CONCLUSION ON PESTICIDE PEER REVIEW

Conclusion regarding the peer review of the pesticide risk assessment of the active substance fenpyroximate

Revision issued on 16 October 2008

SUMMARY

Fenpyroximate is one of the 79 substances of the third stage Part A of the review programme covered by Commission Regulation (EC) No 1490/2002[1]. This Regulation requires the European Food Safety Authority (EFSA) to organise upon request of the EU-Commission a peer review of the initial evaluation, i.e. the draft assessment report (DAR), provided by the designated rapporteur Member State and to provide within six months a conclusion on the risk assessment to the EU-Commission.

Germany being the designated rapporteur Member State submitted the DAR on fenpyroximate in accordance with the provisions of Article 10(1) of the Regulation (EC) No 1490/2002, which was received by the EFSA on 25 October 2005. The peer review was initiated on 5 May 2006 by dispatching the DAR for consultation of the Member States and the sole applicant Nihon Nohyaku Co. Ltd. Subsequently, the comments received on the DAR were examined by the rapporteur Member State and remaining issues were agreed on during a written procedure in April – May 2007. The identified issues as well as further data made available by the applicant upon request were evaluated in a series of scientific meetings with Member State experts in October and December 2007.

A final discussion of the outcome of the consultation of experts took place during a written procedure with the Member States in February-March 2008 leading to the conclusions as laid down in this report. The conclusion was initially finalised on 14 April 2008 (scientific report no. 143 refers) however, following an update to the Residues chapter, the conclusion is revised and re-issued in October 2008.

The conclusion was reached on the basis of the evaluation of the representative uses as an acaricide on grapes, apples, pears and beans. Full details of the GAP can be found in the attached list of end points.

[1] OJ No L 224, 21.08.2002, p. 25, as last amended by Regulation (EC) No 1095/2007 (OJ L 246, 21.9.2007, p. 19)

The representative formulated product for the evaluation was "Kiron", a suspension concentrate formulation (SC).

Only single methods for the determination of residues are available since a multi-residue-method like the German S19 or the Dutch MM1 is not applicable due to the nature of the residues. The method of analysis for products of animal origin is only validated for fenpyroximate but the residue definition includes metabolite M-3[2] and therefore a data gap has been identified. Also the residue definition for surface water has not been finalised.
Sufficient analytical methods as well as methods and data relating to physical, chemical and technical properties are available to ensure that quality control measurements of the plant protection product are possible. The technical specification could not be concluded on.

Regarding the mammalian metabolism, fenpyroximate showed a rapid but incomplete oral absorption and excretion, mainly via faeces; intensive enterohepatic circulation was observed.
Fenpyroximate is harmful if swallowed and very toxic by inhalation; eye irritation and skin sensitisation were observed. Based on toxicokinetic properties and different toxicological profile of the substance via oral or inhalation, the meeting of experts concluded that the oral absorption was not representative of the bioavailability of fenpyroximate.

Critical effects observed through short term and long term studies were decreased body weight and food consumption. The relevant oral short term NOAEL is 1.3 mg/kg bw/day from the 90-day, rat study and the relevant inhalation NOAEL is 0.54 mg/kg bw/day from the 4-week study in rats; relevant long-term NOAEL was the dose level of 0.97 mg/kg bw/day. No genotoxicity, carcinogenicity or neurotoxicity was observed; neither reproductive nor developmental parameters were affected by treatment with fenpyroximate.

The acceptable daily intake (ADI) is set at 0.01 mg/kg bw/day; the acceptable operator exposure level (AOEL) is 0.005 mg/kg bw/day and the acute reference dose (ARfD) is 0.02 mg/kg bw considering an assessment factor of 100 for all reference values.

Dermal absorption is 7% when handling the concentrate formulation and 24% when handling the spray dilution. Considering the representative uses of Kiron (pome fruits, grapes and beans), the estimated operator exposure exceeds the AOEL according to the UK POEM model; according to the German model calculations, exposure exceeds the AOEL for high crop, tractor mounted air blast sprayers (pome fruits and grapes); exposure resulting from high crop, hand held applications (grapes) and field crop, tractor mounted hydraulic sprayers (beans) is below the AOEL when the use of PPE as

[2] M3: (E)-4-[1,3-dimethyl-5-phenoxypyrazole-4-yl)-methyleneaminooxy-methyl]benzoic acid

protective gloves during mixing/loading and gloves, protective garment and sturdy footwear during application is considered.
Re-entry worker exposure is estimated to be below the AOEL only if additional protective clothing, as gloves, long sleeved shirt and long trousers is considered.
Bystander's exposure exceeds the AOEL for high crop applications, either tractor mounted or hand held; however for field crop applications (beans), bystander's exposure is estimated to be below the AOEL.

The plant metabolism of fenpyroximate is very slow. Only one metabolite, the (Z)-isomer of the active substance (M-1) [3] is included in the residue definition for risk assessment. Further information is required to ensure that the toxicological reference values allocated to fenpyroximate cover its (Z)-isomer. Some insufficiencies were identified in the submitted residue trials and further data are required. These deficiencies do not allow proposing an MRL in pome fruits. Studies are also required to investigate the stability of residues under hydrolysis conditions simulating processing.
Transfer of soil residues to succeeding crops cannot be excluded for the use evaluated on beans harvested fresh.

Based on animal metabolism and feeding studies, one animal metabolite is expected to reach quantifiable residue levels in ruminant liver and kidney.
A provisional consumer exposure assessment has shown potential for children exposure in the range of the ARfD for apples, pears and grapes. This may however be reconsidered on the basis of more appropriate residue data for pome fruits. For grapes an option for decision makers is to consider to set the MRL at 0.2mg/kg instead of 0.3mg/kg.

In soil under aerobic conditions fenpyroximate exhibits moderate to high persistence forming the major soil metabolite M-3 (accounting for up to 10.8% of applied radioactivity (AR)) which exhibits moderate to medium persistence and the minor non transient metabolite M-11[4] (accounting for up to 8.8%AR). Mineralisation of both the pyrazole and benzyl rings to carbon dioxide accounted for 17% AR and 51-65% AR respectively after 112 days. The formation of unextractable residues was a significant sink, accounting for 23.5-58.3 % AR and 21-41%AR respectively after 100-112 days. Fenpyroximate is immobile in soil, M-3 exhibits medium to low mobility in soil whilst M-11 is estimated by quantitative structure activity relationship (QSAR) calculations to exhibit medium mobility. There was no indication that adsorption of any of these compound was pH dependent.

In dark natural sediment water systems fenpyroximate degraded exhibiting moderate persistence but partitioned relatively rapidly from water to sediment where the major metabolite M-11 was formed.

[3] M1 Z isomer of fenpyroximate: tert-butyl (*Z*)-4-[(1,3-dimethyl-5-phenocypyrazole-4-yl)-methyleneaminooxymethyl]benzoate
[4] M-11: 1,3-dimethyl-5-phenoxypyrzole-4-carbonitrile

M-3 and M-8[5] were major metabolites in water. The terminal metabolite, CO_2, was an insignificant sink for the pyrazole ring radiolabel in the material balance accounting for a maximum of 1.9 % AR at 105 days (study end). Unextracted sediment residues were a more significant sink representing up to 28 % AR at study end. As no experiment is available where the benzyl ring was investigated a data gap is identified for further information on the fate and behaviour of the benzyl moiety in natural sediment water systems. In laboratory aqueous photolysis studies the Z isomer of fenpyroximate (M-1) was a major metabolite. The necessary surface water and sediment exposure assessments were appropriately carried out using the agreed FOCUS scenarios approach for fenpyroximate at steps 1-4, with spray drift mitigation being applied at step 4. For the metabolites M-3, M-11 and M-8 appropriate FOCUS step 1 and 2 calculations were carried out. These values are the basis for the risk assessment discussed in this conclusion.
The potential for groundwater exposure from the applied for intended uses by fenpyroximate and its soil metabolites M-3 and M-11 above the parametric drinking water limit of 0.1 µg/L, was concluded to be low in geoclimatic situations that are represented by all 9 FOCUS groundwater scenarios.

The acute and short term risk to birds can be considered as low for all representative uses evaluated. The blue tit is accepted as a focal species to refine the risk to insectivorous birds in pome fruit and vines. The tier 1 long-term risk assessment to birds did not identify low risk for any of the uses. Both PD and PT were refined in the risk assessment for orchard use and the PD was refined in the vine scenario. However, the TER did not reach the Annex VI trigger and a data gap is identified to refine the risk assessment for insectivorous birds in both orchards and vines. The yellowhammer and the grey partridge are accepted as focal species to refine the assessment of the risk to insectivorous and herbivorous birds respectively in beans. An acceptable risk was identified with refinements of PD in both scenarios.
Based on the first tier risk assessment the acute risk to herbivorous mammals can be considered as low for all representative uses evaluated. . A refined long term risk assessment was needed for all representative uses. In a refined risk assessment the hare is used as focal species in beans and the bank vole is used for the representative uses in pome fruit and grapevine. The risk to mammals in beans can be considered low based on the hare, unattractiveness of crop, and an interception factor of 0.7. The risk to bank vole is considered low for uses in orchards and vine yard, based on a refined PD. The risk from secondary earthworm and fish poisoning is considered low for both birds and mammals. Furthermore the risk to birds and mammals from ingestion of contaminated drinking water is considered low.

Fenpyroximate is very toxic to aquatic organisms both on an acute as on a chronic time scale. A similar toxicity to fish, algae and aquatic invertebrates was observed. The higher tier toxicity test with fish in the present of sediment was accepted as the relevant endpoint in the aquatic risk assessment.

[5] M:8: 1,3-dimethyl-5-phenoxypyrzole-4-carboxylic acid

Based on the available data the risk to aquatic organisms is considered low in all FOCUSsw Step 4 scenarios for all uses if sufficient non spray buffer zones are included. Buffer zones of 70 m, 45 m and 20 m are required for pome fruit, vine and bean respectively. The conclusion of the aquatic risk assessment may however change, as a data gap was identified for a fish full life cycle study. The risk from M-3 and M-8 to aquatic organisms is considered low. A BCF of 1601 was experimentally derived for whole fish. The risk to bees is considered low. A data gap is identified for a study to address the in-field risk to *A. rhopalosiphi*. The in-field risk to *T. pyri* is considered to be low, as the off-field risk is considered to be low for all non-target arthropods if buffer zones up to 5 meter are applied. The risk to earthworms is considered to be low both for the parent and the metabolites M-3 and M-11. Also the risk to non-target marcro-organisms, non-target micro-organisms and non-target plants is considered low.

Key words: Fenpyroximate, peer review, risk assessment, pesticide, acaricide

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BACKGROUND

Commission Regulation (EC) No 1490/2002 laying down the detailed rules for the implementation of the third stages of the work program referred to in Article 8(2) of Council Directive 91/414/EEC and amending Regulation (EC) No 451/2000, as amended by Commission Regulation (EC) No 1095/2007 regulates for the European Food Safety Authority (EFSA) the procedure of evaluation of the draft assessment reports provided by the designated rapporteur Member State. Fenpyroximate is one of the 79 substances of the third stage Part A covered by the amended Regulation (EC) No 1490/2002 designating Germany as rapporteur Member State.

In accordance with the provisions of Article 10(1) of the Regulation (EC) No 1490/2002, Germany submitted the report of its initial evaluation of the dossier on fenpyroximate, hereafter referred to as the draft assessment report, to the EFSA on 25 October 2005. Following an administrative evaluation, the draft assessment report was distributed for consultation in accordance with Article 11(2) of the Regulation (EC) No 1490/2002 on 5 May 2006 to the Member States and the main applicant Nihon Nohyaku Co. Ltd as identified by the rapporteur Member State.

The comments received on the draft assessment report were evaluated and addressed by the rapporteur Member State. Based on this evaluation, EFSA and Member States identified and agreed during a written procedure in April – May 2007 on lacking information to be addressed by the notifier as well as issues for further detailed discussion at expert level.

Taking into account the information received from the notifier addressing the request for further data, a scientific discussion of the identified data requirements and/or issues took place in expert meetings in October and December 2007. The reports of these meetings have been made available to the Member States electronically.

A final discussion of the outcome of the consultation of experts took place with representatives from Member States in February-March 2008 leading to the conclusions as laid down in this report.

During the peer review of the draft assessment report and the consultation of technical experts no critical issues were identified for consultation of the Scientific Panel on Plant Protection Products and their Residues (PPR).

In accordance with Article 11c (1) of the amended Regulation (EC) No 1490/2002, this conclusion summarises the results of the peer review on the active substance and the representative formulation evaluated as finalised at the end of the examination period provided for by the same Article. A list of the relevant end points for the active substance as well as the formulation is provided in appendix 1.

The documentation developed during the peer review was compiled as a **peer review report** comprising of the documents summarising and addressing the comments received on the initial evaluation provided in the rapporteur Member State's draft assessment report:

- the comments received,
- the resulting reporting table (rev. 1-1 of 22 June 2007)

as well as the documents summarising the follow-up of the issues identified as finalised at the end of the commenting period:

- the reports of the scientific expert consultation,
- the evaluation table (rev. 2-1 of 12 March 2008).

Given the importance of the draft assessment report including its addendum (compiled version of February 2008 containing all individually submitted addenda) and the peer review report with respect to the examination of the active substance, both documents are considered respectively as background documents A and B to this conclusion.

THE ACTIVE SUBSTANCE AND THE FORMULATED PRODUCT

Fenpyroximate is the ISO common name for *tert*-butyl (*E*)-alpha-(1,3-dimethyl-5-phenoxypyrazol-4-ylmethyleneamino-oxy)-p-toluate (IUPAC).

Fenpyroximate, belongs to the class of pyrazole acaricides the group also includes cyenopyrafen and tebufenpyrad. It has quick knockdown activity against larvae, nymphs and adults, mainly by contact and ingestion. Also some moulting inhibitory activity on nymphs. The representative formulated product for the evaluation was "Kiron" a suspension concentrate (SC).

The evaluated representative uses are as an acaricide on grapes, apples, pears and beans. Full details of the GAP can be found in the attached list of end points.

SPECIFIC CONCLUSIONS OF THE EVALUATION

1. Identity, physical/chemical/technical properties and methods of analysis

At the moment no minimum purity for fenpyroximate as manufactured can be given, because further clarification is needed. Also in general the technical specification was rejected by the meeting of experts. The issue was that the proposed levels were not justified by the available data. Since the meeting of experts a new specification has been submitted, however it has not been peer review. It should be noted however, that the meetings of experts mammalian and ecotoxicology accepted the specification as presented in addendum 3 to volume 4. A possible relevant impurity was identified

during the peer review process however; no conclusion can be made on this as there are mammalian toxicology data gaps.

The content of fenpyroximate in the representative formulation is 51.2 g/L (pure) however, an open point remained after the peer review process that the formulation may have to be amended when the minimum purity of the active substance is fixed.

The assessment of the data package revealed no issues that need to be included as critical areas of concern with respect to the identity, physical, chemical and technical properties of fenpyroximate or the respective formulation. However, the following data gaps were identified:

- calculation of Henry's law constant.
- data or information to address the discrepancies seen with the UV spectrum in studies by Kodeira and Kudo (1993) and Swanson (1993).

The main data regarding the identity of fenpyroximate and its physical and chemical properties are given in appendix 1.

Sufficient test methods and data relating to physical, chemical and technical properties are available. Also adequate analytical methods are available for the determination of fenpyroximate in the technical material and in the representative formulation as well as for the determination of the respective impurities in the technical material.
Therefore, enough data are available to ensure that quality control measurements of the plant protection product are possible.

Adequate methods are available to monitor all compounds given in the respective residue definition, i.e. fenpyroximate in food of plant origin; soil and air. The residue definition for surface water is not finalised however, a method for fenpyroximate in water is available. For food of animal origin there is an acceptable method available for fenpyroximate however for metabolite M-36 which is in the residue definition no method is available and a data gap is identified.

Residues in food of plant origin are analysed by GC-PND with an LOQ of 0.05 mg/kg confirmation is by LC-MS/MS. Residues in products of animal origin are analysed by HPLC-UV with an LOQ of 0.02 mg/kg in fat and 0.005 mg/kg for the other matrices.
Soil is analysed by GC-PND with a LOQ of 0.01 mg/kg confirmation is by LC-MS. Water is analysed by HPLC-UV with an LOQ of 0.1µg/L and confirmation by LC-MS and air is analysed by HPLC-UV with an LOQ of 0.29 µg/m3.

[6] M-3 : (*E*)-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)- methyleneaminooxy-methyl]benzoic acid

As the active substance is classified as very toxic a method of analysis is available to analyse fenpyroximate in serum with an LOQ of 0.02 mg/L the meeting of experts for mammalian toxicology have confirmed that fenpyroximate is the correct residue definition.

2. Mammalian toxicology

Fenpyroximate was discussed at the PRAPeR Expert's Meeting on mammalian toxicology (PRAPeR 34) in October 2007.

The meeting discussed the addendum 3 to volume 4 dated September 2007 and concluded that the toxicological batches were representative of the technical specification, as proposed by the Rapporteur Member State. It is noted that this technical specification was not agreed by the experts at the meeting on physical and chemical properties (PRAPeR 31); however, as new specifications would lead to lower maximum limits, no further assessment is necessary.

2.1. Absorption, Distribution, Excretion and Metabolism (Toxicokinetics)

Fenpyroximate was orally absorbed in about 60% of the administered dose considering bile excretion (47 to 55%) and urinary excretion (5 to 10%) within 48 hours. This value was agreed at the meeting of experts; however some experts expressed concerns about the corresponding bioavailability of this percentage, once most part of it is actually retained in the entero hepatic circulation, and hence not bioavailable. It was considered that this difference between "orally absorbed" and "bioavailable" might explain the difference in toxicity of fenpyroximate when administered orally or via inhalation (see point 2.2, 2.3 and 2.10).

Six to twelve hours after dosing, most of the radioactivity was found in the gastrointestinal tract and the liver; twenty-four hours after dosing, highest levels of radioactivity were detected in fat, liver, kidney, urinary bladder and still some parts of the gastrointestinal tract; low residues were found after 168 hours. Elimination half-life was 6.1 and 8.9 hours after low dose administration (2 mg/kg bw) in males and females, but was increased to 35.4 and 48.7 hours after dosing with a high dose of 400 mg/kg bw; 168 hours after low dosing, 70-85% of the dose had been excreted via faeces and 12-18% via urine.

A great number of metabolites was identified indicating that fenpyroximate is extensively metabolised by hydrolytic cleavage of the oxime bond, hydrolysis of the tert-butyl ester moiety, oxidation of the tert-butyl group, hydroxylation of the phenoxy ring and 3-methyl group, by isomerisation, N-demethylation and conjugation. The major urinary metabolites were M-8[7] and M-21[8]; they were also excreted via faeces but not in large amounts. Fenpyroximate represents the major

[7] M-8 : 1,3-dimethyl-5-phenoxypyrazole-4-carboxylic acid
[8] M-21 : 4-cyano-1-methyl-5-phenoxypyrazole-3-carboxylic acid

compound in faeces; M-3 and M-22[9] were also excreted in faeces; metabolites of minor importance were the Z-isomer of fenpyroximate (M-1)[10], M-6[11] and M-11[12].

2.2. ACUTE TOXICITY

Oral LD_{50} of fenpyroximate was between 350 mg/kg bw in rat (245 mg/kg bw in females and 480 mg/kg bw in males) and 500 mg/kg bw in mouse. Classification as harmful, symbol Xn, and risk phrase **R22 "harmful if swallowed"** is proposed. Low dermal toxicity was found, but fenpyroximate presented a low a LC_{50} in rats (4 hours) of 0.21 - 0.33 mg/L air (nose-only) in males and females. As fenpyroximate was formulated with 10% dioxosilane (silicon dioxide), the toxicological contribution of this compound for the mortality observed in the inhalation study was investigated and considered to be negligible (see addendum 4 to volume 3 of September 2007). The experts agreed that the toxicity observed is due to the active substance and not to the dioxosilane. Consequently classification as **very toxic**, symbol **T+**, and risk phrase **R26 "very toxic by inhalation"** is proposed.
No skin irritation and slight ocular irritation were observed in acute studies, however based on human experience (see point 2.9), classification of fenpyroximate as irritant, symbol Xi, and risk phrase **R36 "irritating to eyes"** is proposed. Sensitisation properties were examined in a Buehler test, where no positive response was observed in any animals, and in a Magnusson & Kligman test, where a sensitisation rate of 36% was obtained; so classification with risk phrase **R43 "may cause skin sensitisation by skin contact**" is proposed.

2.3. SHORT TERM TOXICITY

Short term effects of fenpyroximate were examined in 90-day oral studies in rat and dog, 1-year study in dog, 4-week inhalation study and 21-day dermal study in rats.
In rats, the NOAEL was the dose level of 1.3 mg/kg bw/day based on reduced food intake and body weight accompanied with asymptomatic plasma cholinesterase inhibition and hepatocytes hypertrophy at the next dose level of 6.6 mg/kg bw/day. In dogs, the overall NOAEL was the dose level of 1.5 mg/kg bw/day from the 1-year study, although effects were observed at 2 mg/kg bw/day in the 90-day study as diarrhoea, emaciation, salivation and emesis, and at higher doses, bradycardia and decreased body weight.
Rats exposed via nose-only inhalation for 4 weeks, presented a NOAEL of 2 mg/m^3 (corresponding to 0.54 mg/kg bw/day) based on increased lung weight, squamous metaplasia of nasal passage mucosa and increased erythrocyte counts at 10 mg/m^3; higher concentration levels showed laboured

[9] M-22 : (*E*)-2-[4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl) methyleneamino-oxymethyl]benzoyloxy]-2-methyl-propanoic acid
[10] Z isomer of fenpyroximate M-1: tert-butyl (*Z*)-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)-methyleneaminooxymethyl]benzoate
[11] M-6 : 1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde
[12] M-11 : 1,3-dimethyl-5-phenoxypyrazole-4-carbonitrile

breathing, rales, decreased body weight gain, decreased food consumption, increased leukocyte count and increased liver weight.
The dermal NOAEL of fenpyroximate when administered to rats for 21 consecutive days was 300 mg/kg bw/day based on decreased body weight gain, decreased food consumption and increased liver weight at 1000 mg/kg bw/day.

2.4. GENOTOXICITY

Fenpyroximate was tested *in vitro* for point mutations (Ames test) with *Salmonella typhimurium* and *Escherichia coli*, for DNA repair test (rec-assay) in *Bacillus subtilis*, gene mutations at the HGPRT locus of Chinese hamster V79 cells, for chromosomal aberrations in cultured human lymphocytes and for unscheduled DNA synthesis in rat hepatocytes (UDS assay), and *in vivo*, for micronucleus in mouse bone marrow erythrocyte test. No potential for genotoxicity or clastogenicity was found.

2.5. LONG TERM TOXICITY

Long term toxicity was studied in a combined chronic toxicity/carcinogenicity study in rats and a carcinogenicity 18-month study in mice.
Main effects upon long term exposure were decreased body weight gain, food consumption and food efficiency. The NOAEL in rat was the dose level of 0.97 mg/kg bw/day based on these findings at the next dose level of 3.0 mg/kg bw/day.
In mice, the NOAEL was the dose level of 2.4 mg/kg bw/day based on decreased body weight and food consumption at 9.5 mg/kg bw/day; higher dose level presented a significant increase in the overall incidence of ovarian atrophy.
No carcinogenic potential was observed in either rats or mice upon long term exposure to fenpyroximate.

2.6. REPRODUCTIVE TOXICITY

In a two-generation reproductive study in rats, the parental and offspring's NOAELs were the dose level of 2 mg/kg bw/day based on decreased body weight gain in the adults and in the offspring during lactation. No adverse effect on the reproductive parameters was observed, therefore the NOAEL for reproduction was the highest dose tested of 8 mg/kg bw/day.

The effects of fenpyroximate on the development were examined in a teratology study in rat and a teratology study in rabbit preceded by a preliminary range-finding study (considered as supplementary).
In rats, maternal and embryofoetal NOAELs were the dose level of 5 mg/kg bw/day based on decreased body weight gain and reduced food consumption in dams, and an increased incidence of additional thoracic rib(s) in the foetuses at the highest dose level of 25 mg/kg bw/day.

In rabbits, impairment of maternal condition as body weight loss, reduced food and water consumption, and reduced faecal output was observed at 5 mg/kg bw/day, the highest dose tested. Control data for the incidence of litter resorption were provided in addendum 4 to volume 3 dated September 2007 and the experts agreed with the rapporteur Member State, to consider litter resorption as spontaneous finding in single animals, and not treatment related. An increased incidence of slightly folded retinas was apparent at the high dose level. Based on these findings, both maternal and foetal NOAELs were the dose level of 2.5 mg/kg bw/day as confirmed by the meeting.
No teratogenic effect was observed in either rats or rabbits.

2.7. NEUROTOXICITY

An acute delayed neurotoxicity study in hen was conducted with fenpyroximate at 5000 mg/kg bw, no overt or histopathological change was found that could be attributable to a neurotoxic effect of the active substance.

2.8. FURTHER STUDIES

Metabolites

During plant metabolism studies, metabolites M-1 (Z-isomer of fenpyroximate) and M-12[13] (both minor rat metabolites), were found at levels ≥ 10% of the applied radioactivity (refer to point 3.1.1); acute oral toxicity was tested in these two metabolites. The acute oral toxicity of M-1 is approximately in the same range as the parent with a LD_{50} of 607 mg/kg bw (in the rat); metabolite M-12 showed a lower toxicity than the parent with a LD_{50} higher than 5000 mg/kg bw.
Main concerns remained on the isomer ratio obtained in rat versus plant metabolism. In rat, 0.76% of the Z isomer and 32.8% of the E isomer were found in the faeces, thus the shift from E to Z isomer seems to be low. A data gap was identified by the experts on a possible shift from E to Z isomer in animals and animal feed to show if the reference value of the E isomer could be used for the Z isomer.

Acute toxicity study in dogs

An acute toxicity study in dogs (1 day and 5 days) was presented in addendum 1 to volume 3, dated March 2007, to find a basis for the derivation of the ARfD. The NOAEL was 2 mg/kg bw based on diarrhoea observed at 5 mg/kg bw and up.

2.9. MEDICAL DATA

The concentration of fenpyroximate in air at the working place in the factory and the exposure amount of fenpyroximate on workers were monitored in 1991, 1993, and between 1994 and 1999; based on the medical surveillance no clear change induced by fenpyroximate was observed in any of

[13] M-12 : tert-butyl (*E*)-4-[(3-methyl-5-phenoxypyrazole-4-yl)-methylene- aminooxymethyl]benzoate

the workers. Eyes and skin irritation was found in the workers engaged in manufacturing fenpyroximate 5% SC at an early stage of the manufacturing process (1991).
Eye irritation was found in farmers who used fenpyroximate 5% SC in citrus field (but not another crop): 23 cases were reported in 1991 and 3 cases in 1992. The incidence of eye irritation seems to have decreased with the use of glasses and goggles that were recommended from 1992 on.
No clinical case or poisoning incidents have been reported from possible exposure to fenpyroximate amongst the general population.

2.10. ACCEPTABLE DAILY INTAKE (ADI), ACCEPTABLE OPERATOR EXPOSURE LEVEL (AOEL) AND ACUTE REFERENCE DOSE (ARFD)

ADI

The ADI for fenpyroximate was established at 0.01 mg/kg bw/day based on the NOAEL of 0.97 mg/kg bw/day from the 2-year, rat study and an assessment factor or 100.

AOEL

The rapporteur Member State proposed in the DAR an AOEL of 0.008 mg/kg bw/day based on the NOAEL of 1.3 mg/kg bw/day from the oral 90-day study in rat, a correction factor for oral absorption of 60% and a safety factor of 100, supported by the overall oral NOAEL set for the dog's studies.
The meeting discussed intensively on this issue, considering kinetic properties of fenpyroximate (see point 2.1) together with its potentially higher toxicity when inhaled. The oral absorption value was not considered to reflect the actual bioavailability of the active substance. To obviate this concern, two proposals were considered, either to increase the safety factor over the NOAEL from the oral study or to use directly the NOAEL from the inhalation toxicity study with the general safety factor. It was noted that the results of both approaches would lead to similar values, and in this case, the use of the increased safety factor should be avoided.
The meeting agreed to set **the AOEL at 0.005 mg/kg bw/day** based on the 4-week inhalation study in rats with a NOAEL of 0.54 mg/kg bw/day (2 mg/m^3) and an assessment factor of 100.
EFSA note: Although no expert expressed his/her disagreement with this decision during the experts meeting, including the rapporteur Member State expert, the rapporteur Member State indicated in the addendum 6 to volume 3 (January 2008) that he doesn't support the AOEL set by the PRAPeR meeting.

ARfD

In the DAR an ARfD of 0.01 mg/kg bw was proposed, based on the LOAEL of 2 mg/kg bw/day from the oral 90-day study in dog and a safety factor of 200, which was supported by the 52-week study in dogs and the oral 90-day study in rat.
An acute toxicity study in dog was provided in the addendum 1 to volume 3 of march 2007 (refer to point 2.8) and the rapporteur Member State proposed a revised **ARfD of 0.02 mg/kg bw**, considering

the NOAEL of 2 mg/kg bw from this study and a safety factor of 100. No further discussion was considered necessary.

2.11. DERMAL ABSORPTION

Only one *in vivo* study in (male) rats is available, which was conducted with the active substance in a blank formulation. The high dose corresponded to the concentration of fenpyroximate in the representative SC formulation (5.2%); however the highest dilution was not equivalent to the lowest spray concentration. The meeting agreed with the proposal of the rapporteur Member State, to consider, as a worst case, the results obtained after a 24-hour exposure. However, it was considered that a **7% dermal absorption when handling the concentrate formulation** should be considered additionally to **24% when handling the spray dilution**.

2.12. EXPOSURE TO OPERATORS, WORKERS AND BYSTANDERS

The representative plant protection product Kiron (code NNI-850 flowable-R) is a suspension concentrate (SC) containing 51.2 g fenpyroximate/L.
Exposure data were recalculated by the Rapporteur Member State in the addendum 6 to vol.3, (January 2008), since the values of the AOEL and dermal absorption had changed (refer to point 2.10 and 2.11).
Kiron is an acaricide applied as a single application in pome fruits, grapes and beans. The use of a tractor with airblast sprayers in pome fruits and grapes, or hand held equipment in grapes was considered; in beans, conventional field crop sprayers with hydraulic boom and nozzles were considered. According to the representative uses, the maximum applied dose is 0.1152 kg fenpyroximate/ha, corresponding to 2.25 L product/ha in grapes and pome fruits, and 0.1024 kg fenpyroximate/ha corresponding to 2.0 L product/ha in field beans.

Operator exposure

For the UK POEM, a container size of 5 L (wide neck) was used (tractor mounted) or 1 L (hand held applications); default value for work rate is 15 ha/day (high crop, tractor mounted), 1 ha/day (hand held) or 50 ha/day (field crop, tractor mounted applications) and for operator body weight is 60 kg; a worst case application volume of 500 L spray/ha was considered.
According to the German model, default value for work rate is 8 ha/day (high crop, tractor mounted), 1 ha/day (hand held) or 20 ha/day (field crop, tractor mounted applications) and for operator body weight is 70 kg.

According to the UK POEM model calculations, the exposure of operators is above the AOEL even if PPE (gloves during mixing/loading and application) are used.
According to the German model, the exposure is below the AOEL for field crop, tractor mounted, applications and high crop, hand held applications only when PPE are worn (gloves during

mixing/loading & application, and coverall and sturdy footwear during application). For high crop, tractor mounted airblast sprayers, operator exposure is above the AOEL (112% of the AOEL), when the same PPE are used.

Estimated operator exposure presented as % of AOEL (0.005 mg/kg bw/day)

High crop, tractor-mounted air blast sprayer	**No PPE**	**With PPE during M/L**	**With PPE during M/L & application**
UK POEM	2341	2261 (a)	1598 (a)
German model	776	733 (a)	112 (b)
High crop, hand held sprayer	**No PPE**	**With PPE during M/L**	**With PPE during M/L & application**
UK POEM	3763	1493 (a)	995 (a)
German model	803	336 (a)	66 (b)
Field crop, tractor-mounted sprayer	**No PPE**	**With PPE during M/L**	**With PPE during M/L & application**
UK POEM	923	696 (a)	122 (a)
German model	386	288 (a)	22 (b)

(a) PPE: gloves

(b) PPE: gloves (M/L & application), protective garment and sturdy footwear (application)

Worker exposure

A worst-case scenario was considered by the rapporteur Member State according to Hoernicke *et al.* (1998). The following default assumptions were considered: dislodgeable foliar residue level of 1 µg/cm2 x kg as/ha, transfer factor of 15.000 cm^2/person x h for grapes and of 10.000 cm^2/person x h for pome fruits and beans, work rate of 8 hours, and a worker body weight of 70 kg. The exposure of re-entry workers without protection (no PPE) and with additional protection (with PPE) assuming a penetration factor of 5% through clothes and gloves were considered for the re-entry scenarios.

The systemic exposure of re-entry workers after the application in grapes, pome fruits and beans, once the spray has dried, was below the AOEL only if protective clothing are used during re-entry.

Estimated worker exposure presented as % of AOEL (0.05 mg/kg bw/day)

Scenario	**No PPE**	**With PPE** (a)
Grapes	949	48
Pome fruits	632	32
Beans	562	29

(a) assuming a penetration factor of 5% through clothes and gloves

Bystander exposure

For the calculation of the bystander exposure, drift data according to Ganzelmeier (2000) were used with the following assumptions: maximum drift deposit of 11.81% for 10 m distance in orchards (early application), maximum exposure time of 10 minutes, an exposed area of 1 m^2/person (assuming a bystander wearing a short-sleeved shirt and short trousers as a worst case) and a body weight of 60 kg.

Adding the potential dermal and inhalation exposures, bystander exposure for each high crop, tractor mounted air blast sprayer and high crop, hand held applications represented **109% of the AOEL**.

For field crop, tractor mounted application, bystander exposure represented **2.4% of the AOEL**.

3. Residues

Fenpyroximate was discussed by the experts in residues in October 2007 (PRAPeR 35).

3.1. NATURE AND MAGNITUDE OF RESIDUES IN PLANT

3.1.1. PRIMARY CROPS

The metabolism of fenpyroximate has been investigated in citrus, apples, grapes and snap beans. These studies were conducted in accordance with the representative use patterns supported by the notifier. The compound was labelled either in the pyrazole or the benzyl ring, in order to provide sufficient information on its metabolism.

In fruits the metabolic pattern for PHIs ranging from 14 to 28 days is dominated by the parent compound (representing 55 to 79 % of the TRR) and its Z-isomer (representing 3 to 18 % of the TRR). During this time frame, the observed ratios between E- and Z-isomers ranged between 96/4 and 77/23. Generally the (E)/(Z) ratio decreased with time, as confirmed by samples collected at 57 days of PHI in the apple and grape study, and revealing a slow shift from E- to Z- isomeric forms of fenpyroximate. This shift was also observed in leaves, and in case of citrus and apple leaves, more extensively than in fruits. Fourteen other metabolites, individually present in low amounts were identified. All these metabolites were occurring at less than 10 % of the TRR for PHIs of 28 days or less, except one, metabolite M12, which was present in citrus fruits at about 12% of the TRR. For longer PHIs (57 days), the relative amount of metabolites to the parent was higher.

The metabolic pattern in citrus, apples and grapes was essentially similar.

In snap beans 7 days after application of fenpyroximate, parent compound and its Z-isomer were the only identified compounds, representing about 90 and 5% of the TRR respectively.

Based on the structure of metabolites identified in fruits the metabolic pathway of fenpyroximate can be considered as elucidated and proceeds through ester hydrolysis of the *tert*-butyl moiety, oxime ether cleavage, *N*-demethylation and oxidative processes.

Generally the routes of metabolism in plants were also observed in rats and it can be considered that the toxicity of metabolites is covered by the toxicity studies with the parent compound. In addition

acute toxicity studies were conducted with fenpyroximate Z-isomer as well as with metabolite M-12. These studies suggest that the acute toxicity of the Z-isomer is similar to that of parent compound while metabolite M-12 is less toxic (Refer to point 2.8).

Considering this, and based on the residue pattern in the 28 days following application which is representative of the supported uses, the residue definition for plant products for monitoring can be restricted to the parent compound.

Inclusion of its Z-isomer in the residue definition for risk assessment was discussed in the expert meeting. Its actual occurrence in practical conditions is low. Field trial data for representative uses show that the Z-isomer may be present in commodities at harvest at levels close to the analytical limit of quantification (LOQ, 0.01 mg/kg) one order of magnitude below those of parent compound. The (E)/(Z) isomer ratio consumer is typically exposed to is 90/10. Nevertheless as mentioned under 2.8, information is necessary to confirm that the toxicological reference values of fenpyroximate can be used for the Z-isomer. Provisionally the expert meeting on residues decided to consider this metabolite as toxic as the parent and to include it in the residue definition for risk assessment. No conversion factor is necessary.

Field supervised residue trials have been submitted in support of the representative uses on pome fruits and grapes in Northern Europe and on beans with pods in Southern Europe. Further supervised residue trials should be submitted to support the representative use in pome fruits and grapes in Southern Europe. No data are available for beans without pods.

In addition to this, most of residue trials on apples in Northern Europe were rejected for MRL setting on the ground that two applications instead of one were performed. These 2 applications occurred with an interval of approximately 1 month. Given the slow rate of degradation of the Fenpyroximate, it is assumed that the results overestimate potential residues when the product is applied in accordance with the supported use pattern. Nevertheless the results of these trials can be used for risk assessment purpose because they represent a worst case.

Trials conducted in grapes were also performed with two applications. However in this case the interval between applications was about 3 months, making the contribution of the first application to the final residue very minor, due to the dilution effect resulting from the bunch growth.

Fenpyroximate, its Z-isomer and in a number of cases metabolite M12 were analysed on mature commodities.

Fenpyroximate was confirmed to be the essential constituent of the residue at harvest. Median residues in pome fruits, grapes and beans with pods were around 0.1 mg/kg. Only in some cases residues of its Z-isomer were present in amounts slightly above the LOQ (0.01 mg/kg). Metabolite M12 was never present in quantifiable amounts.

In addition, a unit to unit variability study has been conducted in apples with individual analysis of 130 individual units. Within the conditions of the study a variability factor of 2.2 was calculated.

The reliability of the submitted residue data is supported by storage stability studies demonstrating that residues of fenpyroximate are stable under deep-freeze conditions up to 540 and 360 days respectively. This conclusion was agreed by the expert meeting despite the fact that the submitted

studies showed an important variability in residues found in fortified samples at different time points as well as in procedural recoveries. No unambiguous trend to degradation along time could however be concluded from the data. As far as the storage stability of the Z-isomer is concerned, the expert meeting did not draw any conclusion, but the erratic results could at least partly be due to re-isomerisation to the (*E*)-configuration as observed in a storage stability study in hops. This should be reconsidered in case further toxicological assessment would come to the conclusion that the Z-isomer needs to be considered more toxic than fenpyroximate.

The effect of processing on the nature of fenpyroximate residues is not known and should be investigated. However studies are available on the transfer of unchanged fenpyroximate residues to commodities processed from apples (apple juice, pomace and sauce) and from grapes (wine). These studies, as expected from the physicochemical properties of the active substance, resulted in all cases in residues below the LOQ in apple juice and wine (0.01 to 0.05 mg/kg, depending on the method of analysis). Residues were transferred to the solid fractions with a calculated transfer of 3 for wet pomace. These studies did not indicate any conversion of fenpyroximate to its (*Z*)-isomer.

3.1.2. SUCCEEDING AND ROTATIONAL CROPS

Transfer of soil residues to succeeding crops does not need to be considered for apples and grapes which are permanent crops. Beans may be followed by a different crop. Fenpyroximate exhibits moderate to high persistence in soil. Field DT50 values (from 4 Trial sites in Germany) ranged from 10 to 17 days with the related field DT90 values being 32 to 55 days. The major soil metabolite M-3 had laboratory DT50 of 25-68 days (DT90 84-225 days) (see section 4.1.2). Therefore the potential for uptake of soil residues, particularly M-3, by succeeding crops cannot be excluded and should, according to EU residues guidance[14], be addressed for beans where the PHI requested is 7 days. A data gap was therefore identified by EFSA.

3.2. NATURE AND MAGNITUDE OF RESIDUES IN LIVESTOCK

The metabolism of fenpyroximate has been investigated in lactating goats. The observed metabolic pathways consists in oxidation of the *tert*-butyl moiety leading to alcohol and acid derivatives, ester hydrolysis of the *tert*-butyl moiety, oxime ether cleavage of the compound and *N*-demethylation of the pyrazole ring. The metabolic pattern differs from tissue to tissue. Parent compound was found to be a major constituent of the residue in milk, muscle and fat. In these tissues additional major metabolites were also identified (metabolite M-21 in milk and Fen-OH[15] in muscle and fat). In liver and kidneys the metabolic pattern contained 2 major metabolites (M-3 and its desmethyl derivative[16]).

[14] SANCO 7524/VI/95 Rev2, 22 July 1997
[15] Fen-OH : 2-hydroxymlethyl-2-propyl*(E)*-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)-methylene-aminooxymethyl]benzoate
[16] M-3 desmethyl derivative : (E)-4-[3-methyl-5-phenoxypyrazole-4-yl)-methyleneaminooxy-methyl]benzoic acid

The (Z)-stereoisomer of fenpyroximate was identified in one out of 5 milk sample and in liver. Metabolism in ruminants and rat can be considered as similar.

Considering this residue pattern, 5 compounds were considered for inclusion in the residue definition for risk assessment in ruminant commodities: parent compound, metabolites M-21, Fen-OH, metabolite M-3 and its desmethyl derivative. Account was taken of feeding studies analysing all these compounds and showing that in contrast to the metabolism studies neither metabolite M-21 nor the M-3 desmethyl derivative were present in tissues above the LOQ (0.01 mg/kg), even for an exposure level 1 order of magnitude above the predicted practical level, while the other compounds reached clearly measurable levels at 1N dose in at least one tissue.

The residue definition for risk assessment initially proposed by the RMS was the sum of fenpyroximate, Fen-OH and metabolite M-3, expressed as fenpyroximate. Given the structural similarity of these compounds with fenpyroximate all were considered as toxicologically equivalent to the parent compound. In addition and for the same reason as for plant commodities, Z-isomers of these compounds were recommended by the expert meeting on residues to be included as well in the residue definition as there is a potential consumer exposure resulting either from production of these isomers through animal metabolism or from their transfer to animal commodities from plant commodities.

The residue definition for monitoring was also discussed in expert meeting. There is no indicator compound valid for all edible tissues. Despite of the proposal of the RMS to select the parent compound for enforcement analysis as it represents an appropriate marker for milk, muscle and fat, the expert meeting recommended to define the residue for monitoring as metabolite M-3 which is the major compound found in liver and kidneys. This was based on the fact that residue levels of metabolite M-3 in liver and kidneys are significantly higher than residues of the parent compound in milk and other tissues. The EFSA is however of the opinion that the initial proposal of the RMS to use the parent compound as indicator compound for monitoring was the most suitable option in the specific cases of milk, muscle and fat.

Conversion factors between residue definitions for risk assessment and monitoring were not discussed by the expert meeting.

No metabolism studies were conducted in pigs and laying hens as these species are not supposed to be exposed to fenpyroximate residues resulting from the peer-reviewed representative uses.

Ruminants can be exposed to fenpyroximate residues through consumption of apple pomace. The notifier indicated that the representative use on beans concerns beans for human consumption only, as seeds or pods. Field beans are therefore not covered and do not need to be considered in potential livestock exposure.

A feeding study was conducted in dairy cows with animal exposure reflecting the potential critical exposure through apple pomace. Residues of metabolite M-3 amounted to about 0.2 mg/kg in liver and kidneys and were below the LOQ (0.01 mg/kg) in other tissues. Residues of fenpyroximate were analysed together with residues of Fen-OH and were below the LOQ (0.01 mg/kg) in all tissues but fat where they were quantified at the LOQ level (0.01 mg/kg).

3.3. CONSUMER RISK ASSESSMENT

Chronic and acute exposure assessments were carried out in accordance with the current WHO guidelines.

It must be kept in mind that this risk assessment is valid under restriction that no degradation products of toxicological concern are formed during processing and that it can be demonstrated that the toxicological reference values of fenpyroximate can be used for its (Z)-isomer.

Chronic exposure.

TMDI and EDI calculation were performed by the RMS using the WHO typical European diet for adult consumers and the German national diet for the 2 to <5 year old children (VELS project). Residues in table and wine grapes, beans with pods and animal products were considered to be at the level of respective MRL/HRs or STMRs. For pome fruits a potential MRL of 0.3 mg/kg was used, based on the current data base (worst case with 2 applications). Processing factor for apple juice and wine of 0.33 (which is a very conservative figure) were used where appropriate. No contribution from rotational crop was considered as no or low transfer of soil residues is provisionally expected. Based on these assumptions, all calculated TMDIs and EDIs resulting from the representative uses were clearly below the ADI for both considered diets.

Acute exposure.

Assessment of the acute exposure to residues of fenpyroximate in apples, pears, wine and table grapes, beans and animal products is relevant for all groups of the population and has been assessed by the RMS using large portion consumption data for German toddlers as well as for 10 population subgroups (including infants, toddlers, children and adults) in UK. Calculations were carried out considering residues of fenpyroximate in composite samples of treated commodities at the level of the HR found in supervised trials (which is lower than the proposed MRL). The transfer factors determined for wine was used. In addition, in the latest assessment provided by the RMS the unit to unit variability factor used was 3 for apples and pears (based on the provided unit to unit variability study) and 5 for table grapes. Under these conditions all calculated NESTI were below 50 % of the ARfD of fenpyroximate, the highest acute exposure being calculated for German toddlers consuming table grapes. The expert meeting did not endorse the calculations based on the variability factor of 3 for pome fruits.

In an opinion[17] adopted in 2005, the EFSA PPR panel estimated the probability that the use of a variability factor of 3 is an underestimate of the actual variability to be about 34 % in case of supervised trials and about 65 % in case of market samples, while using a variability factor of 5

[17] Opinion of the Scientific Panel on Plant Health, Plant protection products and their Residues on a request from Commission related to the appropriate variability factor(s) to be used for acute dietary exposure assessment of pesticide residues in fruits and vegetables (Adopted on 16 February 2005). http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178620775732.htm .

means a probability of underestimation of 2 % in case of supervised trials and of 10 % in case of market samples. In the same opinion the origin of the unit to unit variability was considered to be due to a great variability of factors including the application, the crop, and the environment.
Therefore National Estimates of Short Term Intakes (NESTI) were recalculated by EFSA for pome fruits and grapes using the MRL and, for pome fruits, a higher variability factor. The calculations were made on the basis of the EFSA data base for acute intake assessment, compiled from information provided by several Member States. The EFSA data base uses for each commodity the most critical national combination of large portion consumption and unit size. For this exercise, residues in pome fruits and grapes were considered to be 0.3 mg/kg (representing the MRL proposal for grapes and reflecting for pome fruits the current worst case data base with 2 applications). A variability factor of 5 was used in each case. Based on this, the calculated NESTIs were in the range of the ARfD for children (reaching 98, 98 and 108% of the ARfD, for table grapes, pears and apples respectively). For grapes, it is the opinion of EFSA that there is a management option to set the MRL at 0.2 mg/kg, considering the data base. This alternative level would offer a wider margin with regard to the ARfD.

3.4. PROPOSED MRLS

On the basis of the results of supervised residue trials and their analysis according to statistical methods recommended by the current guidelines as well as feeding studies in dairy cows, the following MRLs are proposed:

Fenpyroximate:

Commodity	***Proposed MRL (mg/kg)***
Pome fruits	No proposal, due to the lack of appropriate data
Grapes	0.3
Beans with pods (fresh)	0.5
Beans without pods (fresh)	No proposal, due to the lack of appropriate data

Proposals on grapes are valid for use of fenpyroximate in Northern Europe only.

Metabolite M-3:

Commodity	***Proposed MRL (mg/kg)***
Ruminant liver and kidneys	0.3
Ruminant meat and fat	0.01*
Milk	0.005*

* Indicates that the MRL is proposed at the level of the LOQ

4.1. FATE AND BEHAVIOUR IN SOIL

Fenpyroximate was discussed at the PRAPeR experts' meeting for environmental fate and behaviour PRAPeR 32 in October 2007.

4.1. FATE AND BEHAVIOUR IN SOIL

4.1.1. ROUTE OF DEGRADATION IN SOIL

Soil experiments (5 different soils, 3 originating in Germany and 2 in Japan) were carried out under aerobic conditions in the laboratory (20-25°C at 40-82 % maximum water holding capacity (MWHC) in the dark. The formation of residues not extracted by methanol or methanol:water followed by basified acetonitrile were a sink for the applied pyrazole and benzyl ring-^{14}C-radiolabels (23.5-58.3% and 21-41 % respectively of the applied radiolabels (AR) after 100-112 days). Mineralisation to carbon dioxide of these radiolabels was only measured in the 2 Japanese soils and accounted for ca. 17% AR and 51-65% AR respectively after 112 days. The major (>10 % AR) extractable breakdown product present was M-3 (max. 2.6-10.8%AR at 14-32 days). The minor (<10 % AR) but non transient extractable breakdown product (that accounted for > 5 % AR at 2 consecutive sampling times) M-11 was also identified (max. 8.2-8.8%AR at 28 days). The member state experts discussed if this database was sufficient to conclude on the route of degradation in soil, as in the German studies a full material balance was not possible as mineralised carbon dioxide was not trapped, and there was some uncertainty whether the properties of the Japanese soils investigated could be considered representative of typical agricultural soils in the EU. They concluded that in this case, as the qualitative nature of the pattern of metabolite formation and the formation of unextracted residues in the Japanese and German soils was comparable and as mineralisation rates in the Japanese soils were clearly much greater than 5 % AR at 100 days[18], that it would be expected that mineralisation rates in the German soils would also have been comparable to that observed in the Japanese soils and that using all the available data, the requirement for the route of degradation to be appropriately characterised was fulfilled by the available data.

Data on anaerobic degradation in soil in the laboratory were provided which indicated that fenpyroximate degraded to the major metabolites, M-3 (max. 50 % AR at 59 days), M-16[19] (max. 58%AR at 182 days), M-8 (max. 21%AR at 182 days) and M-11 (max. 15%AR at 182 days), mineralisation was minimal. For the applied for intended uses anaerobic soil conditions at the time of application are unlikely. However in soils where parent fenpyroximate dissipates more slowly anaerobic conditions cannot be excluded completely in relation to the requested use on Pome fruit. Member states might therefore wish to take the formation of anaerobic soil metabolites into account in their national assessments. This was not done in the available EU assessment discussed in this conclusion. In a laboratory soil photolysis study, fenpyroximate was converted to it's Z isomer (M-1,

[18] A uniform principles (annex VI) unless criteria.
[19] M-16: 4-hydroxymethylbenzoic acid

max. 36 % AR at 30 days, study end). In field dissipation studies M-1 was analysed for but was not detected above the limit of analytical determination (0.01mg/kg, which represents ca. 7 % of the initial measured fenpyroximate residue in the trials).

4.1.2. PERSISTENCE OF THE ACTIVE SUBSTANCE AND THEIR METABOLITES, DEGRADATION OR REACTION PRODUCTS

The rate of degradation of fenpyroximate was estimated from the results of the studies described in 4.1.1 above and in an additional loamy sand soil. DT_{50} were: 26-159 days (single first order non linear regression, 20-25°C 40-82 % MWHC, 6 different soils). After normalisation to FOCUS reference conditions[20] (20°C and -10kPa soil moisture content) this range of single first order DT_{50} was 29.9-159 days (geometric mean that is appropriate for use in FOCUS modelling 52.3 days). (See addendum 6 to the DAR.)

Aerobic M-3 and M-11 soil DT_{50} values which were estimated as dissipation rates (represent the sum of formation and degradation rate constants) estimated from the time point of the maximum observed concentration, in the laboratory studies where fenpyroximate was dosed were 25.2 to 68 days (results from 3 soils, geometric mean that is appropriate for use in FOCUS modelling 33.5 days) and 86 days (result from 1 soil) respectively. (See addendum 6 to the DAR.)
Field soil dissipation studies (bare soil) were provided from 4 sites in Germany where applications were made in May or June. Using the residue levels of parent fenpyroximate from the soil layers where it was detected (0-10cm 3 trial sites or 0-20cm at 1 site), single first order DT_{50} were 9.7-16.7 days. Residues of M-3 were analysed for in samples from all the trial sites but were detected at just 2 of the sites at a limited number of sampling times at concentrations up to 0.02 mg/kg (representing 9-13 % of initial measured residue of fenpyroximate at these 2 trial sites). As already noted in section 4.1.1, the soil photolysis product M-1 was analysed for but not detected in these field studies.

The longest available field fenpyroximate single first order soil DT_{50} of 16.7 days was agreed by the experts from the member states for use in PEC soil calculations. For M-3 it was agreed it would be appropriate to use the longest aerobic laboratory decline DT_{50} value of 68 days.

4.1.3. MOBILITY IN SOIL OF THE ACTIVE SUBSTANCE AND THEIR METABOLITES, DEGRADATION OR REACTION PRODUCTS

The adsorption / desorption of fenpyroximate was investigated in 6 soils in satisfactory batch adsorption experiments. Calculated adsorption K_foc values varied from 40000 to 79500 mL/g, (mean 52067 mL/g, median 47650) (1/n 0.97 – 1.07, mean 1.03, median 1.04). There was no evidence of a correlation of adsorption with pH.

[20] Using section 2.4.2 of the generic guidance for FOCUS groundwater scenarios, version 1.1 dated April 2002.

The member state experts agreed that the adsorption / desorption behaviour of the Z isomer of fenoyroximate (M-1) that has the potential to be formed in the presence of sunlight would be expected to be comparable to that measured for the active substance.

The adsorption / desorption of metabolite M-3 was investigated in 5 soils in satisfactory batch adsorption experiments. Calculated adsorption $K_f$oc values varied from 325 to 779 mL/g, (mean 513 mL/g) (1/n 0.69 – 0.86, mean 0.77). There was no evidence of a correlation of adsorption with pH.

The adsorption of metabolite M-11 was estimated using a quantitative structure activity relationship (QSAR) approach (EPT-SUITE software CSR 2000). The value estimated was 250 mL/g. The member state experts agreed that this value (in combination with a default 1/n value of 0.9) could be used in groundwater and surface water PEC calculations in combination with the other assumptions in the available assessments for the applied for intended uses assessed in the DAR as the overall combination of input values used in the calculation was likely to be conservative. However they agreed that this conclusion should identify a data gap for batch adsorption measurements in 3 soils for this metabolite. The reason behind this agreement was to obtain a more reliable indication of this key value for environmental exposure assessment parameter, to be used when assessing other uses that may be requested in member states, should fenpyroximate be included in annex 1.

The adsorption of metabolite M-8 (major (>10%AR) in the water phase but not the sediment phase of sediment water systems see section 4.2.1) was reported (in addendum 6 to the DAR) to have been estimated using a QSAR approach (EPIWIN version used not indicated). The value estimated was 2430mL/g. However this value doe not seem reasonable based on the partitioning behaviour observed in the sediment water systems. Therefore the experts agreed that the PECs in surface water should also be calculated assuming a conservative low adsorption value of 10mL/g (default) in line with the aquatic guidance document[21].

4.2. FATE AND BEHAVIOUR IN WATER

4.2.1. SURFACE WATER AND SEDIMENT

Fenpyroximate was essentially stable under sterile hydrolysis conditions at 25°C at pH 5 and 7 and 9. In a laboratory study where the aqueous photolysis of fenpyroximate was investigated under sterile pH 7 conditions, a rate of degradation (single first order DT_{50}) of 1 hour equated to June sunlight at 55°N was determined. Fenpyroximate was converted to its Z isomer (M-1) which accounted for 59 % AR after 4 hours in this test system, it subsequently degraded with an estimated DT_{50} of 10.5 hours to M-11.

[21] Sanco/3268/2001 rev. 4 (final) 17 October 2002.

A ready biodegradability test (OECD 301B) indicated that fenpyroximate is 'not readily biodegradable' using the criteria defined by the test.

In water-sediment studies (2 systems studied at 20°C in the laboratory) fenpyroximate partitioned from the water to the sediment (first order water dissipation estimated to have DT_{50} in the range 2.8-3.1 days). Fenpyroximate degradation in the whole systems was calculated to be 23.4 to 34.1 days (geomean value of the two systems 28.8 days). The kinetic fitting to derive these values that utilised ModelMaker that were agreed by the member state experts can be found in Addendum 5. The major (>10%AR) metabolites formed were: M-3 (max. 13.3-20.8 % AR at 14 days after treatment, in water), M-11 (max. 16.8-24.3 % AR at 61-105 days after treatment, in sediment) and M-8 (max. 16.6-27.7 % AR at 30-61 days after treatment, in water). The terminal metabolite, CO_2, accounted for only 0.9-1.9 %AR of the pyrazole ring radiolabel by 105 days. Residues not extracted from sediment by methanol and methanol:water were a sink representing 23-28 % AR at study end (105 days). The experts agreed that for fenpyroximate it was appropriate to use the whole system geomean DT_{50} of 28.8 days for FOCUSsw scenario calculation input for the sediment compartment and 1000 days for the water compartment as outlined in Addendum 5. For the metabolites M-3, M-11 and M-8 default DT_{50} of 1000 days and maximum whole system observed formation fractions of 25.3, 30.4 and 34.3 % were agreed as appropriate for use in FOCUSsw step 1&2 calculations (see addendum 6).

The member state experts discussed the fact that sediment water experiments had not been provided with test substance radiolabelled in the benzyl ring. They concluded that as M-11 was a major metabolite (in sediment) the cleavage products also formed when M-11 was formed that would contain the benzyl moiety (likely to be M-16 and related products), would also be expected to be major metabolites in natural sediment water systems. The environmental exposure assessment that was available did not address this issue adequately. The experts therefore identified a data gap; for the applicant to provide information on the potential level of metabolites containing the benzyl moiety that will occur in natural sediment water systems.

FOCUS surface water modelling was evaluated up to step 4 for fenpyroximate and step 2 for the metabolites M-3, M-11 and M-8. The peer review agreed these PEC surface water and sediment as presented in addendum 6 (excluding the values with drift reducing nozzles) were appropriate for use in risk assessment. At step 4 the only mitigation considered was spray drift reducing measures including no spray zones of up to 70 m, that were implemented following the methods prescribed by FOCUSsw guidance. It should be noted that there is uncertainty in the PEC for surface water and sediment presented in addendum 6 where no spray buffer zones are combined with low drift nozzle reductions as whilst it is accepted that drift reducing nozzles may substantially reduce spray drift, the magnitude of the drift reduction when combined with no spray buffer zones is currently unclear as discussed in the Draft FOCUS Report on Landscape and Mitigation factors in aquatic ecological risk

assessment[22] and the PPR Opinion[23] on the report. Therefore the values where low drift nozzles were considered in combination with no spray buffer zones are not included in appendix 1.

M-11 is a major metabolite in sediment but no sediment PEC are presented for this metabolite in Addendum 6 as was intended by the member state fate and behaviour experts. However, in this case, the member state ecotoxicology experts agreed that the risk to sediment dwellers from exposure to M-11 would be low, based on the low toxicity to aquatic organisms including *Daphnia* for the metabolites M-3 and M-8 proposed as a precursor to and a metabolite of M-11 respectively. Therefore EFSA accepts that in this case it is not necessary to have PEC in sediment for M-11 to finalise the EU level risk assessment.

The member state fate and behaviour experts considered that the surface water exposure from the photolysis conversion product M-1 (Z isomer of fenpyroximate) would be low relative to the calculated fenpyroximate concentrations, due to the expected rapid partitioning of a high proportion of the fenpyroximate to sediment limiting the proportion of the fenpyroximate in the upper layers of surface water where there is potential for photolytic breakdown.

4.2.2. POTENTIAL FOR GROUND WATER CONTAMINATION OF THE ACTIVE SUBSTANCE THEIR METABOLITES, DEGRADATION OR REACTION PRODUCTS

The applied for representative use of applications to pome fruit and grapes was simulated using FOCUS PELMO 3.3.2 using the following input parameters: fenpyroximate single first order DT_{50} 48.7 days, K_{foc} 47650 mL/g (median value), 1/n=1.04; M-3 single first order DT_{50} 27.5 days, formation fraction from fenpyroximate 100% (conservative assumption), K_{foc} 465 mL/g, 1/n=0.78; M-11 single first order DT_{50} 71.4 days, formation fraction from fenpyroximate 100% (conservative assumption), K_{foc} 250 mL/g, 1/n=0.9. Whilst these input parameters are not exactly those agreed by the member state peer review, the experts considered that these values were comparable enough to accept the output of this modelling to support the groundwater exposure assessment. (The correct values would be as listed above except fenpyroximate single first order DT_{50} 52.3 days; M-3 single first order DT_{50} 33.5 days, K_{foc} 513 mL/g, 1/n=0.77; M-11 single first order DT_{50} 86 days)

Parent fenpyroximate and M-3 were calculated to be present in leachate leaving the top 1m soil layer at 80th percentile annual average concentrations of <0.001µg/L at all 9 FOCUS groundwater scenarios. For M-11 this range for the 9 FOCUS groundwater scenarios was <0.001-0.027µg/L, i.e. below the 0.1µg/L parametric drinking water limit (see the DAR). The member state fate and

[22] Sanco/10422/2005, version 1.0, May 2005
[23] Opinion of the Scientific Panel on Plant protection products and their Residues on a request from EFSA on the Final Report of the FOCUS Working Group on Landscape and Mitigation Factors in Ecological Risk Assessment, EFSA Journal (2006) 437, 1-30.
http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178620770123.htm

behaviour experts considered that the groundwater exposure assessment for parent fenpyroximate covered the potential groundwater exposure from the photolysis conversion product M-1 (Z isomer of fenpyroximate), particularly as it was not detected (>0.01mg/kg) in the available bare soil field dissipation studies.

4.3. FATE AND BEHAVIOUR IN AIR

The vapour pressure of fenpyroximate (<$1x10^{-5}$ Pa at 25°C) means that fenpyroximate would be classified under the national scheme of The Netherlands as very slightly volatile, indicating significant losses due to volatilisation would not be expected. Calculations using the method of Atkinson for indirect photooxidation in the atmosphere through reaction with hydroxyl radicals resulted in an atmospheric half life estimated at 8 hours (assuming an atmospheric hydroxyl radical concentration of $0.5x10^{6}$ radicals cm^{-3}) indicating the small proportion of applied fenpyroximate that will volatilise would be unlikely to be subject to long range atmospheric transport.

5. Ecotoxicology

Fenpyroximate was discussed in two meetings of experts on ecotoxicology - PRAPeR 33 in October 2007 and PRAPeR 38 in December 2007.

5.1. RISK TO TERRESTRIAL VERTEBRATES

As foreseen in the guidance document SANCO/4145/2000, the risk to birds was calculated for an insectivorous bird for the representative uses in vines and pome fruit. The risk was calculated for an insectivorous and a medium herbivorous bird for the representative use in beans.

The acute and short term risk to birds can be considered as low for all representative uses evaluated. The reproductive endpoint for mallard duck used for the long-term risk assessment was corrected in Addendum 5 (October, 2007) to a NOAEL of 40 mg/kg diet (3.65 mg as/kg bw/day). Based on the first tier assessment of the long term risk, a refinement is necessary for all the representative uses evaluated. Several refinement options are proposed by the applicant and will be discussed below.
The blue tit is proposed as a focal species to refine the risk to insectivorous birds in pome fruit and vines. For this focal species a PT (proportion of food taken in the treated area) of 0.61 for the orchard scenario and 0.25 for the vines scenario was proposed. Furthermore a PD (proportion of different food types in the diet) of 30% small leaf dwelling insects and 70% larger insects was proposed. The refinements were discussed in the ecotox expert meeting (PRAPeR 38). As regards orchards, the selection of the blue tit as a focal species was agreed. A PT of 0.61 was questioned by the meeting, based on recommendation by UK. They proposed at higher PT value of 0.79 due to a more

conservative statistical interpretation of the same Crocker[24] data. A dietary composition of 30 % and 70 % by weight of "large" and "small" arthropods respectively based on literature data was accepted by the expert meeting. The TER value of 2.3 presented in the list of endpoints is based on a PT value of 0.61 and thus remains below the Annex VI trigger of 5.
As regards vineyards, it was noted in the expert meeting that the reference given for the setting of PT in the DAR contained an extensive compilation of observations, however, not on level of individuals. The calculation for the blue tit without considering a PT refinement resulted in a TER of 1.4, as provided in Addendum 6 (January, 2008) after the expert meeting. A data gap is identified to refine the risk assessment for insectivorous birds in both orchards and vines.

Both the yellowhammer and the yellow wagtail are proposed as focal species to refine the assessment of the risk to insectivorous birds in beans. Low risk was identified for both species with refinements of PD and PT. The refined assessment was discussed in the expert meeting (PRAPeR 38). Yellow wagtail was considered a more appropriate insectivorous focal species for beans in South Europe in the expert meeting, because dietary data is available and the species breed throughout Europe. A PD of 89% 'large' and 11% 'small' arthropods (by weight) was agreed in the expert meeting, and is in line with previous risk assessments. Based on PD refinement, the risk to yellow wagtail is considered to be low for uses in beans (see addendum 5, October 2007 and addendum 6, January 2008).
To refine the risk for herbivorous birds in beans the grey partridge is proposed as a focal species. The appropriateness of the PD and PT values proposed in the DAR was discussed at the expert meeting (PRAPeR 38). Grey partridge was accepted as a relevant herbivorous focal species in beans in South Europe, as it was considered to cover the same ecological niche in South Europe as the more common red-legged partridge. The PT refinement for the grey partridge was based on a telemetry field study in Germany. The potential for extrapolation to Southern European conditions depends on comparable landscape structures and cannot be clarified. Consequently, the PT was not considered appropriate. The refinement of PD was based on literature data that is deemed still applicable as it is understood to reflect generic demands of a bird occupying a certain ecological niche and thus the expert meeting accepted the PD refinement. In the expert meeting RMS presented TER values based on corrected calculation of energy content in the mixed diet for grey partridge and the refined PD value. The TER value indicating a low risk to gray partridge was accepted in the expert meeting and were subsequently presented in Addendum 6 (January 2008).

The risk to mammals was calculated for a small herbivorous mammal in grapevine and pome fruit and for a medium herbivorous mammal in beans. Based on the first tier risk assessment the acute risk to herbivorous mammals can be considered as low for all representative uses evaluated. Without changing the conclusion of the risk assessment the TER was recalculated in Addendum 5 (September

[24] Crocker, D.R., et al. 1998. Contract PN0903: Improving the assessment of pesticide risks to birds in orchards; Objective 1: Use of radio-telemetry to monitor birds´ use of orchards. Central Science Laboratory, 1998, 1-39, CSL EH18/02 ! MO-01-003304

2007) with a corrected lower LD_{50} value of 245 mg/kg bw. A further refinement of the long term risk assessment is needed for all representative uses. Several refinement options are proposed by the applicant and will be discussed below.

As a first refinement step a refined f_{twa} of 0.42 is proposed, based on a DT_{50} of 7 days calculated as a mean value from measured residue data from plant leaves in several plant metabolism studies in citrus, apple and grapes. The expert meeting (PRAPeR 38) questioned the use of a refined f_{twa} because residue decline data was from different crops than the short grass and seeds used in the risk assessment. Furthermore, only six data points were used to calculate the geomean and the maximum DT_{50} in the residue data used was higher than the default 10 days. As no consensus was reached for refinement of the f_{twa} at the expert meeting, the TER calculation was repeated using the default f_{twa}. A revised risk assessment was provided in addendum 6 (January 2008).

Furthermore, a refinement of the crop interception for pome fruit and vine is proposed. Based on the BBCH stage, indicated in the table of intended uses, an interception factor of 70 % for both uses at the representative developmental stages is used in the refined risk assessment.

The hare is used as focal species in beans and. the bank vole is used for the representative uses in pome fruit and grapevine.

For the long-term risk to hares in beans, PD is set at 0.53 based on the assumption that hares will not eat bean leaves. The PD was questioned during the peer-review. Instead of refining the PD factor on the basis of generic assumptions, RMS proposed to introduce an interception factor in the calculation in the expert meeting. Assuming that only vegetation growing under the beans will be eaten and not the bean leaves themselves, an interception factor of 0.7 according to the FOCUSsw report can be used. The expert meeting accepted this approach in this specific case, and the risk to mammals in beans can be considered low based on the hare as focal species, unattractiveness of crop, and an interception factor of 0.7. However, there were concerns that other species may eat bean leaves and interception factors may differ depending on the cultivation types of the crop. In case of Annex 1 inclusion, MS may consider relevant focal species, crop type and agronomic practice for other uses. The refined risk assessment is provided in Addendum 6 (January 2008).

For the bank vole a PD of 0.2/0.2/0.6 for short grass/large insects/large seeds is proposed. It was noted at the expert meeting (PRAPeR 38), that the same PD values were accepted in the risk assessment on pyrimethanil used in apple orchards. Even though it was questioned in the expert meeting whether it is likely to have such a high amount of (cereal) seeds in an orchard, it was agreed for consistency reasons to use the PD data also used for pyrimethanil. Furthermore, it was clarified in the expert meeting that the arithmetic mean RUD value of 42.2 for small seeds (appendix II to the guidance document, SANCO/4145/2000) should be used in the risk assessment for bank vole, as it was considered that bank voles eat both small and large seeds. The revised risk assessment is presented in Addendum 5 (October 2007) and with a minor correction of the value for assimilation efficiency in Addendum 6 (January 2008). The risk to bank vole is considered low for uses in orchards and vine yard.

As the Log P_{ow} exceeds 3, the risk to birds and mammals from secondary poisoning was assessed. Based on the 'maximum PEC possible for low risk for aquatic organisms' this assessment the risk to earthworm- and fish-eating birds and mammals can be considered as low. The expert meeting (PRAPeR 38) considered that the 'maximum PEC' may change during the peer-review and the transparency of this approach was low. The meeting proposed to use Step 1 of FOCUSsw for the risk assessment. Such an assessment was provided in Addendum 6 (January 2008), still indicating a low risk to fish-eating birds and mammals. The risk assessment to earthworm-eating birds and mammals is also considered to be low.

Furthermore the risk to birds and mammals from ingestion of contaminated drinking water was calculated in Addendum 5 (October 2007) and agreed at the expert meeting with a minor correction of water ingestion (see Addendum 6, January 2008). The risk from drinking contaminated water is considered low.

5.2. RISK TO AQUATIC ORGANISMS

Fenpyroximate is very toxic to aquatic organisms both on an acute as on a chronic time scale. A similar toxicity to fish, algae and aquatic invertebrates was observed. Higher tier studies on fish growth in the presence of sediment and effects on total abundance and community composition of zooplankton also in the presence of sediment were presented in the DAR. The overall no observed effect concentration (NOEC) of the 'microcosm' study was considered to be 1.0 µg/L. This endpoint was compared to PECsw for Fenpyroximate at FOCUS Step 3 in the DAR. Use of the growth test with fish in presence of sediment was discussed in the expert meeting (PRAPeR 33/38). It was noted that the presence of sediment and aeration of the system would favour a high rate of dissipation. However, given the fast and very steep dose-response curve, it was agreed to express the NOEC as the geometric mean of measured initial concentration and concentration after 96 h at the 1.0 µg/L dose level. This approach reflects dissipation of fenpyroximate in the test vessel and produces an approximation of a 'twa-NOEC' (0.61 µg/L). The interval of 96 h was chosen in accordance with the test duration of the acute fish toxicity test, as mortality was the relevant observed parameter in the study (see Addendum 5 (October 2007)). For a refined aquatic risk assessment the expert meeting agreed that the twa-NOEC of 0.61 µg/L should be compared to initial FOCUS PEC's to avoid double counting of partitioning into sediment.

TER-values for all Focus Steps (1-4) based on the revised NOEC were provided in Addendum 6 (January 2008), in addition to TER-values for Step 1 for the most sensitive fish, algae and daphnid. Based on the available data the risk to aquatic organisms is considered low in all FOCUSsw Step 4 scenarios for all uses if sufficient large non spray buffer zones are included. Buffer zones of 70 m, 45 m and 20 m are required for pome fruit, vine and bean respectively.

The expert meeting (PRAPeR 33) agreed on a data gap for a Fish Full Life Cycle study, as all three triggers indicating the need for an FFLC test are met (BCF > 1000; DT_{90} > 100 d; LC_{50} < 0.1 mg/L). Results from the fish full life cycle study may change the conclusion of the aquatic risk assessment.

It should be noted as a general issue that the aquatic risk assessment for *Chironomus riparius* is based on nominal initial concentrations in water-spiked *Chironomus* study. This is deemed sufficient in the context of the intended uses with one application per year. However, it would not necessarily cover build-up of residues of the active substance in sediment if several applications per year were made or scenarios where the main exposure path was the entry of particle-bound residues via run-off or drainage. In such cases, it must be demonstrated by an applicant that the higher concentrations in sediment than in the current test would not lead to higher exposure of chironomids and, consequently, too high risk. E.g. by checking if maximum PECsed converted to water concentrations will be in excess of the global maximum PECsw or alternatively to base the risk assessment from multiple applications on a sediment spiked *Chironomus* study.

M-3 and M-8 are identified as major metabolites in surface water. Summaries of acute toxicity studies of both metabolites to fish including a risk assessment were provided in Addendum 5 (October 2007) and accepted in the expert meeting (PRAPeR 33). The risk from M-3 and M-8 is considered low.

Fenpyroximate and the metabolite M-11 were found in concentrations above 10 % in the sediment at or after 14 days in the water/sediment study. It was agreed in the expert meeting that since M-11 is structurally related to M-8, the potentially toxic effects are considered to be covered (see Addendum 5, October 2007 and Addendum 6, January 2007).

EFSA notes that the metabolite M-1 (Z isomer of Fenpyroximate) produced by photolysis was not specifically assessed in the DAR or during the review process. However, considering that the Z isomer is generated from the active substance and that exposure levels in natural water bodies are expected to be low compared to the active substance (see fate sedition 4.2.1), the risk to aquatic organisms is considered to be covered by the risk assessment of the parent substance.

No studies with aquatic higher plants are considered necessary as fenpyroximate is not an herbicide.

A study on the bioconcentration in fish is available as the logPow is above 3 for fenpyroximate. The resulting BCF is 1601 for the whole fish. All triggers for a 'biomagnification in aquatic food' chain risk assessment are met. Data gap was agreed in the expert meeting, that risk from biomagnification in aquatic food chains must be addressed.

A data gap was also agreed in the expert meeting that the risk to aquatic organisms from the expected major metabolites containing the benzyl moiety that will occur in natural sediment water systems needs to be addressed.

5.3. RISK TO BEES

Acute contact and oral toxicity studies with fenpyroximate are available. Furthermore a contact toxicity study with the formulation AE F094552 00 SC05 A107 and oral toxicity studies with the formulation AE F094552 00 SC05 A102 were provided. These formulations are considered to be representative for the lead formulation (see Addendum 5, October 2007). The HQ values calculated from the endpoints of these studies indicate a low risk to bees for both representative uses evaluated.

5.4. RISK TO OTHER ARTHROPOD SPECIES

The tested formulations are considered to be representative to the lead formulation Kiron. Standard laboratory studies with *Aphidius rhopalosiphi*, *Coccinella septempunctata*, *Aleochara bilineata*, *Pardosa* spp., *Poecilus cupreus*, and *Chrysoperla carnea* are available. At a tested dose rate of 25 g as/ha, 100 % mortality on *A. rhopalosiphi* was observed. No extended laboratory study with this species was submitted nor requested in the DAR. The exposure to *T. pyri* in the laboratory study did not meet the representative use rate. A new study was not required as it was clear already with lower exposure that *T. pyri* was a sensitive species. Only field studies are available for *T. pyri*. Nevertheless an extended laboratory study with this species was requested by the RMS as *T. pyri* is an indicator species used in the risk assessment for other species in the off-field area. Field studies reflect not only the toxicity of a test compound, but also recovery and further species-specific biology of the tested species. Such data cannot be used for assessing effects on other arthropod species in the off-field area. Mortality was 100 % for *C. septempunctata* at off-field dose rates. As the available extended lab study is considered not valid, a new study was requested in the DAR. Effects on mortality and/or reproduction were below 30 % for *P. cupreus*, *A. bilineata and Pardosa* spp. but the tested dose concentrations in these studies are far below the intended use rate. Furthermore an extended lab study with *Episyrphus balteatus* and *C. carnea* is available. Effects were at or below 50 % at 125 g as/ha which is above the representative use rates.

Requested standard laboratory study with *C. septempunctata* and extended laboratory studies with *T. pyri* and *C. septempuctata* were submitted and summaries were provided in addendum 5 (October 2007), including a revised risk assessment.

The expert meeting (PRAPeR 38) discussed the revised risk assessment. It was agreed that the glass plate tests indicated that *T. pyri* and *A. rhopalosophi* were the most sensitive species and the higher tier risk assessment concentrated on that. The expert meeting considered that it is not clear if there are sufficient data in the DAR to cover the in-field risk to *A. rhopalosiphi*. A data gap is identified for a

study to address the in-field risk to *A. rhopalosiphi*, e.g. a field study or an aged residue study. *E. balteatus* was used in higher tier risk assessment. Based on different field studies, in which one showed a risk to *T. pyri* but the others did not, the in-field risk to *T. pyri* is considered to be low. For off-crop, the risk assessment for *E. balteatus* was shown to include also *T. pyri*, based on the available data from the extended laboratory tests.
Based on the available studies the risk to non-target arthropods can be regarded as low in-field for *T. pyri*. However, further data is required to address the risk for *A. rhopalosiphi* in-field. The off-field risk to non-target arthropods is considered to be low, provided a buffer zone of 3 meter is applied for use in grapes and beans and 5 meters buffer zone is applied for uses in pome fruit.

5.5. RISK TO EARTHWORMS

An acute toxicity study with fenpyroximate and the formulation Hoe 094552 00 SC05 A104 is available. Furthermore a long term toxicity study with the formulation Hoe 094552 00 SC05 A106 is available. The tested formulations are considered equal to the lead formulation. As the $\log P_{ow}$ exceeds 2, the results were corrected for the organic carbon content in the test soils. The resulting TER-values range from 12-61, based on the worst-case PECsoil of 0.0768 mg as/kg soil, indicating a low risk to earthworms for all the representative uses evaluated.

The major metabolite of fenpyroximate in aerobic soil is M-3 with a maximum amount 10.8 % in laboratory soil. Furthermore, metabolite M-11 was considered as a minor metabolite with observed concentrations > 5 % at sequential samplings in two soils. No ecotoxicological studies with terrestrial organisms were provided for the metabolites M-3 and M-11. Furthermore, the toxicity of the metabolites, at the time of maximum occurrence, is not considered to be covered by the 14-days acute study, but possibly by the 70 d reproduction study with the parent substance. However, considering the significantly lower toxicity of M-3 as compared to fenpyroximate in the tests with aquatic organisms as well as the relatively low toxicity of fenpyroximate to earthworms in acute and reproduction tests, it can be assumed that M-3 is not significantly more toxic to earthworms than its parent compound. M-11 is also deemed not relevant in soil, since it is a part of the metabolic pathway in virtually all investigated taxa and has a structural similarity to M-3 insofar as it lacks the tert.-butyl ester functionality, which appears to be responsible for the effect of fenpyroximate on the target organisms. The expert meeting (PRAPeR 38) agreed to the conclusion in the DAR that the risk from the soil metabolites is considered to be low and no toxicity studies are required.

5.6. RISK TO OTHER SOIL NON-TARGET MACRO-ORGANISMS

No studies are considered necessary to address this Annex point for the active substance fenpyroximate as the DT_{90} field in the soil is below 100 days.

5.7. RISK TO SOIL NON-TARGET MICRO-ORGANISMS

The effects of the formulation Hoe 094552 00 SC05 A104 was tested on soil microbial respiration and nitrogen transformation. Effects were less than 25 % at day 28 at 1.5 mg a.s./kg d.w. soil. This tested concentration exceeds the predicted environmental concentrations in soil and therefore the risk to soil non-target micro-organisms from fenpyroximate is considered to be low for the representative uses evaluated.

5.8. RISK TO OTHER NON-TARGET-ORGANISMS (FLORA AND FAUNA)

A study on the effects of fenpyroximate 5 %EC on seedling emergence and vegetative vigour of 10 crop species is available. Effects in these studies were below 50 % at 336.25 g as/ha. This tested concentration is above the maximum representative use rate of 115.2 g as/ha. Therefore the risk to non-target plants from the use of fenpyroximate is regarded to be low for all representative uses evaluated.

5.9. RISK TO BIOLOGICAL METHODS OF SEWAGE TREATMENT

The respiration rate EC_{50} for fenpyroximate exceeds 1000 mg a.s./L. Based on this study the risk to biological methods of sewage treatment is considered to be low for the representative uses of fenpyroximate evaluated.

6. Residue definitions

Soil

Definitions for risk assessment: fenpyroximate, M-3[25],
(+M-11[26], M-16[27] & M-8[28] under anaerobic conditions).

Definitions for monitoring: fenpyroximate, when anaerobic soil conditions are not expected.

Water

Ground water

Definitions for exposure assessment: fenpyroximate, M 3, M-11

Definitions for monitoring: fenpyroximate

[25] M3 : (E)-4-[1,3-dimethyl-5-phenoxypyrazole-4-yl)-methyleneaminooxy-methyl]benzoic acid
[26] M11: 1,3-dimethyl-5-phenoxypyrzole-4-carbonitrile
[27] M16: 4-hydroxymethylbenzoic acid
[28] M8: 1,3-dimethyl-5-phenoxypyrzole-4-carboxylic acid

Surface water

Definitions for risk assessment: water: fenpyroximate, Z isomer of fenpyroximate (M-1)[29], M 3, M-8, M-11, metabolites containing benzyl moiety data gap.
sediment: fenpyroximate, M-1, M-11, metabolites containing benzyl moiety data gap.

Definitions for monitoring: Data gaps in fate and behaviour and ecotoxicology need to be filled before this definition can be finalised.

Air

Definitions for risk assessment: Fenpyroximate, M-1

Definitions for monitoring: Fenpyroximate

Food of plant origin

Definitions for risk assessment: sum of fenpyroximate and its Z-isomer (M-1), expressed as fenpyroximate

Definitions for monitoring: fenpyroximate

Food of animal origin

Definitions for risk assessment: Sum of fenpyroximate, Fen-OH[30], metabolite M-3 and their Z-isomers, expressed as fenpyroximate.

Definitions for monitoring: metabolite M-3

[29] M1 Z isomer of fenpyroximate: tert-butyl (*Z*)-4-[(1,3-dimethyl-5-phenocypyrazole-4-yl)-methyleneaminooxymethyl]benzoate

[30] Fen-OH : 2-hydroxymlethyl-2-propyl*(E)*-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)-methylene-aminooxymethyl]benzoate

Overview of the risk assessment of compounds listed in residue definitions for the environmental compartments

Soil

Compound (name and/or code)	Persistence	Ecotoxicology
Fenpyroximate	moderate to high persistence Single first order DT_{50} 30-159 days (20°C, PF2 soil moisture) Single first order DT_{50} 9.7-16.7 days (German field studies)	The risk is considered low to all soil living organisms.
M-3	Moderate to medium persistence Single first order DT_{50} 25-68 days (20°C, PF2 soil moisture)	The risk is considered low to all soil living organisms.
M-11 anaerobic	medium persistence Single first order DT_{50} 86 days (20°C, PF2 soil moisture)	The risk is considered low to all soil living organisms.
M-16 anaerobic	Data not available	Data not available
M-8 anaerobic	Data not available	Data not available

Ground water

Compound (name and/or code)	Mobility in soil	> 0.1 µg / L 1m depth for the representative uses (at least one FOCUS scenario or relevant lysimeter)	Pesticidal activity	Toxicological relevance	Ecotoxicological relevance
fenpyroximate	immobile K_{foc} 40000-79500 mL/g	No	Yes	Yes	Yes
M-3	Medium to low mobility K_{foc} 325-799 mL/g	No	No	Up to 8.15% of dose recovered in faeces	No
M-11	Medium mobility K_{foc} 250 mL/g (QSAR estimate, data gap identified)	No	No	Up to 5.24% of dose recovered in faeces	No

Surface water and sediment

Compound (name and/or code)	Ecotoxicology
fenpyroximate	The risk to aquatic organisms is considered to be low providing mitigation measures are applied. There is a gap for a FFLC study. There is a data gap for addressing the risk for biomagnification in the aquatic food chain. The risk assessment to sediment dwellers, covering only single application, is considered to be low.
Z isomer of fenpyroximate (M-1)	The risk to aquatic organisms is considered to be covered by the risk assessment carried out for the active substance.
M-3 (water only)	The risk to aquatic organisms is considered to be low
M-8	The risk to aquatic organisms is considered to be low
M-11	The risk to aquatic organisms is considered to be low from the structural relation ship to M-8

Air

Compound (name and/or code)	Toxicology
fenpyroximate	LC_{50} in rats (4 h) is 0.21 - 0.33 mg/L air (nose-only) in males and females, classification as very toxic by inhalation is proposed
Z isomer of fenpyroximate (M-1)	No data

LIST OF STUDIES TO BE GENERATED, STILL ONGOING OR AVAILABLE BUT NOT PEER REVIEWED

- The minimum purity of the active substance and maximum level of impurities in the technical specification needs to be justified further (relevant for all uses evaluated, data gap identified by meeting of experts for physical and chemical properties October 2007, date of submission unknown, refer to chapter 1).
- The Henry's law constant should be recalculated (relevant for all uses evaluated, data gap identified by meeting of experts for physical and chemical properties October 2007, date of submission unknown, refer to chapter 1).
- The difference in UV spectrum seen in studies Kodeira and Kudo (1993) and Swanson (2003) should be explained (relevant for all uses evaluated, data gap identified by meeting of experts for physical and chemical properties October 2007, date of submission unknown, refer to chapter 1).
- Validated method of analysis for metabolite M3 in products of animal origin (relevant for all uses evaluated, data gap identified by meeting of experts for residues October 2007, date of submission unknown, refer to chapter 3).
- Information on the isomer ratio occurring in rat metabolism allowing to conclude if the toxicological end points and reference values for fenpyroximate can be used for its (Z)-isomer (relevant for all representative uses; data gap identified by the expert meetings on mammalian toxicology and residues; no submission date proposed by the notifier, refer to points 2.8 and 3.1.1)
- Supervised residue trials on pome fruits in Northern and Southern Europe (relevant for use in pome fruits in Northern and Southern Europe; no submission date proposed by the notifier; refer to point 3.1.1; the requested trials in Northern region are necessary only for appropriate MRL setting as risk assessment could be conservatively conducted on basis of trials with two applications)
- Supervised residue trials on grapes in Southern Europe (relevant for use in grapes in Southern Europe; no submission date proposed by the notifier; refer to point 3.1.1)
- Supervised residue trials on beans without pods (fresh) in Southern Europe (relevant for use in beans varieties cultivated for harvest of fresh beans without pods in Southern Europe; no submission date proposed by the notifier; refer to point 3.1.1)
- Study investigating the effects of processing on the nature of residues (relevant for all representative uses evaluated; submission date proposed by the notifier: March 2008; refer to point 3.1.1)
- The potential for uptake of residues from soil by crops planted after the treated crop needs to be addressed (relevant for the evaluated use on beans harvested fresh; no submission date proposed by the notifier; refer to point 3.1.2)

- A guideline batch soil adsorption study on 3 different soils is required for the metabolite M-11 (pertinent for all uses; no submission date proposed by the notifier; refer to point 4.1.3).
- A data gap is identified to provide information on the potential level of metabolites containing the benzyl moiety that will occur in natural sediment water systems and a consequent aquatic risk assessment for these metabolites (relevant for all representative uses evaluated; no submission date proposed by the notifier; refer to points 4.2.1 and 5.2).
- Further data to address the risk for insectivorous birds. (relevant for uses in vine and orchards, no submission date proposed by the notifier; refer to point 5.1)
- A fish full life cycle study is required (relevant for all representative uses evaluated; no submission date proposed by the notifier; refer to 5.2).
- The risk from biomagnification in aquatic food chains needs to be addressed. (relevant for all representative uses evaluated, no submission date proposed by the notifier; refer to point 5.2)
- Further data to address the in-field risk to *A. rhopalosiphi*, e.g. a field study or an aged residue study. (relevant for all representative uses evaluated, no submission date proposed by the notifier; refer to point 5.4)

CONCLUSIONS AND RECOMMENDATIONS

Overall conclusions

The conclusion was reached on the basis of the evaluation of the representative uses as an acaricide on grapes, apples, pears and beans. Full details of the GAP can be found in the attached list of end points.

The representative formulated product for the evaluation was "Kiron", a suspension concentrate formulation (SC).

Only single methods for the determination of residues are available since a multi-residue-method like the German S19 or the Dutch MM1 is not applicable due to the nature of the residues. The method of analysis for products of animal origin is only validated for fenpyroximate but the residue definition includes metabolite M3 and therefore a data gap has been identified. Also the residue definition for surface water has not been finalised.

Sufficient analytical methods as well as methods and data relating to physical, chemical and technical properties are available to ensure that quality control measurements of the plant protection product are possible. The technical specification could not be concluded on.

Regarding the mammalian metabolism, fenpyroximate showed a rapid but incomplete oral absorption and excretion, mainly via faeces; intensive enterohepatic circulation was observed.

Fenpyroximate is harmful if swallowed and very toxic by inhalation; eye irritation and skin sensitisation were observed. Based on toxicokinetic properties and different toxicological profile of the substance via oral or inhalation, the meeting of experts concluded that the oral absorption was not

representative of the bioavailability of fenpyroximate. Critical effects observed through short term and long term studies were decreased body weight and food consumption. No genotoxicity, carcinogenicity or neurotoxicity was observed; neither reproductive nor developmental parameters were affected by treatment with fenpyroximate.
The acceptable daily intake (ADI) is set at 0.01 mg/kg bw/day; the acceptable operator exposure level (AOEL) is 0.005 mg/kg bw/day and the acute reference dose (ARfD) is 0.02 mg/kg bw considering an assessment factor of 100 for all reference values.
Considering the representative uses of Kiron (pome fruits, grapes and beans), the estimated operator exposure exceeds the AOEL according to the UK POEM model; according to the German model calculations, exposure exceeds the AOEL for high crop, tractor mounted air blast sprayers (pome fruits and grapes); exposure resulting from high crop, hand held applications (grapes) and field crop, tractor mounted hydraulic sprayers (beans) is below the AOEL when the use of PPE is considered.
Re-entry worker exposure is estimated to be below the AOEL only if additional protective clothing is considered.
Bystander's exposure exceeds the AOEL for high crop applications, either tractor mounted or hand held; however for field crop applications (beans), bystander's exposure is estimated to be below the AOEL.

The plant metabolism of fenpyroximate is very slow. Only one metabolite, the (Z)-isomer of the active substance is included in the residue definition for risk assessment. Further information is required to ensure that the toxicological reference values allocated to fenpyroximate cover its (Z)-isomer. Some insufficiencies were identified in the submitted residue trials and further data are required. These deficiencies do not allow proposing an MRL in pome fruits. Studies are also required to investigate the stability of residues under hydrolysis conditions simulating processing.
A data gap was identified to address potential residues in succeeding crops planted after the product has been used on beans harvested fresh. Based on animal metabolism and feeding studies, one animal metabolite is expected to reach quantifiable residue levels in ruminant liver and kidney.
A provisional consumer exposure assessment has shown potential for children exposure in the range of the ARfD for apples, pears and grapes. This may however be reconsidered on the basis of more appropriate residue data for pome fruits. For grapes an option for decision makers is to consider setting the MRL at 0.2mg/kg instead of 0.3mg/kg.

The information available on the fate and behaviour in the environment is sufficient to carry out an appropriate environmental exposure assessment at the EU level with the exception that further data are required to address the fate and behaviour of the benzyl moiety of the active substance in natural sediment water systems. For the applied for intended uses, the potential for groundwater exposure by fenpyroximate and its metabolites M-3 and M-11 above the parametric drinking water limit of 0.1 µg/L, is low. The EU level assessment has not covered use where anaerobic soil conditions may occur. These conditions may be encountered in some territories. In relation to the applied for

intended uses, it cannot be concluded, that anaerobic soil conditions will never occur where pome fruits are grown.

The acute and short term risk to birds can be considered as low for all representative uses evaluated. The blue tit is accepted as a focal species to refine the risk to insectivorous birds in pome fruit and vines. The tier 1 long-term risk assessment to birds did not identify low risk for any of the uses. Both PD and PT were refined in the risk assessment for orchard use and the PD was refined in the vine scenario. However, the TER did not reach the Annex VI trigger and a data gap is identified to refine the risk assessment for insectivorous birds in both orchards and vines. The yellowhammer and the gray partridge are accepted as focal species to refine the assessment of the risk to insectivorous and herbivorous birds respectively in beans. An acceptable risk was identified with refinements of PD in both scenarios.

Based on the first tier risk assessment the acute risk to herbivorous mammals can be considered as low for all representative uses evaluated. . A refined long term risk assessment was needed for all representative uses. In a refined risk assessment the hare is used as focal species in beans and the bank vole is used for the representative uses in pome fruit and grapevine. The risk to mammals in beans can be considered low based on the hare, unattractiveness of crop, and an interception factor of 0.7. The risk to bank vole is considered low for uses in orchards and vine yard, based on a refined PD. The risk from secondary earthworm and fish poisoning is considered low for both birds and mammals. Furthermore the risk to birds and mammals from ingestion of contaminated drinking water is considered low.

Fenpyroximate is very toxic to aquatic organisms both on an acute as on a chronic time scale. A similar toxicity to fish, algae and aquatic invertebrates was observed. The higher tier toxicity test with fish in the present of sediment was accepted as the relevant endpoint in the aquatic risk assessment. The risk to aquatic organisms is considered low in all FOCUSsw Step 4 scenarios for all uses if sufficient non spray buffer zones are included. Buffer zones of 70 m, 45 m and 20 m are required for pome fruit, vine and bean respectively. The conclusion of the aquatic risk assessment may however change as a data gap was identified for a fish full life cycle study. The risk from M-3 and M-8 to aquatic organisms is considered low. A BCF of 1601 was experimentally derived for whole fish. A data gap is identified to provide a risk assessment for aquatic organisms consequent to the expectation that metabolites that contain the benzyl moiety are likely to be formed in natural water bodies. The risk to bees is considered low. A data gap is identified for a study to address the in-field risk to *A. rhopalosiphi.* The in-field risk assessment to *A. rohpalosiphi* is considered to be low, as the off-field risk is considered to be low for all non-target arthropods if buffer zones up to 5 meter are applied. The risk to earthworms is considered to be low both for the parent and the metabolites M-3 and M-11. Also the risk to non-target marcro-organisms, non-target micro-organisms and non-target plants is considered low.

Particular conditions proposed to be taken into account to manage the risk(s) identified

- The estimated operator exposure in high crop, hand held applications (grapes) and field crop, tractor mounted hydraulic boom sprayers applications (beans) was below the AOEL only if PPE, as protective gloves during mixing/loading and gloves, protective garment and sturdy footwear during application, is used (refer to point 2.12).
- The estimated re-entry worker exposure was below the AOEL only if additional protection (PPE as gloves, long sleeved shirt and long trousers) is used (refer to point 2.12).
- At regulatory level the option to set the MRL at 0.2 mg/kg for grapes should be considered. This level would still be in accordance with the residue data base, and would offer a wider margin with regard to the ARfD.
- Based on available data the refined aquatic risk assessment indicated needs for mitigation, e.g. non spray buffer zones of 70 m, 45 m and 20 m respectively for uses in pome fruit, vine and beans. (refer to point 5.2)
- The refined in-field risk assessment to non-target arthropods indicated need for mitigation, e.g. non spray buffer zones of 3 m to 5 m depending on the use.

Critical areas of concern

- Operator exposure for high crop, tractor mounted air blast sprayer applications, exceeds the AOEL even when the use of PPE (gloves during mixing/loading and gloves, protective garment and sturdy footwear during application) is considered.
- Bystander exposure exceeds the AOEL for high crop applications (tractor mounted air blast sprayer and hand held applications).
- Potential for slight exceedence of the ARfD was identified for pome fruits and grapes.
- The risk to aquatic organisms from metabolites of fenpyroximate containing the benzyl moiety that are expected to be formed in natural water bodies is not finalised.
- The risk to insectivorous birds in both orchards and vines needs to be addressed.
- The aquatic risk assessment can not be finalised until a fish full life cycle study has been include in the assessment.
- The risk for biomagnification in aquatic food chains needs to be addressed.
- The in-field risk to the non-target arthropod *A. rhopalosiphi* needs to be addressed for all representative uses.

APPENDIX 1 – LIST OF ENDPOINTS FOR THE ACTIVE SUBSTANCE AND THE REPRESENTATIVE FORMULATION

(Abbreviations used in this list are explained in appendix 2)

Appendix 1.1: Identity, Physical and Chemical Properties, Details of Uses, Further Information

Active substance (ISO Common Name) ‡	fenpyroximate
Function (e.g. fungicide)	acaricide

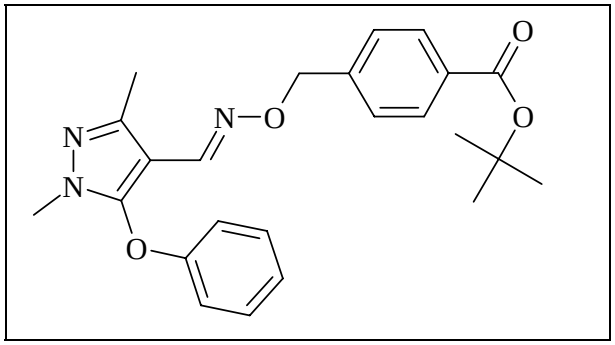
Rapporteur Member State	Federal Republic of Germany
Co-rapporteur Member State	none

Identity (Annex IIA, point 1)

Chemical name (IUPAC) ‡	tert-butyl (E)-alpha-(1,3-dimethyl-5-phenoxypyrazol-4-ylmethyleneamino-oxy)-p-toluate
Chemical name (CA) ‡	(E)-1,1-dimethylethyl 4-[[[[(1,3-dimethyl-5-phenoxy-1H-pyrazol-4-yl)methylene] amino]oxy]methyl]benzoate
CIPAC No ‡	695
CAS No ‡	134098-61-6
EC No (EINECS or ELINCS) ‡	none
FAO Specification (including year of publication) ‡	none
Minimum purity of the active substance as manufactured ‡	960 g/kg (open)
Identity of relevant impurities (of toxicological, ecotoxicological and/or environmental concern) in the active substance as manufactured	Open
Molecular formula ‡	$C_{24}H_{27}N_3O_4$
Molecular mass ‡	421.5 g/mol

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Structural formula ‡



Physical and chemical properties (Annex IIA, point 2)

Melting point (state purity) ‡	100 - 101 °C (98.6 %)
Boiling point (state purity) ‡	Decomposition before boiling
Temperature of decomposition (state purity)	> 215 – 219 °C (98.6 %)
Appearance (state purity) ‡	white crystalline powder (98.6 %)
Vapour pressure (state temperature, state purity) ‡	< 1.00 x 10^{-5} Pa (25 °C, 98.6 %)
Henry's law constant ‡	0.182 Pa * m^3 * mol^{-1} (calculated by the RMS) data gap for the applicant
Solubility in water (state temperature, state purity and pH) ‡	pH 5: 21.4 x 10^{-6} ± 1.6 x 10^{-6} g/L (25 °C, 99.8 %)
	pH 7: 23.1 x 10^{-6} ± 2.8 x 10^{-6} g/L (25 °C, 99.8 %)
	pH 9: 29.8 x 10^{-6} ± 4.6 x 10^{-6} g/L (25 °C, 99.8 %)
Solubility in organic solvents ‡ (state temperature, state purity)	at 25 °C [g/L] (97.1%) Methylene chloride 1307 g/L Chloroform 1197 g/L Tetrahydrofuran 737 g/L Toluene 268 g/L Ethyl acetate 201 g/L Xylene 193 g/L Acetone 150 g/L Dimethyl sulfoxide 28.6 g/L Ethanol 16.5 g/L Methanol 15.3 g/L n-Hexane 3.5 g/L
Surface tension ‡ (state concentration and temperature, state purity)	72.2 mN/m at 20 °C (90 % saturated solution) (98.6 %)

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Partition co-efficient ‡ (state temperature, pH and purity)	log P_{OW} = 5.01 (20 °C, water saturated with *n*-octanol) (99.9 %, the active substance does not dissociate→ pH dependence is not relevant)
Dissociation constant (state purity) ‡	No dissociation.
UV/VIS absorption (max.) incl. ε ‡ (state purity, pH)	open
Flammability ‡ (state purity)	Not highly flammable. (98.6 %) no self-ignition observed.
Explosive properties ‡ (state purity)	Not explosive (theoretical assessment
Oxidising properties ‡ (state purity)	none (theoretical assessment)

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Summary of representative uses evaluated *

Crop and/ or situation (a)	Member State or Country	Product name	F G or I (b)	Pests or Group of pests controlled (c)	Preparation		Application				Application rate per treatment			PHI (days) (m)	Remarks
					Type (d-f)	Conc. of as (i)	method kind (f-h)	growth stage & season (j)	number min/ max (k)	interval between applications (min)	kg as/hL min – max (l)	water L/ha min – max	kg as/ha min – max (l)		
Table and wine grapes	Northern and Southern Europe	Kiron	F	Mites	SC	51.2 g/L	foliar spraying	BBCH 73 - 83	1	-	0.00768	500 - 1500	0.0384 - 0.1152	35	Representative use [1][2][3][4][5][6][7]
Pome fruit apples pears	Northern and Southern Europe	Kiron	F	Mites	SC	51.2 g/L	foliar spraying	BBCH 69 - 78	1	-	0.00768	500 - 1500	0.0384 - 0.1152	21	Representative use [1][2][3][4][5][6][7]
Beans (fresh)	Southern Europe	Kiron	F	Mites	SC	51.2 g/L	foliar spraying	BBCH 51 - 88	1	-	0.01024	500 - 1000	0.0512 - 0.1024	7	Representative use [3][5][6]

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

[1] Operator exposure exceeds the AOEL for tractor mounted air blast sprayer applications, even when the use of PPE is considered.
[2] Bystander exposure exceeds the AOEL for tractor mounted air blast sprayer and hand held applications.
[3] The aquatic risk assessment to metabolites containing the benzyl moiety cannot be finalised.
[4] The risk to insectivorous birds cannot be finalised.
[5] The risk for biomagnification in aquatic food chains cannot be finalised.
[6] The in-field risk to the non-target arthropod *A. rhopalosiphi* cannot be finalised.
[7] Potential for slight exceedence of the ARfD was identified

* For uses where the column "Remarks" is marked in grey further consideration is necessary. Uses should be crossed out when the notifier no longer supports this use(s). (a) For crops, the EU and Codex classifications (both) should be taken into account; where relevant, the use situation should be described (e.g. fumigation of a structure) (b) Outdoor or field use (F), greenhouse application (G) or indoor application (I) (c) *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 Codes - GIFAP Technical Monograph No 2, 1989 (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 plant- type of equipment used must be indicated	(i) g/kg or g/L. Normally the rate should be given for the active substance (according to ISO) and not for the variant in order to compare the rate for same active substances used in different variants (e.g. fluoroxypyr). **In certain cases, where only one variant is synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).** (j) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application (k) Indicate the minimum and maximum number of application possible under practical conditions of use (l) The values should be given in g or kg whatever gives the more manageable number (e.g. 200 kg/ha instead of 200 000 g/ha or 12.5 g/ha instead of 0.0125 kg/ha (m) PHI - minimum pre-harvest interval

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Appendix 1.2: Methods of Analysis

Analytical methods for the active substance (Annex IIA, point 4.1)

Technical as (analytical technique)	HPLC-UV
Impurities in technical as (analytical technique)	HPLC-UV; GC-FID
Plant protection product (analytical technique)	HPLC-UV

Analytical methods for residues (Annex IIA, point 4.2)

Residue definitions for monitoring purposes

Food of plant origin		fenpyroximate
Food of animal origin		M3
Soil		fenpyroximate
Water	surface	Open
	drinking/ground	fenpyroximate
Air		fenpyroximate

Monitoring/Enforcement methods

Food/feed of plant origin (analytical technique and LOQ for methods for monitoring purposes)	Primary method and ILV: GC-PND 0.05 mg/kg (apple, pear, tomato) Confirmatory method: LC-MS/MS 0.01 mg/kg (apple, tomato)
Food/feed of animal origin (analytical technique and LOQ for methods for monitoring purposes)	Open
Soil (analytical technique and LOQ)	Primary method: GC-PND 0.01 mg/kg Confirmatory method: HPLC-MS (SIM) 0.01 mg/kg
Water (analytical technique and LOQ)	Primary method: HPLC-UV 0.1 µg/L Confirmatory method: HPLC-MS (SIM) 0.1 µg/L
Air (analytical technique and LOQ)	Primary method: HPLC-UV 0.29 µg/m^3 Confirmatory method: HPLC-UV (UV spectrum)

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Body fluids and tissues (analytical technique and LOQ)	Primary method: HPLC-UV ≤ 0.02 mg/L (fenpyroximate and eight metabolites) (serum) Confirmatory method: HPLC-MS (SIM) 0.02 mg/L (fenpyroximate and metabolite M-3) (serum)

Classification and proposed labelling with regard to physical and chemical data (Annex IIA, point 10)

	RMS/peer review proposal
Active substance	none

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Appendix 1.3: Impact on Human and Animal Health

Absorption, distribution, excretion and metabolism (toxicokinetics) (Annex IIA, point 5.1)

Rate and extent of oral absorption ‡	Approximately 60 %, based on excretion via bile (47-55 %) and urine (5-10 %) within 48 hours
Distribution ‡	Widely distributed, the highest amounts of radioactivity were found in the gastrointestinal tract, liver, fat and kidney; 168 h after administration tissue residues below limit of detection
Potential for accumulation ‡	None
Rate and extent of excretion ‡	168 h after administration of 2 mg/kg bw the extent of excretion amounted to 70-85 % via faeces and 12-18 % via urine, elimination half live 6.1-8.9 h, delayed elimination of high dose (400 mg/kg bw), a low dose was excreted more rapidly in males, a high dose more rapidly in females.
Metabolism in animals ‡	Intensively metabolised: cleavage of the benzyl moiety from the pyrazole ring with further oxidation, oxime hydrolysis, ester hydrolysis, other pathways of metabolism were 4-hydroxylation of the 5-phenoxy ring and oxidation of the t-butyl moiety
Toxicologically relevant compounds ‡ (animals and plants)	Parent compound and metabolite M1
Toxicologically relevant compounds ‡ (environment)	Parent compound and metabolite M1

Acute toxicity (Annex IIA, point 5.2)

Rat LD_{50} oral ‡	245 mg/kg bw (f), 480 mg/kg bw (m)	R22
Rat LD_{50} dermal ‡	> 2000 mg/kg bw	
Rat LC_{50} inhalation ‡	0.21 mg/L air (m), 0.33 mg/L air (f) (nose only, 4 h)	T^{+}, R26
Skin irritation ‡	Not irritating	
Eye irritation ‡	Irritating (based on human experience)	R36
Skin sensitisation ‡	Sensitising (M &-K test)	R43

Short term toxicity (Annex IIA, point 5.3)

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Target / critical effect ‡	Reduced food intake, decreased bw gain and in dogs diarrhoea, salivation, emesis, bradycardia	
Relevant oral NOAEL ‡	Dog, 52-week: 1.5 mg/kg bw/day Dog, 13-week: < 2 mg/kg bw/day Rat , 13-week: 1.3 mg/kg bw/day	
Relevant dermal NOAEL ‡	Rat, 21-day: 300 mg/kg bw/day (systemic toxicity)	
Relevant inhalation NOAEL ‡	Rat, 4-week: 2 mg/m^3 (0.54 mg/kg bw/day)	

Genotoxicity ‡ (Annex IIA, point 5.4)

…… …..	No evidence of genotoxicity	

Long term toxicity and carcinogenicity (Annex IIA, point 5.5)

Target/critical effect ‡	Lower bw gain, lower food ~~and water~~ intake and an inferior food conversion efficiency, in mice ovarian atrophy	
Relevant NOAEL ‡	Rat, 2-year: 0.97 mg/kg bw/day Mice, 18-month: 2.4 mg/kg bw/day	
Carcinogenicity ‡	No evidence of carcinogenicity	

Reproductive toxicity (Annex IIA, point 5.6)

Reproduction toxicity

Reproduction target / critical effect ‡	Reduced body weight gain in offspring during lactation at parental toxic dose level (decreased body weight gain) No effect on reproductive parameters	
Relevant parental NOAEL ‡	2 mg/kg bw/day	
Relevant reproductive NOAEL ‡	8 mg/kg bw/day	
Relevant offspring NOAEL ‡	2 mg/kg bw/day	

Developmental toxicity

Developmental target / critical effect ‡	Increased incidence of slightly folded retinas in rabbits and supernumerary ribs in rats at maternal toxic doses (reduced body	

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

	weight and food consumption)	
Relevant maternal NOAEL ‡	Rabbit: 2.5 mg/kg bw/day Rat: 5 mg/kg bw/day	
Relevant developmental NOAEL ‡	Rabbit: 2.5 mg/kg bw/day Rat: 5 mg/kg bw/day	

Neurotoxicity (Annex IIA, point 5.7)

Acute neurotoxicity ‡	No study required.	
Repeated neurotoxicity ‡	No study required.	
Delayed neurotoxicity ‡	No delayed neurotoxicity was observed in an acute study in hen.	

Other toxicological studies (Annex IIA, point 5.8)

Mechanism studies ‡	Fenpyroximate, acute oral toxicity in dogs (1-day and 5-day) NOAEL: 2 mg/kg bw, diarrhoea at 5 mg/kg bw and at 20 mg/kg bw
Studies performed on metabolites or impurities ‡	Acute oral toxicity of metabolites M1 and M12: M-1, rat: approximately the same range of acute toxicity as fenpyroximate, LD_{50} = 500-700 mg/kg bw Effects: Reduced spontaneous movement, diarrhoea and coat staining around anus M-12, rat: less toxic than fenpyroximate, LD_{50} > 5000 mg/kg bw, Effects: Reduced spontaneous movement, lacrimation, coat staining around anus, loose faeces, decrease in body-weight

Medical data ‡ (Annex IIA, point 5.9)

…… …..	Few cases of eye and skin irritation have been reported from workers in the chemical factory and manufacturing and from farmers in the years 1991 and 1992.

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Summary (Annex IIA, point 5.10)	Value	Study	Safety factor
ADI ‡	0.01 mg/kg/day	Rat, 2-year oral study	100
AOEL ‡	0.005 mg/kg/day	Rat, 4-week, inhalation study	100
ARfD ‡	0.02 mg/kg bw	Dog, 1-day and 5-day oral study	100

Dermal absorption ‡ (Annex IIIA, point 7.3)

Formulation (Kiron 51.2 g fenpyroximate/L SC)	7 % (undiluted formulation) 24 % (dilution 1 mg/mL) based on rat, *in vivo* (24 h, including application site skin values) conducted with fenpyroximate diluted in blank formulation

Exposure scenarios (Annex IIIA, point 7.2)

Operator	**Grapes, pome fruit, tractor mounted airblast sprayer**; (application rate 0.1152 kg as/ha): German model % of AOEL Without PPE: 776 % With PPE:gloves (m/l) 733 % gloves (m/l, appl.), garment (appl.)112 % UK POEM % of AOEL Without PPE: 2341 % With PPE: gloves (m/l) 2261 % gloves (m/l, appl.) 1598 % **Grapes, high crop, hand held sprayer**; (0.1152 kg as/ha): German model % of AOEL Without PPE: 803 % With PPE: gloves (m/l) 336 % gloves (m/l, appl.), garment (appl.)66 % UK POEM % of AOEL Without PPE: 3763 % With PPE: gloves (m/l) 1493 %

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

	gloves (m/l, appl.) 995 %
	Field beans, tractor mounted boom sprayer; (0.1024 kg as/ha):
	German model % of AOEL
	Without PPE: 386 %
	With PPE: gloves (m/l) 288 %
	gloves (m/l, appl.), garment (appl.)(22 %)
	UK POEM % of AOEL
	Without PPE: 923 %
	With PPE: gloves (m/l) 696 %
	gloves (m/l, appl.) 122 %
Workers	**Grapes (0.1152 kg as/ha)**
	Without PPE: 949 %
	With PPE (gloves & clothes) 48 %
	Pome fruit (0.1152 kg as/ha)
	Without PPE: 632 %
	With PPE (gloves & clothes) 32 %
	Beans (0.1024 kg as/ha)
	Without PPE: 562 %
	With PPE (gloves & clothes) 29 %
Bystanders	High crop tractor mounted air blast sprayer:109 %
	High crop hand held sprayer: 109 %
	Field crop tractor mounted sprayer: 2.4 %

Classification and proposed labelling with regard to toxicological data (Annex IIA, point 10)

	RMS/peer review proposal
Active substance	T+, R22, 26, 36, 43

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Appendix 1.4: Residues

Metabolism in plants (Annex IIA, point 6.1 and 6.7, Annex IIIA, point 8.1 and 8.6)

Plant groups covered	Fruit: apples, grapes, citrus Legume vegetables: beans
Rotational crops	Not required for use in apples and grapes Data gap for use on beans (fresh)
Metabolism in rotational crops similar to metabolism in primary crops?	Not required for use in apples and grapes Data gap for use on beans (fresh)
Processed commodities	No study submitted about the effect of processing on the nature of residues
Residue pattern in processed commodities similar to residue pattern in raw commodities?	No study submitted about the effect of processing on the nature of residues
Plant residue definition for monitoring	Fenpyroximate
Plant residue definition for risk assessment	Sum of fenpyroximate and it (Z)-isomer expressed as fenpyroximate (provisional)
Conversion factor (monitoring to risk assessment)	Not necessary for the representative uses (provisional)

Metabolism in livestock (Annex IIA, point 6.2 and 6.7, Annex IIIA, point 8.1 and 8.6)

Animals covered	Lactating goat
Time needed to reach a plateau concentration in milk and eggs	[pyrazole-^{14}C]-fenpyroximate: concentration in milk increased during three days of dosing [benzyl-^{14}C]-fenpyroximate: plateau in milk reached at day 2 cattle feeding study: plateau in milk reached at days 1-3
Animal residue definition for monitoring	M-3 expressed as fenpyroximate
Animal residue definition for risk assessment	Sum of fenpyroximate, Fen-OH and M-3 and their (Z)-isomers expressed as fenpyroximate
Conversion factor (monitoring to risk assessment)	Not defined
Metabolism in rat and ruminant similar (yes/no)	yes
Fat soluble residue: (yes/no)	log P_{ow} of M-3 not determined

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Residues in succeeding crops (Annex IIA, point 6.6, Annex IIIA, point 8.5)

…… …..	No study available. Most intended uses refer to permanent crops. Due to fast aerobic degradation in soil, transfer of fenpyroximate residues from soil to succeeding crops is considered negligible and thus an adverse impact on succeeding crops is not expected.

Stability of residues (Annex IIA, point 6 introduction, Annex IIIA, point 8 Introduction)

…… …..	Plant commodities: Fenpyroximate was stable in apples during a storage interval of 540 days. Recovery was highly variable. Metabolite M-1 was slightly degraded during storage. This might be attributed to partly isomerisation of M-1 to the more stable E-enantiomer fenpyroximate. Animal commodities: Storage stability studies indicated that analytes investigated in the feeding study were stable in milk and tissues when stored frozen, except for M-21 in milk (65.3 % recovery) and Fen-OH in fat (37.2 % recovery). Recovery of fenpyroximate and metabolites in muscle and fat was generally quite low (55.5 %-75.5 %), but remained at the same level after storage.

Residues from livestock feeding studies (Annex IIA, point 6.4, Annex IIIA, point 8.3)

	Ruminant:	Poultry:	Pig:
	Conditions of requirement of feeding studies		
Expected intakes by livestock ≥ 0.1 mg/kg diet (dry weight basis)	yes dairy cattle: 0.209 mg/kg feed beef cattle: 0.626 mg/kg feed (based on HR-P in apple pomace)	no	no
Potential for accumulation:	no		
Metabolism studies indicate potential level of residues ≥ 0.01 mg/kg in edible tissues	yes		
	Feeding studies (specify the feeding rate in cattle and poultry studies considered as relevant: low dose group from cattle feeding study, 1 mg as/kg)		

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

	Residue levels in matrices : Mean (max) mg/kg		
Muscle	as + Fen-OH: < 0.01 M-3: n.d. N-desmethyl-M-3: n.d. M-22: n.d.		
Liver	as + Fen-OH: < 0.01 M-3: 0.19 N-desmethyl-M-3: < 0.01 M-22: < 0.01		
Kidney	as + Fen-OH: < 0.01 M-3: 0.20 N-desmethyl-M-3: < 0.01 M-22: < 0.01		
Fat	as + Fen-OH: 0.01 M-3: n.d. N-desmethyl-M-3: n.d. M-22: n.d.		
Milk	as + Fen-OH: 0.005 (0.006) M-21: < 0.005		
Eggs			

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Summary of residues data according to the representative uses on raw agricultural commodities and feedingstuffs (Annex IIA, point 6.3, Annex IIIA, point 8.2)

Crop	Northern or Mediterranean Region, field or glasshouse, and any other useful information	Trials results relevant to the representative uses (a)	Recommendation/comments	MRL estimated from trials according to the representative use	HR (c)	STMR (b)
Pome fruit	Northern	0.08, 0.11 mg/kg	only trials accepted with one single application → data gap	No proposal	No proposal	No proposal
Pome fruit	Mediterranean	no trial matching the GAP		No proposal	No proposal	No proposal
Grapes	Northern	0.06, 3 x 0.08, 0.09, 0.11, 0.15 mg/kg		0.3	0.15	0.08
Grapes	Mediterranean	no trial matching the GAP		No proposal	No proposal	No proposal
Beans	Mediterranean	2 x 0.06, 0.07, 0.08, 0.13, 0.14, 0.23, 0.41 mg/kg		0.5	0.41	0.105

(a) Numbers of trials in which particular residue levels were reported e.g. 3 x <0.01, 1 x 0.01, 6 x 0.02, 1 x 0.04, 1 x 0.08, 2 x 0.1, 2 x 0.15, 1 x 0.17
(b) Supervised Trials Median Residue i.e. the median residue level estimated on the basis of supervised trials relating to the representative use
(c) Highest residue

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Consumer risk assessment (Annex IIA, point 6.9, Annex IIIA, point 8.8)

ADI	0.01 mg/kg bw/day
TMDI (% ADI) according to WHO European diet	9.4 %
TMDI (% ADI) according to national (to be specified) diets	10.5 % (old German consumption data) 31.8 % (new German consumption data, VELS)
IEDI (WHO European Diet) (% ADI)	3.2 %
NEDI (specify diet) (% ADI)	2.6 % (old German consumption data) 9.0 % (new German consumption data, VELS)
Factors included in IEDI and NEDI	Grapes, apples: processing factor 0.33 for all products Beans: processing factor 1
ARfD	0.02 mg/kg bw/day
NESTI (% ARfD) according to UK model	Ten consumer groups (range of results from all groups is given, most sensitive consumer group is specified in brackets): Apples: 4.8 - 37.2 % (infants), variability factor 3 Pears: 6.0-28.2 % (toddlers), variability factor 3 Grapes: 6.0 - 45.8 % (toddlers) , variability factor 5 Beans: 2.2 - 10.3 % (infants, toddlers)
NESTI (% ARfD) according to German large portion consumption data (VELS)	Apples: 29.7 %, variability factor 3 Pears: 32.0 %, variability factor 3 Grapes: 49.1 %, variability factor 5 Beans: 13.5 %
NESTI (% ARfD) according to the EFSA model	Apples: 108 % (children), variability factor 5 Pears: 98 % (children) , variability factor 5 Table grapes: 98 % (children) , variability factor 5
Factors included in IESTI and NESTI	HR for calculations according to UK and German models and MRL (proposed for grapes and anticipated on worst case assumption for pome fruits) for according to the EFSA model Processing factor 0.33 grapes (juice production), apples (juice production, apple sauce) Beans: no processing factor available

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Processing factors (Annex IIA, point 6.5, Annex IIIA, point 8.4)

Crop/ process/ processed product	Number of studies	Processing factors		Amount transferred (%) (Optional)
		Transfer factor	Yield factor	
Apples/apple juice Apples/apple sauce Apples/apple pomace	2 2 2	0.33 0.33 3.0	no information available	
Grapes/must Grapes/wine	12 12	0.33 0.33	no infor-mation availabl e	

Proposed MRLs (Annex IIA, point 6.7, Annex IIIA, point 8.6)

Plant matrices (fenpyroximate)	Pome fruit: Grapes: Beans (fresh):	No proposal 0.3 mg/kg 0.5 mg/kg
Animal matrices (M3 metabolite)	Ruminant liver and kidneys	0.3 mg/kg
	Ruminant meat and fat	0.01* mg/kg
	Milk	0.005* mg/kg

* LOQ

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Appendix 1.5: Fate and Behaviour in the Environment

Route of degradation (aerobic) in soil (Annex IIA, point 7.1.1.1.1)

Mineralization after 100 days ‡	[Pyrazole-^{14}C]- fenpyroximate Sand, Ehime: 10.6 % after 84 d 17.1 % after 112 d (study end) Loam, Kanagawa: 14.3 % after 84 d 16.8 % after 112 d (study end) [Benzyl-^{14}C]- fenpyroximate Sand, Ethime: 64.6 % after 112 d (study end) Loam, Kanagawa: 51.2 % after 112 d (study end)
Non-extractable residues after 100 days ‡	[Pyrazole-^{14}C]- fenpyroximate (% TAR) Sand, Ehime: 31.9 % after 84 d 46.0 % after 112 d (study end) Loam, Kanagawa: 56.4 % after 84 d 58.3 % after 112 d (study end) Clay loam; Frankfurt Ost:34.5/22.5 % (mean 28.5 %) Silt loam, Frankfurt Ost:13.7/33.3 % (mean 23.5 %) Sandy loam, Königstein:29.8/27.8 % (mean 28.8 %) Study at 10 °C Silty clay loam 50.2/52.7 % after 90/120 d [Benzyl-^{14}C]- fenpyroximate Sand, Ethime: 21.3 % after 112 d (study end) Loam, Kanagawa: 41.5 % after 112 d (study end)
Metabolites requiring further consideration ‡ - name and/or code, % of applied (range and maximum)	[Pyrazole-^{14}C]- fenpyroximate (% TAR) Sand, Ehime: M-3 2.4 - 9.1 %; 5.4/9.1/5.1 % after 14/28/56 d M-11 0.6 - 8.8 % 4.9/8.8/4.9/5.0/6.8 % after 14/28/56/84/112 (end) days Loam, Kanagawa: M-3 0.1 - 10.8 % 10.8/5.7 % after 14/28 d M-11 0.3 - 8.2 % 6.3/7.1/8.2/5.2/3.1 % after 7/14/28/56/112 (end) days

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Clay loam	Range of single values	Maximum means
M-3	1.0 - 8.8 %	7.9/8.0 % after 16/32 d
Silt loam		
M-3	0.40 - 6.2 %	5.6/3.0 % after 16/32 d
Sandy loam		
M-3	0.40 - 5.9 %	4.9/4.4 % after 32/64 d
[Benzyl-^{14}C]- fenpyroximate		
Sand, Ehime:		
M-3	0.4 - 7.3 %;	2.9/7.3/5.9/0.4 % after 7/28/112 d
Loam, Kanagawa:		
M-3	0.2 - 2.6 %	1.1/2.6/1.0/0.2 % after 7/28/112 d

Route of degradation in soil - Supplemental studies (Annex IIA, point 7.1.1.1.2)

Anaerobic degradation ‡	Soil/Water system, Loamy sand (% TAR) [Pyrazole-^{14}C]- fenpyroximate CO_2 0/0.5 % after 366 d (study end) unextracted residues 9.4/11.1 % after 90 d 16.4/13.6 % after 366 d (study end) Metabolite M-3 50% at 59 days Metabolite M-8 21% at 182 days Metabolite M-11 15% at 182 days [Benzyl-^{14}C]- fenpyroximate CO_2 3.9/9.6 % after 366 d (study end) Unextracted residues 16.3/10.3 % after 90 d 15.0/13.4 % after 366 d (study end) Metabolite M-3 46% at 90 days Metabolite M-16 58% at 182 days
Soil photolysis ‡	[Pyrazole-^{14}C]- and [Benzyl-^{14}C]- fenpyroximate in sandy loam (USDA). Irradiation 30 d, Xenon lamp < 290 nm excluded, Iintensity 496 W/m², 25 °C. Application rate 29.1 µg as/g soil.

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Recoveries in % of total applied radioactivity: pyrazole-/benzyl-label	
active substance	37.3/34.8 % after 30 days
metabolites	M-1 (Z-isomer of parent) max 36.6/31.2 % after 30 days M-8 4.1/- % after 30 d others 7.7/4.6 % after 30 d
CO_2	1.6/1.5 % after 30 d
DT_{50} parent	22.4 d (37.45 °N, natural summer sunlight), $r^2 > 0.9$

Rate of degradation in soil (Annex IIA, point 7.1.1.2, Annex IIIA, point 9.1.1)

Method of calculation	Lab. DT_{50} aerob: Fenpyroximate - 1st order normalised according to FOCUS to field capacity pF2 10kPa, with Q10 2.2, Walker-equation exponent 0.7. Field DT_{50}: Timme & Frehse, sqrt 1st order
Laboratory studies (range or median, with n value, with r^2 value) DT_{50lab} ‡	DT_{50lab} (20 °C, aerobic) Fenpyroximate, applied [pyrazole-^{14}C] and [benzyl-^{14}C]-fenpyroximate

	20 °C best fit	1st order[1)]	norm.[2)] 1st order	r^2
Sand	27.7 d	51.1 d	51.1 d	0.983
Loam	32.6 d	39.2 d	39.2 d	0.969
Clay loam	16.9 d [3)]	46.5 d	39.7 d	0.806
Silt loam	10.1 d [3)]	35 d	29.9 d	0.926
Sandy loam	21.3 d [3)]	54.2 d	54.2 d	0.890
Loamy sand	159 d	159 d	159 d	0.915
median	24.5 d	48.8 d	45.4 d	
geomean		55.1 d	52.3 d	

Metabolite M-3, applied pyrazole-^{14}C-fenpyroximate

	25 °C 1st order	1st order[1)]	norm.[2)] 1st order	r^2
Sand	45.6 d	67.9 d	67.9 d	0.997
Loam	14.7 d	21.9 d	21.9 d	0.995
Silt loam	[4)]	25.2 d	25.2 d	-
geomean		33.5 d	33.5 d	

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Rate of degradation in soil (Annex IIA, point 7.1.1.2, Annex IIIA, point 9.1.1)

	Metabolite M-11, applied pyrazole-^{14}C-fenpyroximate 25 °C; norm.[2)] 1st order; 1st order[1)]; 1st order; r^2 Loam: 57.8 d; 86.1 d; 86.1 d [1)] 20 °C, 40 % MWHC [2)] 20 °C, field capacity (pF2) [3)] Timme & Frehse best fit 1st root. [4)] Study at 10 °C M-3 and M-11 DT50 values are dissipation rates (represent the sum of formation and degradation rate constants) estimated from the time point of the maximum observed concentration, in studies where fenpyroximate was dosed.
DT_{90lab}	DT_{90lab} (20 °C, aerobic): Clay loam: 186.4 [1)] Silt loam: 111.9 [1)] Sandy loam: > 100 d [1)] Loamy sand: > 200 d (1st order) [1)] Timme & Frehse best fit 1st root.
	DT_{50lab} (10 °C, aerobic): - measured, (pF0 88.1 %, 32.1 % pF2.5) Silt clay loam (UK)/silt loam (USDA): 23 d - calculated from 20 °C values using Q10 of 2.2 1st order, normalised Loam sand: 60.9 d Loam: 71.7 d Clay loam: 74.8 d Silt loam: 57.9 d Sandy loam: 57.9 d Loamy sand: 279.4 d

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Rate of degradation in soil (Annex IIA, point 7.1.1.2, Annex IIIA, point 9.1.1)

	median 73.3 d 90th percentile 188.4 d
	DT_{50lab} (20 °C, anaerobic): Sandy loam soil and natural water pyrazole label: 1st order 39.4 d, r^2 0.98 benzyl label: 1st order 32.2 d, r^2 0.99
	degradation in the saturated zone: not relevant
Field studies (state location, range or median with n value) DT_{50f}	DT_{50f}: Investigated: fenpyroximate suspension 50 g/L in water Germany / soil / sqrt 1st order / field conditions 1st order / field conditions r^2 Barum-Horburg / loamy sand / 2 d / 10.5 / 0.924 Bornheim / sandy loam / 4 d / 16.7 d / 0.877 Gertshofen-Helmhof / sandy loam / 10 d / 9.7 d / 0.986 Frankfurt-Schwanheim / sandy silty loam / < 7 d / < 14 d / - geometric mean (d) / 4.3 d / 11.9 d (Frankfurt-Schwanheim site not considered in averaging)
DT_{90f}	DT_{90f}: Investigated: fenpyroximate suspension 50 g/L in water Germany / soil / sqrt 1st order / 1st order Barum-Horburg / loamy sand / 27 d / - d Bornheim / sandy loam / 48 d / - d Gertshofen Helmhof / sandy loam / 32 d / 32.3 d Frankfurt-Schwanheim / sandy silty loam / 6 d / - geometric mean (d) / 11.9 d / 32.3 d

Soil accumulation and plateau concentration ‡	not performed, not required

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Soil adsorption/desorption (Annex IIA, point 7.1.2)

K_f /K_{oc} ‡

Fenpyroximate (n = 6), range K_{oc} 40000 - 79500

soil	pH	K_{oc}	K_f	1/n
Sandy loam, Ohio (62 % sand, 24 % silt, 14 % clay, 0.82 % org. C)	7.3	50000	406	1.07
Sandy loam, Aomoni (73.5 % sand, 6 % silt, 10.5 % clay, 8.6 % org. C)	6.3	45300	3890	1.02
Clay loam, California (32.5 % sand, 34.4 % silt, 33.1 % clay, 1.22 % org. C)	7.8	40000	474	1.03
Clay loam, Texas (54.3 % sand, 28.7 % silt, 17.0 % clay, 1.66 % org. C)	6.0	79500	1320	0.97
Loam, Texas (30.8 % sand, 43.8 % silt, 25.4 % clay, 0.82 % org. C)	7.6	44000	355	1.04
Loam, Kanagawa (61.2 % sand, 28.8 % silt, 10.0 % clay, 2.52 % org. C)	5.5	53600	1350	1.04
arithmetic mean		52067 ±14253	1299	1.028 ±0.033

median 47650

$K_{desorption}$ ‡

Fenpyroximate

soil	pH	$K_{oc,des}$	K_{des}	1/n
Sandy loam, Ohio (62 % sand, 24 % silt, 14 % clay, 0.82 % org. C)	7.3	44000	361	0.99
Clay loam, California (32.5 % sand, 34.4 % silt, 33.1 % clay, 1.22 % org. C)	7.8	64000	764	1.02
Loam, Texas	7.6	37000	304	0.95
arithmetic mean		48333	476	0.987

pH dependence (yes / no) (if yes type of dependence) ‡

no

K_f /K_{oc} ‡

Metabolite M-3

Fenpyromimate (n = 5), range K_{oc} 325 - 779

soil	pH	K_{oc}	K_f	1/n
Sand (90 % sand, 6 % silt, 4 % clay, 1.1 % org. C)	7.0	370	3.86	0.689
Sand (56 % sand, 36 % silt, 8 % clay, 0.3 % org. C)	8.8	325	1.32	0.858
Loamy sand (81 % sand, 14 % silt, 5 % clay, 0.5 % org. C)	7.5	623	2.89	0.752
Clay loam (42 % sand, 42 % silt, 28 % clay, 3.1 % org. C)	8.2	468	14.4	0.77
Silty loam (22 % sand, 62 % silt, 16 % clay, 0.7 % org. C)	6.4	779	5.42	0.804
arithmetic mean		513	5.578	0.775

$K_{desorption}$ ‡

soil	pH	$K_{oc,des}$	K_{des}	1/n
Sand (90 % sand, 6 % silt, 4 % clay, 1.1 % org. C)	7.0	545	5.99	0.725
Sand (56 % sand, 36 % silt, 8 % clay, 0.3 % org. C)	8.8	880	2.64	0.870
Loamy sand (81 % sand, 14 % silt, 5 % clay, 0.5 % org. C)	7.5	1116	5.58	0.768
Clay loam (42 % sand, 42 % silt, 28 % clay, 3.1 % org. C)	8.2	816	25.3	0.791
Silty loam (22 % sand, 62 % silt, 16 % clay, 0.7 % org. C)	6.4	767	5.37	0.788
arithmetic mean		825	8.98	0.788

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Metabolite M-11 K_{oc} = 250 L/kg; calculated with EPT-SUITE software CSR(2000)

Mobility in soil (Annex IIA, point 7.1.3, Annex IIIA, point 9.1.2)

Column leaching ‡	Guideline: BBA IV-4-2, unlabelled-fenpyroximate, 20 ± 2 °C, saturated moisture, Application rate 150 g as/ha. Column height 35 cm, diameter 5 cm. Percolation 393 mL/48 h = 200 mm rainfall. 3 soils: sand (Speyer 2.1, 87.4 % sand, 3.5 % clay, 0.7 % org. C. CEC 4.9, pH 6.1); loamy sand (Speyer 2.2, 82.0 % sand, 5.1 % clay, 2.3 % C_{org}, 9.7 CEC, pH 6.3); sandy loam (Speyer 2.3, 64.1 % sand, 8.3 % clay, 1.34 % C_{org}, 9.5 CEC, pH 6.7). µg fenpyroximate/L % TAR Leachates: Speyer 2.1 0.19/2.3 (mean 0.21) 0.27 Speyer 2.2 < 0.1 < 0.13 Speyer 2.3 < 0.1 < 0.13 Soil: relative amount per 5 cm segment Speyer 2.1 55.5/12.1/3.8/1.4/0/0 sum 72.8 Speyer 2.2 57.6/1.0/0/0/0/0 sum 58.6 Speyer 2.3 97.9/1.0/0/0/0/0 sum 98.9
Aged residues leaching ‡	(1) Guideline: BBA IV, pyrazole-^{14}C-fenpyroximate; 30 day ageing in the dark, 20 ± 2 °C, saturated moisture, Application rate 159 g as/ha. Column height 35 cm, diameter 5 cm. Soil: Loamy sand (LUFA 2.1; 0.64 % C_{org}, pH 6.0, 89.7 % sand, 3.1 % clay). Percolation 393 mL/48 h = 200 mm rainfall. Leachate: 1.7 % of applied radioactivity in leachate. metabolites in leachate not analysed Soil: % TAR in soil extract per 5 cm segment Speyer 2.1 106.6/2.4/0.6/0/0/0 sum 109.6 Fenpyroximate 0 - 5 cm 103.1 % /5 - 10 cm 1.6 % M-1 0 - 5 cm 2.9 % /5 - 10 cm 0.2 % M-3 0 - 5 cm 0.5 % /5 - 10 cm 0.3 % M-8 0 - 5 cm 0.1 % /5 - 10 cm 0.1 % (2) Guideline: BBA IV, benzyle-^{14}C-fenpyroximate; 30 day ageing in the dark, 20 ± 2 °C, saturated moisture, Application rate 159 g as/ha. Column height 35 cm, diameter 5 cm. Soil: . Loamy sand (LUFA 2.1; 0.64 % C_{org}, pH 6.0, 89.7 % sand, 3.1 % clay). Percolation 393 mL/48 h = 200 mm rainfall. Leachate: 1.1 % of applied radioactivity in leachate. metabolites in leachate not analysed Soil: % TAR in soil extract per 5 cm segment Speyer 2.1 83.9/16.3/0.4/0/0/0 sum 100.6 Fenpyroximate 0 - 5 cm 81.5 % /5 - 10 cm 15.6 % M-1 0 - 5 cm 1.7 % /5 - 10 cm 0.4 % M-3 0 - 5 cm 0.6 % /5 - 10 cm 0.3 %
Lysimeter/ field leaching studies ‡	not performed, not required

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

PEC (soil) (Annex IIIA, point 9.1.3)

Parent Method of calculation	1st order kinetic, DT_{50} worst case from field studies 16.7 d, 5 cm soil layer, 1.5 kg/L bulk density, with interception 0.5 (FOCUS) for apple orchards BBCH 69-78 (worst case).
Application data	annual rate: 1 x 115.2 g active substance/ha

$PEC_{(s)}$ (mg/kg)	Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial	0.0768			
Short term 24h	0.0737	0.0753		
2d	0.0737	0.0737		
4d	0.0651	0.0708		
Long term 7d	0.0575	0.0667		
28d	0.0240	0.0454		
50d	0.0097	0.0324		
100d	0.0012	0.0182		
Plateau concentration	x mg/kg after n yr			

Metabolite M-3 Method of calculation	1st order kinetic, DT_{50} 68 days, 5 cm soil layer, 1.5 kg/L bulk density, with interception 0.5 (FOCUS) for apple orchards BBCH 69-78 (worst case). Max. appearance of metabolite M-3: 10.8 % after 14 d.
Application data	annual rate: 1 x 115.2 g active substance /ha

$PEC_{(s)}$ (mg/kg)	Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial	0.0072			
Short term 24h	-	-	-	-
2d	-	-	-	-

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

	4d	-	-	-	-
Long term	7d	-	-	-	-
	21d	-	0.0065	-	-
	28d	-	-	-	-
	50d	-	-	-	-
	100d	-	-	-	-
Plateau concentration		x mg/kg after n yr			

Route and rate of degradation in water (Annex IIA, point 7.2.1)

Hydrolysis of active substance and relevant metabolites (DT_{50}) (state pH and temperature) ‡	pH 5: 25°C slow hydrolysis, DT_{50} 180 days minor products of hydrolysis: M-1 (5.2 %); M-3 (8 %) after 30 d (study end)
	pH 7: 25°C slow hydrolysis, DT_{50} 226 days minor products: M-3 (9 %) after 30 days (study end)
	pH 9: 25°C slow hydrolysis, DT_{50} 221 days products of hydrolysis: M-1 (6.7 %), M-3 (10.1 %) after 30 days (study end)
Photolytic degradation of active substance and relevant metabolites ‡	Fenpyroximate 10 µg/L, in sterile buffer solution after 73 hours, pH 7, 25 °C, Xenon lamp (natural sunlight mimic), photon irradiance 135 µmoles/h * cm². - molar decadic extinction coefficient 121.21 M^{-1} cm^{-1} - quantum yield 0.83739 at 325 nm - photolysis DT_{50} 1.5 hours (test result) photolysis products: M-1 (DT_{50} 10.5 hours); M-11 - ABIWAS (vers. 2) calculation for middle europe (55 °) December mean DT_{50} 24 hours, June mean DT_{50} 1 hour
Readily biodegradable (yes/no) ‡	no (OECD 301B)
Dissipation in water/sediment	Water/sediment, 2 systems, ^{14}C-pyrazole labelled fenpyroximate, application rate 150 g as/ha. t = 105 days. 2 systems A = river Rhine, sediment: sandy loam; B = pond, sediment: silt loam)

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Dissipation in water/sediment	- DT_{50} water ‡ - DT_{90} water ‡ - DT_{50} whole system ‡ - DT_{90} whole system ‡ - DT_{50} sediment ‡ - DT_{90} sediment ‡	Fenpyroximate as: [1] 1st order, [2] Model Maker Model Maker results to be used for FOCUSsw system A / system B $DT_{50,water}$ 2.8 d [1] / 3.1 d [1] $DT_{90,water}$ 9.2 d [1] / 24.3 d [1] $DT_{50,system}$ 34.1 [2] / 23.4 [2] $DT_{90,system}$ 113.1 [2] / 77.8 [2]
Dissipation in water/sediment	- DT_{50} water ‡ - DT_{90} system ‡	
Mineralisation		after 105 days (study end) in % TAR: ^{14}C-pyrazole labelled fenpyroximate system A: 1.9 % CO_2 system B: 0.9 % CO_2
Non-extractable residues		after 105 days (study end) in % TAR: system A: 22.7 % system B: 28.2 %

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Distribution in water / sediment systems (active substance) ‡

Maximum values: (active substance in % TAR)

System A / B: 56 %/64.8% in water after 6 hours/ 2 days

System A / B: 86.4 % / 67.2 % in sediment after 7 days

Fenpyroximate in % total applied radioactivity (TAR)

days after (as: pyrazole-^{14}C label)				
applicat.	(A) **water**	(B)	(A) **sediment**	(B)
0	55.4	59.4	42.7	39.7
6 h	56.1	51.6	41.9	41.8
1 d	49.6	51.5	49.8	42.7
2	54.2	64.8	47.8	33.6
7	9.5	14.6	86.4	67.2
14	2.0	3.1	58.8	63.0
30	n.d.	0.1	51.0	37.7
61	n.d.	n.d.	29.6	11.8
105	n.d.	n.d.	21.8	15.8

n.d. not determined

Distribution in water / sediment systems (metabolites) ‡

Maximum values: (in % TAR)

System A:	M-8	16.6/16.7 %	in water after 30/61 days
	M-3	13.3 %	in water after 14 days
	M-11	16.8 %	in sediment after 61 days
System B:	M-8	27.7 %	in water after 61 days
	M-3	20.8 %	in water after 14 days
	M-11	24.3 %	in sediment after 105 days

M-8 / M-3 / M-11 in % TAR

days after	(as: pyrazole-^{14}C label)			
applicat.	(A) **water**	(B)	(A) **sediment**	(B)
0	n.d.	n.d.	n.d.	n.d
6 h	n.d.	n.d.	n.d.	n.d.
1 d	0.2 / n.d. /n.d.	n.d. /0.5/n.d.	n.d.	n.d.
2	1.2 / n.d./ n.d.	n.d. /1.1/n.d.	n.d.	n.d./0.2/ n.d.

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

7	4.2 / n.d./ 0.6	0.2 / 11.3/0.4/	n.d.	n.d./1.8/ n.d.
14	9.0 / 13.2/ 5.5	n.d. / 20.8/1.9	0.9 / n.d./ 1.8	0.4/ 4.5/ 1.0
30	16.6 / 6.0/ 5.3	8.9 / 14.6/3.7	1.5 / 2.7 /6.7	2.6/ 9.1/ 6.1
61	16.7 / 3.8/ 8.0	27.7 / 0.6/6.4	2.0 / 3.3/ 16.8	6.6/ 3.3/ 18.6
105	15.6 / 1.6/ 8.8	12.4 / 0.3/6.1	2.6 / 0.8/ 13.5	3.8/ 1.8/ 24.3

PEC (surface water) and PEC sediment (Annex IIIA, point 9.2.3)

Parent Parameters used in FOCUSsw step 1 and 2	Version control no. of FOCUS calculator: Molecular weight (g/mol): 421.49 Water solubility (mg/L): 0.0231 KOC (L/kg): 52067 (arithmetic mean) DT50 soil (d): 48.7 days (Lab, arithmetic mean according to DAR of 30 September 2005) DT50 water/sediment system (d): 28.8 DT50 water (d): 1000 (default) DT50 sediment (d): 28.8 Crop interception (%): 70 % (all crops)
Parameters used in FOCUSsw step 3 (if performed)	Version control no.'s of FOCUS software: Vapour pressure: 5.2×10^{-6} DT_{50} soil (d): 52.3 days (Lab, geometric mean according to Addendum 6) Koc: 52067 (arithmetic mean) 1/n: 1 (Freundlich exponent general or for soil, susp. solids or sediment respectively)
Application rate	Crop: a) pome fruit b) grapes c) beans Crop interception: 70 % (all crops) Number of applications: 1 (all crops) Interval (d): -/- Application rate(s): a) 115.2 g as/ha b) 115.2 g as/ha a) 102.4 g as/ha Application window: a) 10 Sept – 6 Oct

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

	b) 21 Aug – 10 Oct c) 2 April – 27 May or 28 July – 18 Aug

Only PECsw,ini and 28-d PECsw,twa values are provided for FOCUS Steps 1, 2 and 3, as other values are not relevant for the risk assessment using the relevant ecotoxicological endpoints. For FOCUS Step 4, only the PECsw,ini values corresponding to the endpoint selected as most relevant are listed.

FOCUS STEP 1 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
	0 h	a) 6.584 b) 3.628 c) 1.4264		-	
	28 d	-	a) 0.550 b) 0.4688 c) 0.3671	-	-

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU	0 h	a) 6.0384 b) 3.0828 c) 0.6280		-	
	28 d	-	a) 0.2901 b) 0.1577 c) 0.0204	-	-
Southern EU	0 h	a) 4.0269 b) 3.0828 c) 0.9417		-	
	28 d	-	a) 0.0643 b) 0.1675 c) 0.0683	-	-

Pome fruit

FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA	Actual	TWA
D3	Ditch	0 h	4.070		-	

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA	Actual	TWA
		28 d	-	0.241	-	-
D4	Pond	0 h	0.182		-	
		28 d	-	0.096	-	-
D4	Stream	0 h	4.071		-	
		28 d	-	0.039	-	-
D5	Pond	0 h	0.182		-	
		28 d	-	0.094	-	-
D5	Stream	0 h	4.404		-	
		28 d	-	0.060	-	-
R1	Pond	0 h	0.182		-	
		28 d	-	0.094	-	-
R1	Stream	0 h	3.123		-	
		28 d	-	0.024	-	-
R2	Stream	0 h	4.186		-	
		28 d		0.017	-	-
R3	Stream	0 h	4.402		-	
		28 d	-	0.061	-	-
R4	Stream	0 h	3.122		-	
		28 d		0.027	-	-

Grapes

FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D6	Ditch	0 h	1.900		-	
		28 d	-	0.327	-	-
R1	Pond	0 h	0.068		-	
		28 d	-	0.035	-	-
R1	Stream	0 h	1.394		-	
		28 d	-	0.011	-	-
R2	Stream	0 h	1.868		-	

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
		28 d	-	0.008	-	-
R3	Stream	0 h	1.964		-	
		28 d	-	0.027	-	-
R4	Stream	0 h	1.393		-	
		28 d	-	0.013	-	-

Beans

FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
D2	Ditch	0 h	0.522		-	
		28 d	-	0.104	-	-
D2	Stream	0 h	0.488		-	
		28 d	-	0.086	-	-
D3	Ditch	0 h	0.518		-	
		28 d	-	0.034	-	-
D4	Pond	0 h	0.021		-	
		28 d	-	0.011	-	-
D4	Stream	0 h	0.468		-	
		28 d	-	0.005	-	-
D6a	Ditch	0 h	0.520		-	
		28 d		0.088	-	-
D6b	Ditch	0 h	0.520		-	
		28 d	-	0.081	-	-
R1	Pond	0 h	0.021		-	
		28 d	-	0.011	-	-
R1	Stream	0 h	0.354		-	
		28 d	-	0.002	-	-
R2	Stream	0 h	0.480		-	
		28 d	-	0.002	-	-

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

FOCUS STEP 3 Scenario	Water body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			Actual	TWA	Actual	TWA
R3	Stream	0 h	0.503		-	
		28 d	-	0.007	-	0.480
R4	Stream	0 h	0.351		-	
		28 d	-	0.002	-	-

Pome fruit

FOCUS Step 4 Scenario	D3	D4	D4	D5	D5	R1	R1	R2	R3	R4
Water body	ditch	pond	stream	pond	stream	pond	stream	stream	stream	stream
No low-drift spraying equipment										
70 m buffer zone	0.0431	0.0131	0.0416	0.0131	0.0450	0.0131	0.0319	0.0428	0.0450	0.0357

Grapes

FOCUS Step 4 Scenario	D6	R1	R1	R2	R3	R4
Water body	ditch	pond	stream	stream	stream	stream
No low-drift spraying equipment						
45 m buffer zone	0.0418	0.0126	0.0308	0.0412	0.0434	0.0571

Beans

FOCUS Step 4 Scenario	D2	D2	D3	D4[1]	D4	D6a	D6b	R1[1]	R1	R2	R3	R4
Water body	ditch	stream	ditch	pond	stream	ditch	ditch	pond	stream	stream	stream	stream
No low-drift spraying equipment												
20 m buffer zone	0.0471	0.0470	0.0467	-	0.0451	0.0469	0.0468	-	0.0342	0.0463	0.0485	0.0338

[1] Maximum initial concentrations are below the critical ecotoxicological concentration at STEP 3. STEP 4 calculations are therefore not necessary

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Metabolites i) M-3 ii) M-8 iii) M-11	Molecular weight: i) 365.4 ii) 234.26 iii) 213.24
Parameters used in FOCUSsw step 1 and 2	Water solubility (mg/L): i) 365.9 ii) 1101 iii) 468.2
	Soil or water metabolite: i) soil, water ii) water iii) soil, water
	Koc (L/kg): (if necessary, soil metabolites) i) 465 iia) 10 (default); iib) 2430 (EPIWIN, not in DAR) iii) 250
	DT_{50} soil (d): x days (If necessary, Lab or field. In accordance with FOCUS SFO) i) 33.5 (Lab, geometric mean) ii) 365 (default, soil degradation studies not triggered) iii) 86.1 (Lab, single value)
	DT_{50} water/sediment system (d): (representative worst case from sediment water studies) i) 1000 ii) 1000 iii) 1000
	DT_{50} water (d): i) 1000 ii) 1000 iii) 1000
	DT_{50} sediment (d): i) 1000 ii) 1000 iii) 1000
	Crop interception (%): 70 % (all crops) iMaximum occurrence observed (% molar basis with respect to the parent)
	Water: i) 20.8 ii) 27.7 % iii) 8.8
	Sediment: i) 9.1 ii) 6.6

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

	iii) 24.3 Soil: i) 10.8 ii) 5 iii) 8.8
Parameters used in FOCUSsw step 3 (if performed)	Not relevant
Application rate	See parent
Main routes of entry	

FOCUS STEP 1 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Pome fruit (worst case, covering also grapes and beans)	0h	i) 3.54 iia) 2.20 iib) 1.40 iii) 2.21		-	

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU Pome fruit	0 h	i) 1.32 iia)1.20 iib)1.15 iii) 0.93		-	
Northern EU Grapes	0 h	i) 0.68 iia) 0.64 iib).0.59 iii)0.47		-	
Northern EU Beans	0 h	i) 0.25 iia) 0.23 iib) .018 iii) 0.18		-	
Southern EU Pome fruit	0 h	i) 1.32 iia)1.23 iib)1.15 iii) 0.93		-	

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Southern EU Grapes	0 h	i) 0.68 iia) 0.68 iib).0.59 iii) 0.50		-	
Southern EU Beans	0 h	i) 0.31 iia) 0.26 iib) .018 iii) 0.22		-	

PEC (ground water) (Annex IIIA, point 9.2.1)

Method of calculation and type of study (*e.g.* modelling, monitoring, lysimeter)	FOCUS-PELMO 3.3.2 Input parameters DT_{50}: 48.7 d (fenpyroximate) – arithmetic mean according to DAR of 30 September 2005; 27.5 d (M-3) – arithmetic mean according to DAR of 30 September 2005; 79.1 d (M-11) – derived for Kanagawa loam soil according to DAR of 30 September 2005 Koc: 47650 L/kg (fenpyroximate, median value, 1/n 1.04), 465 L/kg (M-3, 1/n 0.778), 250 L/kg (M-11, 1/n 0.9)
Application rate	1 x 115.2 g as/ha (vines, apples), BBCH 69-78, 70 % interception M-3: 10.8 % formation in Kanagawa loam soil M-11: 100 % formation assumed

$PEC_{(gw)}$

Maximum concentration	fenpyroximate, M-3: < 0.001 µg/L
Average annual concentration (Results quoted for modelling with FOCUS gw scenarios, according to FOCUS guidance)	fenpyroximate, M-3: < 0.001 µg/L for all scenarios M-11: < 0.001…0.027 µg/L

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

PEC(gw) - FOCUS modelling results (80th percentile annual average concentration at 1m)

	Scenario annual application	Parent (µg/L)	Metabolites (µg/L)		
			M-3	M-11 (vines)	M-11 (apples)
FOCUS-PELMO 3.3.2 /	Châteaudun	< 0.001	< 0.001	0.003	0.002
	Hamburg	< 0.001	< 0.001	0.001	0.001
	Jokioinen	< 0.001	< 0.001	-	< 0.001
	Kremsmünster	< 0.001	< 0.001	0.001	0.001
	Okehampton	< 0.001	< 0.001	-	0.001
	Piacenza	< 0.001	< 0.001	0.027	0.025
	Porto	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	0.001	< 0.001

Fate and behaviour in air (Annex IIA, point 7.2.2, Annex III, point 9.3)

Direct photolysis in air ‡	not performed
Quantum yield of direct phototransformation	Φ =0.83739
Photochemical oxidative degradation in air ‡	Calculation according to Atkinson (1987), OH-radicals 6.5 x 10^5 : $t_{1/2}$ 12 hour day: 1.47 d (35.3 h) $t_{1/2}$ 24 hour day: 0.73 d (17.5 h) Degradation rate constant at 298 K: ≥ 1.68 e^{-11} cm³/molecule/s OH-radicals 0.5 x 10^6/cm³: $t_{1/2}$ 24 hour day: 0.33 d (7.99 h). Degradation rate constant at 298 K: ≥ 48.2 e^{-12**}cm³/molecule/s
Volatilisation ‡	low vapour pressure of fenpyroximate (< 1 x 10^{-5} Pa, 25 °C), no volatilisation expected.

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

PEC (air)

Method of calculation	not performed

$PEC_{(a)}$

Maximum concentration	not performed

Definition of the residue (Annex IIA, point 7.3)

Environmental occurring residues requiring further assessment by other disciplines (toxicology and ecotoxicology) and or requiring consideration for groundwater exposure.	Residues triggering risk assessment by other disciplines or for which a groundwater exposure assessment is triggered. Soil. fenpyroximate, M-3, (+M-11, M-16 & M-8 under anaerobic conditions). Surface water: fenpyroximate, M-1 (i.e. Z isomer of fenpyroximate), M-3, M-8, M-11, metabolites containing benzyl moiety data gap. Sediment: fenpyroximate, M-1, M-11, metabolites containing benzyl moiety data gap. Groundwater: fenpyroximate, M-3, M-11 Air: Fenpyroximate & M-1 (by default)

Monitoring data, if available (Annex IIA, point 7.4)

Soil (indicate location and type of study)	not available
Surface water (indicate location and type of study)	not available
Ground water (indicate location and type of study)	not available
Air (indicate location and type of study)	not available

Points pertinent to the classification and proposed labelling with regard to fate and behaviour data

candidate for R 53

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Appendix 1.6: Effects on non-target Species

Effects on terrestrial vertebrates (Annex IIA, point 8.1, Annex IIIA, points 10.1 and 10.3)

Acute toxicity to mammals ‡	Rat	active substance LD_{50} 245 mg as/kg bw KIRON formulation LD_{50} 5277 mg/kg bw LD_{50} 277 mg as/kg bw
Long-term toxicity to mammals ‡	Rat	active substance NOAEL 30 mg as/kg diet NOAEL 1.99 mg as/kg bw/d
Acute toxicity to birds ‡	*Colinus virginianus* *Anas platyrhynchos*	LD_{50} > 2000 mg as/kg bw LD_{50} > 2000 mg as/kg bw
Short term dietary toxicity to birds ‡	*Colinus virginianus* *Anas platyrhynchos*	LC_{50} > 5000 mg as/kg diet LD_{50} > 744 mg as/kg bw/d LC_{50} > 5000 mg as/kg diet no reliable LD_{50} , due to significant avoidance of treated food
Reproductive toxicity to birds ‡	*Colinus virginianus* *Anas platyrhynchos*	NOEC 50 mg as/kg diet NOEDD 4.05 mg as/kg bw/d NOAEC 40 mg as/kg diet NOAEDD 3.65 mg as/kg bw/d

Toxicity/exposure ratios for terrestrial vertebrates (Annex IIIA, points 10.1 and 10.3)

i) Pome fruit, 1 x 115.2 g as/ha
ii) Vines, 1 x 115.2 g as/ha

Indicator species/Category[2]	Time scale	ETE	TER[1]	Annex VI Trigger[3]
Tier 1 (Birds)				
Insectivore	Acute	6.23	> 321	10
Insectivore	Short-term	3.47	> 214	10
Insectivore	Long-term	3.47	1.1	5
Small passerine – drinking water uptake	Acute	12.4	> 161	10
fish-eating bird (using FOCUSsw Step 1 PECsw)	Long-term	0.45	8.1	5

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Indicator species/Category[2]	Time scale	ETE	TER[1]	Annex VI Trigger[3]
earthworm-eating bird	Long-term	0.15	50	5
Higher tier refinement (Birds)				
i) Pome fruit: Blue tit (*Parus caeruleus*) – insectivorous diet arthropod RUD for 30 % large/70 % small arthropods; PT = 0.61 (radiotracking)	Long-term	1.58	2.3	5
ii) Vines: Blue tit (*Parus caeruleus*) – insectivorous diet arthropod RUD for 30 % large/70 % small arthropods	Long-term	2.60	1.4	5
Tier 1 (Mammals)				
Small herbivore	Acute	13,63	18	10
Small herbivore	Long-term	3.87	0.5	5
Small mammal – drinking water uptake	Acute	7.2	34	10
fish-eating mammal	Long-term	0.28	7.1	5
earthworm-eating mammal	Long-term	0.19	21.3	5
Higher tier refinement (Mammals)				
i) pome fruit ii) Vines: Bank vole (*Clethrionomys glareolus*) mixed diet (20 % arthropods, 20 % short grass, 60 % seeds); 70 % crop interception	Long-term	0.19	10.5	5

[1] in higher tier refinement provide brief details of any refinements used (e.g., residues, PT, PD or AV)
[2] for cereals indicate if it is early or late crop stage
[3] If the Annex VI Trigger value has been adjusted during the risk assessment of the active substance (e.g. many single species data), it should appear in this column.

iii) Beans, 1 x 102.4 g as/ha
drinking water uptake and accumulation via food chain covered by the assessment for pome fruit and vines

Indicator species/Category[2]	Time scale	ETE	TER[1]	Annex VI Trigger[3]
Tier 1 (Birds)				
Medium herbivore	Acute	6.77	> 295	10

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Indicator species/Category[2]	Time scale	ETE	TER[1]	Annex VI Trigger[3]
Insectivore	Acute	5.54	> 361	10
Medium herbivore	Short-term	3.11	> 239	10
Insectivore	Short-term	3.09	> 241	10
Medium herbivore	Long-term	1.65	2.2	5
Insectivore	Long-term	3.09	1.2	5
Higher tier refinement (Birds)				
Grey partridge (*Perdix perdix*) mixed diet (62 % non-grass herbs, 34 % weed seeds, 4 % arthropods)	Long-term	0.48	7.7	5
Yellow wagtail (*Motacilla flava*) – insectivorous diet arthropod RUD for 89 % large/11 % small arthropods	Long-term	0.70	5.2	5
Tier 1 (Mammals)				
Medium herbivore	Acute	2,49	98	10
Medium herbivore	Long-term	0.60	3.3	5
Higher tier refinement (Mammals)				
Hare (*Lepus europaeus*) 70 % crop interception	Long-term	0.18	11.0	5

[1] in higher tier refinement provide brief details of any refinements used (e.g., residues, PT, PD or AV)
[2] for cereals indicate if it is early or late crop stage
[3] If the Annex VI Trigger value has been adjusted during the risk assessment of the active substance (e.g. many single species data), it should appear in this column.

Toxicity data for aquatic species (most sensitive species of each group) (Annex IIA, point 8.2, Annex IIIA, point 10.2)

Group	Test substance	Time-scale	Endpoint	Toxicity (mg/L) [1)]
Oncorhynchus mykiss	fenpyroximate	acute, 96 h, flow through	LC_{50}	0.00105 [2)]
Oncorhynchus mykiss	fenpyroximate	long-term, 21 d flow through	NOEC	0.00019 [2)]
Pimephales promelas	fenpyroximate	long-term, 34 d, flow through	NOEC early life stage	0.0001
Daphnia magna	fenpyroximate	acute, 48 h, static	EC_{50} immobilisation	0.00328 [2)]

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Group	Test substance	Time-scale	Endpoint	Toxicity (mg/L) [1)]
Daphnia magna	fenpyroximate	long-term, 21 d, semi-static	NOEC reproduction	0.00068[2)]
Pseudokirchneriella subcapitata	fenpyroximate	acute, 72 h, static	E_bC_{50} biomass	10
Scenedesmus subspicatus	fenpyroximate	acute, 72 h, static	E_bC_{50} biomass E_rC_{50} growth rate NOEC	0.0034 0.0055 0.001
Chironomus riparius	fenpyroximate	long-term, 28 d, static	NOEC growth, emergence	0.010
Oncorhynchus mykiss	formulation fenpyroximate 5 SC	acute, 96 h, flow through	LC_{50}	0.041 [2)] (0.00213 as)
Daphnia magna	formulation fenpyroximate 5 SC	acute, 48 h, static	EC_{50} immobilisation	0.0217 (0.00109 as)
Scenedesmus subspicatus	formulation fenpyroximate 5 SC	acute, 72 h, static	E_bC_{50} biomass E_rC_{50} growth rate NOEC	0.11 (0.0057 as) > 0.18 (0.0094 as) 0.032 (0.0017 as)
Oncorhynchus mykiss	Metabolite M-3	acute, 96 h, static	LC_{50}	8.2
Daphnia magna	metabolite M-3	acute, 48 h, static	EC_{50}	14 [1)]
Pseudokirchneriella subcapitata	metabolite M-3	acute, 72 h, static	E_bC_{50} biomass E_rC_{50} growth rate NOEC	41.8 93.3 12.5
Oryzias latipes	Metabolite M-8	acute, 96 h, static	LC_{50}	> 100
Daphnia magna	metabolite M-8	acute, 48 h, static	EC_{50}	> 10 [2)]
Pseudokirchneriella subcapitata	Metabolite M-8	72 h, static	E_bC_{50} biomass E_rC_{50} growth rate NOEC	38.1 >100 12.5

1) nominal concentrations, confirmed by chemical analyses

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

2) measured actual concentrations

Microcosm or mesocosm tests
Indoor-microcosm, static, 28 days with formulation fenpyroximate 5 SC: Effects on zooplankton: the microcosm study is regarded as a toxicity study under realistic conditions with sediment: 28 d NOEC 0.001 mg as/L; (aquatic insects, amphipods, isopods were not tested) EC_{50} 24 h 0.00059 mg as /L (total abundancy). Effects on fish: the microcosm study is regarded as prolonged fish toxicity study (juvenile fish) under realistic conditions with sediment: 0-96 h NOEC 0.00061 mg as/L (based on measured concentrations); 96 h LC_{50} 0.0018 mg as/L

Toxicity/exposure ratios for the most sensitive aquatic organisms (Annex IIIA, point 10.2)

FOCUS Step1

i) Pome fruit
ii) Grapes
iii) Beans

Test substance	Organism	Toxicity end point (mg/L)	Time scale	PEC_i	PEC_{twa} 28 d	TER	Annex VI Trigger [1]
a.s.	Fish *O. mykiss*	0.00105	Acute	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 0.16 ii) 0.29 iii) 0.74	100
a.s.	Fish *O. mykiss*	0.00019	Chronic	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 0.42 ii) 0.49 iii) 0.63	10
a.s.	Fish *P. promelas* (ELS)	0.00023	Chronic		i) 0.00055 ii) 0.00047 iii) 0.00037	i) 0.03 ii) 0.05 iii) 0.13	10
a.s.	Aquatic invertebrates *D. magna*	0.00328	Acute	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 0.50 ii) 0.90 iii) 2.30	100
a.s.	Aquatic invertebrates *D. magna*	0.00068	Chronic	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 0.10 ii) 0.19 iii) 0.48	10

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Test substance	Organism	Toxicity end point (mg/L)	Time scale	PEC_i	PEC_{twa} 28 d	TER	Annex VI Trigger [1]
a.s.	Algae *S. subspicatus*	0.00344	Chronic	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 0.52 ii) 0.95 iii) 2.41	10
a.s.	Higher plants[2]	-/-	Chronic	i) 0.00658 ii) 0.00363 iii) 0.00146			10
a.s.	Sediment-dwelling[3] organisms *C. riparius*	0.010	Chronic	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 1.52 ii) 2.79 iii) 7.01	10
a.s.	Fish microcosm	0.001	Chronic	i) 0.00658 ii) 0.00363 iii) 0.00146		i) 0.15 ii) 0.28 iii) 0.70	10
M-3	*O. mykiss*	8.148	Acute	i) 0.00354		i) 2302	100
M-8	*P. subspicata*	38.1	Chronic	i) 0.00220[a] i) 0.00140[b]		i) 17318[a] i) 27214[b]	10

[1] If the Annex VI Trigger value has been adjusted during the risk assessment of the active substance, it should appear in this column. E.g. if it is agreed during the risk assessment of mesocosm, that a trigger value of 5 is required, it should appear as a minimum requirement to MS in relation to product approval.
[2] only required for herbicides
[3] consider the need for PEC_{sw} and PEC_{sed} and indicate which has been used
[a] with conservative default assumption K_{OC} = 10 from the Guidance Document on Aquatic Ecotoxicology (SANCO/3268/2001)
[b] with EPIWIN calculation K_{OC} = 2430

FOCUS Step 2

i) Pome fruit
ii) Grapes
iii) Beans

Test substance	N/S[1]	Organism[2]	Toxicity end point (mg/L)	Time scale	PEC[3]	TER	Annex VI Trigger [4]
a.s.	N	Fish Microcosm	0.001	Chronic	i) 0.00604 ii) 0.00308 iii) 0.00063	i) 0.17 ii) 0.32 iii) 1.59	10
a.s.	S	Fish	0.001	Chronic	i) 0.00403 ii) 0.00308	i) 0.25 ii) 0.32	10

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Test substance	N/S[1]	Organism[2]	Toxicity end point (mg/L)	Time scale	PEC[3]	TER	Annex VI Trigger [4]
		Microcosm			iii) 0.00094	iii) 1.06	

[1] indicate whether Northern of Southern
[2] include critical groups which fail at Step 1.
[3] indicate whether maximum or twa values have been used.
[4] If the Annex VI Trigger value has been adjusted during the risk assessment of the active substance, it should appear in this column. E.g. if it is agreed during the risk assessment of mesocosm, that a trigger value of 5 is required, it should appear as a minimum requirement to MS in relation to product approval.

Refined aquatic risk assessment using higher tier FOCUS modelling.

FOCUS Step 3

Pome fruit

Test substance	Scenario[1]	Water body type[2]	Test organism[3]	Time scale	Toxicity end point (mg/L)	PEC[4]	TER	Annex VI trigger[5]
a.s.	D3	ditch	Fish, microcosm	Chronic	0.001	4.07	0.25	10
	D4	pond				0.182	5.49	
	D4	stream				4.071	0.25	
	D5	pond				0.182	5.49	
	D5	stream				4.404	0.23	
	R1	pond				0.182	5.49	
	R1	stream				3.123	0.32	
	R2	stream				4.186	0.24	
	R3	stream				4.402	0.23	
	R4	stream				3.122	0.32	

[1] drainage (D1-D6) and run-off (R1-R4)
[2] ditch/stream/pond
[3] include critical groups which fail at Step 2.
[4] indicate whether PEC_{sw}, or PEC_{sed} and whether maximum or twa values used
[5] If the Annex VI Trigger value has been adjusted during the risk assessment of the active substance, it should appear in this column. E.g. if it is agreed during the risk assessment of mesocosm, that a Trigger value of 5 is required, it should appear as a minimum requirement to MS in relation to product approval.

Grapes

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Test substance	Scenario[1]	Water body type[2]	Test organism[3]	Time scale	Toxicity end point (mg/L)	PEC[4]	TER	Annex VI trigger[5]
a.s.	D6	ditch	Fish, microcosm	Chronic	0.001	1.900	0.53	10
	R1	pond				0.068	14.71	
	R1	stream				1.394	0.72	
	R2	stream				1.868	0.54	
	R3	stream				1.964	0.51	
	R4	stream				1.393	0.72	

For footnotes see table above

Beans

Test substance	Scenario[1]	Water body type[2]	Test organism[3]	Time scale	Toxicity end point (mg/L)	PEC[4]	TER	Annex VI trigger[5]
a.s.	D2	ditch	Fish, microcosm	Chronic	0.001	0.522	1.92	10
	D2	stream				0.488	2.05	
	D3	ditch				0.518	1.93	
	D4	pond				0.021	47.62	
	D4	stream				0.468	2.14	
	D6a	ditch				0.520	1.92	
	D6b	ditch				0.520	1.92	
	R1	pond				0.021	47.62	
	R1	stream				0.354	2.82	
	R2	stream				0.480	2.08	
	R3	stream				0.503	1.99	
	R4	stream				0.351	2.85	

For footnotes see table above

FOCUS Step 4

Pome fruit
Only the respective most critical subscenario is reported

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Test organism[3]			Fish, microcosm			
Time scale			0-96 h (out of 21 d total test duration)			
Toxicity end point (µg/L)			0.61 (NOEC)			
Annex VI trigger[5]			10			
Scenario[1]	Water body type[2]	Buffer zone distance	Drift-reducing nozzles	Run-off mitigation	PEC[4] (µg/L)	TER
D3	ditch	70 m	-/-	-/-	0.0431	14.2
D4	stream	70 m	-/-	-/-	0.0416	14.7
D5	stream	70 m	-/-	-/-	0.0450	13.6
R1	stream	70 m	-/-	-/-	0.0319	19.1
R2	stream	70 m	-/-	-/-	0.0428	14.3
R3	stream	70 m	-/-	-/-	0.0450	13.6
R4	stream	70 m	-/-	-/-	0.0357	17.1

[1] drainage (D1-D6) and run-off (R1-R4)
[2] ditch/stream/pond
[3] include critical groups which fail at Step 3.
[4] indicate whether PEC_{sw}, or PEC_{sed} and whether maximum or twa values used
[5] If the Annex VI Trigger value has been adjusted during the risk assessment of the active substance, it should appear in this column. E.g. if it is agreed during the risk assessment of mesocosm, that a Trigger value of 5 is required, it should appear as a minimum requirement to MS in relation to product approval.

Grapes
Only the respective most critical subscenario is reported

Test organism[3]			Fish, microcosm			
Time scale			0-96 h (out of 21 d total test duration)			
Toxicity end point (µg/L)			0.61 (NOEC)			
Annex VI trigger[5]			10			
Scenario[1]	Water body type[2]	Buffer zone distance	Drift-reducing nozzles	Run-off mitigation	PEC[4] (µg/L)	TER
D6	ditch	45 m	-/-	-/-	0.0418	14.6
R1	stream	45 m	-/-	-/-	0.0308	19.8
R2	stream	45 m	-/-	-/-	0.0412	14.8
R3	stream	45 m	-/-	-/-	0.0434	14.1
R4	stream	45 m	-/-	-/-	0.0571	10.7

For footnotes see table above

Beans
Only the respective most critical subscenario is reported

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Test organism[3]			Fish, microcosm			
Time scale			0-96 h (out of 21 d total test duration)			
Toxicity end point (µg/L)			0.61 (NOEC)			
Annex VI trigger[5]			10			
Scenario[1]	Water body type[2]	Buffer zone distance	Drift-reducing nozzles	Run-off mitigation	PEC[4] (µg/L)	TER
D2	ditch	20 m	-/-	-/-	0.0471	13.0
D3	ditch	20 m	-/-	-/-	0.0467	13.1
D4	stream	20 m	-/-	-/-	0.0451	13.5
D6a	ditch	20 m	-/-	-/-	0.0469	13.0
R1	stream	20 m	-/-	-/-	0.0342	17.8
R2	stream	20 m	-/-	-/-	0.0463	13.2
R3	stream	20 m	-/-	-/-	0.0485	12.6
R4	stream	20 m	-/-	-/-	0.0338	18.0

For footnotes see table above

Bioconcentration

Bioconcentration factor (BCF) ‡	whole fish:	1601 max. BCF
	edible tissue:	656 max. BCF
	non-edible tissue:	2746 max. BCF
Annex VI Trigger for the bioconcentration factor	100	
Clearance time(CT_{50})	whole fish:	4.2 days
(CT_{90})	whole fish:	14 days
Level of residues (%) in organisms after the 14 day depuration phase	depuration after 14 d	after 22 d
	whole fish: 42.4	14.1 µg/kg
	edible tissue: 13.7	5.2 µg/kg
	non-edible tissue: 78.0	29.0 µg/kg

Effects on honeybees (Annex IIA, point 8.3.1, Annex IIIA, point 10.4)

Acute oral toxicity ‡	LD_{50}: > 118.5 µg as/bee (active substance)
	LD_{50}: > 5 µg as/bee (formulation)
	LD_{50}: - µg as/bee (metabolite 1)
Acute contact toxicity ‡	LD_{50}: 15.8 µg as/bee (active substance)
	LD_{50}: 25 µg as/bee (formulation)

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

LD_{50}: - µg as/bee (metabolite 1)

Hazard quotients for honey bees (Annex IIIA, point 10.4)

Application rate (kg as/ha)	Crop	Route	Hazard quotient	Annex VI Trigger
Laboratory tests: active substance				
0.1152	table/wine grapes, pome fruit , apples, pears	oral	< 0.98	50
0.1152	table/wine grapes, pome fruit , apples, pears	contact	< 7.3	50
Laboratory tests: formulation				
0.1152	table/wine grapes, pome fruit , apples, pears	oral	< 23.1	50
0.1152	table/wine grapes, pome fruit , apples, pears	contact	< 4.7	50

Field or semi-field tests Tests are not required as the test substance is of low toxicity to honey bees.

Effects on other arthropod species (Annex IIA, point 8.3.2, Annex IIIA, point 10.5)

Laboratory tests with standard sensitive species

Species	Stage	Test substance	Dose (kg as/ha)	Endpoint	Effect	Trig-ger
Laboratory tests with inert substrate						
Typhlodromus pyri	proto-nymphs			mortality	not valid	
Aphidius rhopalosiphi	adults	KIRON	0.025	mortality / reproduction	100 % / n.d. %	30 %[1]
			0.0025		32 % / 1 %	
			0.00125		3 % / 6 %	
Chrysoperla carnea	adults	KIRON	0,01, 21 d (”0.15 %”)	mortality / reproduction	22.5 % / 42.3 %	30 %[1]
Coccinella septempunctata	adults	KIRON	0.01-0.02 ("0.2 %"); 3 d	mortality	100 %	30 %[1]
Poecilius cupreus	adults	KIRON	0.08, 14 d	mortality	0 %	30 %[1]

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Species	Stage	Test substance	Dose (kg as/ha)	Endpoint	Effect	Trig-ger
Aleochara bilineata	adults	KIRON	0.046, 28 d	mortality / reproduction	0 % / -19 %	30 %[1]
Aleochara bilineata	adults	KIRON	0.028, 62 d	reproduction	3.6 %	30 %[1]
Pardosa spp.	adults	KIRON	0.08, 14 d	mortality	6.7 %	30 %[1]
			0.0032		0 %	
Extended laboratory tests with natural substrate						
Episyrphus balteatus	adults	KIRON on potted plants	0.125	mortality / reproduction	50 % / 0 %	50 %[2]
			0.025		16 % / 0 %	
Typhlodromus pyri	Proto-nymphs	KIRON on leafs	0.0625	mortality / reproduction	22 % / 46. %	50 %[2]
			0.125		32 % / 92 %	
			0.250		56 % / 91 %	
			0.500		66 % / 83 %	
			1		36 % / 97 %	
			LR_{50}		233.4 g as/ha	
Coccinella septempunctata	Larvae (24h)	KIRON on leafs	0.02	mortality	-6 %	50 %[2]
			0.03		20 %	
			0.05		49 %	
			0.08		60 %	
			LR_{50}		59.7 g a.s./ha	
Chrysoperla carnea	adults	KIRON on leaf disc	0.125, 26 d	mortality / fertility	19 % / 32 % [3)]	50 %[2]
			0.025		15 % / 12 % [3)]	
Field study, vine yards						
Typhlodromus pyri	adults	KIRON 0.2 %	1st appl. 0.03	abundances	60 %, recovery after 11 weeks	
			2nd appl. 0.09		46 % no complete recovery	
Typhlodromus pyri	adults	KIRON 0.2 %	1st appl. 0.03	abundances	no effect	
			2nd appl. 0.09		no effect	
Typhlodromus	adults	KIRON	1st appl. 0.023	abundances	no effect	

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Species	Stage	Test substance	Dose (kg as/ha)	Endpoint	Effect	Trig-ger
pyri		0.15 %	2nd appl. 0.08		no effect	

[1)] Trigger according to Annex VI 91/414/EEC on max. application rate
[2)] Trigger at field rate according to Sanco/10329/2002
[3)] effects on reproduction not statistically significant

Hazard quotients for other arthropod species: in-field and off-field scenario

Pome fruit

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field[1]	Trigger
Fenpyroximate 5SC	*Aphidius rhopalosiphi*	> 2.5	46	3 m: 13.5 5 m: 9.2 10 m: 5.4 15 m: 2.6 20 m: 1.3	2

[1]indicate distance assumed to calculate the drift rate

Grapes

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field[1]	Trigger
Fenpyroximate 5SC	*Aphidius rhopalosiphi*	> 2.5	46	3 m: 3.7 5 m: 1.7	2

[1]indicate distance assumed to calculate the drift rate

Beans

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field[1]	Trigger
Fenpyroximate 5SC	*Aphidius rhopalosiphi*	> 2.5	41	3 m: 3.3 5 m: 1.5	2

[1] indicate distance assumed to calculate the drift rate

Refined toxicity/exposure ratios for arthropod species: off- field scenario

Escort 2 concept

Species	Crop	AR (g as/ha)	MAF	drift	vdf	CF	ARcorr (g as/ha)	Comparison with 50-% effect rate

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Episyrphus balteatus	Pome fruit	115.2	1	3 m: 29.20 % 5 m: 19.89 %	1	5	3 m: 168.2 5 m: 114.6	> 125 < 125
	Grapes	115.2	1	3 m: 8.02 %			3 m: 46.2	< 125
	Beans	102.4	1	3 m: 8.02 %			3 m: 41.1	< 125

TER concept

Species	Crop	AR (g as/ha)	MAF	drift	vdf	E/LR50 (g as/ha)	TER	Trigger
Episyrphus balteatus	Pome fruit	115.2	1	3 m: 29.20 % 5 m: 19.89 %	1	125	3 m: 3.7 5 m: 5.5	5
	Grapes	115.2	1	3 m: 8.02 %			3 m: 13.5	
	Beans	102.4	1	3 m: 8.02 %			3 m: 15.2	

Further laboratory and extended laboratory studies ‡

Application rate (kg as/ha)	Test species	Test substance	PEC off-crop, distance 3 m (g as/ha) *	LR_{50} (kg as/ha)	TER	Trigger **
Laboratory tests with inert substance						
1 × 0.1152 worst case: pome fruit	*Aphidius rhopalosiphi*	KIRON	6.73	> 0.0025	> 0.4	10
	Poecilius cupreus			> 0.08	> 12	10
	Pardosa spp.			> 0.08	> 12	10
	Aleochara bilineata			> 0.046	> 7	10
	Coccinella septempunctata			< 0.01-0.02	< 1.5	10
Extended laboratory tests with natural substrate						
1 × 0.1152 pome fruit	*Chrysoperla carnea*	KIRON	6.73	> 0.125	> 19	5
	Episyrphus balteatus		33.64	0.125	3.7	
1 × 0.1152 vine	*Chrysoperla carnea*	KIRON	1.85	> 0.125	> 68	5
	Episyrphus balteatus		9.24	0.125	14	
1 × 0.1024 beans	*Chrysoperla carnea*	KIRON	1.64	> 0.125	> 76	5
	Episyrphus balteatus		8.21	0.125	15	

* PEC off-crop = Single application rate × drift factor/VDF(5). Without VDF if product is sprayed on plants
** used by the German Federal Environmental Agency (Schulte et al., 1999: UWSF 11(5) 261-266).

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Field or semi-field tests Based on data from 3 out of 11 valid studies with application rates that cover the intended application rate in vines of 115.2 g as/ha (1 × 122 g as/ha; 107 + 107 g as/ha; 123 + 138 g as/ha), fenpyroximate can be classified as "harmless to Typhlodromus pyri".

Effects on earthworms (Annex IIA, point 8.4, Annex IIIA, point 10.6)

Acute toxicity ‡	Fenpyroximate LC_{50} 69.3 mg as/kg soil dw LC_{50} corrected (f_{oc} = 2) 34.7 mg as/kg soil dw Formulation KIRON LC_{50} 180 mg product/kg soil dw (9.36 mg as/kg soil dw) LC_{50} corrected (f_{oc} = 2) 90 mg product/kg soil dw (4.68 mg as/kg soil dw)
Reproductive toxicity ‡	NOEC 26.25 L product/ha = 1.35 kg as/ha 1.8 mg as/kg soil dw corrected (f_{oc} = 2) 0.9 mg as/kg soil dw
Field study	not required

Toxicity/exposure ratios for earthworms (Annex IIIA, point 10.6)

Application rate (kg as/ha)	Crop	Time-scale	$PEC_{soil, ini}$ (mg as/kg soil)	TER	Annex VI Trigger
Fenpyroximate					
0.1152	pome fruits	acute $LC_{50\ corr}$	0.0768	452	10
0.1152	pome fruits	long-term $NOEC_{corr}$	0.0768	12	5
Formulation KIRON (related to as)					
0.1152	pome fruits	acute $LC_{50\ corr}$	0.0768	61	10

Effects on other soil macro-organisms (Annex IIIA, point 10.6.2)

Folsomia candida / Litter bag	not required, $DT_{90\ field}$ < 100 d

Effects on soil micro-organisms (Annex IIA, point 8.5, Annex IIIA, point 10.7)

Nitrogen mineralisation ‡	KIRON formulation (fenpyroximate 5 % SC): 2.25, 11.25 and 22.5 kg as/ha, equivalent to 0.15, 0.75 and 1.5 mg as/kg soil, in two soils: clay loam and sandy loam. After 28 d < 15 % different from controls

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

Carbon mineralisation ‡	KIRON formulation (fenpyroximate 5 % SC): 2.25 and 22.5 kg as/ha, equivalent to 0.15 and 1.5 mg as/kg soil, in two soils: clay loam and sandy loam. After 28 d < 15 % different from controls

Impact on water treatment procedures (Annex IIA, point 8.7)

Oxygen consumption by activated sludge ‡	EC_{20} respiration: > 1000 mg as/L (nominal, highest test conc. above water solubility of 14.7 µg/L)

Effects on other non-target organisms (flora and fauna) (Annex IIA, point 8.6)

Flora, species	Test substance	Effect			Trigger
Limit test with the formulation, 14 days, seedling emergence / vegetative vigour,					
		emergence	shoot length	shoot weight	
Allium cepa	fenpyroximate 5 % EC at 336.25 g as/ha	0 - 14 %	-5 - 31 % / -8 - 11 %	-8 - 17 % / -1 - 39 %	50 %*
Avena sativa					
Brassica oleracea					
Brassica rapa					
Cucumis sativus					
Glycine max					
Lactuca sativa					
Lolium perenne					
Lysopersicum esculentum					
Zea mays					
Lysopersicum esculentum *Lactuca sativa*	fenpyroximate 5 % EC	EC_{25} > 0.336 kg as/ha			

* Trigger at field rate according to Sanco/10329/2002

Toxicity/exposure ratios for non-target plants

Application rate (kg as/ha)	Crop	EC_{50} (mg as/kg soil)	PEC_{soil}, (mg as/kg soil)	TER	Trigger*

‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

0.1152	pome fruit	> 336	33.6	10	5
	vine	> 336	9.23	37	5
	beans	> 336	8.21	41	5

* SANCO/10329/2002 rev 2 final, 17 Oct 2002

Classification and proposed labelling (Annex IIA, point 10)

with regard to ecotoxicological data	R 50/53, N, dangerous for the environment

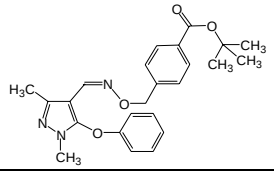
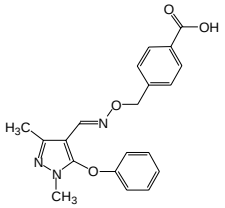
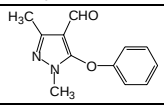
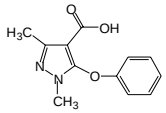
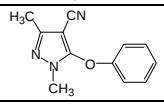
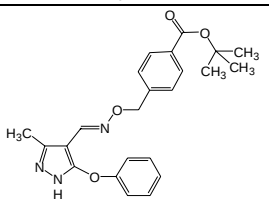
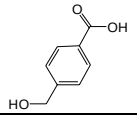
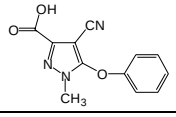
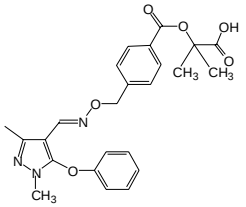
‡ Endpoints identified by EU-Commission as relevant for Member States when applying the Uniform Principles

APPENDIX 2 – ABBREVIATIONS USED IN THE LIST OF ENDPOINTS

ADI	acceptable daily intake
AOEL	acceptable operator exposure level
ARfD	acute reference dose
a.s.	active substance
bw	body weight
CA	Chemical Abstract
CAS	Chemical Abstract Service
CIPAC	Collaborative International Pesticide Analytical Council Limited
d	day
DAR	draft assessment report
DM	dry matter
DT_{50}	period required for 50 percent dissipation (define method of estimation)
DT_{90}	period required for 90 percent dissipation (define method of estimation)
ε	decadic molar extinction coefficient
EC_{50}	effective concentration
EEC	European Economic Community
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINKS	European List of New Chemical Substances
EMDI	estimated maximum daily intake
ER50	emergence rate, median
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FOCUS	Forum for the Co-ordination of Pesticide Fate Models and their Use
GAP	good agricultural practice
GCPF	Global Crop Protection Federation (formerly known as GIFAP)
GS	growth stage
h	hour(s)
ha	hectare
hL	hectolitre
HPLC	high pressure liquid chromatography or high performance liquid chromatography
ISO	International Organisation for Standardisation
IUPAC	International Union of Pure and Applied Chemistry
K_{oc}	organic carbon adsorption coefficient
L	litre
LC	liquid chromatography

LC-MS	liquid chromatography-mass spectrometry
LC-MS-MS	liquid chromatography with tandem mass spectrometry
LC_{50}	lethal concentration, median
LD_{50}	lethal dose, median; dosis letalis media
LOAEL	lowest observable adverse effect level
LOD	limit of detection
LOQ	limit of quantification (determination)
µg	microgram
mN	milli-Newton
MRL	maximum residue limit or level
MS	mass spectrometry
NESTI	national estimated short term intake
NIR	near-infrared-(spectroscopy)
nm	nanometer
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
PEC	predicted environmental concentration
PEC_A	predicted environmental concentration in air
PEC_S	predicted environmental concentration in soil
PEC_{SW}	predicted environmental concentration in surface water
PEC_{GW}	predicted environmental concentration in ground water
PHI	pre-harvest interval
pK_a	negative logarithm (to the base 10) of the dissociation constant
PPE	personal protective equipment
ppm	parts per million (10^{-6})
ppp	plant protection product
r^2	coefficient of determination
RPE	respiratory protective equipment
STMR	supervised trials median residue
TER	toxicity exposure ratio
TMDI	theoretical maximum daily intake
UV	ultraviolet
WHO	World Health Organisation
WG	water dispersible granule
yr	year

APPENDIX 3 – USED COMPOUND CODE(S)

Code/Trivial name	Chemical name	Structural formula
M-1 (Z-isomer of fenpyroximate)	tert-butyl (*Z*)-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)-methyleneaminooxymethyl]benzoate	
M-3	(*E*)-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)-methyleneaminooxy-methyl]benzoic acid	
M-6	1,3-dimethyl-5-phenoxypyrazole-4-carbaldehyde	
M-8	1,3-dimethyl-5-phenoxypyrazole-4-carboxylic acid	
M-11	1,3-dimethyl-5-phenoxypyrazole-4-carbonitrile	
M-12	tert-butyl (*E*)-4-[(3-methyl-5-phenoxypyrazole-4-yl)-methylene-aminooxymethyl]benzoate	
M-16	4-hydroxymethylbenzoic acid	
M-21	4-cyano-1-methyl-5-phenoxypyrazole-3-carboxylic acid	
M-22	(*E*)-2-[4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl) methyleneamino-oxymethyl]benzoyloxy]-2-methyl-propanoic acid	

Code/Trivial name	Chemical name	Structural formula
Fen-OH	2-Hydroxymethyl-2-propyl (E)-4-[(1,3-dimethyl-5-phenoxypyrazole-4-yl)-methyleneaminooxymethyl]benzoate