demonstrated that the degradation rate of bixafen is slow; the maximum DT_{90} was >1000 days (The United Kingdom, 2011a), which is above the trigger value of 100 days. Thus, further studies investigating the nature and magnitude of the compound uptake in rotational crops are required (EC, 1997c).

3.1.2.2. Nature of residues

The metabolism of bixafen in rotational crops was assessed in the DAR prepared under Directive 91/414/EEC (The United Kingdom, 2011a). The metabolism and distribution of bixafen in rotational crops was investigated in wheat, turnips and Swiss chard. The crops were grown in soil that had been treated with pyrazole- and dichlorophenyl-ring labelled [C^{14}] bixafen, at a rate of 0.79 to 0.85 kg as/ha. Crops were planted 30, 138 and 285 days after application.

At harvest the TRR in Swiss chard ranged between 0.03 mg eq./kg and 0.06 mg eq./kg at all plant-back intervals. The level of the parent compound ranged between 26% and 37% of the TRR in the pyrazole label-study and between 52% and 71% of the TRR in the dichlorophenyl label-study.

In wheat grain no radioactive residues were detected (residues were below the LOQ). In wheat straw, the TRR ranged between 0.49 mg eq/kg at the shortest plant-back interval and 0.24 mg eq/kg after 285 days plant-back interval. Parent bixafen accounted for 14% to 23% of the TRR in the pyrazole label-study and 14% to 37% of the TRR in the dichlorophenyl label-study.

In turnip roots, the TRR was in the range of 0.01 mg eq/kg and 0.05 mg eq/kg. Significant residue levels of parent bixafen above the LOQ (0.03 mg/kg) were found in the sample derived from the shortest plant-back interval corresponding to 59% of the TRR. In turnip tops the total residues ranged between 0.01 mg eq./kg and 0.08 mg eq/kg. Again, parent compound was quantifiable only in samples grown after 30 days plant-back interval (0.03 mg/kg-37% of the TRR).

Bixafen was extensively metabolised into numerous metabolites in wheat plant parts (forage, hay, straw) at all plant-back intervals while in Swiss chard and turnip roots the parent was recovered at a level of up to 71% and 78% of the TRR, respectively. In the different wheat plant parts (forage, hay, straw), the desmethyl-bixafen metabolite was found to be the major compound of the total residues with residue levels ranging between 44% of the TRR (0.19 mg/kg) and 73% of the TRR (0.18 mg/kg) while the other identified metabolites in wheat straw were detected at a very low level (4.7% of the TRR-0.02 mg/kg). From the nature of the identified metabolites it was concluded that the bridge

between the pyrazole ring and the dichlorophenyl ring had been broken and lead to the formation of bixafen-pyrazolone-4-carboxylic acid, bixafen-pyrazole-4-carboxamide[15], bixafen-pyrazole-4-carboxylic acid[16] and bixafen-desmethyl-pyrazole-4-carboxylic acid for the pyrazole labelling whilst only the desmethyl-bixafen and its hydroxy glycoside sulfate[17] conjugate were identified in the dichlorophenyl-label study (The United Kingdom, 2011a).

The metabolism of bixafen showed a similar profile as in soybean with the parent bixafen being the most valid indicator of the total residues in the edible parts of the rotational crops. The provisional residue definitions for monitoring and risk assessment are also applicable for rotational crops, but may need to be revised if the peer review comes to different conclusions.

3.1.2.3. Magnitude of residues

Rotational field crop studies were assessed in the DAR (The United Kingdom, 2011a). Winter/spring wheat, lettuce, and turnip/carrots were grown in soil which had been treated at an application rate of 0.28 kg as/ha (though this dose rate represents 2.3N; it is only equivalent to *ca*. 1.3 times the intended use rate on the crops being assessed once an estimation of accumulated levels in soil from repeated use over the years is included) and aged for 30 days. In a second study design these crops were grown in soil which had been previously used to grow barley (treated with 2 foliar applications of bixafen at a combined rate of 0.28 kg as/ha). The barley crop was harvested at maturity 52 to 73 days after the last application and then the soil was cultivated and planted with following crops. Rotational crops were planted into the soil at 60 to 70 and 298 to 331 days after the last application to simulate winter and spring rotations. Rotational crop samples were taken at set intervals up to maturity and analysed for bixafen and desmethyl-bixafen. In all samples bixafen and desmethyl-bixafen residues were below the LOQ of 0.01 mg/kg, respectively, with the exception of one sample of immature lettuce head which contained 0.05 mg/kg of bixafen and one sample of wheat straw at harvest in which desmethyl-bixafen residues were found at a concentration of 0.02 mg/kg.

Based on the available information on the nature and magnitude of the residues, EFSA concludes that relevant residue levels are unlikely to occur in rotational crops provided that the compound is used on oilseed rape, linseed, poppy seed and mustard seed according to the intended pattern proposed and on cereals following the use pattern assessed in the previous reasoned opinion (EFSA, 2009). However as indicated by the result on an immature lettuce head, the presence of detectable residues is not completely excluded.

3.2. Nature and magnitude of residues in livestock

The use of bixafen will result in significant residue levels in oilseed rape seed, linseed, poppy seed and mustard seed and their by-products which might be fed to livestock. However as the available information on the nature and magnitude of residues is considered insufficient to propose any change to the existing MRLs in these oilseed crops, the conclusions of the livestock dietary burden calculations and MRLs for commodities of animal origin included in the previous reasoned opinion (EFSA, 2011) remain valid.

Therefore the modification of the MRLs for commodities of animal origin was not investigated further in the framework of the current application. For information the DAR (The United Kingdom, 2011a) and reasoned opinion (EFSA, 2009) proposed the residue definition for enforcement for animal commodities would be the sum of bixafen and its metabolite desmethyl-bixafen, expressed as bixafen.

[15] Bixafen-pyrazole-4-carboxamide– See Appendix D
[16] Bixafen-pyrazole-4-carboxylic acid– See Appendix D
[17] Hydroxy glycoside sulphate of desmethyl-bixafen– See Appendix D

4. Consumer risk assessment

A consumer risk assessment was not performed as the data available are considered insufficient to make a proposal to change any MRL. The consumer risk assessment from a previous EFSA opinion on bixafen (EFSA, 2011) remains valid.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The toxicological profile of bixafen was assessed in the DAR by the rapporteur Member State the United Kingdom and the data were sufficient to propose an ADI of 0.02 mg/kg bw per day and an ARfD of 0.2 mg/kg bw. Pending the finalisation of the peer review process, the assessment and the derived toxicological reference values should be considered as provisional.

The metabolism of bixafen in primary crops was investigated in wheat and soybean. From these studies the RMS concluded to establish the residue definition for pulses and oilseeds for enforcement as bixafen and for risk assessment as bixafen and desmethyl-bixafen expressed as bixafen. For the use on the oilseed crops being assessed in this opinion, EFSA considers that the metabolism study on soybean was not dosed at an appropriate level to provide sufficient and reliable information on the metabolism of bixafen in pulses and oilseeds. Consequently EFSA concludes that these residue definitions should be considered provisional and should be further discussed in the framework of the review of MRLs under Art. 12 of Regulation (EC) No 396/2005, with a view to including bixafen-desmethyl-pyrazole-4-carboxylic acid and bixafen-pyrazolone-4-carboxylic acid in the residue definition for risk assessment for pulses and oilseeds.

EFSA considers that the submitted supervised residue trials are sufficient to derive a MRL proposal of 0.04 mg/kg for the proposed use on oilseed rape, extrapolated to linseed, poppy seed and mustard seed in the northern European residues trials zone for the proposed enforcement residue definition of bixafen. The intended use on these oilseed crops in the southern European residues trials zone is not adequately supported by residue data and therefore MRL proposals consequent to use in this zone cannot be derived. As the intended use is only in France, a proposal to change the MRL is not appropriate, as for authorisation in France of these oilseeds, it would need to be possible to propose MRLs for both the northern and southern residues trials zones. Adequate analytical enforcement methods are available to control the residues of bixafen in plant matrices under consideration at the validated LOQ of 0.01 mg/kg. In addition to lacking residues trials data for the southern residues zone, as the MRL proposal from the trials for the northern zone would be four times the LOQ and the available metabolism data are considered insufficient to conclude on a risk assessment residue definition in oilseeds and pulses when residues are significantly above the LOQ, EFSA has a second justification to propose the MRLs on oilseed rape linseed, poppy seed and mustard seed are left unchanged.

Under processing conditions simulating pasteurisation, baking/brewing/boiling and sterilisation bixafen residues are stable. Specific studies investigating the magnitude of bixafen residues in processed commodities are not required, as the residues expected in primary crops are low.

The occurrence of bixafen residues in rotational crops was investigated in the DAR. Based on the available information on the nature and magnitude of residues in succeeding crops, it was concluded that significant residue levels are unlikely to occur in rotational crops, provided that the compound is used on cereals and oilseeds according to the proposed pattern. However as indicated by a result on an immature lettuce head, the presence of detectable residues is not completely excluded.

Since these oilseed feed products and their by-products are used as feed products, a potential carry-over into food of animal origin has to be considered. However as EFSA is proposing the existing MRLs for these oilseed are not changed, the assessment from a previous EFSA opinion on bixafen (EFSA, 2011) regarding the potential carry-over into food of animal origin remains valid.

A consumer risk assessment was not performed as the data available are considered insufficient to make a proposal to change any MRL. The consumer risk assessment from a previous EFSA opinion on bixafen (EFSA, 2011) remains valid.

EFSA concludes that the data available are insufficient to make a proposal to change any MRL.

RECOMMENDATIONS

The MRLs for bixafen in oilseed rape, linseed, poppy seed and mustard seed should remain unchanged at 0.015 mg/kg with the associated enforcement residue definition being bixafen. Better designed metabolism studies for the oilseed crop group should be generated, to enable a conclusion on the risk assessment residue definition in oilseeds and pulses to be derived, for uses when residues of parent bixafen are significantly above the LOQ.

Since the peer review according to Commission Regulation (EU) No 188/2011 is not yet finalised, the conclusions reached in this reasoned opinion should be taken as provisional and might need to be reconsidered in the light of the outcome of the peer review.

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APPENDICES

A. GOOD AGRICULTURAL PRACTICE (GAPS)

Crop and/or situation (a)	Member State or Country	F G or I (b)	Pest or group of pests controlled (c)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks (m)
				type (d - f)	conc. of a.s. (i)	method kind (f - h)	growth stage & season (j)	number min max (k)	interval min max	kg a.s./hL min max	water L/ha min max	kg a.s./ha min max		
Oilseed rape, linseed, poppy seed mustard seed	F	F	Stem and leaf diseases	EC*	75 g/L	Foliar spray	-	2	-	0.02-0.06	100-300	0.06	30	

* Bixafen is formulated with the active substance prothioconazole. Prothioconazole is applied at a rate of up to 2x0.12 kg a.s./ha when in combination with bixafen, which is identical to the rate and latest timing in the prothioconazole product 'Aviator', which is being considered in France and is covered by the current CODEX MRL for prothioconazole.

Remarks:
(a) For crops, EU or other classifications, e.g. Codex, should be used; where relevant, the use situation should be described (e.g. fumigation of a structure)
(b) Outdoor or field use (F), glasshouse application (G) or indoor application (I)
(c) e.g. biting and sucking insects, soil born insects, foliar fungi, weeds
(d) e.g. wettable powder (WP), emulsifiable concentrate (EC), granule (GR)
(e) GCPF Technical Monograph No 2, 4th Ed., 1999 or other codes, e.g. OECD/CIPAC, should be used
(f) All abbreviations used must be explained
(g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench
(h) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants - type of equipment used must be indicated
(i) g/kg or g/l
(j) Growth stage at last treatment (Growth stages of mono-and dicotyledonous plants. BBCH Monograph, 2nd Ed., 2001), including where relevant, information on season at time of application
(k) The minimum and maximum number of application possible under practical conditions of use must be provided
(l) PHI - minimum pre-harvest interval
(m) Remarks may include: Extent of use/economic importance/restrictions (*i.e.* feeding, grazing)

B. EXISTING EU MAXIMUM RESIDUE LEVELS (MRLS)

(Pesticides - Web Version - EU MRLs (File created on 22/05/2012 13:59)

Code number	Groups and examples of individual products to which the MRLs apply	Bixafen
100000	1. FRUIT FRESH OR FROZEN; NUTS	0.01*
110000	(i) Citrus fruit	0.01*
110010	Grapefruit (Shaddocks, pomelos, sweeties, tangelo, ugli and other hybrids)	0.01*
110020	Oranges (Bergamot, bitter orange, chinotto and other hybrids)	0.01*
110030	Lemons (Citron, lemon)	0.01*
110040	Limes	0.01*
110050	Mandarins (Clementine, tangerine and other hybrids)	0.01*
110990	Others	0.01*
120000	(ii) Tree nuts (shelled or unshelled)	0.01*
120010	Almonds	0.01*
120020	Brazil nuts	0.01*
120030	Cashew nuts	0.01*
120040	Chestnuts	0.01*
120050	Coconuts	0.01*
120060	Hazelnuts (Filbert)	0.01*
120070	Macadamia	0.01*
120080	Pecans	0.01*
120090	Pine nuts	0.01*
120100	Pistachios	0.01*
120110	Walnuts	0.01*
120990	Others	0.01*
130000	(iii) Pome fruit	0.01*
130010	Apples (Crab apple)	0.01*
130020	Pears (Oriental pear)	0.01*
130030	Quinces	0.01*
130040	Medlar	0.01*
130050	Loquat	0.01*
130990	Others	0.01*
140000	(iv) Stone fruit	0.01*
140010	Apricots	0.01*
140020	Cherries (sweet cherries, sour cherries)	0.01*
140030	Peaches (Nectarines and similar hybrids)	0.01*
140040	Plums (Damson, greengage, mirabelle)	0.01*
140990	Others	0.01*
150000	(v) Berries & small fruit	0.01*
151000	(a) Table and wine grapes	0.01*
151010	Table grapes	0.01*
151020	Wine grapes	0.01*
152000	(b) Strawberries	0.01*
153000	(c) Cane fruit	0.01*
153010	Blackberries	0.01*
153020	Dewberries (Loganberries, Boysenberries, and cloudberries)	0.01*
153030	Raspberries (Wineberries)	0.01*
153990	Others	0.01*
154000	(d) Other small fruit & berries	0.01*
154010	Blueberries (Bilberries cowberries (red bilberries))	0.01*
154020	Cranberries	0.01*
154030	Currants (red, black and white)	0.01*
154040	Gooseberries (Including hybrids with other ribes species)	0.01*
154050	Rose hips	0.01*
154060	Mulberries (arbutus berry)	0.01*
154070	Azarole (mediteranean medlar)	0.01*
154080	Elderberries (Black chokeberry (appleberry), mountain ash, azarole, buckthorn (sea sallowthorn), hawthorn, service berries, and other treeberries)	0.01*
154990	Others	0.01*
160000	(vi) Miscellaneous fruit	0.01*
161000	(a) Edible peel	0.01*
161010	Dates	0.01*
161020	Figs	0.01*
161030	Table olives	0.01*
161040	Kumquats (Marumi kumquats, nagami kumquats)	0.01*
161050	Carambola (Bilimbi)	0.01*
161060	Persimmon	0.01*
161070	Jambolan (java plum) (Java apple (water apple), pomerac, rose apple, Brazilean cherry (grumichama), Surinam cherry)	0.01*
161990	Others	0.01*
162000	(b) Inedible peel, small	0.01*
162010	Kiwi	0.01*
162020	Lychee (Litchi) (Pulasan, rambutan (hairy litchi))	0.01*
162030	Passion fruit	0.01*
162040	Prickly pear (cactus fruit)	0.01*
162050	Star apple	0.01*
162060	American persimmon (Virginia kaki) (Black sapote, white sapote, green sapote, canistel (yellow sapote), and mammey sapote)	0.01*
162990	Others	0.01*
163000	(c) Inedible peel, large	0.01*
163010	Avocados	0.01*
163020	Bananas (Dwarf banana, plantain, apple banana)	0.01*
163030	Mangoes	0.01*
163040	Papaya	0.01*
163050	Pomegranate	0.01*
163060	Cherimoya (Custard apple, sugar apple (sweetsop) , llama and other medium sized Annonaceae)	0.01*
163070	Guava	0.01*
163080	Pineapples	0.01*
163090	Bread fruit (Jackfruit)	0.01*
163100	Durian	0.01*
163110	Soursop (guanabana)	0.01*
163990	Others	0.01*
200000	2. VEGETABLES FRESH OR FROZEN	0.01*
210000	(i) Root and tuber vegetables	0.01*
211000	(a) Potatoes	0.01*
212000	(b) Tropical root and tuber vegetables	0.01*
212010	Cassava (Dasheen, eddoe (Japanese taro), tannia)	0.01*
212020	Sweet potatoes	0.01*
212030	Yams (Potato bean (yam bean), Mexican yam bean)	0.01*
212040	Arrowroot	0.01*
212990	Others	0.01*
213000	(c) Other root and tuber vegetables except sugar beet	0.01*
213010	Beetroot	0.01*
213020	Carrots	0.01*
213030	Celeriac	0.01*
213040	Horseradish	0.01*
213050	Jerusalem artichokes	0.01*
213060	Parsnips	0.01*
213070	Parsley root	0.01*
213080	Radishes (Black radish, Japanese radish, small radish and similar varieties)	0.01*
213090	Salsify (Scorzonera, Spanish salsify (Spanish oysterplant))	0.01*
213100	Swedes	0.01*
213110	Turnips	0.01*
213990	Others	0.01*
220000	(ii) Bulb vegetables	0.01*
220010	Garlic	0.01*
220020	Onions (Silverskin onions)	0.01*
220030	Shallots	0.01*
220040	Spring onions (Welsh onion and similar varieties)	0.01*
220990	Others	0.01*
230000	(iii) Fruiting vegetables	0.01*
231000	(a) Solanacea	0.01*
231010	Tomatoes (Cherry tomatoes,)	0.01*
231020	Peppers (Chilli peppers)	0.01*
231030	Aubergines (egg plants) (Pepino)	0.01*
231040	Okra, lady's fingers	0.01*
231990	Others	0.01*
232000	(b) Cucurbits - edible peel	0.01*
232010	Cucumbers	0.01*
232020	Gherkins	0.01*
232030	Courgettes (Summer squash, marrow (patisson))	0.01*
232990	Others	0.01*
233000	(c) Cucurbits-inedible peel	0.01*
233010	Melons (Kiwano)	0.01*
233020	Pumpkins (Winter squash)	0.01*
233030	Watermelons	0.01*
233990	Others	0.01*
234000	(d) Sweet corn	0.01*
239000	(e) Other fruiting vegetables	0.01*
240000	(iv) Brassica vegetables	0.01*
241000	(a) Flowering brassica	0.01*
241010	Broccoli (Calabrese, Chinese broccoli, Broccoli raab)	0.01*
241020	Cauliflower	0.01*
241990	Others	0.01*
242000	(b) Head brassica	0.01*
242010	Brussels sprouts	0.01*
242020	Head cabbage (Pointed head cabbage, red cabbage, savoy	0.01*

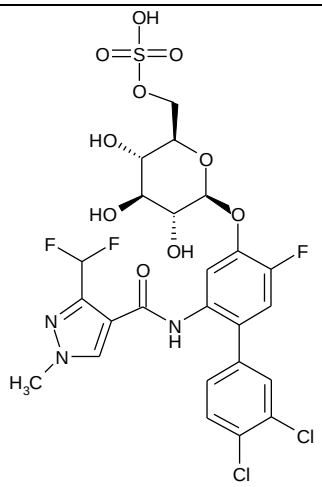
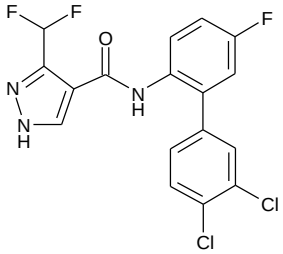
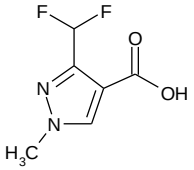
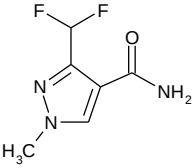
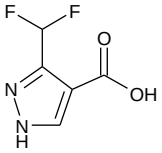
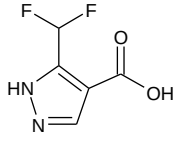
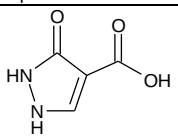
Code number	Groups and examples of individual products to which the MRLs apply	Bixafen
	cabbage, white cabbage)	
242990	Others	0.01*
243000	(c) Leafy brassica	0.01*
243010	Chinese cabbage (Indian (Chinese) mustard, pak choi, Chinese flat cabbage (tai goo choi), peking cabbage (pe-tsai), cow cabbage)	0.01*
243020	Kale (Borecole (curly kale), collards)	0.01*
243990	Others	0.01*
244000	(d) Kohlrabi	0.01*
250000	(v) Leaf vegetables & fresh herbs	0.01*
251000	(a) Lettuce and other salad plants including Brassicacea	0.01*
251010	Lamb´s lettuce (Italian cornsalad)	0.01*
251020	Lettuce (Head lettuce, lollo rosso (cutting lettuce), iceberg lettuce, romaine (cos) lettuce)	0.01*
251030	Scarole (broad-leaf endive) (Wild chicory, red-leaved chicory, radicchio, curld leave endive, sugar loaf)	0.01*
251040	Cress	0.01*
251050	Land cress	0.01*
251060	Rocket, Rucola (Wild rocket)	0.01*
251070	Red mustard	0.01*
251080	Leaves and sprouts of Brassica spp (Mizuna)	0.01*
251990	Others	0.01*
252000	(b) Spinach & similar (leaves)	0.01*
252010	Spinach (New Zealand spinach, turnip greens (turnip tops))	0.01*
252020	Purslane (Winter purslane (miner's lettuce), garden purslane, common purslane, sorrel, glassworth)	0.01*
252030	Beet leaves (chard) (Leaves of beetroot)	0.01*
252990	Others	0.01*
253000	(c) Vine leaves (grape leaves)	0.01*
254000	(d) Water cress	0.01*
255000	(e) Witloof	0.01*
256000	(f) Herbs	0.01*
256010	Chervil	0.01*
256020	Chives	0.01*
256030	Celery leaves (fennel leaves , Coriander leaves, dill leaves, Caraway leaves, lovage, angelica, sweet cisely and other Apiacea)	0.01*
256040	Parsley	0.01*
256050	Sage (Winter savory, summer savory,)	0.01*
256060	Rosemary	0.01*
256070	Thyme (marjoram, oregano)	0.01*
256080	Basil (Balm leaves, mint, peppermint)	0.01*
256090	Bay leaves (laurel)	0.01*
256100	Tarragon (Hyssop)	0.01*
256990	Others	0.01*
260000	(vi) Legume vegetables (fresh)	0.01*
260010	Beans (with pods) (Green bean (french beans, snap beans), scarlet runner bean, slicing bean, yardlong beans)	0.01*
260020	Beans (without pods) (Broad beans, Flageolets, jack bean, lima bean, cowpea)	0.01*
260030	Peas (with pods) (Mangetout (sugar peas))	0.01*
260040	Peas (without pods) (Garden pea, green pea, chickpea)	0.01*
260050	Lentils	0.01*
260990	Others	0.01*
270000	(vii) Stem vegetables (fresh)	0.01*
270010	Asparagus	0.01*
270020	Cardoons	0.01*
270030	Celery	0.01*
270040	Fennel	0.01*
270050	Globe artichokes	0.01*
270060	Leek	0.01*
270070	Rhubarb	0.01*
270080	Bamboo shoots	0.01*
270090	Palm hearts	0.01*
270990	Others	0.01*
280000	(viii) Fungi	0.01*
280010	Cultivated (Common mushroom, Oyster mushroom, Shi-take)	0.01*
280020	Wild (Chanterelle, Truffle, Morel ,)	0.01*
280990	Others	0.01*
290000	(ix) Sea weeds	0.01*
300000	3. PULSES, DRY	0.01*
300010	Beans (Broad beans, navy beans, flageolets, jack beans, lima beans, field beans, cowpeas)	0.01*
300020	Lentils	0.01*
300030	Peas (Chickpeas, field peas, chickling vetch)	0.01*
300040	Lupins	0.01*
300990	Others	0.01*
400000	4. OILSEEDS AND OILFRUITS	
401000	(i) Oilseeds	0.01*
401010	Linseed	0.015
401020	Peanuts	0.01*
401030	Poppy seed	0.015
401040	Sesame seed	0.01*
401050	Sunflower seed	0.01*
401060	Rape seed (Bird rapeseed, turnip rape)	0.015
401070	Soya bean	0.01*
401080	Mustard seed	0.015
401090	Cotton seed	0.01*
401100	Pumpkin seeds	0.01*
401110	Safflower	0.01*
401120	Borage	0.01*
401130	Gold of pleasure	0.01*
401140	Hempseed	0.01*
401150	Castor bean	0.01*
401990	Others	0.01*
402000	(ii) Oilfruits	0.01*
402010	Olives for oil production	0.01*
402020	Palm nuts (palmoil kernels)	0.01*
402030	Palmfruit	0.01*
402040	Kapok	0.01*
402990	Others	0.01*
500000	5. CEREALS	
500010	Barley	0.5
500020	Buckwheat	0.01*
500030	Maize	0.01*
500040	Millet (Foxtail millet, teff)	0.01*
500050	Oats	0.5
500060	Rice	0.01*
500070	Rye	0.05
500080	Sorghum	0.01*
500090	Wheat (Spelt Triticale)	0.05
500990	Others	0.01*
600000	6. TEA, COFFEE, HERBAL INFUSIONS AND COCOA	0.01*
610000	(i) Tea (dried leaves and stalks, fermented or otherwise of Camellia sinensis)	0.01*
620000	(ii) Coffee beans	0.01*
630000	(iii) Herbal infusions (dried)	0.01*
631000	(a) Flowers	0.01*
631010	Camomille flowers	0.01*
631020	Hybiscus flowers	0.01*
631030	Rose petals	0.01*
631040	Jasmine flowers	0.01*
631050	Lime (linden)	0.01*
631990	Others	0.01*
632000	(b) Leaves	0.01*
632010	Strawberry leaves	0.01*
632020	Rooibos leaves	0.01*
632030	Maté	0.01*
632990	Others	0.01*
633000	(c) Roots	0.01*
633010	Valerian root	0.01*
633020	Ginseng root	0.01*
633990	Others	0.01*
639000	(d) Other herbal infusions	0.01*
640000	(iv) Cocoa (fermented beans)	0.01*
650000	(v) Carob (st johns bread)	0.01*
700000	7. HOPS (dried) , including hop pellets and unconcentrated powder	0.01*
800000	8. SPICES	0.01*
810000	(i) Seeds	0.01*
810010	Anise	0.01*
810020	Black caraway	0.01*
810030	Celery seed (Lovage seed)	0.01*
810040	Coriander seed	0.01*
810050	Cumin seed	0.01*
810060	Dill seed	0.01*
810070	Fennel seed	0.01*
810080	Fenugreek	0.01*
810090	Nutmeg	0.01*
810990	Others	0.01*
820000	(ii) Fruits and berries	0.01*
820010	Allspice	0.01*
820020	Anise pepper (Japan pepper)	0.01*
820030	Caraway	0.01*
820040	Cardamom	0.01*
820050	Juniper berries	0.01*
820060	Pepper, black and white (Long pepper, pink pepper)	0.01*
820070	Vanilla pods	0.01*
820080	Tamarind	0.01*
820990	Others	0.01*
830000	(iii) Bark	0.01*
830010	Cinnamon (Cassia)	0.01*
830990	Others	0.01*
840000	(iv) Roots or rhizome	0.01*
840010	Liquorice	0.01*
840020	Ginger	0.01*
840030	Turmeric (Curcuma)	0.01*
840040	Horseradish	0.01*
840990	Others	0.01*

Code number	Groups and examples of individual products to which the MRLs apply	Bixafen
850000	(v) Buds	0.01*
850010	Cloves	0.01*
850020	Capers	0.01*
850990	Others	0.01*
860000	(vi) Flower stigma	0.01*
860010	Saffron	0.01*
860990	Others	0.01*
870000	(vii) Aril	0.01*
870010	Mace	0.01*
870990	Others	0.01*
900000	9. SUGAR PLANTS	0.01*
900010	Sugar beet (root)	0.01*
900020	Sugar cane	0.01*
900030	Chicory roots	0.01*
900990	Others	0.01*
1000000	10. PRODUCTS OF ANIMAL ORIGIN-TERRESTRIAL ANIMALS*	
1010000	(i) Meat, preparations of meat, offals, blood, animal fats fresh chilled or frozen, salted, in brine, dried or smoked or processed as flours or meals other processed products such as sausages and food preparations based on these	
1011000	(a) Swine	0.02*
1011010	Meat	0.02*
1011020	Fat free of lean meat	0.02*
1011030	Liver	0.02*
1011040	Kidney	0.02*
1011050	Edible offal	0.02*
1011990	Others	0.02*
1012000	(b) Bovine	
1012010	Meat	0.15
1012020	Fat	0.4
1012030	Liver	1.5
1012040	Kidney	0.3
1012050	Edible offal	0.02*
1012990	Others	0.02*
1013000	(c) Sheep	
1013010	Meat	0.15
1013020	Fat	0.4
1013030	Liver	1.5
1013040	Kidney	0.3
1013050	Edible offal	0.02*
1013990	Others	0.02*
1014000	(d) Goat	
1014010	Meat	0.15
1014020	Fat	0.4
1014030	Liver	1.5
1014040	Kidney	0.3
1014050	Edible offal	0.02*
1014990	Others	0.02*
1015000	(e) Horses, asses, mules or hinnies	0.02*
1015010	Meat	0.02*
1015020	Fat	0.02*
1015030	Liver	0.02*
1015040	Kidney	0.02*
1015050	Edible offal	0.02*
1015990	Others	0.02*
1016000	(f) Poultry -chicken, geese, duck, turkey and Guinea fowl-, ostrich, pigeon	0.02*
1016010	Meat	0.02*
1016020	Fat	0.02*
1016030	Liver	0.02*
1016040	Kidney	0.02*
1016050	Edible offal	0.02*
1016990	Others	0.02*
1017000	(g) Other farm animals (Rabbit, Kangaroo)	0.02*
1017010	Meat	0.02*
1017020	Fat	0.02*
1017030	Liver	0.02*
1017040	Kidney	0.02*
1017050	Edible offal	0.02*
1017990	Others	0.02*
1020000	(ii) Milk and cream, not concentrated, nor containing added sugar or sweetening matter, butter and other fats derived from milk, cheese and curd	
1020010	Cattle	0.04
1020020	Sheep	0.04
1020030	Goat	0.04
1020040	Horse	0.02*
1020990	Others	0.02*
1030000	(iii) Birds' eggs, fresh preserved or cooked Shelled eggs and egg yolks fresh, dried, cooked by steaming or boiling in water, moulded, frozen or otherwise preserved whether or not containing added sugar or sweetening matter	0.02*
1030010	Chicken	0.02*
1030020	Duck	0.02*
1030030	Goose	0.02*
1030040	Quail	0.02*
1030990	Others	0.02*
1040000	(iv) Honey (Royal jelly, pollen)	0.02*
1050000	(v) Amphibians and reptiles (Frog legs, crocodiles)	0.02*
1060000	(vi) Snails	0.02*
1070000	(vii) Other terrestrial animal products	0.02*

(*) Indicates lower limit of analytical determination

(a): The enforcement residue definition for products of animal origin, terrestrial animals is: the sum of bixafen and its metabolite desmethyl-bixafen, expressed as bixafen.

C. LIST OF METABOLITES AND RELATED STRUCTURAL FORMULA

Common name	IUPAC name	Structure
Hydroxy glycoside sulphate of desmethyl-bixafen	Hydroxy glycoside sulphate of *N*-(3',4'-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1*H*-pyrazole-4-carboxamide	 or isomer
Desmethyl-bixafen	*N*-(3',4'-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1*H*-pyrazole-4-carboxamide	
Bixafen-pyrazole-4-carboxylic acid	3-(difluoromethyl)-1-methyl-1*H*-pyrazole-4-carboxylic acid	
Bixafen-pyrazole-4-carboxamide	3-(difluoromethyl)-1-methyl-1*H*-pyrazole-4-carboxamide	
Bixafen-desmethyl-pyrazole-4-carboxylic acid (tautomer 1)	3-(difluoromethyl)-1*H*-pyrazole-4-carboxylic acid	 proposal for tautomer 1
Bixafen-desmethyl-pyrazole-4-carboxylic acid (tautomer 2)	5-(difluoromethyl)-1*H*-pyrazole-4-carboxylic acid	 proposal for tautomer 2
Bixafen-pyrazolone-4-carboxylic acid	3-hydroxy-1H-pyrazole-4-carboxylic acid	

ABBREVIATIONS

ADI	acceptable daily intake
AIR	Annex I Renewal
AR	applied radioactivity
ARfD	acute reference dose
a.s.	active substance
BBCH	growth stages of mono- and dicotyledonous plants
bw	body weight
CAC	Codex Alimentarius Commission
CCPR	Codex Committee on Pesticide Residues
cGAP	critical GAP
CEN	European Committee for Standardisation (Comité Européen de Normalisation, *French*)
CF	conversion factor for enforcement residue definition to risk assessment residue definition
CIPAC	Collaborative International Pesticide Analytical Council
CIRCA	(EU) Communication & Information Resource Centre Administrator
CXL	Codex Maximum Residue Limit (Codex MRL)
d	day
DALA	days after last application
DAR	Draft Assessment Report
DAT	days after treatment
DM	dry matter
DT_{90}	period required for 90 % dissipation (define method of estimation)
EC	European Community
EC	emulsifiable concentrate
EFSA	European Food Safety Authority
EMS	evaluating Member State
eq	residue expressed as a.s. equivalent
EU	European Union
EURLs	EU Reference Laboratories (former CRLs)
FAO	Food and Agriculture Organisation of the United Nations
GAP	good agricultural practice
GCPF	Global Crop Protection Federation (former GIFAP)
GLP	Good Laboratory Practice

GS	growth stage
ha	hectare
hL	hectolitre
HR	highest residue
ILV	independent laboratory validation
IPCS	International Programme of Chemical Safety
ISO	International Organisation for Standardisation
IUPAC	International Union of Pure and Applied Chemistry
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
kg	kilogram
L	litre
LC/MS/MS	liquid chromatography tandem mass spectrometry
LOAEL	lowest observed adverse effect level
LOD	limit of detection
LOQ	limit of quantification
MRL	maximum residue level
MS	Member States
NEU	northern European Union
NOAEL	no observed adverse effect level
MW	molecular weight
OECD	Organisation for Economic Co-operation and Development
PF	processing factor
PHI	pre-harvest interval
P_{ow}	partition coefficient between n-octanol and water
PRIMo	(EFSA) Pesticide Residues Intake Model
QuEChERS	Quick, Easy, Cheap, Effective, Rugged, and Safe (method)
R_{ber}	statistical calculation of the MRL by using a non-parametric method
R_{max}	statistical calculation of the MRL by using a parametric method
RAC	raw agricultural commodity
RD	residue definition
RMS	rapporteur Member State
SCFCAH	Standing Committee on the Food Chain and Animal Health
STMR	supervised trials median residue
SEU	Southern European Union
TMDI	theoretical maximum daily intake
TRR	total radioactive residue

WHO	World Health Organisation
wk	week
yr	year