

REASONED OPINION

Reasoned opinion on the setting of MRLs for saflufenacil in various crops, considering the risk related to the metabolite trifluoroacetic acid (TFA)¹

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ABSTRACT

In accordance with Article 43 of Regulation (EC) No 396/2005, the European Commission requested EFSA to perform a follow-up evaluation of saflufenacil with regard to the MRLs adopted recently by Codex Alimentarius Commission and the possible consumer health concerns regarding the metabolite trifluoroacetic acid (TFA). On the basis of the information available to EFSA and the current scientific knowledge, EFSA concludes that for the intended use of saflufenacil on the crops for which MRLs were requested in the framework of the MRL application (EFSA-Q-2011-00208), including the CXLs established by Codex Alimentarius Commission in 2012, the exposure to saflufenacil and its metabolite trifluoroacetic acid via the diet will not result in a consumer exposure exceeding the toxicological reference values derived for the parent compound saflufenacil and its metabolite and therefore is unlikely to pose a public health concern.

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KEY WORDS

saflufenacil, trifluoroacetic acid (TFA), MRL application, Regulation (EC) No 396/2005, consumer risk assessment

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SUMMARY

In accordance with Article 43 of Regulation (EC) No 396/2005, the European Commission requested EFSA to perform a follow-up evaluation of saflufenacil with regard to the MRLs adopted recently by Codex Alimentarius Commission and the possible consumer health concerns regarding the metabolite trifluoroacetic acid (TFA).

EFSA bases its assessment on the evaluation reports submitted by the EMS in the framework of the previous question related to setting of new MRLs for saflufenacil, the JMPR evaluation/JMPR reports, the UK position paper, the Danish position paper as well as the conclusions from the previous EFSA opinion on saflufenacil. In addition, additional information provided by the applicant on trifluoroacetic acid and a position paper supported by toxicological data on TFA submitted by Bayer CropScience were used to assess the toxicological profile of the metabolite.

The toxicological profile of the active substance saflufenacil was assessed in the previously issued reasoned opinion of EFSA. The data were sufficient to derive an ADI of 0.046 mg/kg bw per day and an ARfD of 0.05 mg/kg bw. For the metabolite TFA, on the basis of toxicological studies that were made available for this assessment, EFSA concluded that it is possible to derive a tentative ADI of 0.05 mg/kg bw per day and a tentative ARfD at the same level (0.05 mg/kg bw).

EFSA was asked to address concerns to what extent TFA may exert local irritative effects in the gastro-intestinal tract, considering that the free acid (trifluoroacetic acid) is classified and labelled as corrosive. Considering the pH levels in food and the low concentrations TFA will not occur as free acid but in form of its salt. Thus, the irritative effects observed with the free acid are of low relevance in the framework of this assessment.

The European Commission asked EFSA to assess the toxicokinetics of TFA following oral administration, since according to the Danish position paper this information is indispensable if the TTC approach should be applied. EFSA concludes that lacking these studies, no final conclusions can be derived. However, the Danish concern is considered to be sufficiently addressed as it is not necessary to base the risk assessment for TFA on the TTC approach but on specific toxicological reference values derived for TFA.

EFSA was also requested to update the consumer risk assessment of the previously issued opinion on saflufenacil, taking into account the MRLs established by Codex Alimentarius Commission (CXLs) in July 2012 and additional information provided in the position papers of the United Kingdom and Denmark. Considering the argumentation presented in the position paper of the United Kingdom, EFSA revised its previous opinion and derived MRL proposals for coffee and potatoes (0.03 mg/kg, respectively). However, EFSA noted that considering the short PHI specified in the GAP for coffee the EU data requirements regarding metabolism studies are not fully addressed. To clarify the situation, the applicant should provide further explanations if the short PHI is relevant in practice. Also for potatoes, further metabolism studies would be desirable to confirm the assumption that after desiccation use of saflufenacil the metabolic profile in roots is comparable to the one found in soya beans.

EFSA updated the chronic and acute exposure assessment for saflufenacil, including the CXLs adopted in 2012 and the MRL proposals for coffee and potatoes. No consumer concerns were identified: the long-term (chronic) exposure accounted for a maximum of 3.2 % of the ADI (UK toddler) while the short-term (acute) exposure did not exceed 10 % of the ARfD for any of the commodities for which MRL proposals were derived (maximum for bovine liver: 9.4% of the ARfD). On the basis of this updated dietary exposure assessment for saflufenacil (including metabolite M800H11 and M800H35), EFSA concludes that the MRLs derived by EFSA, including the CXLs adopted in 2012 in the EU legislation do not pose a consumer health concern.

For **TFA** a comprehensive dietary consumer exposure assessment was performed as requested by the European Commission taking into account all sources. Thus, for the calculation of the long-term and short-term exposure the following sources of exposure were considered:

- TFA residues in primary crops resulting from the use of saflufenacil;
- TFA residues in rotational crops grown on fields previously treated with saflufenacil;
- TFA residues resulting from other pesticides that are metabolised to TFA and where measurable TFA concentrations are expected in primary or rotational crops;
- TFA residues in food resulting from environmental contaminations (see Section 4.2.3).

To derive the input values for the exposure assessments, a conservative approach was applied using highest TFA concentrations described in relevant studies identified in dossiers of saflufenacil or other pesticides or in the public domain. Since the input values derived for the comprehensive exposure assessment are subject to a high level of uncertainty, the results of the exposure assessment are less accurate compared with standard exposure assessments. For the interpretation of the results these uncertainties should be born in mind, meaning that they give an indicative estimation of the order of magnitude of the exposure. The total calculated intake accounted for up to 5 % of the ADI. The major contributors in this calculation were apples (up to 1.9% of the ADI), wheat (up to 1.4% of the ADI) and oranges and wine grapes (both 0.6% of the ADI, respectively).

No acute consumer risk was identified in relation to the estimated TFA concentrations in food. The calculated maximum exposure in percentage of the ARfD was 24.6 % for potatoes, followed by oranges (21.2% of the ARfD) and apples (15.7% of the ARfD).

To verify the results of the dietary exposure assessment it would be desirable to generate more experimental data in the framework of a monitoring programme on TFA in food.

On the basis of the information available to EFSA and the current scientific knowledge, EFSA concludes that for the intended use of saflufenacil on the crops for which MRLs were requested in the framework of the MRL application (EFSA-Q-2011-00208), including the CXLs established by Codex Alimentarius Commission, the TFA exposure via the diet will not result in a consumer exposure exceeding the toxicological reference values derived for this metabolite and therefore is unlikely to pose a public health concern.

Thus EFSA proposes to amend the existing MRLs as reported in the summary table.

SUMMARY TABLE

Code number ^a	Commodity	Existing EU MRL (mg/kg)	Proposed EU MRL (mg/kg)	Justification for the proposal
The proposed import tolerances and CXLs reported below are sufficiently supported by data and no consumer intake concerns were identified with regard to the residue definition for risk assessment. Regarding the metabolite TFA a separate risk assessment was performed which did not raise intake concerns.				
Enforcement residue definition for commodities of plant origin: the sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil				
0110000	Citrus fruit	0.01* (default MRL)	0.03*	Import tolerance for grapefruit, oranges, lemons assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of citrus

Code number ^a	Commodity	Existing EU MRL (mg/kg)	Proposed EU MRL (mg/kg)	Justification for the proposal
0120000	Tree nuts		0.03*	Import tolerance for almonds and pecans assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of tree nuts
0130000	Pome fruit		0.03*	Import tolerance for apples and pears assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of pome fruit
0140000	Stone fruit		0.03*	Import tolerance for cherries, peaches and plums assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of stone fruit
0151000	Table and wine grapes		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0163020	Banana		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0163030	Mangoes		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0211000	Potatoes		0.03*	Import tolerance re-evaluated in this reasoned opinion
0234000	Sweet corn		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0260000	Legume vegetables (fresh)		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0300010	Dry beans		0.5	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0300030	Dr peas		0.1	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0401070	Soya bean		0.1	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0401050	Sunflower seed		1.0	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0401060	Rape seed		0.6	CXL established in 2012
0401090	Cotton seed		0.3	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0500000 (except 0500020)	Cereals (except buckwheat)		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0900020	Sugarcane		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596

Code number ^a	Commodity	Existing EU MRL (mg/kg)	Proposed EU MRL (mg/kg)	Justification for the proposal
0620000	Coffee beans		0.03*	Import tolerance re-evaluated in this reasoned opinion; further explanations should be provided concerning the PHI relevant in practice to confirm that the metabolism studies are representative for the use.
Enforcement residue definition for commodities of animal origin: saflufenacil				
1011010 1011020	Swine meat Swine fat	0.01* (default MRL)	0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1011030 1011040	Swine liver Swine kidney		0.3	For liver the import tolerance was derived in EFSA Journal 2012;10(2):2596, for kidney the CXL should be taken over.
1012010 1013010 1014010	Bovine meat Sheep meat Goat meat		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1012020 1013020 1014010	Bovine fat Sheep fat Goat fat		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1012030 1013030 1014030	Bovine liver Sheep liver Goat liver		0.6	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1012040 1013040 1014040	Bovine kidney Sheep kidney Goat kidney		0.3	CXL derived in 2012.
1016000	Poultry meat, fat, liver, kidney, edible offal		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1020000	Milk		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1030000	Eggs		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596

(*): Indicates that the MRL is set at the limit of analytical quantification.

(a): According to Annex I of Regulation (EC) No 396/2005.

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BACKGROUND

In February 2012, EFSA published a Reasoned Opinion on the setting of new MRLs for saflufenacil in a wide range of food commodities (EFSA, 2012a) based on an import tolerance request from BASF which was submitted to the Evaluating Member State (EMS) United Kingdom. In the EU currently no uses are registered for this active substance. In its opinion, EFSA highlighted that there were no consumer health concerns for saflufenacil; a consumer risk assessment for trifluoroacetic acid (TFA), a metabolite of saflufenacil, could not be performed as further data on the toxicological profile would be needed. For TFA no Acceptable Daily Intake (ADI) and Acute Reference Dose (ARfD) could be derived so far. TFA is a metabolite that comes also from other sources, e.g. as metabolite from other active substances.

The issue was discussed with the Member States at several meetings of the Standing Committee on the Food Chain and Animal Health (SCFCAH) where additional information on saflufenacil was presented in a position paper of the United Kingdom (United Kingdom, 2012). Additional information was also recently provided by Denmark (Denmark, 2013). Member States delegations indicated that there was a need to assess consumer exposure to TFA from all sources, and that the threshold of toxicological concern (TTC) approach should be considered. The principles for the TTC approach have been outlined in the recent EFSA Opinion on evaluation of the toxicological relevance of pesticides metabolites for dietary risk assessment (EFSA, 2012b).

Furthermore, in July 2012, the Codex Alimentarius Commission adopted several CXLs for saflufenacil for which EFSA provided an evaluation to the European Commission (EFSA, 2012c).

On 11 June 2013 the European Commission submitted a request to EFSA to perform a follow-up evaluation of saflufenacil with regard to the recently adopted CXLs and the possible consumer health concerns regarding the metabolite TFA. The request was included in the EFSA Register of Questions with the reference number EFSA-Q-2013-00432 and the following subject:

Request of a scientific opinion on the setting of MRLs for saflufenacil

EFSA proceeded with the preparation of the reasoned opinion.

While EFSA was working on the detailed assessment, the European Commission informed EFSA on 31 October 2013 that specific toxicological studies for TFA will be made available by Bayer Crop Science. These data were submitted to EFSA on 6 November 2013 and 11 November 2013. Considering the late submission of the toxicological studies on TFA, EFSA agreed with the European Commission that the originally agreed deadline needed to be extended to 15 February 2014.

On 22 January 2014 EFSA circulated the draft reasoned opinion to consult Member State experts on the proposed toxicological reference values derived for trifluoroacetic acid and the other questions addressed in the document. All comments received by 31 January 2014 were considered by EFSA in the final reasoned opinion.

TERMS OF REFERENCE

In accordance with Article 43 of Regulation (EC) No 396/2005, the European Commission asked EFSA to update the reasoned opinion on saflufenacil adopted in February 2012 (EFSA, 2012a), taking into account the new information provided by the United Kingdom and Denmark as well as the CXLs adopted in 2012.

In particular the update should address

- the consumer exposure to the metabolite trifluoroacetic acid (TFA) from all sources, taking into account the principles for assessment as described in the recent EFSA Scientific Opinion

on evaluation of the toxicological relevance of pesticide metabolites for dietary risk assessment (EFSA, 2012b);

- potential irritative effects of TFA on the gastro-intestinal-tract following ingestion;
- toxicokinetics of TFA following oral administration.

(Terms of Reference taken over from mandate submitted by European Commission on 11 June 2013)

APPROACH TO ASSESS THE REQUEST

Due to the complexity of the request, EFSA has broken down the terms of reference in the following questions which will be discussed in detail in the following sections:

1. Mammalian toxicology:

1a: Availability of data in regard to deriving an ADI and an ARfD for trifluoroacetic acid, considering the additional information provided by the European Commission on 6 November 2013 and 11 November 2013;

1b: If no toxicological reference values can be derived from empirical data, clarification if TFA fulfils the criteria defined for using the TTC approach and proposal of a threshold of toxicological concern for acute and chronic effects;

1c: Assessment if the available data are sufficient to conclude on potential irritative effects of TFA on the gastro-intestinal-tract following ingestion, taking into account the expected concentrations of TFA in food treated with saflufenacil;

1d: Assessment of the toxicokinetics of TFA following oral administration;

2. Evaluation of the data for coffee beans and potatoes with regards to deriving a MRL proposal for saflufenacil for these crops, taking into account the considerations presented in the UK position paper;

3. Exposure assessment/risk assessment saflufenacil:

Assessment of the recently adopted CXLs for saflufenacil regarding the consumer exposure. If necessary/appropriate, the dietary risk assessment has to be updated, including the risk assessment values for the recently adopted CXLs, as well as the data on potatoes and coffee.

4. Exposure assessment/risk assessment TFA:

4a: Identification of possible sources of exposure to TFA;

4b: Estimation of the overall expected dietary exposure to TFA, resulting from all sources of exposure;

4c: Assessment of the overall expected dietary consumer exposure to TFA, conclusion on the risk for consumer health.

ASSESSMENT

EFSA bases its assessment on the evaluation reports submitted by the EMS in the framework of the previous question related to setting of new MRLs for saflufenacil (EFSA-Q-2011-00208; United Kingdom, 2011a, 2011b), the JMPR evaluation/JMPR report (FAO, 2011a, 2011b, 2012), the UK position paper (United Kingdom, 2012), the Danish position paper (Denmark, 2013) as well as the

conclusions from the previous EFSA opinion on saflufenacil (EFSA, 2012a). In addition, a document provided by the applicant on trifluoroacetic acid (TFA: Environmental and Consumer Safety Considerations arising from Saflufenacil Agricultural Uses) (BASF, 2011) and a position paper supported by toxicological data on TFA submitted by Bayer CropScience (Bayer CropScience, 2013) were used to assess the toxicological profile of the metabolite.

In order to identify all sources of consumer exposure for TFA, EFSA performed a systematic literature review (see Appendix D). In addition, data submitted in the framework of the peer review and previously issued reasoned opinions and EFSA conclusions were screened to identify which pesticides might be a source for TFA exposure.

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 546/2011³ 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).

1. Mammalian toxicology

1.1. Derivation of toxicological reference values (ADI and ARfD) for TFA

In order to decide whether sufficient data are available to derive an ADI and an ARfD for trifluoroacetic acid, EFSA assessed the additional information and studies provided by Bayer CropScience in November 2013 (Bayer CropScience, 2013) and the information provided by the applicant (BASF, 2011).

According to a position paper of the applicant, trifluoroacetic is classified and labelled as corrosive and has not been tested for eye or skin irritation in animals (BASF, 2011).

The intraperitoneal (i.p.) LD₅₀ for TFA (sodium salt) was >2,000 mg/kg bw in mice. In comparative acute toxicity experiments, the free acid was shown to be much more acutely toxic than the sodium salt. The sodium salt of TFA was administered to 10 male rats as single oral dose of either 10 or 25 mg/kg bw and caused no observable effects on the testes or on body weight. In a gavage experiment, no effects on liver or body weights were observed in rats administered TFA by gavage for 8 days. The NOAEL in this study was 950 mg/kg bw (Blake et al, 1970).

Male Wistar rats were fed TFA⁴ for 5-14 days: a dose of 500 mg/kg bw per day did not affect body weight, but caused a slight increase in liver weight. TFA was not considered a significant peroxisome proliferating chemical (Just et al, 1989).

Groups of pregnant Sprague-Dawley rats were exposed to either 75 or 150 mg/kg bw per day TFA (free acid), by gavage, on gestational days 10-20. TFA did not affect litter size, neonatal survival or postnatal growth. In both dose groups, minor and transient (only on PND 3) effects in liver biochemistry were noted by changes in serum glutamate dehydrogenase and aspartate aminotransferase activities. Additionally, a transient (PND 3 only) effect on the kidneys was observed as an increase in the urinary excretion of β 2-microglobulin in the high-dose pups. No other effects on kidneys were noted. In dams, liver weights were statistically significantly increased in both treatment groups (123% of control in low-dose and 122% of control in high-dose dams). However, the increased liver weights were not dose-related and may have been related to dehydration resulting from dosing with the free TFA acid (Saillenfait, 1996).

³ Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products. OJ L 155, 11.06.2011, p. 127-175.

⁴ Not specified if the test material was TFA free acid or a salt.

As the raw data of the studies assessed in the position papers of BASF are not available to EFSA, an in-depth analysis of the toxicological effects and an assessment of the acceptability of the studies cannot be done. Therefore the above data cannot be considered for deriving reference values, but only as supportive data.

According to the UK assessment (United Kingdom, 2012), in repeated dose studies the effects which occurred between 75 and 750 mg/kg bw included changes in liver weight, liver serum enzymes and liver histopathology. Based on these studies it was not possible to derive a robust sub acute NOAEL, which could be used to derive a chronic reference dose. Studies published in open literature and in the REACH Dossier show no evidence for a mutagenic or clastogenic potential of TFA/sodium trifluoroacetate.

The findings of the studies provided by Bayer CropScience (2013) are summarised in Table 1-1.

TFA (sodium salt) is not acutely toxic via oral route, not genotoxic and not toxic to developments in rats. After repeated exposure to rats, the liver was the target organ (increased liver weight due to hepatocellular hypertrophy based on peroxisome proliferation). A NOAEL of 10 and 12 mg/kg bw per day in male and female rats, respectively, was established after 90-day oral exposure. The lowest NOAEL of 10 mg/kg bw per day was considered appropriate to derive the ADI, with the application of an uncertainty factor of 100 for intra- and inter-species variation plus an additional factor of 2 to extrapolate from subchronic to chronic study duration, resulting in a proposed ADI of 0.05 mg/kg bw per day. As for the ARfD, in the absence of an appropriate single exposure toxicity study the NOAEL of 43 mg/kg bw per day from a 14-day rat dietary toxicity study was considered the most appropriate and conservative, resulting in an ARfD of 0.43 mg/kg bw, by applying an uncertainty factor of 100 (Bayer CropScience, 2013).

Table 1-1: Summary results of toxicological studies provided by Bayer CropScience in support of the application for saflufenacil

Study type	Dose tested	Result	Reference	Acceptability
Acute oral (gavage) rat	2000 mg/kg bw	LD50 >2000 mg/kg bw	M-444479-01-1	Yes
Ames test (S. typhimurium TA98, TA100, TA1535, TA1537, TA102)	1.6-5000 µg/plate	Negative (+/- S9 mix)	M-256628-01-1	Yes
Mammalian cell gene mutation test (mouse lymphoma L5178Y cells)	360-1360 µg/mL	Negative (+/- S9 mix)	M-260699-01-1	Yes
Mammalian chromosome aberration test (human lymphocytes)	85-1360 µg/mL	Negative (+/- S9 mix)	M-260807-01-1	Yes
14-day oral (dietary) rat (mechanistic)	0-600-1200-2400 ppm (males: 0-43-85-170 mg/kg bw per day; females: 0-45-91-190 mg/kg bw per day)	NOAEL: males: 43 mg/kg bw per day; females: 190 mg/kg bw per day	M-202165-01-1	No (not GLP)
28-day oral (dietary) rat	0-600-1800-5400-16000 ppm (males: 0-50-149-436-1315 mg/kg bw per day; females: 0-52-157-457-1344 mg/kg bw per day)	NOEL: males: 50mg/kg bw per day; females: 52mg/kg bw per day	M-259106-01-1	Yes

Study type	Dose tested	Result	Reference	Acceptability
90-day oral (dietary) rat	0-160-1600-16000 ppm (males: 0-10-98-1043 mg/kg bw per day; females: 0-12-123-1216 mg/kg bw per day)	NOAEL: males: 10 mg/kg bw per day females: 12 mg/kg bw per day	M-283994-01-1	Yes
Developmental toxicity rat	0-37.5-75-150 mg/kg bw per day	NOAEL: maternal: 150 mg/kg bw per day foetal: 150 mg/kg bw per day	M-411209-01-1	The acceptability cannot be assessed as the raw data are not available

Among the active substances assessed in the peer review where TFA was identified in metabolism studies, only limited information as regards hazard characterisation of TFA is available.

Flurtamone was approved in 2004; TFA was considered for its relevance a groundwater metabolite. TFA was considered not a skin and eye irritant, and as a non-genotoxic substance; when tested at level up to 150-400 mg/kg it showed moderate acute toxicity. Administered in the rat diet for 14 or 28 days, TFA induced no relevant toxicity at 750 mg/kg bw per day. In the case of flurtamone the ADI of the parent compound (0.03 mg/kg bw per day) was considered adequate to cover the toxicity of TFA.

Fluazinam was approved in 2009; a data gap was identified as regards the toxicological properties of the plant metabolite TFA, also in comparison with the toxicity of fluazinam.

1.1.1. Setting of reference doses

The approach to derive the ADI of 0.05 mg/kg bw per day as proposed in the position paper submitted by Bayer CropScience (Bayer CropScience, 2013) is agreed: the relevant NOAEL from the subchronic study in rodents and the application of an extra uncertainty factor (UF) of 2 in consideration of the potential chronic toxicity are appropriate.

With regard to the ARfD, Bayer CropScience proposed to use the NOAEL of 43 mg/kg bw derived from the 14-day oral study in rats. However, no rationale is given for the selection of this study end point. EFSA is of the opinion that this study is not appropriate since it is not a GLP study. It is acknowledged that in none of the submitted studies there is an indication of the need to set an ARfD, however key studies for this purpose are missing (e.g. an acute neurotoxicity study, reproductive and developmental toxicity studies). Therefore it is appropriate to include an extra UF to the standard 100; the reference point could be the same as for the ADI, in the absence of any further indication. The application of an additional UF of 2, the same applied for setting the ADI, seems appropriate considering that this approach would lead to an ARfD value at the same level as the ADI, which can be regarded as a conservative approach.

Table 1-1: Overview of the proposed toxicological reference values

	Source	Year	Value	Study relied upon	Uncertainty factor
Trifluoroacetic acid					
ADI	EFSA	2014	0.05 mg/kg bw per day	90 d oral rat study	200*
ARfD	EFSA	2014	0.05 mg/kg bw	90 d oral rat study	200°

(*): An extra uncertainty factor (UF) of 2 is applied to the standard 100 to account for the potential chronic toxicity (no assays available).

(°): An extra uncertainty factor (UF) of 2 is applied to the standard 100 to account for the incomplete toxicological database.

Since the data were sufficient to derive tentative toxicological reference values, the application of the TTC approach as proposed in the mandate of the European Commission is not necessary.

1.2. Assessment of potential irritative effects of TFA on the gastro-intestinal-tract following ingestion

In the position paper provided by BASF it is reported that trifluoroacetic acid is classified and labelled as corrosive and has not been tested for eye or skin irritation in animals (BASF, 2011).

Considering that at the pH levels which are expected for food, TFA will not occur as free acid (pKa 0.23) but in form of its salts (while the classification refers to the free acid), it is highly unlikely that the concentration of TFA expected in food could impact on the pH of food and hence no significant irritative effect is expected.

1.3. Toxicokinetics of TFA following oral administration

Denmark raised concerns regarding the lack of information on the half-lives and kinetics of TFA since no data are available investigating TFA toxicokinetics following oral administration (Denmark, 2013).

According to the position paper of the UK (United Kingdom, 2012) there is limited information on the half-lives and kinetics of TFA: the elimination half-life after intravenous injection to rabbits with or without bile fistulae was 15.6 or 34.4 hours, respectively. Rabbits with bile fistulae, which were administered TFA internally through a duodenal cannula showed rapid appearance in the circulating blood, with an elimination half-life of 16.8 hours.

Two reviews of anaesthetics have been published by European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC, 1996, 2006). In particular for dichlorotrifluoroethane, an extensive part is dedicated to the toxicokinetics of this compound, including data on TFA. However, the ADME (Absorption, Distribution, Metabolism and Excretion) studies as well as other toxicological studies are performed via inhalation exposure, and, as such, not relevant to the present purpose.

Denmark was of the opinion that a clear understanding of the toxicokinetic is indispensable if the TTC approach is applied (Denmark, 2013). EFSA concludes that as sufficient toxicological studies are available to derive toxicological reference values for TFA, the information is no longer required.

2. Setting of MRLs for coffee beans and potatoes

2.1. Coffee beans

The basis of the import tolerance request for coffee beans were the GAP from Brazil (3 applications of 25 to 50 g/ha, PHI 7 days) and the GAP from Costa Rica and Ecuador (4 applications of 100 g/ha, PHI 0 or 1 d) (Appendix A to EFSA, 2012a).

2.1.1. Metabolism studies representative for coffee beans

In the previous assessment EFSA concluded that for coffee beans no adequate metabolism studies were available (EFSA, 2012a).

EFSA notes that in the EU guidance document on plant metabolism (EC, 1997a), coffee beans are not specifically assigned to one of the main crop groups which are normally used to investigate plant metabolism. However, taking into account botanical considerations, EFSA considered coffee beans as a crop represented by fruits and fruiting vegetables. The metabolism study on tomatoes was not representative for the reported GAP in coffee beans since in this study the active substance was

applied to the soil surface before the tomato plants were transplanted and it was therefore not reflecting the short PHI specified in the GAPs reported for coffee beans.

In the UK position paper (United Kingdom, 2012) it was proposed to use the soya bean metabolism study to support of the MRL request for coffee beans. This proposal is in line with the OECD guideline on metabolism in crops (OECD, 2007), which classifies coffee beans in the group of pulses and oilseeds. For soya beans two metabolism studies were available (EFSA, 2012a), one study with pre-emergence application to the soil 40 days after planting (uracil and phenyl labelled active substance) and a second study with a desiccation use 7 days before the harvest (uracil labelled active substance). EFSA is of the opinion that both studies have similar deficiencies as the metabolism study in tomatoes, i.e. the GAP for coffee beans is not reflected in terms of timing of the application and the PHI. According to the Brazilian GAP saflufenacil is applied 3 times as post-emergence treatment with a PHI of 7 days while according to the GAP of Costa Rica and Ecuador the product is applied 4 times post-emergence with a PHI of 0 or 1 day.

However, considering that saflufenacil is a herbicide which exhibits phytotoxic effects on broad leaved plants, the pesticide application in coffee cultivation shall not be targeted to the crop but rather on the soil to destroy weeds. It is noted that the short PHI might not be a realistic situation in practice. Thus, taking also into account the low residues in the crop, it can be agreed on a provisional basis that the metabolism studies performed on other crops with longer PHI are extrapolated to coffee beans. EFSA concludes that although the EU data requirements as regards the metabolism study relevant for coffee beans are not fully addressed, the residue definitions proposed in the previous issued reasoned opinion might be acceptable also for coffee beans on a provisional basis (sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil). The applicant should however, provide further explanations on the GAP, in particular to specify why a short PHI of 0 to 7 days is required in coffee beans for a herbicide use.

2.1.2. Residue trials representative for coffee beans

In 2012, EFSA received three GAP compliant trials reflecting the Brazilian GAP and five trials representative for the GAP of Costa Rica and Ecuador (GAPs see Appendix A). In none of the trials residues of saflufenacil and the relevant metabolites M800H11 and M800H35 were detected in concentrations above the limit of quantification (< 0.01 mg/kg for each of the compounds included in the residue definition). In its previous opinion EFSA was of the opinion that the number of trials was not sufficient to derive a MRL proposal (EFSA, 2012a).

Considering the argumentation in the UK position paper (UK, 2012), EFSA reconsidered its previous conclusions on the residue trials. EFSA concludes that the trials are sufficient to demonstrate a no residue situation and thus a MRL of 0.03 mg/kg (equivalent to the limit of quantification) is proposed. The mean and highest residue to be considered for the dietary risk assessment is 0.03 mg/kg, respectively.

It is noted that no data are available regarding the TFA concentration in coffee beans treated according to the notified GAPs.

2.2. Potatoes

The basis of the import tolerance request for potatoes was the GAP from Brazil (1 application of 100 g/ha, PHI 7 days – desiccation use) (Appendix A).

2.2.1. Metabolism studies representative for potatoes

EFSA concluded in its previous assessment that the available metabolism studies sufficiently address the residue profile expected in all crop groups after soil application and after foliar application in pulses and oilseeds. However, the metabolism in root and tuber vegetables (following desiccation use) was not sufficiently reflected (EFSA, 2012a).

In the UK position paper it was proposed to consider the findings of the metabolism study in tomatoes for the MRL request in potatoes, since both crops are high water containing matrices (United Kingdom, 2012).

EFSA would like to clarify that, according to the EU guidance document on plant metabolism (EC, 1997a) and the OECD guideline on crop metabolism, potatoes are classified as root crops while tomatoes are classified as fruits and fruiting vegetables crops. Thus, metabolism studies in tomatoes are normally not representative for potatoes. It should also be highlighted that on potatoes saflufenacil is intended to be used as desiccant, and since the metabolism study in tomatoes reflects a soil surface treatment, this study is not appropriate. For desiccation use a metabolism study in oilseeds (soya beans) is available. This study demonstrated that with the short PHI typical for desiccation uses the metabolism is less extensive, with parent saflufenacil being the main compound accounting for 63.7 to 76.4% of the TRR in stem, pods and leaves. In seeds parent compound and the demethylated metabolite M800H02 occurred in similar amounts (ca. 25% of TRR, respectively). Although the metabolism study is not representative for root crops, the study provides some evidence that no new metabolites are expected in desiccation uses. Thus, the residue definition derived for saflufenacil can be applied to potatoes on a provisional basis, considering also the low residue concentrations found in residue trials. However, further studies to confirm the assumption that in potatoes the metabolic profile is comparable to the one found in soya beans after desiccation use should be performed.

2.2.2. Residue trials representative for potatoes

For potatoes in total four residue trials were submitted by the applicant which were assessed by EFSA in 2012 (EFSA, 2012a). In none of the trials residues of saflufenacil and the metabolites M800H11 and M800H35 were detected in concentrations above the limit of quantification. EFSA was of the opinion that the number of trials was not sufficient to derive a MRL proposal for potatoes since potatoes are a major crop (EFSA, 2012a).

Considering the argumentation in the UK position paper, EFSA reconsidered its previous conclusions on the residue trials. EFSA concludes that the trials are sufficient to demonstrate a no residue situation for the three compounds included in the proposed residue definition. Thus, the MRL should be set at the LOQ of 0.03 mg/kg on a provisional basis, pending the submission of the confirmatory data regarding the metabolism study in potatoes. The mean and highest residue to be considered for the dietary risk assessment is 0.03 mg/kg, respectively.

3. Exposure assessment/risk assessment saflufenacil

In 2012, EFSA assessed the data submitted in support of the requested import tolerances for a wide range of commodities (EFSA, 2012a). EFSA derived MRL proposals for the proposed enforcement residue definition (sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil (see Table 3-1)). For risk assessment the same residue definition was proposed.

The JMPR evaluated saflufenacil in 2011 (FAO, 2011a, 2011b); all proposed MRLs for the residue definition saflufenacil were advanced and adopted by Codex Alimentarius Commission in July 2012 (CAC, 2012).

In 2012, JMPR assessed the use on pulses and proposed to set a group tolerance of 0.3 mg/kg for the whole group of pulses (FAO, 2012). Thus, the previously proposed CXLs for dry beans (0.3 mg/kg), dry peas (0.05 mg/kg) and soya beans (0.07 mg/kg) were recommended for revocation. In the minutes of the CCPR meeting a reservation of the delegation of the EU and Norway was reported as regards this proposal (CAC, 2013).

In the following table (Table 3-1) EFSA summarises the MRLs proposed for saflufenacil in the previous reasoned opinion of EFSA (EFSA, 2012a), the CXLs established in 2012 and 2013 and, since most of the requested import tolerances are based on US GAPs, the legal limits established in the USA for the residue definition which is identical with the residue definition derived at EU level.

From this table it becomes evident that in order to update the consumer risk assessment performed by EFSA in the previous reasoned opinion (EFSA; 2012a) with the CXLs adopted in 2012, the following crops need to be considered: citrus (other than grapefruit, oranges and lemons), tree nuts (other than almonds and pecans), pome fruit (other than apples and pears), stone fruit (other than cherries, peaches and plums), rape seed, coffee beans, potatoes and certain edible offals (mammalian). All other commodities for which Codex Alimentarius has established CXLs in 2012 are covered by the risk assessment performed by EFSA in 2012 since the CXLs correspond to the import tolerances proposed by EFSA (taking into account the different residue definitions). Considering the reservation of the EU delegation, the CXLs for pulses is not taken into account; instead the previously established individual CXLs beans (dry), peas (dry) and soya bean (dry) are included in the dietary exposure calculation. The details of the authorised GAPs for saflufenacil, for which import tolerances were requested, can be found in the previously issued EFSA opinion (Appendix A of EFSA, 2012a). They are identical to the critical GAPs assessed by JMPR for deriving the CXL proposals (FAO, 2011b, 2012).

Table 3-1: Overview of the proposed/existing MRLs derived by EFSA, JMPR and USA

Code number	Commodity	Proposed EU MRL (mg/kg) ⁽¹⁾	Critical GAP for EU MRL proposal	CXL (mg/kg) ⁽²⁾	US tolerance (mg/kg) ⁽³⁾
0110010	Grapefruit	0.03*	USA	0.01	0.03
0110020	Oranges	0.03*	USA	0.01	0.03
0110030	Lemons	0.03*	USA	0.01	0.03
	Other citrus fruit	No MRL requested	N/A	0.01	0.03
0120010	Almonds	0.03*	USA	0.01	0.03
0120080	Pecans	0.03*	USA	0.01	0.03
	Other tree nuts	No MRL requested	N/A	0.01	0.03
0130010	Apples	0.03*	USA	0.01	0.03
0130020	Pears	0.03*	USA	0.01	0.03
	Other pome fruit	No MRL requested	N/A	0.01	0.03
0140020	Cherries	0.03*	USA	0.01	0.03
0140030	Peaches	0.03*	USA	0.01	0.03
0140040	Plums	0.03*	USA	0.01	0.03
	Other stone fruit	No MRL requested	N/A	0.01	0.03
0151000	Table and wine grapes	0.03*	USA	0.01	0.03
0163020	Banana	0.03*	Costa Rica, Ecuador	0.01	No MRL
0163030	Mangoes	0.03*	Brazil	No CXL	No MRL
0234000	Sweet corn	0.03*	USA	0.01	0.03

Code number	Commodity	Proposed EU MRL (mg/kg) ⁽¹⁾	Critical GAP for EU MRL proposal	CXL (mg/kg) ⁽²⁾	US tolerance (mg/kg) ⁽³⁾
0260000	Legume vegetables (fresh)	0.03*	USA	0.01 (peas with and without pods, soya beans (immature seeds))	0.03
0300010	Dry beans	0.5	USA	0.3	0.3
0300030	Dry peas	0.1	USA	0.05 (proposed by JMPR in 2011) 0.3 (proposed by JMPR in 2012, EU reservation)	0.3
	Other pulses	No MRL requested	N/A	0.3 (proposed by JMPR in 2012, EU reservation)	0.3
0401070	Soya bean	0.1	USA	0.07 (proposed by JMPR in 2011) 0.3 (proposed by JMPR in 2012, EU reservation)	0.1
0401090	Cotton seed	0.3	USA	0.2	0.2
0401050	Sunflower seed	1.0	USA	0.7	1.0
0401060	Rape seed	No MRL requested	N/A	0.6 ⁽⁵⁾	0.45
0500000 (except 0500020)	Cereals (except buckwheat)	0.03*	USA	0.01	0.03
0900020	Sugarcane	0.03*	Brazil	No CXL	No MRL
0211000	Potatoes	No proposal (EFSA, 2012a) 0.03* (see section 2.1.2)	Brazil	No CXL	No MRL
0620000	Coffee beans	No proposal (EFSA, 2012a) 0.03* (see section 2.1.2)	Costa Rica, Ecuador	0.01	No MRL
1011010 1011020 1011040	Swine meat Swine fat Swine kidney	0.01* 0.01* 0.01*	N/A	0.01 0.01 0.3 ⁽⁴⁾	No MRL
1011030	Swine liver	0.3	N/A	0.3 ⁽⁴⁾	No MRL

Code number	Commodity	Proposed EU MRL (mg/kg) ⁽¹⁾	Critical GAP for EU MRL proposal	CXL (mg/kg) ⁽²⁾	US tolerance (mg/kg) ⁽³⁾
1012010 1013010 1014010	Bovine meat Sheep meat Goat meat	0.01*	N/A	0.01	No MRL
1012020 1013020 1014010	Bovine fat Sheep fat Goat fat	0.01*	N/A	0.01	No MRL
1012030 1013030 1014030	Bovine liver Sheep liver Goat liver	0.6	N/A	0.3 ⁽⁴⁾	No MRL
1012040 1013040 1014040	Bovine kidney Sheep kidney Goat kidney	0.02	N/A		No MRL
1016000	Poultry meat, fat, liver, kidney, edible offal	0.01*	N/A	No proposal	No MRL
1020000	Milk	0.01*	N/A	0.01	No MRL
1030000	Eggs	0.01*	N/A	No proposal	No MRL

(1): MRL proposed by EFSA in the reasoned opinion issued in 2012 (EFSA, 2012a): EU enforcement residue definition for commodities of plant origin: the sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil; EU enforcement residue definition for commodities of animal origin: saflufenacil.

(2): CXLs adopted in 2012, including the proposal discussed in CCPR meeting 2013 as regards pulses and revocation of CXLs for peas (dry) and soya beans. Codex enforcement residue definition for commodities of plant and animal origin: saflufenacil.

(3): US residue definition: sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil.

(4): CXL for edible offal-mammalian.

(5): As the Codex residue definition does not contain the two metabolites, the CXL should be recalculated. However, since in the metabolism studies in soya beans representative for the GAP (late application, desiccation use) these metabolites were not identified, the CXL can be transferred to the EU legislation without recalculation. It is noted that in the USA MRL is set at 0.45 mg/kg for the RD comparable to the EU RD for the GAP assessed by JMPR.

3.1. Results of updated consumer risk assessment for saflufenacil

The input values for the long-term and short term exposure assessment for the commodities mentioned are summarised in the following table (Table 3-2).

Table 3-2: Input values for the updated consumer dietary exposure assessment (including the input values for the CXLs adopted in 2012)

Commodity	Chronic exposure assessment		Acute exposure assessment	
	Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Risk assessment residue definition for plant commodities: the sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil				
All citrus fruit	0.03	Median residue (EFSA, 2012a), extrapolated to all citrus	0.03	Highest residue (EFSA, 2012a), extrapolated to all citrus

Commodity	Chronic exposure assessment		Acute exposure assessment	
	Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
All pome fruit	0.03	Median residue (EFSA, 2012a), extrapolated to all pome fruit	0.03	Highest residue (EFSA, 2012a), extrapolated to all pome fruit
All tree nuts	0.03	Median residue (EFSA, 2012a), extrapolated to all tree nuts	0.03	Highest residue (EFSA, 2012a), extrapolated to all tree nuts
All stone fruit	0.03	Median residue (EFSA, 2012a), extrapolated to all stone fruit	0.03	Highest residue (EFSA, 2012a), extrapolated to all stone fruit
Grapes	0.03	Median residue (EFSA, 2012a)	0.03	Highest residue (EFSA, 2012a)
Banana	0.03	Median residue (EFSA, 2012a)	0.03	Highest residue (EFSA, 2012a)
Mango	0.011	Median residue (EFSA, 2012a)	0.02	Highest residue (EFSA, 2012a)
Potatoes	0.03	Median residue (see section 2.1.2)	0.03	Highest residue (see section 2.1.2)
Sweet corn	0.03	Median residue (EFSA, 2012a)	0.03	Median residue (EFSA, 2012a)
Peas (without pods), beans (without pods), peas (with pods), beans (with pods), lentils (fresh)	0.03	Median residue (EFSA, 2012a)	0.03	Highest residue (EFSA, 2012a)
Dry beans	0.03	Median residue (dry beans) (EFSA, 2012a)	0.03	Median residue (dry beans) (EFSA, 2012a)
Dry peas	0.03	Median residue (dry beans) (EFSA, 2012a)	0.03	Median residue (dry beans) (EFSA, 2012a)
Rape seed	0.6	CXL (FAO, 2011)	0.6	CXL (FAO, 2011)
Soybean	0.03	Median residue (dry beans) (EFSA, 2012a)	0.03	Median residue (dry beans) (EFSA, 2012a)
Sunflower	0.22	Median residue (EFSA, 2012a)	0.22	Median residue (EFSA, 2012a)
Cotton	0.05	Median residue (EFSA, 2012a)	0.05	Median residue (EFSA, 2012a)
Wheat, rice, barley, rye, oat, maize, sorghum	0.03	Median residue (EFSA, 2012a)	0.03	Median residue (EFSA, 2012a)
Sugarcane	0.03	Median residue (EFSA, 2012a)	0.03	Highest residue (EFSA, 2012a)
Coffee beans	0.03	Median residue (see section 2.1.2)	0.03	Median residue (see section 2.1.2)

Commodity	Chronic exposure assessment		Acute exposure assessment	
	Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Other food commodities of plant origin	0.03	LOQ	No relevant for acute exposure assessment	
Risk assessment residue definition for animal commodities: saflufenacil				
Pig liver	0.20	Median residue (EFSA, 2012a)	0.25	Highest residue (EFSA, 2012a)
Pig kidney, meat, fat	0.01	Median residue (EFSA, 2012a)	0.01	Highest residue (EFSA, 2012a)
Liver of bovine, sheep, goat	0.5	Median residue (EFSA, 2012a)	0.58	Highest residue (EFSA, 2012a)
Kidney of bovine, sheep, goat	0.015	Median residue (EFSA, 2012a)	0.015	Highest residue (EFSA, 2012a)
Meat, fat of bovine, sheep, goat	0.01	Median residue (EFSA, 2012a)	0.01	Highest residue (EFSA, 2012a)
Poultry meat, fat, kidney, liver	0.01	Median residue (EFSA, 2012a)	0.01	Highest residue (EFSA, 2012a)
Eggs	0.01	Median residue (EFSA, 2012a)	0.01	Highest residue (EFSA, 2012a)
Milk	0.01	Median residue (EFSA, 2012a)	0.01	Median residue (EFSA, 2012a)
Other commodities of animal origin	0.01	LOQ	Not relevant for acute exposure assessment	

EFSA calculated the chronic and acute exposure according to the internationally agreed methodology using the consumption data included in the EFSA PRIMo rev. 2, and compared the resulting exposure with the ADI and ARfD, derived in the previous opinion on saflufenacil (i.e. ADI of 0.046 mg/kg body weight per day, ARfD of 0.05 mg/kg body weight). In this updated risk assessment no consumer concerns were identified: the long-term (chronic) exposure accounted for a maximum of 3.2 % of the ADI (UK toddler) while the short-term (acute) exposure did not exceed 10 % of the ARfD for any of the commodities for which MRL proposals were derived (maximum for bovine liver: 9.4% of the ARfD). On the basis of this updated dietary exposure assessment for saflufenacil (including metabolites M800H11 and M800H35), EFSA concludes that the CXLs adopted in 2012 do not pose a consumer health concern. Compared with the results of the exposure assessment performed in the previous reasoned opinion (EFSA, 2012a) no significant changes with regard the expected dietary exposure of European consumers are observed. More detailed results of the exposure calculation can be found in Appendix B.

4. Exposure assessment/risk assessment TFA

In its mandate, the European Commission asked EFSA to assess the consumer exposure to the metabolite trifluoroacetic acid from all sources, taking into account the principles for assessment as described in the recent EFSA Scientific Opinion on the Evaluation of the Toxicological Relevance of Pesticides Metabolites for Dietary Risk Assessment (EFSA, 2012b). In this opinion EFSA has elaborated an approach to evaluate the toxicological relevance of metabolites and degradates of pesticide active substances in dietary risk assessment for which limited information on the toxicological properties is available and for which the derivation of toxicological reference values is not possible. As specific toxicological studies for TFA were made available after the mandate was submitted to EFSA which allowed to derive a tentative ADI/ARfD (see section 1), most of the

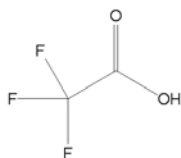
recommendations of this opinion are of no relevance, except some of the recommendations of chapter 8 supported by Appendix D and E, which elaborate how results of metabolism studies can be extrapolated by using conversion factors to perform exposure assessments for metabolites for which no results of supervised field trials are available.

4.1. Background information on TFA

TFA is very soluble in water and has a low octanol/water partition coefficient ($\log P_{ow} = -0.2$ at pH7, 20°C) (BASF, 2011), which indicates that it has a low potential for bioaccumulation. TFA is a strong organic acid with a pKa of 0.23 (BASF, 2011). Thus, under physiological and environmental conditions, TFA is occurring as salts. TFA is highly stable and not easily degraded chemically or by photolysis in the natural environment.

TFA can accumulate in plants via roots uptake of water; it was shown that TFA is transported in the xylem through the stem and accumulated in leaves (Rollins et al., 1989).

The chemical structure of TFA is reported below.



Mol. weight: 114.02

4.2. Identification of possible sources of exposure to TFA

To address the request of the European Commission EFSA structured this section as follows:

- Estimation of TFA concentrations resulting from the use of saflufenacil, taking into account the notified uses on the crops for which MRLs were requested/CXLs were derived (section 4.1.2);
- Identification of other pesticides as possible sources of TFA; estimation of TFA concentrations related to these pesticides in food (section 4.2.1);
- Identification of other sources of TFA exposure (environmental contaminations); estimation of TFA concentrations relevant for dietary exposure from other sources (section 4.2.2);
- Estimation of the overall exposure to TFA resulting from all sources (section 4.2.3).

4.2.1. Estimation of TFA concentrations resulting from the use of saflufenacil

4.2.1.1. Primary crop metabolism

The metabolism of saflufenacil in primary crops (tomatoes and in glyphosate tolerant maize and soybean) was evaluated by the EMS (UK, 2011a) and is described in detail in the previously issued reasoned opinion of EFSA (EFSA, 2012a) as well as in the JMPR evaluation (FAO, 2011). Only the metabolism studies using ^{14}C -uracyl-labelled saflufenacil allow tracing the formation of TFA.

In maize, TFA (M800H29) was the predominant constituent of the methanol extracts of all matrices investigated (30.5% to 88% TRR, in grain it accounted for 0.004 mg/kg). Since the potentially corresponding [^{14}C]phenyl-labelled metabolites as counter parts of M800H29 were not detected at adequate quantities, JMPR explained the occurrence of TFA by the uptake of this metabolite or a respective precursor molecule from the soil (FAO, 2011).

In soya beans after pre-emergence application to the soil surface, TFA was the major compound identified (65.4 %TRR (beans) to 85.2%TRR (forage)). In the metabolism study investigating the desiccation use (7 before harvest), no TFA was identified (FAO, 2011).

In tomatoes TFA was also found being the predominant constituent of the methanol extracts of plant matrices investigated (48.6% TRR (in fruit) to 82.2%TRR (in tomato plant)). The occurrence of TFA was explained by the uptake of this metabolite or of a respective precursor molecule from the soil (FAO, 2011).

On the basis of the submitted metabolism studies EFSA concluded that in addition to the residue definition which comprises saflufenacil, M800H11 and M800H35 also TFA should be considered for consumer risk assessment (EFSA, 2012a).

It is noted that in the evaluation of JMPR, TFA was also identified as a major metabolite in maize, soybean and tomatoes. Its occurrence was explained by the uptake of the compound or a respective precursor molecule from soil. TFA was also one of the major photoproducts formed in aquatic systems and a major metabolite in rotational crop studies (FAO, 2011). However, TFA was not further considered to be included in a residue definition.

In order to estimate the concentrations of TFA relevant for a comprehensive exposure assessment, the results for saflufenacil and TFA obtained in metabolism studies are summarised in Table 4-1. These concentrations are used to calculate conversion factors (last column) which can, in accordance with the recommendations of the Scientific Opinion on the Toxicological Relevance of Pesticide Metabolites for Dietary Risk Assessment (EFSA, 2012b), be used under certain circumstances to estimate the concentration of the metabolite for the exposure assessment of toxicologically relevant metabolites.

Table 4-1: Summary of metabolism studies with ¹⁴C-uracil-labelled saflufenacil regarding the concentration of parent saflufenacil and TFA

Crop group	Crop	Application rate (kg as/ha)	No of applications	DAT	Saflufenacil/TFA ¹⁾ (mg/kg)	Conversion factor saflufenacil to TFA ²⁾
Cereals (pre-emergence, treatment of soil surface after crop sowing)	Corn (forage)	0.2	1	42 DAT	<0.0005/0.006	N/A (>12)
	Corn (forage)			102 DAT	n.d./0.026	N/A (>52)
	Corn (husks)			133 DAT	n.d./0.045	N/A (>90)
	Corn (cob)			133 DAT	n.d./0.01	N/A (>20)
	Corn (grain)			133 DAT	n.d./0.004	N/A (>8)
	Corn (straw)			133 DAT	n.d./0.098	N/A (>196)
Pulses and oilseeds (pre-emergence, treatment of soil surface after crop sowing)	Soya bean (forage)	0.15	1	39 DAT	0.015/0.074	4.9
	Soya bean (bean)			95 DAT	0.002/0.033	16.5
	Soya bean (pod)			95 DAT	n.d./0.351	N/A (>702)
	Soya bean (straw)			95 DAT	0.034/0.187	5.5
Pulses and oilseeds (pre-harvest)	Soya bean (stem)	0.1	1	7 DAT	0.306/n.r.	N/A
	Soya bean			7 DAT	1.420/n.r.	N/A

Crop group	Crop	Application rate (kg as/ha)	No of applications	DAT	Saflufenacil/TFA ¹⁾ (mg/kg)	Conversion factor saflufenacil to TFA ²⁾
desiccant use)	(pod)					
	Soya bean (seed)			7 DAT	0.011/n.r.	N/A
	Soya bean (leaves)			7 DAT	11.423/n.r.	N/A
Fruits and fruiting vegetables (pre-emergence, treatment of soil surface before transplanting if tomato plants	Tomatoes (growth stage 62/63)	0.1	1	68 DAT	0.006/0.025	4.2
	Tomatoes (plants at harvest)			113 DAT	0.012/0.016	1.3
	Tomatoes (fruit)			113 DAT	n.d./0.004	N/A (>8)

n.d. not detected, <0.0005 mg/kg.

n.r. not reported

N/A: not applicable

- 1) The results for TFA are expressed as TFA, considering the molecular weight of TFA.
- 2) The conversion factor is calculated by dividing the concentration of TFA by the concentration of saflufenacil. In case the residue concentration of saflufenacil was below the detection limit (<0.005 or n.d.), an indicative conversion factor (reported in brackets) was calculated assuming a saflufenacil concentration of 0.005 mg/kg.

Considering the wide range of conversion factors, the limited number of crops tested in metabolism studies and low residue concentrations of parent compound in the analysed matrices - in some cases below the detection limit -, the use of conversion factors to estimate the TFA residue concentration is introducing a high uncertainty in the dietary risk assessment. In its previous opinion EFSA proposed to use the conversion factor of 8 for cereals and fruits and fruiting vegetables and 16.5 for pulses and oil seeds. For crops where a desiccation use was reported, no significant TFA residues resulting from the primary crop treatment were expected and therefore no conversion factor was derived (EFSA, 2012a).

Comparing the derived theoretical TFA input values for dietary exposure assessment (Table 4-3 of EFSA, 2012a) with the measured TFA residue concentration in metabolism studies, the approach used seemed to be highly conservative (e.g. TFA concentration in tomato (fruit) in metabolism study is 0.004 mg/kg while the input value for all fruit crops was calculated to be 0.08 mg/kg (0.01 mg/kg * CF (8), which is 20 times higher). In the UK position paper this discrepancy was addressed by re-evaluating the raw data of residue trials for citrus, tree nuts, pome fruits, stone fruits, grapes, banana, mango and sweet corn as regards the residue results for saflufenacil (United Kingdom, 2012). The re-evaluation demonstrated that for the majority of crops the residues were below the limit of detection (LOD) of 0.002 mg/kg. The results reported in the UK position paper are summarised in Table 4-2 below.

Table 4-2: Results of re-evaluated residue trials as regards the residue concentration of saflufenacil

Commodity	Median residue concentration (mg/kg)	Highest residue concentration (mg/kg)
Orange	n.d.	0.009
Lemon	n.d.	n.d.
Grapefruit	n.d.	0.010
Almonds	n.d.	0.003

Commodity	Median residue concentration (mg/kg)	Highest residue concentration (mg/kg)
Pecans	n.d.	n.d.
Apples	n.d.	n.d.
Pears	n.d.	n.d.
Peaches	n.d.	n.d.
Cherries	n.d.	n.d.
Plums	n.d.	0.004
Grapes	n.d.	0.002
Banana	n.d.	n.d.
Mango	n.d.	n.d.
Sweet corn	n.d.	n.d.

n.d. not detected, limit of detection: 0.002 mg/kg

EFSA acknowledges this additional information which confirms that the approach used by EFSA in the previously issued reasoned opinion to estimate the concentrations of TFA was very conservative. Considering that the limit of quantification is by definition the lowest concentration which can be quantified reliably, EFSA is reluctant to follow the proposal of the applicant to use the limit of detection (a concentration level which can be detected with acceptable certainty, but is not quantifiable accurately), in the exposure assessment as the estimate for the residue concentration of saflufenacil. Noting the uncertainties, EFSA proposes to stick to the approach used in the framework of the previous EFSA opinion. However, a sensitivity analysis should be performed which allows to estimate the impact of the conservative approach, using the LOQ of 0.01 mg/kg for the crops mentioned⁵ in Table 4-2 instead of the LOD of 0.002 mg/kg as proposed by the applicant.

4.2.1.2. Rotational crop metabolism

TFA residues may occur in crops that are grown in crop rotation on fields that were previously treated with saflufenacil. The available rotational crop metabolism studies on lettuce, white radish and spring wheat which are described in more detail in the previously issued reasoned opinion (EFSA, 2012a) and in the JMPR evaluation (FAO, 2011) give an indication of the transfer of TFA to the different crop parts.

For wheat grain grown on fields previously treated with saflufenacil at an application rate not exceeding the dose rates reported in the relevant GAPs, the TFA residue concentrations in grain ranged from 0.01 mg/kg to 0.074 mg/kg. JMPR noted that since [¹⁴C] phenyl-labelled metabolites as counter parts have not been detected at corresponding quantities, the occurrence of TFA could be explained by uptake of this metabolite or a respective precursor molecule from the soil (FAO, 2011).

In lettuce heads and other leafy crop parts (white radish tops, wheat forage) the TFA residue concentrations ranged from 0.003 mg/kg to 0.019 mg/kg.

For root crops (radish roots), the TFA concentrations were reported in concentrations between 0.002 mg/kg and 0.007 mg/kg.

In Table 4-3 the results of the metabolism studies in rotational crops are summarised, focussing on the residue concentrations of parent saflufenacil and TFA.

⁵ The data will be extrapolated (e.g. data for orange, lemon and grapefruit can be extrapolated to the whole group of citrus fruit).

Table 4-3: Results of metabolism studies in rotational crops

Crop	Application rate (kg as/ha)	No of applications	PBI	Saflufenacil (mg/kg)	TFA ¹⁾ (mg/kg)
Lettuce heads	0.15	1	30	0.004	0.017
			120	0.001	0.019
			365	n.a.	n.a.
White radish roots	0.15	1	30	0.000	0.007
			120	0.000	0.002
			365	n.a.	n.a.
White radish tops	0.15	1	30	0.002	0.0034
			120	0.001	0.009
			365	0.001	0.018
Wheat forage	0.15	1	30	0.001	0.037
			120	0.000	0.011
			365	0.000	0.003
Wheat straw	0.15	1	30	0.000	0.055
			120	0.000	0.034
			365	0.000	0.060
Wheat chaff	0.15	1	30	0.000	0.322
			120	0.000	0.122
			365	0.000	0.082
Wheat grain	0.15	1	30	0.000	0.074
			120	0.000	0.017
			365	0.000	0.01

n.a. not analysed

1): The results for TFA were re-calculated in consideration of the molecular mass of TFA.

Considering the available data, EFSA tried to derive indicative concentrations of TFA in food (Table 4-3) resulting from the use of saflufenacil. As these data are based on metabolism studies and do not reflect actual GAPs, they are affected by a high level of uncertainty. It is also noted that the study design reflects the worst case conditions and the application rate is slightly higher than in the GAPs notified. Thus, these TFA concentrations are considered to be sufficiently conservative. Taking all these uncertainties, EFSA is of the opinion that the data can be used to estimate the order of magnitude of TFA concentrations resulting in food crops and were therefore considered in the derivation of the input values for the dietary exposure assessment (See Table 4-6).

4.2.1.3. Animal metabolism

Metabolism studies in rats performed to investigate the absorption, distribution, metabolism and excretion of saflufenacil did not give any indications that metabolite M800H29 (TFA) is formed in rats exposed to saflufenacil (JMPR, 2011). Also in livestock metabolism studies with goats and laying hen no TFA was identified (FAO, 2011). Thus, food of animal origin derived from animals exposed to saflufenacil is not expected to be a significant source for exposure to TFA.

No information is available whether and to what extent TFA residues might occur in food of animal origin in significant concentrations if livestock is exposed to TFA via feed. This lack of information is considered to be a source of uncertainty in the exposure assessment.

4.2.2. Estimation of the dietary exposure to TFA resulting from the use of other pesticides

TFA is a plant metabolite which can result from a wide range of pesticides which contain the trifluoromethyl group. Theoretically, all pesticides containing this common moiety have the potential to produce TFA as a degradation product. In order to identify other possible sources for TFA

exposure, EFSA screened the structural formula of pesticides (Compendium of Pesticide Common Names⁶) with view to structural features of the molecule which may lead to the formation of TFA (i.e. trifluoromethyl-group). In total ca. 140 active substances were identified, 39 thereof are currently approved under Regulation (EC) No 1107/2009, for 5 of these substances the peer review is ongoing. In Appendix C the results of the screening for approved/pending and non-approved substances are listed along with further evidence on the formation of TFA relevant for dietary consumer exposure. In particular, the Draft Assessment Reports, EFSA conclusions and EFSA reasoned opinions were examined if TFA was explicitly mentioned in primary or rotational crop metabolism or in livestock metabolism.

Considering the available data, EFSA tried to derive indicative concentrations of TFA in food (Table 4-4) resulting from the use of other pesticides. As these data are based on metabolism studies and do not reflect actual GAPs, they are affected by a high level of uncertainty. However, they can be used to estimate the order of magnitude of TFA concentrations resulting from the use of other pesticides and were therefore considered in the derivation of the input values for the dietary exposure assessment (See Table 4-6).

Table 4-4: Indicative TFA concentrations quantified in primary crop metabolism and rotational crop metabolism studies

Study	Crop	TFA (mg/kg)	Comment
Fluazinam, primary crop metabolism study	Potatoes (tuber)	<0.00025	Insignificant residue concentration, not relevant for dietary exposure assessment.
	Apples	0.0058	To be considered in exposure assessment for apples and grapes (crops where the fluazinam MRLs >LOQ).
Fluazinam, rotational crop metabolism study	Lettuce	0.068	Extrapolation to all leafy crops, fruiting vegetables, cucurbits, brassica vegetables, legume vegetables, stem vegetables.
	Barley grain	0.045	Extrapolation to all cereals
	Carrots	0.014	Extrapolation to all root and tuber vegetables and bulb vegetables
Trifloxystrobin, rotational crop study	White radish roots	0.016	Results affected by uncertainties, but indicative result to be extrapolated to root and tuber vegetables and bulb vegetables
	Wheat	0.016	Indicative result affected by uncertainties; to be extrapolated to all cereals.

4.2.3. Estimation of the dietary exposure to TFA resulting from environmental contaminations or unknown sources

Trifluoroacetates, the salts of TFA, are substances which are found ubiquitous in all environmental compartments (air, precipitation, surface water, plants, soil). So far, no natural sources were identified. Like other trihalogenated acetates trifluoroacetates are persistent. It is assumed that these compounds originate from anthropogenic sources via degradation of organic compounds containing a trifluoromethyl-group such as hydro(chloro)fluorocarbons (HFC/HCFCs). These substances are used as substitutes for chlorofluorocarbons (CFCs), which are known as causing undesirable ozone-damaging effects (Christoph, 2002).

⁶ <http://www.alanwood.net/pesticides/index.html>

In the position paper of the applicant (BASF, 2011) results of TFA analysis in locally purchased food were reported. The samples were analysed with a method having a LOQ of 0.01 mg/kg. The data were generated to estimate the background levels of TFA in food where the treatment history is unknown (random monitoring). The results of these analysis are summarised in Table 4-5. Further details can be found in the position paper of BASF.

Table 4-5: TFA residues in store bought crop commodities

Crop	TFA concentration (mg/kg)	Comment
Orange	0.012 to 0.021	
Apple	all <0.01	in individual samples traces of TFA were present (>LOD 0.001 mg/kg)
Peach	all <0.01	in individual samples traces of TFA were present (>LOD 0.001 mg/kg)
Cherries	all <0.01	in individual samples traces of TFA were present (>LOD 0.001 mg/kg)
Almonds	0.02 to 0.072	
Table grapes	all <0.01	in individual samples traces of TFA were present (>LOD 0.001 mg/kg)
Soya beans	<0.01 to 0.16	

EFSA performed a literature search with a view to identify other sources of information which can be used to estimate the dietary exposure for TFA. The search strategy and the summary findings are reported in Appendix D. The literature search did not reveal additional data on TFA concentrations in food which can be directly used for the dietary exposure assessment. However, the literature search confirmed the ubiquitous occurrence of TFA in the environment which might contribute indirectly to the overall dietary exposure via drinking water or residues of TFA in food crops via soil uptake; in addition, consumers may be exposed through other exposure routes (e.g. inhalative). The reported TFA concentration in air ranged from 10 to 120 µg/m³ (Frank et al, 1995; Klein, 1997). Rain water was found to contain TFA concentrations between 10 and 400 ng/L (mean value 80ng/L) (Klein, 1997, Jordan, 1999, Von Sydow et al, 1996). In German rivers the TFA was found in concentrations between 60 and 630 ng/L, while in lake water from Germany, Ireland, Israel and South Africa TFA concentrations ranged from <10 to 200 ng/L (Jordan, 1999). In spruce needles the TFA concentrations differed widely (between 7 and 1925 µg/kg), the highest concentrations were found in sites close to industrial locations (Christoph, 2002).

The literature search provided evidence of TFA exposure resulting from the use of halothane or other structurally comparable anaesthetics (e.g. isoflurane, desflurane, sevoflurane) which are metabolised in humans to TFA. However, this type of exposure is beyond the mandate and was therefore not further evaluated.

4.3. Overall expected dietary consumer exposure to TFA, resulting from all sources of exposure

In the current mandate, European Commission asked EFSA to assess the consumer exposure to the metabolite trifluoroacetic acid (TFA) resulting from all sources. Thus, the long-term and short-term exposure is calculated taking into account the following information:

- TFA residues in primary crops resulting from the use of saflufenacil: Since no supervised residue trials are available quantifying the actual TFA residues in treated crops, EFSA used the results of metabolism studies to estimate the TFA concentrations that might be present on crops treated with saflufenacil. The TFA concentration is derived by using a CF (see Section

4.2.1.1). Since there is some evidence that in particular for fruit crops this approach is very conservative, EFSA performed a sensitivity analysis where the input values derived for fruit crops are replaced by a less conservative estimate (only for long-term exposure assessment);

- TFA residues in rotational crops grown on fields previously treated with saflufenacil (see Section 4.2.1.2);
- TFA residues resulting from other pesticides that are metabolised to TFA and where measurable TFA concentrations are expected in primary or rotational crops (see Section 4.2.2). The results of metabolism studies in rotational crops were extrapolated to similar crops that can be grown in crop rotation.
- TFA residues resulting in food from environmental contaminations (see Section 4.2.3).

In the exposure assessment EFSA did not take into account other sources of exposure (e.g. inhalation or exposure through pharmacological treatment like anaesthetics which are metabolised to TFA) and the exposure through drinking water which is not included in the agreed European model for exposure assessment (EFSA PRIMo). Dietary exposure through drinking water is expected to be insignificant⁷.

It is noted that TFA is registered under the REACH Regulation⁸ in a tonnage band of 1000 to 10.000 tons per annum. Occupational or environmental exposures associated to these uses or those of other substances producing TFA as metabolite or degradation product are not covered in this opinion.

Since the input values derived for the comprehensive exposure assessment are subject to a high level of uncertainties, the results of the exposure assessment are less accurate compared with standard exposure assessments.

In Table 4-6 the selected input values used for the dietary exposure calculation are outlined. Since EFSA selected very conservative estimates, the same input values can be used for chronic and acute exposure assessment. The consumer risk assessment was performed with revision 2 of the EFSA Pesticide Residues Intake Model (PRIMo) (EFSA, 2007). It was noted that the TFA exposure calculation is affected by a high level of uncertainties and therefore the results should be considered as indicative, but they should allow estimating the order of magnitude of exposure.

Table 4-6: Input values for the comprehensive dietary exposure assessment for trifluoroacetic acid.

⁷ Consumption of 2 L of water containing 630 ng/L (highest concentration reported for European surface water) by an adult of 60 kg body weight corresponds to 0.04 % of the ADI derived for TFA.

⁸ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. OJ L 396 of 30.12.2006, p. 1-848.

Commodity	Chronic exposure assessment		Acute exposure assessment	
	Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Risk assessment residue definition: Trifluoroacetic acid (TFA)				
Citrus fruit	0.081)	Median residue (saflufenacil) * CF (8), extrapolation of data from oranges, lemons, grapefruit to all citrus (See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8), extrapolation of data from oranges, lemons, grapefruit to all citrus (See table 4-3 of EFSA, 2012a)
Pome fruit	0.081)	Median residue (saflufenacil) * CF (8), extrapolation of data from apples and pears to all pome fruit (See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8), extrapolation of data from apples and pears to all pome fruit (See table 4-3 of EFSA, 2012a)
Tree nuts	0.081)	Median residue (saflufenacil) * CF (8), extrapolation of data from almonds and pecan to all tree nuts(See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8), extrapolation of data from almonds and pecan to all tree nuts(See table 4-3 of EFSA, 2012a)
Stone fruit	0.081)	Median residue (saflufenacil) * CF (8), extrapolation of data from cherries, peaches and plums to all stone fruit(See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8), extrapolation of data from cherries, peaches and plums to all stone fruit(See table 4-3 of EFSA, 2012a)
Grapes	0.081)	Median residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)
Banana	0.081)	Median residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)
Mango	0.081)	Median residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)	0.08	Max. residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)
Root and tuber vegetables	0.016	TFA concentration found in rotational crop metabolism study with trifloxystrobin in white radish. See Table 4-4.	0.016	TFA concentration found in rotational crop metabolism study with trifloxystrobin in white radish. See Table 4-4.
Bulb vegetables	0.016		0.016	

Commodity	Chronic exposure assessment		Acute exposure assessment	
	Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Fruiting vegetables	0.068	TFA concentration found in rotational crop metabolism study with fluazinam in lettuce. See Table 4-4.	0.068	TFA concentration found in rotational crop metabolism study with fluazinam in lettuce. See Table 4-4.
Brassica vegetables	0.068		0.068	
Leafy vegetables	0.068		0.068	
Legume vegetable	0.165	Median residue (saflufenacil) * CF (16.5) (See table 4-3 of EFSA, 2012a)	0.165	Max. residue (saflufenacil) * CF (16.5) (See table 4-3 of EFSA, 2012a)
Stem vegetables	0.068	TFA concentration found in rotational crop metabolism study with fluazinam in lettuce. See Table 4-4.	0.068	TFA concentration found in rotational crop metabolism study with fluazinam in lettuce. See Table 4-4.
Pulses	0.165	Median residue (saflufenacil) * CF (16.5) (See table 4-3 of EFSA, 2012a).	0.165	Median residue (saflufenacil) * CF (16.5) (See table 4-3 of EFSA, 2012a)
Soya beans	0.165		0.165	
Other oilseeds	0.068	Median residue (saflufenacil) * CF (16.5) (See table 4-3 of EFSA, 2012a)	0.068	Median residue (saflufenacil) * CF (16.5) (See table 4-3 of EFSA, 2012a)
Cereals	0.08	Median residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)	0.08	Median residue (saflufenacil) * CF (8) (See table 4-3 of EFSA, 2012a)
Coffee	0.08		0.08	
Other crops	0.01	Potential contribution of background TFA levels at the LOQ; see Table 4-5.	0.01	Potential contribution of background TFA levels at the LOQ; see Table 4-5.
Food of animal origin	0	No contribution to TFA exposure via food of animal origin expected.	0	No contribution to TFA exposure via food of animal origin expected.

(1): A sensitivity analysis is performed to assess the impact of the conservative input values (LOQ for saflufenacil (0.01 mg/kg)

(*): CF (8) = 0.08 mg/kg) compared with the less conservative approach proposed by the applicant (LOD for saflufenacil (0.002 mg/kg) * CF (8) = 0.016 mg/kg); further explanations see section 4.2.1.1.

4.4. Results of consumer dietary risk assessment for TFA

The estimated TFA exposure was compared with the proposed toxicological reference value derived for TFA (see Table 1-1). The results of the intake calculation are presented in Appendix E to this reasoned opinion. The overall uncertainties of the calculation should be borne in mind when deriving conclusions from the exposure assessment.

No long-term consumer intake concerns were identified for any of the European diets incorporated in the EFSA PRIMo. The total calculated intake accounted for up to 5 % of the ADI. The major contributors in this calculation were apples (up to 1.9% of the ADI), wheat (up to 1.4% of the ADI) and oranges and wine grapes (both 0.6% of the ADI, respectively). The sensitivity analysis demonstrated that the conservative approach used for fruit crops has an impact on the outcome of the exposure assessment; thus, replacing the input values for these fruit crops with a less conservative input value as proposed by the applicant the overall long-term exposure accounted for maximum of 3.9% of the ADI.

No acute consumer risk was identified in relation to the estimated TFA concentrations in food. The calculated maximum exposure in percentage of the ARfD was 24.6 % for potatoes, followed by oranges (21.2% of the ARfD) and apples (15.7% of the ARfD).

To verify the results of the dietary exposure assessment it would be desirable to generate more experimental data on the actual residue concentrations for TFA in food. For this purpose the setting up of a monitoring programme could be considered. An additional argument for a more specific monitoring is the fact that in future a further increase of TFA concentrations in environmental is expected as a result of the increased use of HCFC/HFCs which may lead to increased consumer exposure.

On the basis of the information available to EFSA and the current scientific knowledge, EFSA concludes that for the intended use of saflufenacil on the crops for which MRLs were requested in the framework of the MRL application (EFSA-Q-2011-00208), including the CXLs established by Codex Alimentarius Commission in 2012, the TFA exposure via the diet will not result in a consumer exposure exceeding the toxicological reference values derived for this metabolite and therefore is unlikely to pose a public health concern. In this assessment also the use of other pesticides which are known to lead to the formation of TFA has been included as far as the data were available to EFSA

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The toxicological profile of the active substance saflufenacil was assessed in the previously issued reasoned opinion of EFSA. The data were sufficient to derive an ADI of 0.046 mg/kg bw per day and an ARfD of 0.05 mg/kg bw. For the metabolite TFA, on the basis of toxicological studies that were made available for this assessment, EFSA concluded that it is possible to derive a tentative ADI of 0.05 mg/kg bw per day and a tentative ARfD at the same level (0.05 mg/kg bw).

EFSA was asked to address concerns to what extent TFA may exert local irritative effects in the gastro-intestinal tract, considering that the free acid (trifluoroacetic acid) is classified and labelled as corrosive. Considering the pH levels in food and the low concentrations TFA will not occur as free acid but in form of its salt. Thus, the irritative effects observed with the free acid are of low relevance in the framework of this assessment.

The European Commission asked EFSA to assess the toxicokinetics of TFA following oral administration, since according to the Danish position paper this information is indispensable if the TTC approach should be applied. EFSA concludes that lacking these studies, no final conclusions can be derived. However, the Danish concern is considered to be sufficiently addressed as it is not necessary to base the risk assessment for TFA on the TTC approach but on specific toxicological reference values derived for TFA.

EFSA was also requested to update the consumer risk assessment of the previously issued opinion on saflufenacil, taking into account the MRLs established by Codex Alimentarius Commission (CXLs) in July 2012 and additional information provided in the position papers of the United Kingdom and Denmark. Considering the argumentation presented in the position paper of the United Kingdom, EFSA revised its previous opinion and derived MRL proposals for coffee and potatoes (0.03 mg/kg, respectively). However, EFSA noted that considering the short PHI specified in the GAP for coffee

the EU data requirements regarding metabolism studies are not fully addressed. To clarify the situation, the applicant should provide further explanations if the short PHI is relevant in practice. Also for potatoes, further metabolism studies would be desirable to confirm the assumption that after desiccation use of saflufenacil the metabolic profile in roots is comparable to the one found in soya beans.

EFSA updated the chronic and acute exposure assessment for saflufenacil, including the CXLs adopted in 2012 and the MRL proposals for coffee and potatoes. No consumer concerns were identified: the long-term (chronic) exposure accounted for a maximum of 3.2 % of the ADI (UK toddler) while the short-term (acute) exposure did not exceed 10 % of the ARfD for any of the commodities for which MRL proposals were derived (maximum for bovine liver: 9.4% of the ARfD). On the basis of this updated dietary exposure assessment for saflufenacil (including metabolite M800H11 and M800H35), EFSA concludes that the MRLs derived by EFSA, including the CXLs adopted in 2012 in the EU legislation do not pose a consumer health concern.

For TFA a comprehensive dietary consumer exposure assessment was performed as requested by the European Commission taking into account all sources. Thus, for the calculation of the long-term and short-term exposure the following sources of exposure were considered:

TFA residues in primary crops resulting from the use of saflufenacil;

TFA residues in rotational crops grown on fields previously treated with saflufenacil;

TFA residues resulting from other pesticides that are metabolised to TFA and where measurable TFA concentrations are expected in primary or rotational crops;

TFA residues in food resulting from environmental contaminations (see Section 4.2.3).

To derive the input values for the exposure assessments, a conservative approach was applied using highest TFA concentrations described in relevant studies identified in dossiers of saflufenacil or other pesticides or in the public domain. Since the input values derived for the comprehensive exposure assessment are subject to a high level of uncertainty, the results of the exposure assessment are less accurate compared with standard exposure assessments. For the interpretation of the results these uncertainties should be born in mind, meaning that they give an indicative estimation of the order of magnitude of the exposure. The total calculated intake accounted for up to 5 % of the ADI. The major contributors in this calculation were apples (up to 1.9% of the ADI), wheat (up to 1.4% of the ADI) and oranges and wine grapes (both 0.6% of the ADI, respectively).

No acute consumer risk was identified in relation to the estimated TFA concentrations in food. The calculated maximum exposure in percentage of the ARfD was 24.6 % for potatoes, followed by oranges (21.2% of the ARfD) and apples (15.7% of the ARfD).

To verify the results of the dietary exposure assessment it would be desirable to generate more experimental data in the framework of a monitoring programme on TFA in food.

On the basis of the information available to EFSA and the current scientific knowledge, EFSA concludes that for the intended use of saflufenacil on the crops for which MRLs were requested in the framework of the MRL application (EFSA-Q-2011-00208), including the CXLs established by Codex Alimentarius Commission, the TFA exposure via the diet will not result in a consumer exposure exceeding the toxicological reference values derived for this metabolite and therefore is unlikely to pose a public health concern.

Recommendations

Code number ^a	Commodity	Existing EU MRL (mg/kg)	Proposed EU MRL (mg/kg)	Justification for the proposal
The proposed import tolerances and CXLs reported below are sufficiently supported by data and no consumer intake concerns were identified with regard to the residue definition for risk assessment. Regarding the metabolite TFA a separate risk assessment was performed which did not raise intake concerns.				
Enforcement residue definition for commodities of plant origin: the sum of saflufenacil, M800H11 and M800H35, expressed as saflufenacil				
0110000	Citrus fruit	0.01* (default MRL)	0.03*	Import tolerance for grapefruit, oranges, lemons assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of citrus
0120000	Tree nuts		0.03*	Import tolerance for almonds and pecans assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of tree nuts
0130000	Pome fruit		0.03*	Import tolerance for apples and pears assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of pome fruit
0140000	Stone fruit		0.03*	Import tolerance for cherries, peaches and plums assessed in EFSA Journal 2012;10(2):2596, CXL ^b for whole group of stone fruit
0151000	Table and wine grapes		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0163020	Banana		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0163030	Mangoes		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0211000	Potatoes		0.03*	Import tolerance re-evaluated in this reasoned opinion
0234000	Sweet corn		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0260000	Legume vegetables (fresh)		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0300010	Dry beans		0.5	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0300030	Dr peas		0.1	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0401070	Soya bean		0.1	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0401050	Sunflower seed		1.0	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0401060	Rape seed		0.6	CXL established in 2012
0401090	Cotton seed		0.3	Import tolerance assessed in EFSA Journal 2012;10(2):2596

Code number ^a	Commodity	Existing EU MRL (mg/kg)	Proposed EU MRL (mg/kg)	Justification for the proposal
0500000 (except 0500020)	Cereals (except buckwheat)		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0900020	Sugarcane		0.03*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
0620000	Coffee beans		0.03*	Import tolerance re-evaluated in this reasoned opinion; further explanations should be provided concerning the PHI relevant in practice to confirm that the metabolism studies are representative for the use.
Enforcement residue definition for commodities of animal origin: saflufenacil				
1011010 1011020	Swine meat Swine fat	0.01* (default MRL)	0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1011030 1011040	Swine liver Swine kidney		0.3	For liver the import tolerance was derived in EFSA Journal 2012;10(2):2596, for kidney the CXL should be taken over.
1012010 1013010 1014010	Bovine meat Sheep meat Goat meat		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1012020 1013020 1014010	Bovine fat Sheep fat Goat fat		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1012030 1013030 1014030	Bovine liver Sheep liver Goat liver		0.6	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1012040 1013040 1014040	Bovine kidney Sheep kidney Goat kidney		0.3	CXL derived in 2012.
1016000	Poultry meat, fat, liver, kidney, edible offal		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1020000	Milk		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596
1030000	Eggs		0.01*	Import tolerance assessed in EFSA Journal 2012;10(2):2596

(*): Indicates that the MRL is set at the limit of analytical quantification.

(a): According to Annex I of Regulation (EC) No 396/2005.

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APPENDICES

Appendix A. Good Agricultural Practices (GAPs) for potatoes and coffee

Crop and / or situation (a)	Member State or Country	F G or I (b)	Pest or group of pests controlled I	Formulation		Application			Application rate per treatment			PHI (days) (k)	Remarks: Maximum applied amount (kg a.s./ha) (l)
				Type (d – f)	Conc. Of a.s. (i)	method, kind (f – h)	growth stage (j)	number (range)	kg a.s./hl	water l/ha	kg a.s./ha		
Potatoes	BR	F	Broadleaf weeds	WG	70	SP	Desiccation	1		200 – 300	0.050 – 0.100	7	Max. 0.10
Coffee	BR	F	Broadleaf weeds	WG	70	SP	Postemergence	3		100 – 150	0.025 – 0.050	7	Max. 0.150
	Costa Rica, Ecuador	F	Broadleaf weeds	WG	70	SP	postemergence	4			0.100	0 or 1	Max. 0.400

- 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)
 - I e.g. biting and suckling 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)

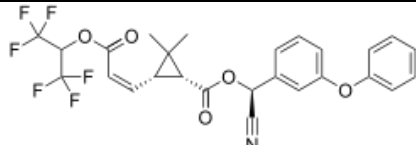
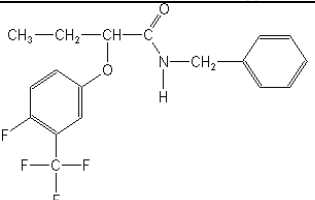
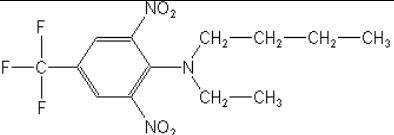
Appendix B. Pesticide Residue Intake Model (PRIMO) – SAFLUFENACIL

updated risk assessment including CXLs adopted in 2012, potatoes and coffee

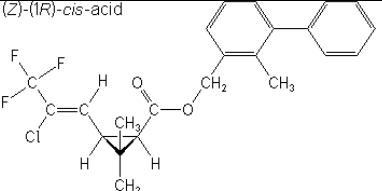
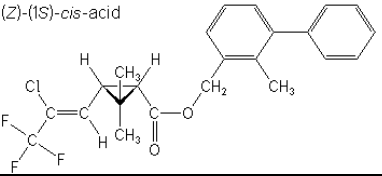
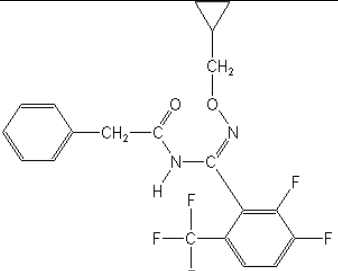
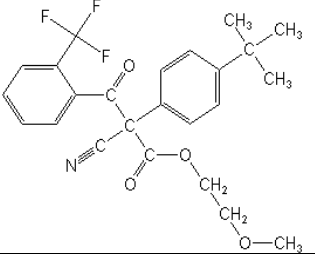
				Saflufenacil								Prepare workbook for refined calculations	
				Status of the active substance: Not included		Code no.							
				LOQ (mg/kg bw): 0,03		proposed LOQ:							
				Toxicological end points									
				ADI (mg/kg bw/day): 0,046		ARID (mg/kg bw): 0,05						Undo refined calculations	
				Source of ADI: UK, EFSA		Source of ARID: UK, EFSA							
				Year of evaluation: 2011		Year of evaluation: 2011							
Chronic risk assessment - refined calculations													
				TMDI (range) in % of ADI minimum - maximum									
				1 3									
				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	pTMDRs at LOQ (in % of ADI)			
	3,2	UK Toddler		1,5	Sugar beet (root)	0,4	Milk and cream,	0,3	Wheat	3,1			
	3,1	WHO Cluster diet B		0,6	Wheat	0,4	Sunflower seed	0,3	Solanacea	2,6			
	3,0	NL child		0,6	Milk and cream,	0,4	Apples	0,4	Potatoes	2,9			
	2,8	DE child		0,8	Apples	0,3	Milk and cream,	0,3	Wheat	2,7			
	2,8	UK Infant		0,8	Milk and cream,	0,7	Sugar beet (root)	0,2	Potatoes	2,7			
	2,6	FR toddler		0,9	Milk and cream,	0,3	Potatoes	0,2	Other root and tuber vegetables	2,5			
	2,5	WHO cluster diet E		0,8	Rape seed	0,3	Wheat	0,3	Potatoes	1,6			
	2,5	IE adult		0,2	Sheep: Liver	0,2	Tropical root and tuber vegetables	0,1	Maize	2,2			
	1,9	DK child		0,4	Wheat	0,3	Rye	0,3	Milk and cream,	1,8			
	1,8	WHO cluster diet D		0,4	Wheat	0,3	Potatoes	0,2	Sunflower seed	1,5			
	1,8	WHO Cluster diet F		0,4	Rape seed	0,2	Wheat	0,2	Potatoes	1,3			
	1,7	FR infant		0,6	Milk and cream,	0,3	Potatoes	0,2	Other root and tuber vegetables	1,7			
	1,6	ES child		0,3	Wheat	0,3	Milk and cream,	0,1	Oranges	1,5			
	1,6	SE general population 90th percentile		0,3	Potatoes	0,3	Milk and cream,	0,2	Wheat	1,6			
	1,6	WHO regional European diet		0,3	Potatoes	0,2	Wheat	0,2	Rape seed	1,3			
	1,5	PT General population		0,3	Potatoes	0,3	Wheat	0,2	Wine grapes	1,3			
	1,2	NL general		0,2	Potatoes	0,1	Milk and cream,	0,1	Wheat	1,1			
	1,2	FR all population		0,3	Wine grapes	0,2	Wheat	0,2	Sunflower seed	1,0			
	1,1	IT kids/toddler		0,4	Wheat	0,1	Solanacea	0,1	Other cereal	1,1			
	1,0	ES adult		0,2	Wheat	0,1	Milk and cream,	0,1	Oranges	1,0			
	1,0	UK vegetarian		0,2	Sugar beet (root)	0,1	Wheat	0,1	Potatoes	1,0			
	0,9	UK Adult		0,3	Sugar beet (root)	0,1	Wheat	0,1	Potatoes	0,9			
	0,8	DK adult		0,1	Wheat	0,1	Milk and cream,	0,1	Potatoes	0,8			
	0,8	LT adult		0,2	Potatoes	0,1	Apples	0,1	Milk and cream,	0,8			
	0,8	IT adult		0,3	Wheat	0,1	Solanacea	0,1	Leaf vegetables & fresh herbs	0,8			
	0,6	PL general population		0,2	Potatoes	0,1	Apples	0,1	Solanacea	0,6			
	0,6	FI adult		0,1	Milk and cream,	0,1	Potatoes	0,1	Wheat	0,6			
Conclusion:													
The estimated Theoretical Maximum Daily Intakes (TMDI), based on pTMDRs were below the ADI.													
A long-term intake of residues of Saflufenacil is unlikely to present a public health concern.													

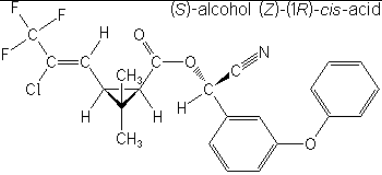
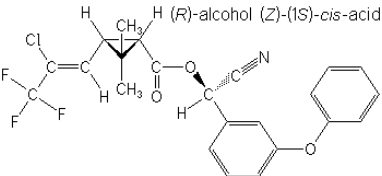
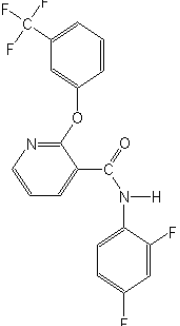
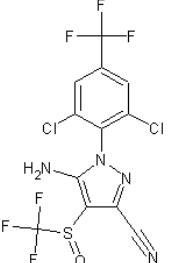
Acute risk assessment /children - refined calculations							Acute risk assessment / adults / general population - refined calculations						
The acute risk assessment is based on the ARfD. For each commodity the calculation is based on the highest reported MS consumption per kg bw and the corresponding unit weight from the MS with the critical consumption. If no data on the unit weight was available from that MS an average European unit weight was used for the IESTI calculation. In the IESTI 1 calculation, the variability factors were 10, 7 or 5 (according to JMPR manual 2002), for lettuce a variability factor of 5 was used. In the IESTI 2 calculations, the variability factors of 10 and 7 were replaced by 5. For lettuce the calculation was performed with a variability factor of 3. Threshold MRL is the calculated residue level which would leads to an exposure equivalent to 100 % of the ARfD.													
Unprocessed commodities	No of commodities for which ARfD/ADI is exceeded (IESTI 1):			No of commodities for which ARfD/ADI is exceeded (IESTI 2):			No of commodities for which ARfD/ADI is exceeded (IESTI 1):			No of commodities for which ARfD/ADI is exceeded (IESTI 2):			
	---			---			---			---			
	IESTI 1 *) **)			IESTI 2 *) **)			IESTI 1 *) **)			IESTI 2 *) **)			
	pTMRL/ threshold MRL			pTMRL/ threshold MRL			pTMRL/ threshold MRL			pTMRL/ threshold MRL			
	Highest % of ARfD/ADI	Commodities	(mg/kg)	Highest % of ARfD/ADI	Commodities	(mg/kg)	Highest % of ARfD/ADI	Commodities	(mg/kg)	Highest % of ARfD/ADI	Commodities	(mg/kg)	
	9.4	Bovine: Liver	0.58 / -	9.4	Bovine: Liver	0.58 / -	3.1	Bovine: Liver	0.58 / -	3.1	Bovine: Liver	0.58 / -	
	9.2	Potatoes	0.03 / -	6.6	Potatoes	0.03 / -	1.9	Table grapes	0.03 / -	1.9	Table grapes	0.03 / -	
	8.0	Oranges	0.03 / -	5.8	Oranges	0.03 / -	1.8	Potatoes	0.03 / -	1.4	Wine grapes	0.03 / -	
	5.9	Apples	0.03 / -	5.4	Grapefruit	0.03 / -	1.5	Oranges	0.03 / -	1.4	Potatoes	0.03 / -	
	5.5	Pears	0.03 / -	4.3	Apples	0.03 / -	1.4	Wine grapes	0.03 / -	1.2	Oranges	0.03 / -	
	5.4	Grapefruit	0.03 / -	3.9	Pears	0.03 / -	1.3	Apples	0.03 / -	1.2	Mangoes	0.02 / -	
	5.0	Bananas	0.03 / -	3.9	Table grapes	0.03 / -	1.3	Sweet corn	0.03 / -	1.1	Apples	0.03 / -	
	4.4	Sweet corn	0.03 / -	3.6	Bananas	0.03 / -	1.3	Pears	0.03 / -	1.0	Pears	0.03 / -	
	3.9	Table grapes	0.03 / -	3.1	Sweet corn	0.03 / -	1.2	Grapefruit	0.03 / -	0.9	Sweet corn	0.03 / -	
	3.6	Peaches	0.03 / -	2.6	Peaches	0.03 / -	1.2	Mangoes	0.02 / -	0.9	Grapefruit	0.03 / -	
	3.3	Mandarins	0.03 / -	2.5	Mandarins	0.03 / -	1.0	Peaches	0.03 / -	0.8	Peaches	0.03 / -	
	3.1	Mangoes	0.02 / -	2.5	Milk and milk	0.01 / -	0.8	Bananas	0.03 / -	0.8	Sheep: Liver	0.58 / -	
	2.5	Milk and milk	0.01 / -	2.2	Mangoes	0.02 / -	0.8	Mandarins	0.03 / -	0.6	Bananas	0.03 / -	
	2.1	Lemons	0.03 / -	1.6	Plums	0.03 / -	0.8	Sheep: Liver	0.58 / -	0.6	Mandarins	0.03 / -	
	2.0	Plums	0.03 / -	1.5	Lemons	0.03 / -	0.6	Plums	0.03 / -	0.5	Wheat	0.03 / -	
	1.9	Apricots	0.03 / -	1.5	Apricots	0.03 / -	0.5	Quinces	0.03 / -	0.5	Plums	0.03 / -	
	1.3	Rape seed	0.6 / -	1.3	Rape seed	0.6 / -	0.5	Wheat	0.03 / -	0.5	Rice	0.03 / -	
	1.2	Limes	0.03 / -	1.1	Beans	0.03 / -	0.5	Apricots	0.03 / -	0.4	Barley	0.03 / -	
	1.1	Beans	0.03 / -	0.9	Wheat	0.03 / -	0.5	Rice	0.03 / -	0.4	Apricots	0.03 / -	
	0.9	Quinces	0.03 / -	0.9	Limes	0.03 / -	0.4	Barley	0.03 / -	0.4	Quinces	0.03 / -	
	0.9	Wheat	0.03 / -	0.8	Rice	0.03 / -	0.4	Lemons	0.03 / -	0.4	Beans	0.03 / -	
	0.8	Rice	0.03 / -	0.7	Cherries	0.03 / -	0.4	Limes	0.03 / -	0.3	Milk and milk products: Cattle	0.01 / -	
	0.7	Cherries	0.03 / -	0.7	Quinces	0.03 / -	0.4	Beans	0.03 / -	0.3	Swine: Liver	0.25 / -	
No of critical MRLs (IESTI 1)			---			No of critical MRLs (IESTI 2)			---				
Processed commodities	No of commodities for which ARfD/ADI is exceeded:			---			No of commodities for which ARfD/ADI is exceeded:			---			
	***)			---			***)			---			
	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	
*) The results of the IESTI calculations are reported for at least 5 commodities. If the ARfD is exceeded for more than 5 commodities, all IESTI values > 90% of ARfD are reported.													
**) pTMRL: provisional temporary MRL													
***) pTMRL: provisional temporary MRL for unprocessed commodity													
Conclusion:													
For Saflufenacil IESTI 1 and IESTI 2 were calculated for food commodities for which pTMRLs were submitted and for which consumption data are available.													
No exceedance of the ARfD/ADI was identified for any unprocessed commodity.													
For processed commodities, no exceedance of the ARfD/ADI was identified.													

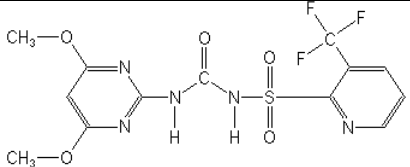
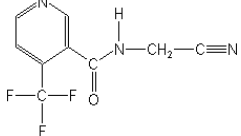
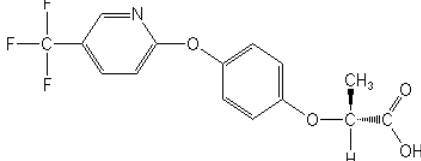
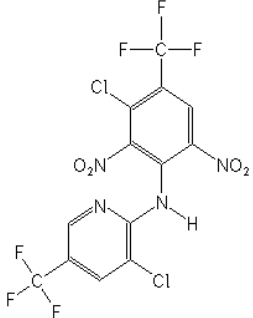
Appendix C. Screening of approved and pending active substances: evidence of the formation of TFA in metabolism studies

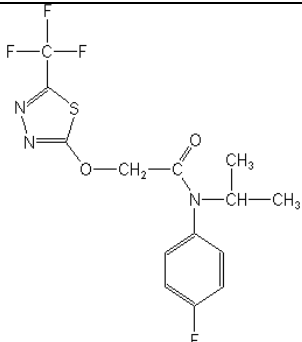
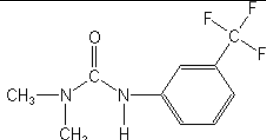
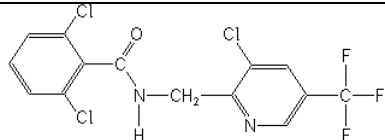
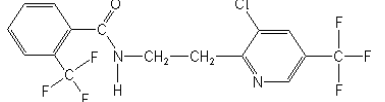
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Approved active substances containing the R-CF₃- group					
Acrinathrin	AC		EFSA conclusion	no	
Beflubutamid	HB		EFSA RO under Art. 12 of Reg. 396/2005, DAR	no	
Benfluralin	HB		EFSA conclusion, EFSA RO under Art. 12 of Reg. 396/2005, BASF, 2011	yes, rotational crop metabolism	TFA was the major metabolite in rotational crop studies in all tested commodities (28 – 77% of TRR; 0.006 to 0.137 ppm ⁹). (BASF, 2011). Since TFA was not described in the DAR or in the EFSA conclusion or in Art. 12 review, no detailed results are available for the different crops/crop parts tested. The derivation of residue concentrations to be used for a quantitative exposure assessment is not possible.

⁹ Lacking further details it is not clear if the concentrations refer to benfluralin equivalents or concentrations expressed as TFA.

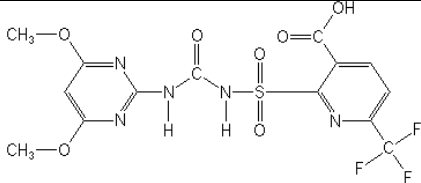
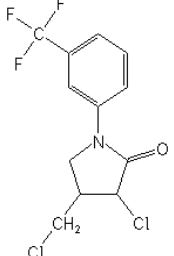
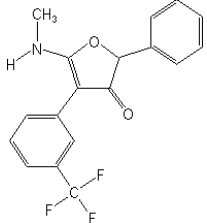
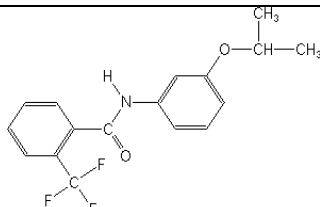
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Bifenthrin	IN, AC	(Z)-(1R)-<i>cis</i>-acid  (Z)-(1S)-<i>cis</i>-acid 	EFSA conclusion	no	
Cyflufenamid	FU		EFSA conclusion	no	
Cyflumetofen	AC		EFSA conclusion	no	Default MRL 0.01 mg/kg, no use of food or feed (only ornamentals)

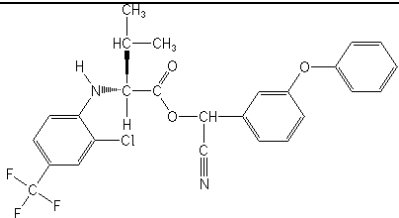
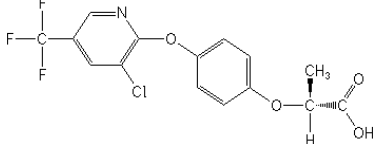
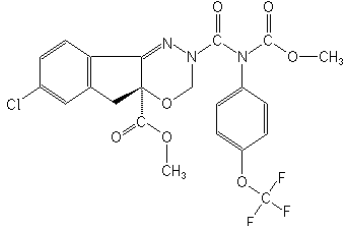
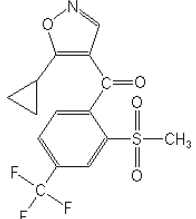
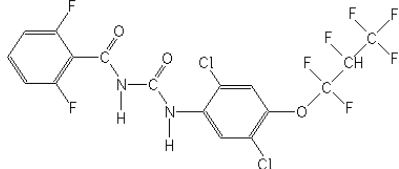
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Cyhalothrin, Lambda-	IN	(S)-alcohol (Z)-(1R)-cis-acid  (R)-alcohol (Z)-(1S)-cis-acid 	DAR	no	
Diflufenican	HB		EFSA conclusion	no	
Fipronil	IN		EFSA conclusion, EFSA RO under Art. 12 of Reg. 396/2005	no	

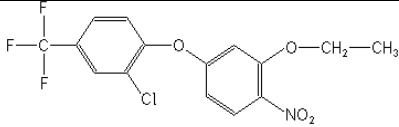
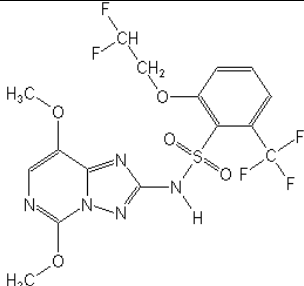
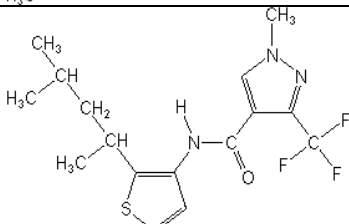
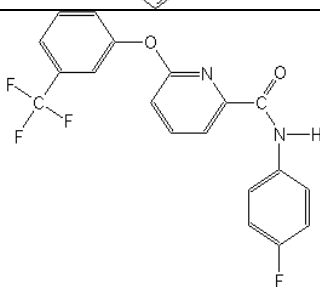
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Flazasulfuron	HB		EFSA RO under Art. 12 of Reg. 396/2005	no	
Flonicamid	IN		EFSA conclusion	no	
Fluazifop-P	HB		EFSA conclusion	no	
Fluazinam	FU		EFSA conclusion, DAR	yes primary crop metabolism study rotational crop metabolism study	TFA was found in primary and rotational crop studies, but not in rat metabolism. It was classified as a toxicologically relevant compound. Primary crop studies: potatoes (tuber): <0.001 mg eq./kg, (0.9% TRR), corresponding to <0.00025 mg TFA/kg; peanut (foliage): 0.87 mg eq./kg, (3.4%TRR), corresponding to 0.22 mg TFA/kg; apples: 0.023 mg eq/kg, (1.23% TRR), corresponding to 0.0058 mg TFA/kg. Rotational crop studies (dose rate tested: total annual rate of fluazinam applied on bare soil) Lettuce: maximum 0.27 mg eq./kg, corresponding to 0.068 mg TFA/ha; Barley grain: maximum: 0.18 mg eq/kg (amount was increasing with the plant interval), corresponding to 0.045 mg TFA/kg; Carrot roots: maximum 0.057 mg eq/kg, corresponding to 0.014 mg TFA/kg.

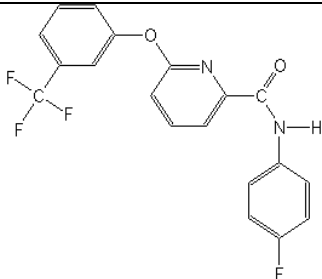
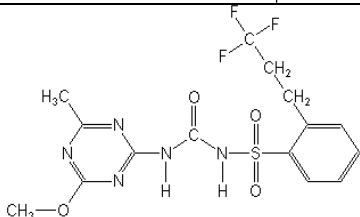
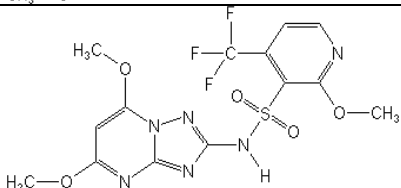
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Flufenacet	HB		EFSA RO under Art. 12 of Reg. 396/2005	no	
Fluometuron	HB		EFSA conclusion, DAR	yes, primary crop metabolism study	TFAA was observed in primary crop metabolism study in cotton, the only crop where the active substance is intended to be used. Studies were conducted with 2.5N the dose intended under the cGAP. cotton (immature stalks): 18% of the TRR (0.23 ppm); cotton (mature stalks): 31% (0.084 ppm) cotton (seed): 21.5% TRR (0.0155 ppm ¹⁰). TFA was proposed for a risk assessment residue definition for pulses and oilseeds. EFSA concluded that for other crops TFA might be included in the RD depending on the assessment of the toxicological properties of TFA. A data gap was identified in the toxicology section to address the toxicological properties of the plant metabolite trifluoroacetic acid (TFA).
Fluopicolide	FU		EFSA conclusion	no	
Fluopyram	FU		EFSA conclusion	no	

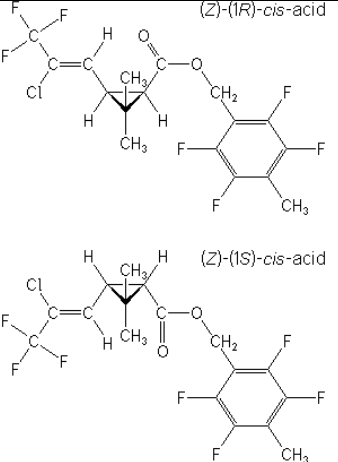
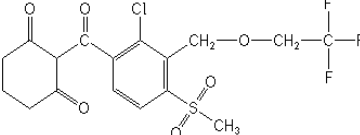
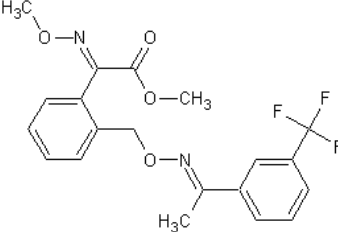
¹⁰ Lacking further details it is not clear if the concentrations refer to benfluralin equivalents or concentrations expressed as TFA.

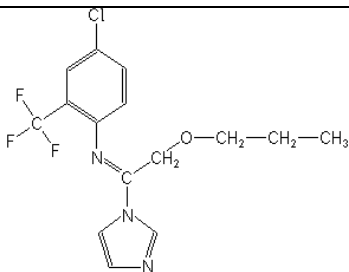
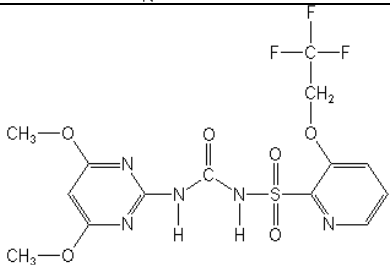
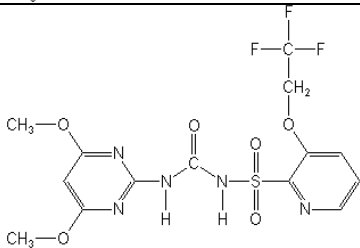
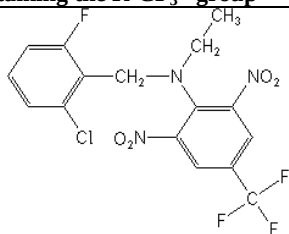
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Flupyr-sulfuron-methyl	HB		EFSA RO under Art. 12 of Regulation 396/2005	no	
Flurochloridone	HB		EFSA conclusion	no	
Flurtamone	HB		EFSA RO under Art. 12 of Reg. 396/2005	yes, rotational crop studies	Rotational crop studies: The soil metabolite trifluoroacetic acid was the main component of the TRR. wheat (grain): 79.9 % of the TRR (0.061 mg eq./kg; corresponding to 0.021 mg TFA/kg) wheat (straw): 33.8 % of the TRR (0.069 mg eq./kg; corresponding 0.024 mg TFA/kg). The studies were performed with a dose rate slightly higher than the intended use rate (1.3N) and represent a worst case in terms of expected residues due to the bare soil application. Under practical conditions, residues of the metabolite are not expected to exceed 0.01 mg/kg in rotational crops.
Flutolanil	FU		EFSA conclusion	no	

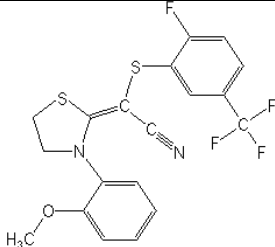
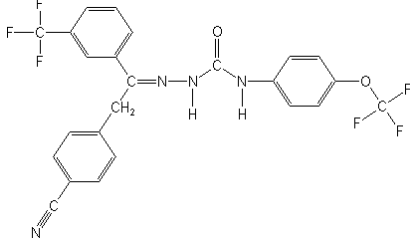
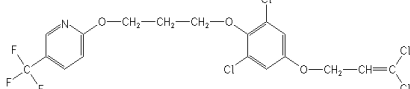
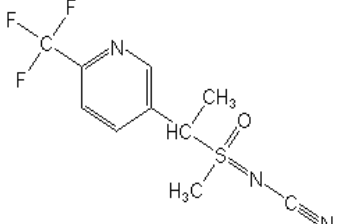
Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Fluvalinate, tau-	IN		EFSA conclusion	no	
Haloxyp-R	HB		EFSA conclusion	yes	TFA was observed in lysimeter studies . The annual average concentration measured was 0.085µg/L in spring studies and 0.079 µg/L in the autumn study. The peer review experts agreed that, as the trigger value of 0.1 µg/L was not reached, no further assessment (i.e. groundwater modelling) was necessary for trifluoroacetic acid.
Indoxacarb	IN		EFSA RO under Art. 12 of Reg. 396/2005	no	
Isoxaflutole	HB		EFSA RO under Art. 12 of Reg. 396/2005	no	
Lufenuron	IN		EFSA conclusion	no	

Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Oxyfluorfen	HB		EFSA RO under Art. 12 of Reg. 396/2005	yes, primary corp metabolism	TFA was observed in primary crop metabolism studies in alfalfa, but not in root and tuber (onion) and fruit crops (tomato, peach, apple). The active substance was applied post-emergence on onion and alfalfa, directly onto the soil in dormant apple and peach trees, and pre-plantation of tomato. Application rates ranged from 2.2 to 11.2 kg a.s/ha (2-8 times greater than the maximum use rates). TFA was observed as a major metabolite in alfalfa, its amounts increasing with time from 17% to 53% TRR (0.02 to 0.11 mg eq/kg).
Penoxsulam	HB		EFSA conclusion	no	
Penthiopyrad	FU		EFSA conclusion	no	
Picolinafen	HB		EFSA RO under Art. 12 of Reg. 396/2005	no	

Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Picoxystrobin	FU		EFSA RO under Art. 12 of Reg. 396/2005	no	
Prosulfuron	HB		EFSA RO under Art. 12 of Reg. 396/2005	no	
Pyroxsulam	HB		EFSA conclusion	no	

Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Tefluthrin	IN	 (Z)-(1R)-cis-acid (Z)-(1S)-cis-acid	EFSA conclusion	no	
Tembotrione	HB		EFSA conclusion	no	
Trifloxystrobin	FU		JMPR evaluation 2004	yes, primary crop metabolism and rotational crop metabolism	Primary crop metabolism studies: Immature peanut vines (treated with 4*560 g a.s./ha) contained 0.025 mg eq/kg (corresponding to 0.007 mg TFA/kg); peanuts (mature hay): 0.217 mg eq/kg, corresponding to 0.06 mg TFA/kg. Rotational crop metabolism studies: Studies conducted by applying [14C-phenyl]trifloxystrobin and [14C-phenyl] trifloxystrobin to bare soil at a rate of 500 g a.s./h. TFA was the major metabolite in rotational crop metabolism studies especially in spring wheat and radish, accounting for up to 65.7% of the TRR (0.016 mg/kg). As trifluoroacetic acid was not observed as a plant metabolite in most target crops after foliar application (except very low amounts in peanuts), JMPR concluded that it is likely that its precursor is formed in the soil or rhizosphere of the plants.

Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Triflumizole	FU		EFSA conclusion	no	
Triflurosulfuron	HB		EFSA conclusion	no	
Tritosulfuron	HB		DAR	no	In primary crop metabolism study in maize a metabolite was identified (635M01) which was formed by opening the triazine ring and elimination of trifluoroacetic acid. However, the complementary metabolite TFA was not directly identified.
Pending active substances containing the R-CF₃ - group					
Flumetralin	PG		-	-	No DAR available yet; default MRL of 0.01 mg/kg

Active substance	Pesticide category	Chemical structure	Source of information	TFA identified in metabolism studies	Comment
Flutianil	FU		DAR	no	No MRLs established yet.
Metaflumizone	IN		DAR	no	
Pyridalyl	IN		DAR	no	
Sulfoxaflor	IN		DAR	no	No MRLs established yet

List of non-approved active substances containing the TFA common moiety

Pesticide	Mode of Action
Acetoprole	Acaricide, Insecticide
Acifluorfen	Herbicide
Acifluorfen-methyl	herbicides
Amidoflumet	Acaricide
Bencarbazone	Herbicide
Benzfendizone	Herbicide
Benzofluor	Herbicide, Growth regulator
Bicyclopyrone	Herbicide
Bistrifluron	
Bromethalin	Rodenticide
Butafenacil	Herbicide
Chlorfenapyr	Acaricide, Insecticide
Chlorfluazuron	Insecticide
Chlorflurazole	herbicides
Cyhalothrin, gamma-	Insecticide
Difenopenten	herbicides
Dinitramine	Herbicide
Dithiopyr	Herbicide
Ethalfuralin	Herbicide
Ethiprole	Insecticide
Fenazaflor	Acaricide
Fentrifanil	acaricides
Flocoumafen	Rodenticide
flometoquin	Insecticides
Fluacrypyrim	Acaricide
Fluazifop	Herbicide
Fluazifop-methyl	Herbicides
Fluazifop-P-Butyl	Herbicide
Fluazolate	Herbicide
Fluazuron	
Flubendiamide	Insecticide
Flubenzimine	Acaricide, Growth regulator
Flucarbazone	Herbicide
Fluchloralin	Herbicide
Flufenapyr-ethyl	herbicides
Flufenican	herbicides
Flufenoxuron	Acaricide, Insecticide
Flufenoxystrobin	acaricides; fungicides
Flufenprox	Insecticide
Flufiprole	Insecticide
Flumezin	herbicides
Fluoridamid	growth inhibitors
Fluorodifen	Herbicide
Fluoroglycofen	Herbicide
Fluoroglycofen-Ethyl	
Fluoroglycofen-ethyl	herbicides
Fluotrimazole	Fungicide
Flupoxam	Herbicide
Flupyrsulfuron	Herbicide

Pesticide	Mode of Action
Flurazole	Herbicide safener
Fluridone	Herbicide
Flurprimidol	Growth regulator
Flusulfamide	Fungicide
Fluvalinate	Acaricide, Insecticide
Fluxofenim	Herbicide safener
Fomesafen	Herbicide
Fucaomi	herbicides
Funaihecaoling	herbicides
Furconazole	Fungicide
Heptafluthrin	insecticides
Hydramethylnon	Insecticide
Lactofen	Herbicide
Mefluidide	Growth regulator, Herbicide
Methalpropalin	herbicides
Nipyraclofen	herbicides
Norflurazon	Herbicide
Novaluron	Insecticide
Noviflumuron	Insecticide
Oxathiapiprolin	fungicides
Penfluron	Insecticide
Perfluidone	Herbicide
Prodiamide	herbicides
Profluralin	Herbicide
Pyflubumide	Acaricide
Pyrafluprole	insecticides
Pyrasulfotole	Herbicide
Pyrifluquinazon	Insecticide
Pyrifluquinazon	Insecticides
Pyriminostrobin	acaricides
Pyriprole	herbicides
Pyroxasulfone	Herbicide
Thiazafluron	Herbicide
Thiazopyr	Herbicide
Thifluzamide	Fungicide
Tiafenacil	herbicides
Tolprocarb	Fungicide
Triafamone	herbicides
Trifloxysulfuron	Herbicide
Trifluralin	Herbicide
Triflursulfuron-Methyl	Herbicide
Trifop	herbicides
Trifop-methyl	herbicides
Trifopsime	Herbicide
Vaniliprole	acaricides/insecticides

Appendix D. Screening of approved and pending active substances regarding the formation of TFA in metabolism studies

The following searches were executed by EFSA (SAS Unit).

1. Search in Web of Knowledge (WoK), 9/OCT/2013:

Topic=(Trifluoroacet* OR "Trifluoro acet*" OR TFA OR TFAA OR trifluoressig* OR trifluoracet*)
AND Topic=(food* OR vegetable* OR fruit* OR cereal* OR rice OR pulse* OR mushroom* OR meat OR liver OR fat OR kidney* OR milk OR egg* OR honey OR fish OR seafood* OR game OR poultry OR algae OR feed OR chicken OR turkey OR beer OR wine OR bread OR "dietary expo*")
NOT Topic=("trans fat*")

Timespan=All years.

Search language=English

Results: 2632 hits, containing:

- 1.996 records from *Web of Science*
- 121 records from *MEDLINE*
- 322 records from *CABI*
- 1 record from *Current Contents Connect*
- 192 records from *FSTA – the food science resource*

Saved in ENDNOTE-file: TFA-WoK.enl

2. Search in PubMed , 9/OCT/2013

(((((food* OR vegetable* OR fruit* OR cereal* OR rice OR pulse* OR mushroom* OR meat OR liver OR fat OR kidney* OR milk OR egg* OR honey OR fish OR seafood* OR game OR poultry OR algae OR feed OR chicken OR turkey OR beer OR wine OR bread OR "dietary exposure"[Title/Abstract]))) AND ((Trifluoroacetate OR Trifluoroacetic* OR "Trifluoro acetic" OR "Trifluoro acetate" OR TFA OR TFAA OR trifluoressigsauere OR trifluoracetat OR Trifluoro-acetate OR trifluoro-acetic[Title/Abstract]))) NOT ("Trans fatty" OR "trans fat"[Title/Abstract]))

Pubmed translated the search in terms given in Annex A.

- Wildcard search for 'egg*' used only the first 600 variations. Lengthen the root word to search for all endings.
- The following term was not found in PubMed: trifluoressigsauere trifluoracetat

Results: 917 hits

Saved in ENDNOTE-file: TFA_PubMed.enl

Merging search results from *PubMed* and *WoK*: 3086 (463 duplicates)

Saved in ENDNOTE-file: TFA_PubMed_plus_WoK.enl

Removing duplicates in Distiller: 2757

3. Supplemental search for “residue” in Web of Knowledge 25/10/2013:

Topic=(Trifluoroacetate OR "Trifluoro acetate*" OR TFA OR TFAA OR trifluoroacetic OR "trifluoro acetic") AND Topic=(residue*) NOT Topic=("fat acids" OR "fatty acids")

Results: 985 hits

Saved in ENDNOTE-file: TFA_residues_WoK.enl

4. Supplemental search for “residue” in Pubmed 25/10/2013:

(residue*[Title/Abstract]) AND ((Trifluoroacetate OR Trifluoroacetic* OR "Trifluoro acetic" OR "Trifluoro acetate" OR TFA OR TFAA[Title/Abstract])) NOT ("fatty acids" OR "fat acids"[Title/Abstract])

Pubmed translated the search in terms given in Annex B.

Results: 508 hits

Saved in ENDNOTE-file: TFA_residues_PubMed.enl

Merged:1235 (258 duplicate)

Merged with TFA_pubmed_plus_wok: 861 (374 duplicates)

Saved in ENDNOTE-file: Merged_dietary_residues.enl

Removing 170 duplicates in Distiller: 691

Appendix E. Pesticide Residue Intake Model (PRIMO) – Results for dietary risk assessment for trifluoroacetic acid (TFA)

Trifluoroacetic acid (TFA)					Prepare workbook for refined calculations				
Status of the active substance:			Code no.						
LOQ (mg/kg bw):			0,01		proposed LOQ:				
Toxicological end points					Undo refined calculations				
ADI (mg/kg bw/day):			0,05		ARfD (mg/kg bw):		0,05		
Source of ADI:			EFSA		Source of ARfD:		EFSA		
Year of evaluation:			2014		Year of evaluation:		2014		
Chronic risk assessment - refined calculations									
TMDI (range) in % of ADI									
minimum - maximum									
1 5									
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 pTMRs at LOQ (in % of ADI)									
5,0 DE child 1,9 Apples 0,7 Wheat 0,6 Oranges 0,0									
4,8 WHO Cluster diet B 1,4 Wheat 0,4 Tomatoes 0,4 Maize 0,1									
4,2 NL child 1,0 Apples 0,8 Wheat 0,5 Oranges 0,0									
3,6 IE adult 0,4 Maize 0,4 Maize 0,2 Wine grapes 0,1									
3,0 DK child 0,9 Wheat 0,7 Rye 0,4 Apples 0,0									
2,9 FR toddler 0,4 Apples 0,4 Apples 0,4 Beans (with pods) 0,0									
2,8 UK Toddler 0,6 Wheat 0,5 SUGAR PLANTS 0,3 Oranges 0,5									
2,8 WHO cluster diet E 0,6 Wheat 0,3 Wine grapes 0,2 Soya bean 0,0									
2,6 WHO cluster diet D 1,0 Wheat 0,1 Tomatoes 0,1 Potatoes 0,0									
2,5 PT General population 0,6 Wheat 0,4 Wine grapes 0,2 Potatoes 0,0									
2,4 IT kids/toddler 1,1 Wheat 0,2 Other cereal 0,2 Tomatoes 0,0									
2,4 UK Infant 0,4 Wheat 0,3 Apples 0,2 Bananas 0,2									
2,3 ES child 0,7 Wheat 0,3 Oranges 0,2 Apples 0,0									
2,2 WHO Cluster diet F 0,6 Wheat 0,2 Soya bean 0,1 Oranges 0,0									
2,2 SE general population 90th percentile 0,5 Wheat 0,3 Bananas 0,2 Apples 0,0									
2,0 WHO regional European diet 0,5 Wheat 0,1 Tomatoes 0,1 Potatoes 0,0									
1,9 FR all population 0,6 Wine grapes 0,5 Wheat 0,1 Apples 0,0									
1,8 NL general 0,3 Wheat 0,2 Oranges 0,2 Apples 0,0									
1,8 FR infant 0,4 Apples 0,3 Beans (with pods) 0,1 Oranges 0,0									
1,8 IT adult 0,7 Wheat 0,2 Tomatoes 0,1 Apples 0,0									
1,6 ES adult 0,4 Wheat 0,2 Oranges 0,1 Apples 0,0									
1,5 UK vegetarian 0,3 Wheat 0,1 Oranges 0,1 Wine grapes 0,1									
1,3 DK adult 0,3 Wheat 0,2 Wine grapes 0,1 Apples 0,0									
1,2 UK Adult 0,3 Wheat 0,2 Wine grapes 0,1 Oranges 0,1									
1,1 LT adult 0,3 Apples 0,2 Rye 0,2 Wheat 0,0									
0,9 PL general population 0,3 Apples 0,1 Tomatoes 0,1 Potatoes 0,0									
0,9 FI adult 0,2 Wheat 0,2 Oranges 0,1 Rye 0,0									
Conclusion:									
The estimated Theoretical Maximum Daily Intakes (TMDI), based on pTMRs were below the ADI.									
A long-term intake of residues of Trifluoroacetic acid (TFA) is unlikely to present a public health concern.									

Acute risk assessment /children - refined calculations						Acute risk assessment / adults / general population - refined calculations						
The acute risk assessment is based on the ARfD.												
For each commodity the calculation is based on the highest reported MS consumption per kg bw and the corresponding unit weight from the MS with the critical consumption. If no data on the unit weight was available from that MS an average European unit weight was used for the IESTI calculation.												
In the IESTI 1 calculation, the variability factors were 10, 7 or 5 (according to JMPR manual 2002), for lettuce a variability factor of 5 was used.												
In the IESTI 2 calculations, the variability factors of 10 and 7 were replaced by 5. For lettuce the calculation was performed with a variability factor of 3.												
Threshold MRL is the calculated residue level which would leads to an exposure equivalent to 100 % of the ARfD.												
Unprocessed commodities	No of commodities for which ARfD/ADI is exceeded (IESTI 1):			---			No of commodities for which ARfD/ADI is exceeded (IESTI 2):			---		
	IESTI 1 *) **)			IESTI 2 *) **)			IESTI 1 *) **)			IESTI 2 *) **)		
	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)
	24,6	Potatoes	0,08 / -	17,6	Potatoes	0,08 / -	5,1	Table grapes	0,08 / -	5,1	Table grapes	0,08 / -
	21,2	Oranges	0,08 / -	15,3	Oranges	0,08 / -	4,8	Potatoes	0,08 / -	4,7	Mangoes	0,08 / -
	15,7	Apples	0,08 / -	14,3	Grapefruit	0,08 / -	4,7	Mangoes	0,08 / -	3,8	Wine grapes	0,08 / -
	14,6	Pears	0,08 / -	11,6	Apples	0,08 / -	4,1	Oranges	0,08 / -	3,7	Potatoes	0,08 / -
	14,3	Grapefruit	0,08 / -	10,5	Pears	0,08 / -	3,8	Wine grapes	0,08 / -	3,3	Oranges	0,08 / -
	13,4	Bananas	0,08 / -	10,5	Table grapes	0,08 / -	3,6	Apples	0,08 / -	3,0	Apples	0,08 / -
	12,6	Mangoes	0,08 / -	9,7	Bananas	0,08 / -	3,5	Sweet corn	0,08 / -	2,6	Pears	0,08 / -
	11,7	Sweet corn	0,08 / -	9,0	Mangoes	0,08 / -	3,4	Pears	0,08 / -	2,5	Sweet corn	0,08 / -
	10,5	Table grapes	0,08 / -	8,4	Sweet corn	0,08 / -	3,2	Grapefruit	0,08 / -	2,4	Grapefruit	0,08 / -
	9,5	Peaches	0,08 / -	7,0	Peaches	0,08 / -	2,8	Peaches	0,08 / -	2,2	Peaches	0,08 / -
	8,9	Mandarins	0,08 / -	6,7	Mandarins	0,08 / -	2,2	Bananas	0,08 / -	2,1	Beans	0,165 / -
	6,0	Beans	0,165 / -	6,0	Beans	0,165 / -	2,1	Mandarins	0,08 / -	2,0	Pumpkins	0,019 / -
	5,8	Melons	0,019 / -	5,8	Melons	0,019 / -	2,1	Beans	0,165 / -	1,7	Beans (with pods)	0,165 / -
	5,5	Lemons	0,08 / -	4,6	Watermelons	0,019 / -	2,0	Pumpkins	0,019 / -	1,7	Bananas	0,08 / -
	5,3	Plums	0,08 / -	4,3	Plums	0,08 / -	1,7	Beans (with pods)	0,165 / -	1,7	Beans (without pods)	0,165 / -
	5,0	Apricots	0,08 / -	4,1	Lemons	0,08 / -	1,7	Beans (without pods)	0,165 / -	1,7	Mandarins	0,08 / -
	4,6	Watermelons	0,019 / -	4,0	Apricots	0,08 / -	1,5	Watermelons	0,019 / -	1,5	Watermelons	0,019 / -
	3,7	Beans (with pods)	0,165 / -	3,7	Beans (with pods)	0,165 / -	1,5	Plums	0,08 / -	1,5	Melons	0,019 / -
	3,3	Scarole (broad-leaf	0,019 / -	3,3	Scarole (broad-leaf	0,019 / -	1,5	Melons	0,019 / -	1,4	Chinese cabbage	0,019 / -
	3,2	Limes	0,08 / -	2,7	Peas (without	0,165 / -	1,4	Chinese cabbage	0,019 / -	1,3	Peas (without pods)	0,165 / -
	2,7	Peas (without pods)	0,165 / -	2,5	Cauliflower	0,019 / -	1,3	Quinces	0,08 / -	1,3	Wheat	0,08 / -
	2,6	Kale	0,019 / -	2,3	Wheat	0,08 / -	1,3	Peas (without pods)	0,165 / -	1,2	Plums	0,08 / -
	2,5	Cauliflower	0,019 / -	2,3	Limes	0,08 / -	1,3	Wheat	0,08 / -	1,2	Cauliflower	0,019 / -
	No of critical MRLs (IESTI 1)			---			No of critical MRLs (IESTI 2)			---		
Processed commodities	No of commodities for which ARfD/ADI is exceeded:			---			No of commodities for which ARfD/ADI is exceeded:			---		
	***)			***)			***)			***)		
	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI		pTMRL/ threshold MRL (mg/kg)
*) The results of the IESTI calculations are reported for at least 5 commodities. If the ARfD is exceeded for more than 5 commodities, all IESTI values > 90% of ARfD are reported.												
**) pTMRL: provisional temporary MRL												
***) pTMRL: provisional temporary MRL for unprocessed commodity												
Conclusion:												
For Trifluoroacetic acid (TFA) IESTI 1 and IESTI 2 were calculated for food commodities for which pTMRLs were submitted and for which consumption data are available.												
No exceedance of the ARfD/ADI was identified for any unprocessed commodity.												

ABBREVIATIONS

ADI	acceptable daily intake
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
CF	conversion factor for enforcement residue definition to risk assessment residue definition
cGAP	critical GAP
CIPAC	Collaborative International Pesticide Analytical Council
CXL	Codex Maximum Residue Limit (Codex MRL)
d	day
DAR	Draft Assessment Report
DAT	days after treatment
DM	dry matter
EFSA	European Food Safety Authority
EMS	evaluating Member State
eq	residue expressed as a.s. equivalent
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GAP	good agricultural practice
GCPF	Global Crop Protection Federation (former GIFAP)
GS	growth stage
ha	hectare
hL	hectolitre
HR	highest residue
i.p.	intraperitoneal
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
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
PND	post-natal day
PRIMo	(EFSA) Pesticide Residues Intake Model
RD	residue definition
RMS	rapporteur Member State
SANCO	Directorate-General for Health and Consumers
SCFCAH	Standing Committee on the Food Chain and Animal Health
SEU	Southern European Union
STMR	supervised trials median residue
TFA	Trifluoroacetic acid
TFAA	
TMDI	theoretical maximum daily intake
TRR	total radioactive residue
WHO	World Health Organization
yr	year