CONCLUSION ON PESTICIDE PEER REVIEW

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

Issued on 17 September 2008

SUMMARY

Cymoxanil is one of the 84 substances of the third stage Part B 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.

Austria being the designated rapporteur Member State submitted the DAR on cymoxanil in accordance with the provisions of Article 10(1) of the Regulation (EC) No 1490/2002, which was received by the EFSA on 15 June 2007. The peer review was initiated on 1 October 2007 by dispatching the DAR for consultation of the Member States and the applicants DuPont de Nemours SAS and Oxon Italia SpA. Subsequently, the comments received on the DAR were examined and responded by the rapporteur Member State in the reporting table. This table was evaluated by EFSA to identify the remaining issues. The identified issues as well as further information made available by the applicant upon request were evaluated in a series of scientific meetings with Member State experts in May-June 2008.

A final discussion of the outcome of the consultation of experts took place during a written procedure with the Member States in August 2008 leading to the conclusions as laid down in this report.

This conclusion was reached on the basis of the evaluation of the representative uses as a fungicide on lettuce and potato. Full details of the GAP can be found in the attached list of end points.

The representative formulated products for the evaluation were "CYM 50" and “Tanos”, a WP and WG formulation containing 500 g a.s. /kg and 250 g a.s. /kg respectively.

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

Residues in food of plant origin can be determined with a multi-method (The German S19 method has been validated). Single methods for the determination of residues in soil, water and air are available. However, a new data gap has been identified as the metabolite IN-KQ960[2] has been included in the residue definition for surface water and ground water. 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. There are some issues with the technical specifications as well as some physical properties of one of the formulations.

Tested in mammals, cymoxanil is harmful if swallowed (Xn R22 was proposed); it shows low toxicity after inhalation and dermal exposure. It is neither a skin nor an eye irritant. It showed positive results in a Magnusson Kligmann test (Xi; R43 – "May cause sensitisation by skin contact" proposed). Target organs in subchronic exposure were testes (organ weight, macroscopic and microscopic changes), epididymes (macroscopic and microscopic changes), kidney (organ weight) and thymus (histology). The relevant short term toxicity NOAEL is 1.3 mg/kg bw/day (1-year dog study). R48/22 ("Danger of serious damage to health by prolonged exposure if swallowed") was proposed based on testicular effects in rats and dogs. Overall, cymoxanil does not have genotoxic potential nor carcinogenic potential up to and including the highest dose levels tested. In multigeneration studies, the NOAEL for both parental and offspring effects is 10.5 mg/kg bw/day; the reproductive NOAEL is 31.6 mg/kg bw/day. Fertility was not affected in multigeneration studies, however, based on findings in testes in rats and dogs, possible classification as R62 "Possible risk of impaired fertility" should be flagged to EChA. Tested in developmental toxicity studies, cymoxanil showed an NOAEL for maternal and developmental toxicity in rats of 10 mg/kg bw/day. Increased incidences of treatment related variations (partially ossified and unossified sternebra, wavy ribs and partially ossified pelvis) were observed in rats at maternal toxic dose levels. Incidences for hemi vertebra, exencephaly and fused ribs were shown to be above the range of historical controls at dose levels of clear maternal toxicity. In the rabbit increased incidences of skeletal malformations (vertebra and/or rib alterations linked with scoliosis) were observed at maternally toxic doses, as well as hydrocephaly and cleft palates in the highest dose tested. The incidence of dilation of heart ventricles was statistically significant increased in the high dose animals and was above historical control data, too. An overall maternal and developmental NOAEL of 8 mg/kg bw/day was set. The classification with R63 ("Possible risk of harm to the unborn child") should be reconsidered by EChA. The ADI is 0.013 mg/kg bw/day, based on the NOAEL of 1.3 mg/kg bw/day of the 1 year dog study, applying an SF of 100; the ARfD is 0.08 mg/kg bw based on the developmental NOAEL in the rabbit and an SF 100. An AOEL of 0.01 mg/kg bw/day was proposed based on the NOAEL in the dog studies of 1.3 mg/kg bw/day corrected for 75% oral absorption and an SF 100. Operator, worker and bystander exposure estimates showed levels below the AOEL.

[2] IN-KQ960: 3-ethyl-4-(methoxyamino)-2,5-dioxoimidazolidine-4-carboxamide

Metabolism in plant has been investigated using foliar application of ^{14}C-cymoxanil on two crops, lettuce and potato, representing two groups of plants: leafy and root crop groups. These studies indicated a rapid and extensive degradation of the parent compound over intermediates (IN-W3595[3], IN-KQ960 or IN-KP533[4]) to glycine which was further conjugated or incorporated in natural substances (carbohydrates, peptides or proteins). Based on these studies, the plant residue definition for monitoring and risk assessment was limited to the parent compound cymoxanil only. The rotational crop metabolism study performed on lettuce, sugar beet and wheat with two rotational crop intervals (30 and 120 days) showed that no significant residues of cymoxanil are expected in practice in rotational crops. A goat metabolism study was evaluated indicating that cymoxanil is rapidly and extensively metabolised essentially to natural products. The parent compound cymoxanil was proposed as residue definition for ruminant only. An overall animal residue definition was not proposed as no laying hen study was submitted. A residue data set was available for outdoor uses on lettuce in S-EU only and for potato uses in N-EU and S-EU. All residues being below the LOQ of 0.05 mg/kg at harvest, a MRL of 0.05* mg/kg was proposed for lettuce and potato. The chronic and acute consumer risk assessments showed that the TMDI and NESTI did not exceed 5% of the ADI and 10% of the ARfD respectively.

In soil under aerobic conditions cymoxanil exhibits very low to low persistence forming the major soil metabolites IN-U3204[5] (maximum occurrence 24.7% applied radioactivity (AR)) and IN-W3595 (maximum occurrence 10.1% AR) and the minor metabolites IN-KQ960 and IN-JX915[6] (major metabolite in photolysis study) regarded as relevant for assessment of leaching potential to groundwater. All these metabolites exhibit very low or low persistence in soil. The degradation of parent cymoxanil was observed as soil pH dependent (less rapid degradation at lower pH). The transformation pathway of ethyl urea route of cymoxanil and all the possible intermediates or degradation products of this route are unknown, therefore the assessment of this route can not be finalised. Mineralisation to carbon dioxide was significant, as it accounted for 28.6-53.0% AR after 1-15 days (study end values from 4 soils), and 56.7% or 60.4% AR after 90 or 92 days, respectively. The formation of unextractable residues was a sink, accounting for 22-47% AR after 1-92 days. Cymoxanil exhibits high to very high mobility in soil, the relevant soil metabolites exhibit very high mobility. There was indication that adsorption of metabolites IN-W3595 and IN-R3273[7] were pH dependent.

Under sterile conditions cymoxanil was stable at pH 4, but undergone extensive and fast hydrolysis at pH 5, 7 and 9 forming the major metabolites IN-U3204, IN-JX915, IN-W3595, IN-KP533, IN-R3273 and IN-KQ960. Under irradiated conditions in aqueous photolysis experiments at pH 5 cymoxanil exhibited photo-degradation (net photolysis half-life was calculated to be 1.7 and 3.0 days) forming

[3] IN-W3595: cyano(methoxyimino)acetic acid
[4] IN-KP533: ((Ethylamino)carbonyl)amino)oxoacetic acid
[5] IN-U3204: 1-ethyl-6-iminodihydropyrimidine-2,4,5(3H)-trione 5-(O-methyloxime)
[6] IN-JX915: 3-ethyl-4-(methoxyamino)-2,5-dioxoimidazolidine-4-carbonitrile
[7] IN-R3273: 1-ethylimidazolidine-2,4,5-trione 5-(O-methyloxime)

IN-JX915 and IN-R3273 as major metabolites. In dark natural sediment water systems cymoxanil did not partition to sediment significantly. Fast degradation from the whole system was observed resulting in the range of single first order DT_{50} values of 0.1 - 1.6 days. The major metabolites formed in the water-sediment systems were IN-U3204, IN-W3595, IN-KQ960, IN-T4226[8], metabolite fraction M5[9] and IN-KP533. Metabolite IN-KQ960 exhibited medium degradation in natural sediment water systems in the dark, while the other metabolites degraded quickly (SFO DT_{50} 0.4-6.3 days). Mineralisation was significant, CO_2 accounted for 39.6 - 75.5 % at the end of the experiments. Unextracted sediment residues were a sink representing 22.5-35.2 % of AR (after 15-30 days) and decreased by the end of the experiments. The necessary surface water and sediment exposure assessments were appropriately carried out using the agreed FOCUS scenarios approach up to step 2. These values are the basis for the risk assessment discussed in this conclusion. Based on the vapour pressure and the calculated photochemical oxidative degradation, air is not likely to be a route of environmental contamination by cymoxanil. The potential for groundwater exposure from the applied for intended uses of cymoxanil, IN-U3204, IN-W3595 and IN-JX915 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. For the metabolite IN-KQ960, in geoclimatic regions represented by Jokioinen and Hamburg FOCUS groundwater scenarios, contaminations of groundwater above the 0.1 µg/L limit cannot be excluded. A non relevance assessment is not available for this metabolite.

The acute toxicity to birds was considered to be low. The first tier acute and short-term risk assessment for insectivorous and herbivorous birds indicated a low risk for all intended uses. Further refinements were required to address the long-term risk to birds. Based on refined residue data the risk to herbivorous birds was considered low for all intended uses. Based on Yellow wagtail and Yellowhammer as focal species and refinement of PD and PT, a low risk was identified for insectivorous birds for all intended uses. Whereas in the first tier the acute risk to insectivorous and herbivorous mammals was considered to be low for all intended uses, only the long-term risk to insectivorous mammals was considered to be low. Further refinements were required for the long-term risk assessment to herbivorous mammals. TER values were above the Annex VI trigger indicating a low risk to herbivorous mammals for all uses based on available residue data. Additionally, potato foliage was considered unpalatable to herbivorous mammals, hence it was considered a non-relevant scenario. Secondary poisoning was not expected (logPow<3) and risk from consumption of contaminated drinking water was considered to be low. Cymoxanil was very toxic to aquatic organisms. The risk was considered to be low for the active substance, metabolites and the lead formulations. However, risk assessment for the combined formulation Tanos indicated a need for risk mitigation, e.g. non-spray buffer zones of 30m (to identify a low risk). No bioaccumulation was expected for aquatic organisms (logPow<3).

[8] IN-T4226: 1-ethylimidazolidine-2,4,5-trione
[9] Metabolite fraction M5: N-(aminocarbonyl)-2-(methoxyimino)malonamide

The risk to bees, non-target arthropods, earthworms, soil non-target micro-organisms, non-target plants and biological methods of sewage treatment was assessed as low.

Key words: cymoxanil , peer review, risk assessment, pesticide, fungicide

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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. Cymoxanil is one of the 84 substances of the third stage, part B, covered by the Regulation (EC) No 1490/2002 designating Austria as rapporteur Member State.

In accordance with the provisions of Article 10(1) of the Regulation (EC) No 1490/2002, Austria submitted the report of its initial evaluation of the dossier on cymoxanil, hereafter referred to as the draft assessment report, received by EFSA on 15 June 2007. Following an administrative evaluation, the draft assessment report was distributed for consultation in accordance with Article 11(2) of the Regulation (EC) No 1095/2007 on 1 October 2007 to the Member States and the main applicants DuPont de Nemours SAS and Oxon Italia SpA 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 identified and agreed on lacking information to be addressed by the notifier as well as issues for further detailed discussion at expert level.

Taking into account the requested information received from the notifier, a scientific discussion took place in expert meetings in May-June 2008. 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 during a written procedure with the Member States in August 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 formulations 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 February 2008)

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 11 September 2008).

Given the importance of the draft assessment report including its addendum (compiled version of July 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

Cymoxanil is the ISO common name for 1-[(*E/Z*)-2-cyano-2-methoxyiminoacetyl]-3-ethylurea (IUPAC).

Cymoxanil belongs to the class of aliphatic nitrogen fungicides, other examples of members of this group are dodine and guazatine. It acts as a foliar fungicide with protective and curative action. It has contact and local systemic activity, and also inhibits sporulation.

The representative formulated products for the evaluation were "CYM 50" and "Tanos", a WP and WG formulation containing 500 g/kg and 250 g/kg respectively.

The evaluated representative uses are as a fungicide on lettuce and potato. 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

The minimum purity of cymoxanil as manufactured should not be less than 970 g/kg, this is the same as in the FAO specification 419/TC (March 2006) which is applicable to both the DuPont and Oxon sources. However, the ratio of the *E* to the *Z* isomer has not been concluded on and is a data gap for both applicants noting that for Oxon an addendum to Vol. 4 dated June 2008 contains information that may address this issue however, this addendum has not been peer reviewed. The specified limit

for the significant but not relevant impurity T3204 in the DuPont source was not accepted and a revised specification for this impurity is required. Also for DuPont details of one of the starting materials is missing. In the Oxon source the possible formation of compounds as detailed in the addendum to Vol. 4 C.1.2.2 dated April 2008 still has to be addressed. Also the batch data for Oxon should include the *Z* isomer. It should be noted that for Oxon an addendum to Vol. 4 dated June 2008 contains information that may address these issue however, this addendum has not been peer reviewed.

DuPont and Oxon are a task force and therefore have equal access to all the Annex II data. For this reason they can both be considered as the reference source for the purposes of equivalence. A third source S.F.P (formerly Phytorus) submitted some data for the purposes of an equivalence check. The meeting of experts were informed that the source that was originally proposed is now no longer manufacturing cymoxanil. It was also explained that new data were available for a new S.F.P. source. However, in view of the restrictions concerning the acceptance of new (i.e. newly submitted) studies after the submission of the DAR to EFSA, as laid down in Commission Regulation (EC) No. 1095/2007, the new studies could not be considered in the peer review. The meeting of experts did not consider this source further.

Since clarification/further information is required for the specifications, the specifications for the technical material must be considered provisional. The technical material contains no relevant impurities.

The content of cymoxanil in the representative formulations is 500 and 250 g/kg (pure).

Beside the specification, 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 cymoxanil or the respective formulation. However, the following data gaps were identified:
Wettability and attrition before and after accelerated storage (DuPont)
Attrition before and after storage in a shelf life study (DuPont)
Evidence that the method for the technical separates the two isomers noting that for Oxon an addendum to Vol. 4 dated June 2008 contains information that may address this issue however, this addendum has not been peer reviewed (Oxon).

For DuPont and Oxon the proposed tank mixes were not agreed by the meeting of experts and this labelling issue can be dealt with at Member State level. The wettability result for the DuPont Plant Protection Product does not comply with the FAO specification. It should also be noted that the DuPont Plant Protection Product contains a second active and the method validation data for this second active were not made available for the peer review.

The main data regarding the identity of cymoxanil 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 cymoxanil 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. The only possible issue is that the Oxon method for the active substance in the technical material may not separate the *E* and *Z* isomers.

Adequate methods are available to monitor all compounds given in the respective residue definition, i.e. cymoxanil (high water content commodities and hops only); and cymoxanil in soil and air. For water, methods are available to monitor cymoxanil however, as IN-KQ960[10] is now in the residue definition for surface and ground water a new data gap for a method is identified.

The method for products of plant origin is GC-NPD with an LOQ of 0.04 mg/kg for wet matrices and 0.1 mg/kg for hops confirmation was by an alternative GC-NPD method with an LOQ of 0.05 mg/kg for wet matrices. No confirmatory method is available for hops but this is not an issue as it is not one of the representative crops. Soil is analysed by HPLC-UV with an LOQ of 0.01 mg/kg the confirmatory method is HPLC-DAD. Water and air are also analysed by HPLC-UV with an LOQ of 0.1 µg/L in water and 0.46 µg/m^3 in air. The confirmatory method for water was with a different column and column switching. The methods for soil and water can be used as confirmatory methods for air.

An analytical method for food of animal origin is not required due to the fact that no MRLs will be set (see 3.2)

A method for body fluids and tissues is not required as cymoxanil is not classified as toxic or very toxic.

2. Mammalian toxicology

Cymoxanil was discussed in the meeting of experts PRAPeR 49 in June 2008.

[10] IN-KQ960: 3-ethyl-4-(methoxyamino)-2,5-dioxoimidazolidine-4-carboxamide

A new specification should be provided; however, as for the compliance to the current specification the experts agreed that the different sources are toxicologically equivalent (this excludes the S.F.P. source, see section 1).

2.1. ABSORPTION, DISTRIBUTION, EXCRETION AND METABOLISM (TOXICOKINETICS)

Cymoxanil is rapidly but incompletely absorbed after single low oral dose to rats. It is widely distributed, with the highest residues in liver and kidneys. It does not show any potential for accumulation. Metabolism is extensive; no parent compound could be detected in any samples investigated (faeces, urine, bile). Considering all studies in the data set, the experts proposed a mean value of 75% for oral absorption.

2.2. ACUTE TOXICITY

Cymoxanil is harmful if swallowed (Xn R22 “Harmful if swallowed” was proposed); it shows low toxicity after inhalation and dermal exposure. It is neither a skin nor an eye irritant. It showed positive results in a Magnusson Kligmann test (Xi; R43 – “May cause sensitisation by skin contact” proposed).

2.3. SHORT TERM TOXICITY

The short term toxicity of cymoxanil has been investigated after oral application in rats (28 and 90 days of exposure), mice (28 and 90 days of exposure) and dogs (90 days and 1 year of exposure). In addition, a 28 days dermal study in rats has been conducted.

Target organs were testes, epididymes, liver, kidney and thymus

In oral rat studies, main target organs were liver (increased organ weight and histological changes) and kidneys (increased organ weight). There were also some associated changes in clinical chemistry and to a minor degree in haematological parameters. In addition, histological alterations were evident in testes and epididymides (together with spermatid alterations) and haematological changes at higher dose levels. In the 90-day study, at 750 ppm spermatid degeneration occurred, not reaching statistical significance but with clear biological significance and dose response. So a relevant NOAEL of 100 ppm (6.5 mg/kg bw/day) was agreed in the meeting.

In the 90-day study in mice, vacuolar changes of liver cells were observed in all treated animals with highest incidence in high dose groups (no statistical analysis performed). During the meeting it was noted that there was no effect on liver function. Furthermore the effect of liver vacuolation was not reproducible in other studies. Therefore the experts agreed to disregard this effect and the meeting considered 450 ppm (84.4 mg/kg bw/day) as the NOAEL based on some clinical chemistry changes at the highest dose tested and an increased liver weight. The increase in creatinine level in males from

450 ppm on was not regarded as relevant effect because of the lack of histopathological findings in kidneys and the absence of effects in females.

The relevant NOAEL in subacute and subchronic studies in dogs was discussed in the meeting of experts, taking into account the occurrence of decreased RBC in females at all doses tested in the 90 day study and atrophy of testis in the 1 year study.

Decrease of erythrocytes was within the historical control ranges but above the concurrent controls. Anaemia was seen in both studies. In the 1-year dog study, testes effects occurred at high dose levels where also effects on body weight occurred. In the 1 year study at 100 ppm there were already 2 cases of atrophy in testis. The experts concluded that the NOAEL for the study was 50 ppm as the testicular findings could not be disregarded. This effect was considered relevant for the NOAEL. In another dog study atrophy of testis was not found, but aspermatogenesis. The overall NOAEL from the dog studies was agreed as 50 ppm (1.3 mg/kg bw/day).

Classification of cymoxanil as R48/22 “Danger of serious damage to health by prolonged exposure if swallowed“ based on testicular effects in rats and dogs was discussed. It was noted that ECB did not classify on testicular effects. Anaemia was found in rats below 50 mg/kg bw/day, but this would not trigger R48 due to the absence of related histopathological findings. The experts noted that there were a number of other effects, e.g. on the retina, severe clinical signs, that support classification with R48/22.

There was a discussion about classification with R62 “Possible risk of impaired fertility” based on testes effects. It was noted that fertility was not affected in the multigeneration study therefore classification with R62 was not appropriate but it should be discussed by EChA.

2.4. GENOTOXICITY

Cymoxanil was tested in a range of *in vitro* and *in vivo* mutagenicity assays.

One of two *in vitro* chromosomal aberration studies showed positive results indicating chromosomal damage in human lymphocytes induced by the test substance. However, the results of a second study submitted on chromosomal aberrations on Chinese hamster ovary cells did not confirm the potential of cymoxanil with respect to possible genotoxicity. Furthermore, the results of 3 *in vivo* studies provided (2 micronucleous tests on mice, one *in vivo* chromosomal aberration assay in rats – bone marrow) did not show any potential of the test substance to produce chromosomal damage.

Overall, cymoxanil does not have genotoxic potential.

2.5. LONG TERM TOXICITY

The long term toxicity and carcinogenicity has been investigated in 2 studies in rats and 2 in mice.

In the rat, macroscopic/histopathological changes in various organs occurred, with an NOAEL of 4.08 mg/kg bw/day. Histological findings supported the conclusions drawn on the results of the short term toxicity studies, including proposal for classification as R48/22.

In the meeting, the experts agreed on a NOAEL of 30 ppm for the long term study in mice (equivalent to 4.19 mg/kg bw/day for males and 5.83 mg/kg bw/day for females) based on clinical symptoms,

reduction of body weight gain, organ weight changes and histological findings in some organs (centrilobular hepatocellular hypertrophy, testicular atrophy, epididymal oligospermia and focal sperm cyst/cystic dilatation). In mice, no increased incidence of total tumours or specific tumours was registered. In rats, liver adenocarcinomas were found, however they were not primary liver tumours but appeared to have metastasized from uterus adenocarcinomas which did not show any clear relationship to treatment with cymoxanil.

Overall, cymoxanil did not reveal any oncogenic potential relevant to humans up to and including the highest dose levels tested.

2.6. REPRODUCTIVE TOXICITY

With respect to reproductive toxicity, two multigeneration studies in rats have been submitted.

In one of the studies, a statistically significant decrease occurred in the percentage of live pups born together with a reduced mean number of corpora lutea, mean number of implantations and an increased percentage of post-implantation loss in the high dosed F1 generation. Statistically significant decreased body weights were observed for F1 and F2 pups (males, females and combined sex) at the mid dose level of 450 ppm and above. Based on these findings, the NOAEL for both parental and offspring effects is 150 ppm equivalent to 10.5 mg/kg bw/day (males) and 14.9 mg/kg bw/day (females); the reproductive NOAEL is 450 ppm (equivalent to 31.6 mg/kg bw/day in males and 42.8 mg/kg bw/day in females).

Developmental toxicity of cymoxanil was investigated in rats (2 studies) and rabbits (4 studies).

Increased incidences of treatment related variations (partially ossified and unossified sternebra, wavy ribs and partially ossified pelvis) were observed at maternal toxic dose levels. Concerning malformations, incidences for hemi vertebra, exencephaly and fused ribs were shown to be above the range of historical controls at dose levels of clear maternal toxicity. Although incidences of these malformations observed were low, treatment-relation with respect to these findings was not excluded. Based on all findings, the NOAEL for maternal and developmental toxicity in rats was set at 10 mg/kg bw/day.

In the rabbit increased incidences of skeletal malformations (vertebra and/or rib alterations linked with scoliosis) were observed at maternally toxic doses, as well as hydrocephaly in two foetuses of the highest dose group, and foetuses with cleft palates in the highest dose tested. The incidence of dilation of heart ventricles was statistically significant increased in the high dose animals and was above historical control data. Taking the 4 rabbit studies together it was agreed to set an overall maternal and developmental NOAEL of 8 mg/kg bw/day.

Proposal of classification of cymoxanil as R63 “Possible risk of harm to the unborn child” was discussed in the meeting. It was noted that ECB did not classify cymoxanil for developmental toxicity (25th ATP). The range of studies did not show a consistent pattern for developmental effects. However there were marked effects in all 6 studies. The highest dose level investigated was well below the limit dose of 1000 mg/kg bw/day. The meeting concluded that classification with R63 should be reconsidered by EChA.

2.7. NEUROTOXICITY

In a 90 day neurotoxicity study in rats no treatment related effects with respect to neurotoxicity have been observed up to the highest dose tested (224 mg/kg bw/day). No evidence of developmental neurotoxic effects was found up to 100 mg/kg bw/day.

2.8. FURTHER STUDIES

Metabolite IN-U3204[11] was shown to be of low acute oral toxicity and is not to be classified according to EC Council Directive 67/548/EEC. It is present in rat metabolism studies (minor amount).

New toxicological data concerning the metabolite IN-KP533 were provided by the applicant but they could not be considered by the meeting on mammalian toxicology. In view of the restrictions concerning the acceptance of new (i.e. newly submitted) studies after the submission of the DAR to EFSA, as laid down in Commission Regulation (EC) No. 1095/2007, the new studies could not be considered in the peer review.

Two studies investigating immunotoxic potential of cymoxanil have been provided. In none of the studies immunotoxic effects were evident up to high doses (107.7 mg/kg bw/day in rats and 218.4 mg/kg bw/day in mice).

2.9. MEDICAL DATA

No health disturbances caused by cymoxanil have been observed in personnel involved in product manufacturing and from the formulation plants. No cases of acute cymoxanil intoxication have been reported.

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

ADI

The meeting agreed to set the ADI of 0.013 mg/kg bw/day, based on the revised NOAEL of 1.3 mg/kg bw/day of the 1 year dog study, applying a SF of 100.

ARfD

Based on the presence of malformations the need for an ARfD was confirmed in the meeting of experts. An ARfD of 0.08 mg/kg bw was agreed based on the NOAEL on the developmental findings in the rabbit and a SF 100. The margin of safety to the LOAEL for malformations is 300. This was considered acceptable.

[11] IN-U3204 1-ethyl-6-iminodihydropyrimidine-2,4,5(3H)-trione 5-(O-methyloxime)

AOEL

The dog was agreed to be the most sensitive species. Therefore an AOEL of 0.01 mg/kg bw/day was proposed based on the NOAEL in the dog studies of 50 ppm (1.3 mg/kg bw/day) corrected for 75% oral absorption and an SF 100.

The MoS to the developmental effects is higher than 800.

2.11. DERMAL ABSORPTION

There was no dermal absorption study for the Oxon preparation (Cymoxanil 50% WP). Therefore 75% was proposed in the DAR as a default value based on the oral absorption. The meeting agreed.

DuPont submitted an *in vitro* and an *in vivo* study on dermal absorption with Tanos.

It was discussed if the values after 18 hours or 21 days should be used for the *in vivo* study in rats. The highest value was found after 18 hours for the concentrate and after 21 days for the dilution. It was agreed to use 1.2% for the concentrate and 9.6% for the dilution.

For the *in vitro* study the dermal penetration of cymoxanil through human skin was 26.8-46.6%; for rat skin, dermal absorption was found to be 91.5-93.6%. The ratio of penetration through rat and human skin would be 2-3.5. However the granule on the membrane was not moistened and/or milled therefore the *in vitro* study was disregarded for the concentrate. The experts agreed that this was not an appropriate technique and that no correction for the concentrate should be used. The correction factor applied for the dilution was 2. Overall dermal absorption was 1% for the concentrate and 5% for the dilution for Tanos WG.

2.12. EXPOSURE TO OPERATORS, WORKERS AND BYSTANDERS

Cymoxanil is intended to be used in field crops: lettuce (WP formulation, use rate 240 g a.s. /ha) and potatoes (WP and WG formulation, use rate 120 g a.s. /ha and 175 g a.s./ha respectively).

The operator exposure has been assessed with both UK POEM and German model.

Operator

- **Exposure data for "Cymoxanil 50% WP"**

Model	**Application method (crop)**	**Systemic exposure (mg/kg bw/day)**		**% of systemic AOEL**	
		No PPE	**PPE**	**No PPE**	**PPE**
UK POEM	lettuce	2.422	0.0546°	24220	661.7
UK POEM	potatoes	1.398	0.0625°	13980	624.7
German	lettuce	0.4184	0.0091*	4183	91
German	potatoes	0.2092	0.0077§	2091	76.7

*gloves M/L and application, broad-brimmed headwear, coverall and sturdy footwear during application; RPE during M/L

°gloves and RPE during M/L and gloves during application

§gloves M/L and application; coverall and sturdy footwear during application

EFSA note: in a comment to the EFSA conclusion, UK stated that "with the latest published version of UK POEM, refined inhalation exposure values for mixing and loading solids (boom sprayers) may produce acceptable results with gloves and RPE for both lettuce and potatoes."

- **Exposure data for "Tanos WG"**

Model	**Application method (crop)**	**Systemic exposure (mg/kg bw/day)**		**% of systemic AOEL**	
		No PPE	**PPE**	**No PPE**	**PPE**
UK POEM	potatoes	0.0644	0.0073#	644.1	73.3
German	potatoes	0.0066	0.0046§	65.2	46.2

gloves during ML and application and RPE during M/L

§ gloves during ML and application

Worker

The estimates for workers re-entering field treated with the 2 formulations containing cymoxanil showed exposure levels below the AOEL with the use of PPE for applications of WP formulation, and even without PPE for application of WG formulation.

- **Exposure data for "Cymoxanil 50% WP"**

The exposure for workers entering the treated area immediately after the application of "Cymoxanil 50 % WP" in lettuce was calculated using the assessment by Krebs et al., 2000 (Uniform Principles for Safeguarding the Health of Workers Re-Entering Crop Growing Areas after Application of Plant Protection Products").

Considering dislodgeable foliar residues (DFR) of 1 µg/cm2 per kg active substance/ha, a transfer factor (TF) of 5000 cm2/person and hour, dermal absorption 75% and a working day of 8 hours the estimated exposure is:

Lettuce

0.12 mg/kg bw/day (1200 % of the AOEL, no PPE) and 0.006 mg/kg bw/day (60 % of the AOEL use of gloves).

Potatoes
0.06 mg/kg bw/day (600 % of the AOEL, no PPE) and 0.003 mg/kg bw (30 % of the AOEL, use of gloves).

- **Exposure data for "Tanos WG"**

The exposure for workers entering the treated area immediately after the application of Tanos in potatoes was calculated using the assessment by Krebs et al., 2000 (Uniform Principles for Safeguarding the Health of Workers Re-Entering Crop Growing Areas after Application of Plant Protection Products").
Considering dislodgeable foliar residues (DFR) of 1 µg/cm^2 per kg active substance/ha, a transfer factor (TF) of 5000 cm^2/person and hour, dermal absorption 5% and a working day of 8 hours the estimated exposure is:
Potatoes
0.0058 mg/kg bw/day (58.3% of the AOEL, no PPE).

Bystander
The exposure was estimated according to Ganzelmeier et al., 1997: the spray drift deposits from application to field crops at 5 m distance outside the treated area are 0.5 % of the applied quantity. A skin surface of about 1 m^2 and a body weight of about 60 kg were considered.
Exposure levels below the AOEL were estimated for both WP and WG formulations.

EFSA note: during the commenting phase of the EFSA conclusion, UK stated that "assuming an exposed area of 1 m^2 assumes that a similar area is covered by clothing which will provide 100% protection from spray, which might not be the case".

- **Exposure data for "Cymoxanil 50% WP"**

For lettuce the estimated exposure would be approximately 25.2 % of the AOEL and for potatoes 9 % of the AOEL (no PPE)

- **Exposure data for "Tanos WG"**

For potatoes the estimated exposure is about 0.88 % of the AOEL.

3. Residues

3.1. NATURE AND MAGNITUDE OF RESIDUES IN PLANT

The active substance was discussed at the PRAPeR experts' meeting for residues (PRAPeR 50, subgroup 2, round 10) in June 2008.

First, the meeting of experts discussed if the Z-isomer of cymoxanil was also identified as a residue in plant and animal matrices, taking into account that the active substance is assumed to be mainly the E-isomer with small amount of Z-isomer. This point was considered in the plant and animal metabolism studies provided by DuPont, since it was mentioned that the samples were analysed using an HPLC method separating both isomers, but no statement was made in the DAR on the possible presence of the Z-isomer. After the meeting, and checking the chromatograms that were originally provided by the applicant, the RMS confirmed that no Z-isomer could be detected in the different plant and animal matrices analysed.

3.1.1. PRIMARY CROPS

Metabolism of cymoxanil has been investigated using foliar application of ^{14}C-cymoxanil on two crops, lettuce and potato, representing two groups of plants: **leafy and root crop groups**. From each applicant (DuPont and Oxon) one metabolism study per crop group was submitted. All four studies were conducted under outdoor conditions and using the same radioactive label position (on the cyano-acetamide group).

The submitted metabolism studies on lettuce and potato indicated a rapid and extensive degradation of the parent compound. Cymoxanil was rapidly metabolised over intermediates (IN-W3595[12], IN-KQ960 or IN-KP533[13]) to glycine, which was further conjugated or incorporated with or in natural substances (carbohydrates, peptides or proteins).

The metabolism studies on lettuce were conducted with a total of 4 applications at a rate of 840 g a.s./ha (total 3360 g a.s./ha) and sampling 3 days after the last treatment (DuPont) or with 3 applications at 240 g/ha (total 720 g a.s./ha) and a 11-day PHI (Oxon). Total radioactive residue levels in mature lettuce at final harvest were 10.78 mg/kg and 1.07 mg/kg respectively. The parent compound was identified in small amounts only, accounting for 1.4-2.1% of the TRR in leaves. In both studies, conjugated glycine was identified as a main metabolite, in a range of 13.0% to 30.6% of TRR. The other metabolites, only observed in the study submitted by DuPont, were glucose (21.2% TRR), IN-KQ960 (7.4% TRR) and IN-KP533 (2.8 % TRR). An additional metabolite IN-W3595 (up to 18.1% TRR) was also identified, but in the Oxon study only.

On potatoes the two following practices were investigated in the metabolism studies: 3 applications at a rate of 404 g a.s./ha (total 1212 g a.s./ha) and sampling 3 days after the last application (DuPont) and 8 applications at 240 g a.s./ha (total 1920 g a.s./ha) and sampling 10 days after the last application (Oxon). Total radioactive residue levels in mature potato tubers at final harvest were 0.69 mg/kg and 1.07 mg/kg respectively. The parent compound was not detected in relevant concentrations in tuber. The main metabolite was glycine observed after acid hydrolysis of mature potato tuber homogenate. The released glycine was detected in a concentration range of 27.0% to 78.5% of TRR (0.28 to 0.54

[12] IN-W3595: 2-cyano-2-methoxyiminoacetic acid
[13] IN-KP533: ((Ethylamino)carbonyl)amino)oxoacetic acid

mg eq/kg). Glucose (originating from starch) was also detected as a minor metabolite at a concentration level of 8.1 % of TRR (0.06 mg eq/kg) after acid hydrolysis of mature potato tuber in the DuPont study performed with a significant higher applied rate and a lower PHI.

The meeting of experts discussed on the relevance of the two lettuce metabolism studies where the nature and amount of the identified metabolites differ significantly. It was pointed out that these two studies were carried out with different PHI (3 and 11 days respectively). For these reasons and due to the extensive metabolisation of cymoxanil to glycine and natural incorporated compounds, it is expected that different intermediates may be detected, depending on the sampling time. The meeting concluded that these two studies have to be considered as acceptable and that the metabolism in lettuce has been sufficiently investigated to propose a residue definition.

Moreover, the experts discussed whether metabolites IN-W3595 (0.193 mg/kg, 18%TRR, Oxon study) and IN-KP533 (0.31 mg/kg, 2.8% TRR, DuPont study) recovered in lettuce have to be included in the residue definition or in the risk assessment. The metabolite IN-W3595 was observed in rat metabolism and comparing the metabolic scheme in plants and rats, the degradation of cymoxanil to metabolite IN-W3595 was similar with a final formation of glycine and further conjugation or incorporation in natural products. Finally, residue experts were of the opinion to consider the metabolite IN-W3595 as a transitory intermediate in the metabolism from the active substance to glycine and concluded that this compound should not be included in the residue definition for monitoring or risk assessment.

New toxicological data concerning the metabolite IN-KP533 were provided by the applicant but they could not be considered by the meeting on mammalian toxicology. In view of the restrictions concerning the acceptance of new (i.e. newly submitted) studies after the submission of the DAR to EFSA, as laid down in Commission Regulation (EC) No. 1095/2007, the new studies could not be considered in the peer review. As previously, this metabolite is supposed to be an intermediate in the metabolism of cymoxanil to glycine. It was not observed in the rat metabolism but the residue experts were of the opinion that metabolite IN-T4226[14] observed in rat was in fact the cyclic version of the IN-KP533 metabolite and they finally concluded on the non relevance of metabolite IN-KP533 for the consumer risk assessment.

Based on these conclusions, the meeting confirmed the **residue definition for monitoring and risk assessment** proposed initially by the RMS and limited to **cymoxanil parent compound only**.

Residue trials were submitted by both applicants with regard to their respective GAPs and were considered sufficient to proposed MRLs on lettuce grown outdoor in southern Europe only and on potatoes in Northern and Southern Europe. The results generated in the residue trials were supported

[14] IN-T4226: 1-ethylimidazolidine-2,4,5-trione

by the storage stability data provided by Oxon and DuPont. Residues of cymoxanil were considered stable under frozen condition (about -20°C and darkness) for at least 12 months in whole lettuce plant matrices and in frozen potato tuber homogenates, but for only 30 days in homogenised lettuce matrices. In addition, the RMS reported in the addendum of April 2008 the validation data on analytical methods used to analyze samples in the residues trials on lettuce and potatoes. These data were considered acceptable.

No study on the effects of industrial processing was presented, residue levels in lettuce and potatoes at harvest being below the LOQ of 0.05* mg/kg.

3.1.2. SUCCEEDING AND ROTATIONAL CROPS

A rotational crop study was submitted by DuPont (data sharing with Oxon). The study was performed with lettuce, sugar beet and spring wheat grown under greenhouse conditions with two rotational crop intervals (30 and 120 days) and using a single soil treatment equivalent to 1212 g 14C-cymoxanil/ha. At final harvest, total radioactivity was not significant (<0.01 mg eq/kg) in lettuce heads for both rotational intervals and 0.01 mg/kg and 0.02 mg/kg in mature roots and leaves of sugar beets from the 30-day rotational interval. Significant amounts of TRR were only detected in wheat grain (0.04-0.05 mg eq/kg) and in wheat straw (0.12-0.14 mg eq/kg) for both rotational intervals. Raw agricultural commodities containing more than 0.01 mg eq/kg were extracted and analyzed. The majority of the radioactivity was extractable. No cymoxanil or structurally related metabolites were identified and no individual component that accounted for more than 0.02 mg eq/ha was detected. Based on this study it was concluded that no significant residues of cymoxanil are expected in practice in rotational crops.

3.2. NATURE AND MAGNITUDE OF RESIDUES IN LIVESTOCK

Though animal metabolism studies are not required to support the representative uses on lettuce and potato, the meeting of experts was asked to consider if the available data and information provided by the applicants allow suggesting a residue definition for animal commodities. Metabolism of cymoxanil has been investigated in lactating goat only (DuPont study, data sharing with Oxon), dosed with 14C-cymoxanil over three consecutive days at a concentration of 10 mg/kg feed/day.

The validity of the study was discussed by the meeting with regard to the low recovery of the administered dose (69% only). This low recovery was tentatively explained in the DAR by the fact that the methane formed from the rumen metabolism was not collected and monitored. It was noted that such low recoveries were also observed in the rat metabolism (around 20%) where the study was highly dose-dependant on the percentage of recovery of the administered dose and the metabolite identification. Finally, the meeting suggested that this lack of radioactivity could be explained by a re-distribution of the radioactivity throughout the animal and concluded that the study was acceptable.

Taking into account the low recovery, the majority of the administered radioactivity was excreted in urine (23.6%) and in faeces (18.3%). In edible parts, recoveries were 6.5% in carcass (0.09 mg/kg for muscle and 0.06 mg/kg for fat), 3.5% in liver (2.1 mg/kg), 2.6% in milk (0.15-0.33 mg/kg) and 0.1% in kidney (0.5 mg/kg). The major 14C-cymoxanil derived residue detected in goat milk was lactose (46% of milk TRR) and fatty acids (i.e. caproic, caprylic, capric, lauric, arachidonic, myristic, lioneleic, oleic acids) that accounted for 5.7 % of milk TRR. In goat liver, formic acid was identified as the primary metabolite, the total formic acid, after acid hydrolysis of extracts or protelytic digestion representing 68.9 % of liver TRR. Additionally, acetic acid was released after protelytic and acid hydrolysis at a concentration level of 14.0 % of liver TRR. Residues in goat muscle or fat fractions were low and remained unidentified. Neither 14C-cymoxanil nor structurally related metabolites were detected in any tissue, milk or in the urine.

Based on this study it was concluded that cymoxanil is rapidly and extensively metabolised in goat essentially to natural products including fatty acids, glycerol, glycine and other amino acids, lactose and hydrolysable formyl and acetyl group. In addition, an in vitro bovine rumen fluid test was performed, demonstrating that cymoxanil is initially metabolised by rumen (micro)organisms to natural polar products (e.g. formic, acetic and valeric acid) that are further incorporated into natural products (e.g. lipids, sugars, proteins or others)

Based on the available goat study the meeting concluded that the residue definition should be cymoxanil parent compound for ruminant only. Since a laying hen metabolism study was not provided, an overall animal residue definition can not be proposed.

Additionally and based on the intended uses on lettuce and potato, it was also concluded that there is no need to set a MRL for animal products at this stage.

3.3. CONSUMER RISK ASSESSMENT

As requested, after the meeting the RMS reconsidered the chronic risk assessment for the consumer taking into account that the PRAPeR expert meeting 49 on mammalian toxicology has lowered the initial ADI value to 0.013 mg/kg b.w./d.

The chronic exposure of consumers to residues of cymoxanil was estimated using WHO/GEMS Food European diet, German and UK consumption data and the proposed MRLs. The Theoretical Maximum Daily Intake (TMDI) was less than 5% of the ADI, the maximum calculated intake being 4.4% of the ADI for UK infant. A calculation performed with the EFSA model showed the NL child to be the most critical diet with a TMDI value of 2.3%. It has to be mentioned that these updated evaluations were inserted by the RMS in the list of endpoints but not peer reviewed.

Acute exposure was estimated using the German and UK consumption data and the EFSA model. The maximum calculated National Estimated Short Term Intake (NESTI) was 9.6% of the ARfD for potato, using the consumption for infant in the UK model.

3.4. PROPOSED MRLS

On lettuce (outdoor), 6 supervised residue trials performed in southern Europe with a total of 4 applications at a rate of 225 to 252 g a.s./ha and a PHI of 9-10 days were submitted by Oxon. No residues at or above the LOQ of 0.05 mg/kg were detected at harvest on mature plants. Cymoxanil residues were only detected in the samples collected 0 to 3 days after the last application and with a maximum level of 4.29 mg/kg at day 0 and 0.95 mg/kg at day 3. According to the non-residue situation at harvest, no additional residue trials were requested on lettuce.

On potato (outdoor), each applicant provided a data package in compliance with their respective GAPs. Oxon submitted 19 trials conducted with 4 to 5 applications at a rate of 95-128 g a.s./ha and a PHI of 6-7 (N-EU) or 7-14 days (S-EU). DuPont provided 12 trials performed with 11 to 12 applications (N-EU) or 6 to 8 applications (S-EU) at 176-294 g a.s./ha and a PHI of 14 days. No residues at or above the LOQ of 0.05 mg/kg were detected in potato tubers at harvest nor at interim sampling times.

Based on these results the following MRL have been proposed:

Lettuce:	0.05* mg/kg	Outdoor uses, S-EU only
Potato:	0.05* mg/kg	S and N-EU

4. Environmental fate and behaviour

Cymoxanil was discussed at the PRAPeR experts' meeting for environmental fate and behaviour PRAPeR 47 in May 2008 on the basis of the Revised monograph (April 2008). It should be noted, as already acknowledged in the DAR, that labelling in the cyanoacetamide-2 position does not allow to be followed the fate of ethyl urea, which is likely to be released together with metabolite IN-W3595 owing to hydrolytic cleavage of the parent molecule (process relevant in soil and water). Whilst ethyl urea and some possible degradation products of ethyl urea are considered non-relevant metabolites, the full degradation pathway of this ethyl urea route and all the possible degradation products are unknown, therefore a data gap was identified to clarify potential intermediates in the transformation pathway and assess their relevance. It should also be noted that according to PRAPeR 46 meeting, cymoxanil represents the E- and the Z-configuration. However, the E-configuration is considered to be the more favourable structure owing to sterical reasons. Information only from two fate studies confirmed that, in general, formation of the Z-isomer in the environment is not significant and could not be linked to any environmental impact. This E/Z isomerism is also true for all metabolites, which

still carry the O-alkyoxime group, these are IN-U3204, IN-R3273[15], IN-W3595, IN-R3274[16] and one identified compound[17] of metabolite fraction M5. The isomer stability and the ratio of the E/Z isomers of these metabolites under environmental conditions are unknown. Since no further information on the isomer ratio of these compounds is available, E/Z isomerism was not further considered for environmental risk assessment.

4.1. FATE AND BEHAVIOUR IN SOIL

4.1.1. ROUTE OF DEGRADATION IN SOIL

Soil experiments (6 different soils in 4 studies) were carried out under aerobic conditions in the laboratory (20-25°C and either at soil moisture of 75% of 1/3 or 40% or 50% maximum water holding capacity (MWHC)) in the dark. The formation of residues not extracted by different extraction methods (acetonitrile/water and 2-aminoethanol or methanol/water or acetonitrile/acetate buffer) was a sink for the applied [cyanoacetaminde-2-^{14}C]labelled cymoxanil (30.3%-47.0% of the applied radiolabel (AR) after 1-15 days, 38.7% or 22.1% AR after 90 or 92 days, respectively). Mineralisation to carbon dioxide was significant, accounted for 28.6-53.0% AR after 1-15 days (study end values from 4 soils), 56.7% or 60.4% AR after 90 or 92 days, respectively. The major (> 10% AR) extractable breakdown products present were IN-U3204 (maximum occurrence 24.7% AR at 0.33 day) and IN-W3595 (maximum occurrence 10.1% AR at day 1). Several minor metabolites were found, among them IN-KQ960 (found above 5% trigger at two consecutive time points) and IN-JX915[18][18] (maximum occurrence 7.6% AR when expressed as mean of replicates and regarded as transient in dark degradation studies, but found above 10 % AR in soil photolysis study) were regarded as relevant for assessment of leaching potential to groundwater.

In a degradation rate study of cymoxanil in one soil (silt loam) at 10°C, the not extracted residues were a significant sink (maximum 55.2 % of AR at day 5), while the mineralisation accounted for 38.6 % of AR at the end of the incubation (on the day 7 after the study initiation). Unidentified metabolites did not exceed 5.1 % of AR.

No data were available on the route of degradation under anaerobic conditions. However degradation under anaerobic conditions was not considered relevant for cymoxanil owing to its use pattern in lettuce and potatoes.

In laboratory soil photolysis study the metabolite pattern formed was similar to dark conditions, however, only IN-JX915 was considered to be major metabolite (maximum occurrence 10.9 % of AR).

[15] IN-R3273: 1-ethylimidazolidine-2,4,5-trione 5-(O-methyloxime)
[16] IN-R3274: Cyano(hydroxyimino)acetic acid
[17] Metabolite fraction M5: N-(aminocarbonyl)-2-(methoxyimino)malonamide
[18] 3-ethyl-4-(methoxyamino)2,5-dioxoimidazolidine-4-carbonitrile

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

The rate of degradation of cymoxanil was determined from the results of the dark aerobic soil degradation studies described in 4.1.1 above and from an additional study with three soils (20°C, 40% MWHC) in the dark. All together nine soil degradation rate experiments were available for the parent. Degradation rates of the soil metabolites of cymoxanil were obtained from degradation studies with cymoxanil as parent. The simple first order (SFO) or first order multi compartment (FOMC) DT_{50} values of the parent were in the range of 0.1-4.3 days. A set of SFO DT_{50} was derived with recalculation as appropriate when the experiment was fitted with FOMC kinetics[19]. After normalisation to FOCUS reference conditions[20] (20°C and 10kPa soil moisture content) this range of (pseudo) SFO DT_{50} becomes 0.2 to 7.3 days (geometric mean 1.2 days). The degradation of cymoxanil was observed as soil pH dependent (less rapid degradation at lower pH), which was taken into consideration in the assessment of the leaching potential.

The normalised SFO DT_{50} values of metabolites were calculated to be 0.2-0.9 days (geometric mean of three values was 0.4 days) for IN-U3204; 2.5 and 2.2 days for IN-W3595 (n=2); 11.2 days for IN-KQ960 (n=1) and 1.0 day for metabolite IN-JX915 (n=1). For full details on these DT_{50} and kinetic formation fraction estimates see revised DAR (June 2008). There are also summary tables outlining this information under the point B.8.2.6 Supplemental studies.

The degradation rate of cymoxanil was estimated in one soil (silt loam) at 10°C. The SFO DT_{50} was calculated to be 1.4 days.

The observed degradation in the soil photolysis study was relatively slow (dry soil), the calculated SFO net DT_{50} (taking into consideration the degradation rate of cymoxanil in the dark control samples) was 22.2 days, which is equivalent to 64.7 days at latitude 39 °N.

Field dissipation studies were not submitted and not required for cymoxanil since aerobic degradation in the laboratory resulted in half-lives far below the trigger of 60 days.

For PECsoil calculation the following normalised SFO laboratory DT_{50} values were used: cymoxanil 7.3 days (longest value); IN-U3204 0.9 day (longest value); IN-W3595 2.5 days (longer value); IN-JX915 1.0 day.

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

The adsorption/desorption of cymoxanil was investigated in 4 soils in satisfactory batch adsorption experiments. Since high instability of cymoxanil in soil experiments was observed, the time for this adsorption study was restricted to 3 hours. Calculated adsorption K_foc values varied from 15.1 to 87.1 mL/g with arithmetic mean of 43.6 mL/g (1/n 0.81 – 0.88, arithmetic mean 0.86). There was no evidence of a correlation of adsorption with pH.

[19] SFO-DT_{50} values were recalculated from FOMC DT_{90} values by dividing with 3.32 following FOCUS recommendations (SANCO/10058/2005, ver. 1.0, 2005)

[20] Using section 2.4.2 of the generic guidance for FOCUS groundwater scenarios, version 1.1 dated April 2002, Q10 2.2, Walker equation coefficient 0.7.

The adsorption/desorption of metabolites IN-U3204, IN-W3595, IN-JX915, IN-KQ960 and IN-R3273 was investigated in four soils in a satisfactory batch adsorption study (only one concentration tested for each soil). The IN-U3204 experiment was inconclusive due to the high instability of this product in aqueous solutions. Due to analytical reasons the experiment of IN-KQ960 was also inconclusive. Calculated adsorption Koc values were the following: IN-W3595 2.3-27.4 mL/g (arithmetic mean 9.2 mL/g); IN-JX915 4.4-34.3 mL/g (arithmetic mean 16.2 mL/g); IN-R3273 25.7-49.5 mL/g (arithmetic mean 42.0 mL/g). There was no evidence of a correlation of adsorption with pH in case of IN-JX915. However pH dependency was observed in case of metabolites IN-W3595 (adsorption lower in alkaline soils) and IN-R3273 (adsorption higher in alkaline soil).

The adsorption/desorption of metabolites IN-U3204, IN-KQ960, IN-T4226, IN-W3595 and IN-KP533 was investigated by HPLC method. The K_{OC} values of IN-U3204, IN-KQ960, IN-T4226, IN-W3595 and IN-KP533 were estimated to be 27.9, 21.6, 17.7, 13.8 and 12.9 mL/g, respectively.

In case of metabolite IN-W3595, Koc values obtained from the batch adsorption experiment were used (only these values are included in Annex 1 of this conclusion) and the observed correlation of adsorption with pH was taken into account in the groundwater risk assessment.
In line with the opinion of the experts in the PRAPeR 47 meeting (previously already agreed by PRAPeR 32 meeting), 1/n value of 1 was used for all the metabolites.

A field lysimeter study (1.2 m depth soil monoliths of loamy sand soil, pH of 5.4, application rate 3 x 320 g a.s./ha) was carried out in Lower Saxony. Cymoxanil or the investigated metabolites were never found in the leachates above 0.1 µg/L (cymoxanil < LOQ; identified metabolites ≤ 0.03 µg/L). A significant fraction of the applied RA found in the leachates, accounting for a maximum annual mean concentration of 0.46 µg/L, could not be identified. A significant ratio of this unidentified RA could be attributed to polar compounds. Taking into account the chromatographic behaviour and the low molecular weight, it was considered unlikely that these compounds exceeded 0.1 µg/L individually. It should be noted that the unidentified fraction contained an amount from loss of radioactivity during sample work-up before HPLC analysis. Moreover it should be noted that some commonly observed and mobile soil metabolites (e.g. IN-W3595 or IN-KQ960) were not investigated.

4.2. FATE AND BEHAVIOUR IN WATER

4.2.1. SURFACE WATER AND SEDIMENT

Hydrolysis of cymoxanil was investigated in two independent studies in sterile buffer solutions at pH 5, 7, 9 at 25 °C and at pH 4, 7, 9 at 20 °C, which gave consistent results. Cymoxanil was essentially stable under sterile hydrolysis conditions at pH 4, but underwent extensive hydrolysis at higher range of pH. The half-life times (first order DT_{50}) at pH 5, 7 and 9 were 144, 1.1 and 0.02 days at 25 °C. At

20°C half-life times at pH 7 and 9 were determined to be 2.1 and 0.04 days. At pH 5 only minor metabolites were observed, major metabolites (> 10 % of AR) were not found. The major metabolites formed under sterile conditions at pH 7 and 9 were the followings: IN-U3204 (maximum 60.8 % AR), IN-JX915 (11.0 % AR), IN-W3595 (41.5 % AR), IN-KP533 (57.4 % AR), IN-R3273 (10.2 % AR) and IN-KQ960 (14.1 % AR). The metabolites IN-W3595, IN-KQ960, IN-R3273 and IN-KP533 were considered stable under the conditions of sterile hydrolysis at both pHs. Hydrolysis half-life (first order DT_{50}) of the metabolite IN-U3204 was estimated to be 2.6 (25 °C) and 2.3 days (20 °C) at pH 7 and 0.4 (25 °C) and 0.5 (20 °C) days at pH 9. Hydrolysis half-life of the metabolite IN-JX915 was estimated to be 1.1 (25 °C) and 0.5 days (20 °C) at pH 7 and 1.7 days at pH 9 (20 °C and 25 °C).

The aqueous photolysis of cymoxanil was investigated under sterile conditions in the laboratory at pH 5 and 25 °C in two independent studies. Net photolysis half-life (taking into consideration the degradation rate in the dark control samples) of cymoxanil was calculated to be 1.7 and 3.0 days (followed by SFO kinetics), which is equivalent to DT_{50} of 4.3 and 12.1 days under environmental conditions at latitude 38 °N or 40 °N (midsummer day). Additional calculations with GC-SOLAR (US-EPA photolysis model) yielded a theoretical half-life of cymoxanil of 5.2 and 17.3 days in the top layer of an aqueous system integrated over a full day in the summer at 40 °N (at pH 5.0). Quantum yield of cymoxanil was calculated to be 0.0052 and 0.00058. In an additional experiment conducted in non-sterile pond water at pH 7.0 the net SFO DT_{50} was calculated to be 0.42 day, which is equivalent to a DT_{50} of 1.1 days at latitude 38 °N.
Two major (> 10 % of AR) metabolites were observed in sterile buffer solution at pH 5: IN-JX915 (maximum 52.6 % AR) and IN-R3273 (maximum 35.4 % AR). The SFO DT_{50} of IN-JX915 due to simultaneous photolysis and hydrolysis was calculated to be 6.6 days (mean of 2 values) and the calculated DT_{50} of IN-R3273 was 32.7 days under these conditions. Based on GC-SOLAR modelling, quantum yields of IN-JX915 and IN-R3273 were 5.04×10^{-4} and 2.41×10^{-5} and DT_{50} values under environmental conditions (pH 5, latitude 40 °N) were estimated to be 21.2 days and 4.7 days, respectively.

A ready biodegradability test (modified sturm test) indicated that cymoxanil is 'not ready biodegradable' using the criteria defined by the test.

In water-sediment studies (4 systems studied at 20°C in the laboratory in the dark in two independent studies) partitioning of cymoxanil to the sediment was insignificant. Fast degradation from the whole system was observed resulting in the range of single first order DT_{50} of 0.1 - 1.6 days (geometric mean 0.3 day). Due to the negligible partitioning to sediment, dissipation in the water layer (0.1 - 1.5 days, geometric mean 0.3 day) was considered as almost consistent to degradation in the entire system. The major (> 10 % of AR) metabolites formed in the water-sediment systems were the following: IN-U3204 (maximum occurrence 24.7 % AR at 0.1 days after treatment (DAT)), IN-W3595 (27.5 % AR at 0.3 DAT), IN-KQ960 (14.3 % AR at 10 DAT), IN-T4226 (12.0 % AR at 3 DAT), metabolite fraction M5 (22.9 % AR at 1 DAT) and IN-KP533 (26.0 % AR at 10 DAT). The

maximum occurrence of all of these compounds in the water phases (at least in case of one system) were above 10 % of AR, but in the sediment phases of all test systems investigated none of them were observed above 10 % of AR.

Single first order whole system degradation DT_{50} values of the metabolites IN-U3204, IN-W3595, IN-T4226, IN-KP533, IN-KQ960, metabolite fraction M5 and the minor metabolites IN-R3273 and IN-JX915 were calculated to be 0.4, 3.0, 4.6, 2.6, 47.4, 1.4, 6.3 and 1.7 days, respectively (geometric means of 2, 3 or 4 values). Mineralisation was significant, CO_2 at the end of the experiments accounted for 45.6 % AR (after 127 days), 39.6 % AR (after 70 days), 75.5 % and 68.5% AR (after 100 days). The maximum amount of residues not extracted from sediment represented 22.5-35.2 % of AR (after 15-30 days, n=4) and decreased by the end of the experiments.

FOCUS surface water modelling was evaluated up to step 2 calculation for cymoxanil and for all the metabolites relevant in surface water.

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

The leaching behaviour of cymoxanil and soil metabolites, relevant for groundwater risk assessment (IN-U3204, IN-W3595, IN-KQ960 and the soil photolysis metabolite IN-JX915) were simulated using FOCUS PEARL 3.3.3 and FOCUS PELMO 3.3.2 model programs. The applied for representative uses of plant protection products containing cymoxanil were 3-4 applications to lettuce and from 4 up to 8 applications to potato with minimum 7 days interval between two applications. The application rates were 120 or 175 g/ha to potatoes and 240 g/ha to lettuce. As there is no lettuce as crop in the FOCUS model programs, in line with the opinion of the experts at the meeting, cabbage as a surrogate of lettuce was modelled for all relevant groundwater scenarios. In the revised DAR (April 2008 and June 2008) two approaches for PECgw calculations were included, however in the Appendix 1 of this conclusion only the `multi-compartment` approach (links the metabolites to the parent or precursor according to the soil degradation scheme) is included as this was preferred by the experts from the Member States. The input parameters discussed and agreed by the experts were the following: cymoxanil single first order DT_{50} 1.3 days (Note: after the expert meeting EFSA concluded that the correct geometric mean of the 9 values is 1.2 days; however using the DT_{50} of 1.3 days results a more conservative calculation regarding the parent compound), K_{foc} 43.6 mL/g, 1/n=0.86; IN-U3204 single first order DT_{50} 0.4 day, formation fraction from parent 0.36, K_{oc} 27.9 mL/g, 1/n=1; IN-W3595 single first order DT_{50} 2.5 days, formation fraction from parent 0.15, K_{oc} was set for soil pH for each FOCUS scenario (2.4-23.4 mL/g for PELMO and 2.3 and 33.3 mL/g for $K_{oc\text{-}base}$ and $K_{oc\text{-}acid}$, respectively with pKa 5.2 for PEARL calculations) taking into consideration the pH dependent adsorption of this metabolite, 1/n=1; IN-JX915 single first order DT_{50} 1.0 day, formation fraction from parent 0.10, K_{oc} 16.1 mL/g (Note: after the expert meeting EFSA concluded that the correct arithmetic mean of the 4 values is 16.2 mL/g; however, using a K_{oc} of 16.1 ml/g results a more conservative calculation), 1/n=1; IN-KQ960 single first order DT_{50} 11.2 days,

formation fraction from IN-U3204 0.16, K_{oc} 21.6 mL/g, 1/n=1. It was also agreed that as interception value 50% is adequate for use for the 8th application for potato.
Taking into account the pH dependent degradation of the parent cymoxanil an additional simulation (FOCUS PEARL 3.3.3) was performed, and agreed by the experts, for the worst case scenarios with a worst case pseudo SFO DT_{50} value of 7.3 days.

Parent cymoxanil, IN-U3204, IN-JX915 and IN-W3595 were calculated to be present in leachate leaving the top 1m soil layer at 80th percentile annual average concentrations clearly below the limit of 0.1 µg/L even under consideration of worst-case degradation rates observed in acidic soils. The minor soil metabolite IN-KQ960 slightly exceeded the trigger of 0.1 µg/L in FOCUS PEARL calculations in the FOCUS scenario Jokioinen, only (0.108 µg/L for potato and 0.150 µg/L for lettuce), and in Jokioinen (0.108 and 0.142 µg/L) and Hamburg (0.123 µg/L) scenarios (potato) when the worst case DT_{50} value of 7.3 days of the parent was used. In the case of all the other FOCUS scenarios, as well as all results from the simulations with FOCUS PELMO 3.3.2 resulted PECgw values below the trigger of 0.1 µg/L.

4.3. FATE AND BEHAVIOUR IN AIR

Considering the vapour pressure value of $1.5x10^{-4}$ Pa at 20°C cymoxanil would be classified under the national scheme of The Netherlands as slightly volatile, indicating that significant losses due to volatilisation would not be expected. Calculations using the method of Atkinson for indirect photo-oxidation in the atmosphere through reaction with hydroxyl radicals resulted in an atmospheric half life estimated at 21.3 hours (assuming an atmospheric hydroxyl radical concentration of $1.5x10^{6}$ radicals cm^{-3}) indicating the small proportion of applied cymoxanil that will volatilise would be unlikely to be subject to long range atmospheric transport.

5. Ecotoxicology

Cymoxanil was discussed in the (PRAPeR) meeting of ecotoxicology experts PRAPeR 48 (subgroup 1) in May 2008, on the basis of the DAR (June, 2007).
Cymoxanil is the active substance in two fungicidal formulations: CYM 50 (name used in DAR: Cymoxanil 50% WP) from the applicant Oxon and TANOS from the applicant Dupont. CYM 50 is a wettable powder (WP) containing only cymoxanil (500g/kg) and TANOS is a water dispersible granule (WG) containing cymoxanil and famoxadone as active substances (250:250g/kg). The representative uses were in lettuce (4 x 240 g a.s./ha) for CYM 50 and in potatoes (8 x 175 g a.s./ha) for both CYM 50 and TANOS.
The risk assessment was conducted according to the following guidance documents: Risk Assessment for Birds and Mammals. SANCO/4145/2000, September 2002: Aquatic Ecotoxicology. SANCO/3268/2001 rev.4 final, October 2002; Terrestrial Ecotoxicology. SANCO/10329/2002 rev.2 final, October 2002; Risk Assessment for non-target arthropods. ESCORT 2, March 2000, SETAC.

5.1. RISK TO TERRESTRIAL VERTEBRATES

The acute toxicity to birds was considered to be low based on available studies for cymoxanil and CYM 50 (LD50> 2000 mg a.s./kg bw). The risk was assessed for insectivorous and herbivorous birds. First tier acute and short-term TERs were above the Annex VI triggers indicating a low risk to insectivorous and herbivorous birds from the representative uses in lettuce and potato (acute TERs in the range of 35-211 and short-term TERs in the range of 16-49). However, a potential high risk was identified for both intended uses in the first tier long-term risk assessment (long-term TERs in the range of 1.7-2.8) and a refined risk assessment was provided in the DAR. Measured data on the residue decline of cymoxanil on plant foliage were taken into account in a refined risk assessment for herbivorous birds. A worst case estimate of the DT_{50} was used and the MAF was set to 1 as it was shown that due to rapid decline no accumulation of residues occurred. The resulting refined long-term TERs for herbivores were 5.4 for lettuce and 7.5 for potatoes, suggesting a low risk. Yellow Wagtail was chosen as focal insectivorous species in lettuce. Based on literature data, the diet of the Yellow Wagtail consists of 80% large arthropods and 20% small arthropods. Yellowhammer (*Emberiza citrinella*) and Yellow wagtail (*Motacilla flava*) were both considered as relevant focal species in potatoes. The Yellowhammer was assumed to feed on 82 % large arthropods and 12 % small arthropods (PD refinement), and to spend 50 % of the time in the treated crop (PT refinement), based on public domain literature data. The diet of the Yellow Wagtail was refined as for lettuce. The resulting refined long-term TERs for insectivores were 6.9 for the Yellow wagtail in lettuce, and 28 for the Yellowhammer and 9.5 for the Yellow Wagtail in potatoes.

The meeting of experts confirmed the use of a NOAEL of 10.5 mg a.s./kg bw/d from the rat reproductive study in the long-term risk assessment. All acute and long-term TERs for insectivorous mammals indicate a low risk. However, a refined long-term risk assessment was required for both intended uses for medium herbivorous mammals. Refinement was based on measured residue decline data (see birds above). The resulting refined long-term TERs were 10 and 14 for lettuce and potatoes respectively, and indicate a low risk. Furthermore, in potatoes the scenario of herbivores was considered not relevant, as potato foliage was considered unpalatable to mammals.

The exposure via drinking water was also assessed and revealed acceptable TERs. No metabolites of ecotoxicological concern were identified and the risk of bioaccumulation is low.

In conclusion, the risk for wild mammals after the use of cymoxanil according to the GAP appears low.

The consumption of contaminated drinking water from puddles and leaf axils were assessed for birds and mammals. TER values were above the Annex VI trigger, suggesting a low risk.

No metabolites of ecotoxicological concern were identified and the potential for bioaccumulation was considered to be low ($logP_{ow}$<3).

Overall it was concluded that the risk to birds and mammals could be considered as low from the intended uses of cymoxanil.

5.2. RISK TO AQUATIC ORGANISMS

Based on the available acute toxicity data, cymoxanil is proposed to be classified as very toxic to aquatic organisms. The lowest end point value for technical cymoxanil was obtained for algae, with an EC_{50} of 0.012 mg a.s./L. Formulation toxicity studies were conducted with both CYM 50 and Tanos. Tanos (containing two active substances) was several orders of magnitude more toxic to fish and Daphnia than CYM 50. The toxicity of CYM 50 was comparable (based on the active substance) to the toxicity of technical cymoxanil. All acute and chronic/long-term TER values for fish, invertebrates, algae and macrophytes were above the respective triggers set in Annex VI based on endpoints for the technical cymoxanil and CYM 50 in addition to PECsw values from FOCUS step 2 modelling for the intended uses. TER values for the product Tanos indicate a low acute risk to aquatic organisms from exposure to the formulation provided that appropriate risk mitigation measures are implemented, e.g. no-spray buffers zones of 30 m (based on PECsw values assuming only drift input in surface waters). It should be noted that FOCUS landscape and mitigation guidance (2007)[21] indicates that spray drift should not be mitigated by more than 95%. However, a buffer zone of 30 m would respect this maximum mitigation value.

FOCUS Step 1 and Step 2 PECsw modelling was provided for the metabolites IN-U3204, IN-W3595, IN-KQ960, IN-T4226, IN-JX915, IN-R3273, IN-KP533 and the metabolite fraction M5. Acceptable studies on the acute toxicity of the metabolites IN-T4226, IN-W3595, IN KQ960 and IN-U3204 to fish and Daphnia were submitted. Respective TER values (based on PECsw from FOCUS step 2) were above the Annex VI triggers. In an additional static acute study on the toxicity of cymoxanil to fish metabolites arising from the mainly abiotic degradation of cymoxanil under test conditions were identified and quantified (in parallel test solutions without fish). The PECsw values (FOCUS step 2) for the metabolites IN-JX915, IN R3273, IN-KP533 and the metabolite fraction M5 were several orders of magnitude lower than the concentrations at which no fish had died in the mentioned study. Therefore, the risk to fish from these metabolites was considered to be low. For the metabolites IN-JX915, IN-R3273, IN-KP533 and the metabolite fraction M5 no toxicity information on daphnids was available. However, if the toxicity of these metabolites to daphnids would be by a factor of 100 higher than the toxicity of the active substance, TER values would still be above the respective Annex VI trigger, indicating a low risk to invertebrates. For the metabolites IN-T4226 and IN-W3595 acceptable toxicity estimates for algae were available and respective TER values were above the Annex VI trigger. For the metabolites IN-KQ960, IN-U3204, IN-JX915, IN-R3273, IN KP533 and the metabolite fraction M5 no valid toxicity data are available for algae. However, all studies with algae were performed under static conditions at relatively high pH levels. At alkaline pH levels the degradation of cymoxanil is mainly driven by abiotic processes (basically hydrolysis). Hence from

[21] FOCUS (2007). "Landscape And Mitigation Factors In Aquatic Risk Assessment. Volume 1. Extended Summary and Recommendations". Report of the FOCUS Working Group on Landscape and Mitigation Factors in Ecological Risk Assessment, EC Document Reference SANCO/10422/2005 v2.0. 169 pp.

fate and behaviour information on cymoxanil it is reasonable to assume that the metabolites IN-KQ960, IN-U3204, IN-JX915, IN-R3273, IN-KP533 and the metabolite fraction M5 have been present in the test solutions of the algae studies with cymoxanil to a sufficient extent to have influenced the outcome of the studies. The risk to aquatic algae from exposure to these metabolites was considered to be low, as it was covered by the assessment of the parent substance. This conclusion for algae was also accepted by member state experts at PRAPeR 48. A chronic daphnid study with IN-KQ960 was submitted, as this metabolite was more acute toxic to daphnia than cymoxanil. The TER value was above the trigger of 10, suggesting a low chronic risk to invertebrates from IN-KQ960.

Since the active substance and its metabolites are not likely to partition into sediments (see section 4.2.1), therefore no risk assessment for sediment dwelling organisms was required.

Bio-accumulation of cymoxanil was not expected to be an issue, as $logP_{ow}$ of cymoxanil was found to be 0.67 - 0.59. No experimentally derived $logP_{ow}$ values were available for metabolites of cymoxanil. The RMS estimated $logP_{ow}$ values with the software KOWWIN (US-EPA) for the metabolites IN-KQ960, IN-U3204, IN-T4226, IN-JX915, IN-R3273 and IN-KP533 and IN-W3595. For the metabolites IN-KQ960, IN-U3204, IN-T4226, IN-JX915, IN-R3273 and IN-KP533 modelled $logP_{ow}$ values were below the trigger of 3 and hence no bio-accumulation was expected. For IN W3595 a $logP_{ow}$ of 4.27 was derived with KOWWIN. IN-W3595 is an organic acid and the software estimates the $logP_{ow}$ for the non dissociated form of the acid. However, in aquatic environments the substance was partly dissociated and it was shown to be highly water soluble. Taking this information into account it was considered unlikely that it would accumulate in fat tissue. Therefore, no bio-accumulation study in fish was considered necessary for the metabolite IN-W3595.

Overall, the assessment for aquatic organisms suggests a low risk from the intended uses provided appropriate risk mitigation are implemented.

5.3. RISK TO BEES

Oral and contact toxicity of technical cymoxanil to bees was considered to be low, based on available data. The hazard quotients were well below the Annex VI trigger indicating a low risk. The calculations of hazard quotients were performed using data on the active substance only. There was no indication of the formulation being more toxic than the technical cymoxanil. Overall, the risk to bees was considered to be low for the intended uses.

5.4. RISK TO OTHER ARTHROPOD SPECIES

Laboratory studies with different cymoxanil containing formulations and eight species of non-target arthropods, among them the two indicator species, *Aphidius rhopalosiphi* and *Typhlodromus pyri*, have been used for the risk assessment. The same level of toxicity (LR_{50} >480 g a.s./ha) was derived for the formulation Cymoxanil 50 WP in standard glass plate studies with the indicator species. All HQ-values for the indicator species *T. pyri* and *A. rhopalosiphi* indicate a low risk for the in- and off-

field area. However, based on the numerous studies with different species of non-target-arthropods and different cymoxanil containing products, the risk for each of the groups parasitoids, predatory mites, foliage and ground dwelling arthropods was evaluated with regard to the intended multiple application scenarios. In two laboratory studies with *T. pyri* a complete inhibition of reproduction was observed. However, in two field studies with up to 6 applications only transient reductions in the abundance of mites and eggs were noted and it could be concluded that under field conditions no long-term impact also on reproduction would occur. Additional laboratory, extended laboratory and semi-field studies with foliage- and ground dwelling arthropods showed a low risk. Overall, it was concluded that both in- and off-field exposure from the intended use would not cause a high risk to populations of terrestrial non-target arthropods.

5.5. RISK TO EARTHWORMS

Acute toxicity studies with earthworms (*Eisenia foetida*) with cymoxanil, the 50 WP formulation and the formulation Cymoxanil/Famoxadone 52.5 WP (containing 22.7 % cymoxanil) revealed LC_{50} values of > 1000 mg a.s./kg soil dw, > 1000 mg product/kg soil dw and 989 mg product/kg soil dw, respectively. All calculated TER values were orders of magnitudes above the trigger of 10, indicating a low acute risk to earthworms for all intended uses. The composition of the Cymoxanil/Famoxadone 52.5 was considered to be comparable to the composition of Tanos (GAP formulation). Due to the multiple use scenarios a sublethal / reproduction test was performed with the Cymoxanil/Famoxadone 50 WG formulation (Tanos) for the use in potatoes (> 6 applications). Since no effects occurred up to and including the highest concentration applied, the issue of whether to attribute impact to either one or both active substances did not arise. The calculated TER value for this long term exposure was significantly above the trigger value of 5. Based on the rapid degradation of the a.s. and because the major metabolites IN-U3204, IN-W3595 and IN-JX915 were assumed to have been formed in the test systems, soil metabolites of cymoxanil pose no unacceptable risk to earthworms. Hence, the long term risk for earthworms was considered to be low for the intended uses of cymoxanil.

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

No assessment available - not required (DT_{90} <100d).

5.7. RISK TO SOIL NON-TARGET MICRO-ORGANISMS

Cymoxanil and Cymoxanil/Famoxadone 20SC did not significantly affect the activity of the soil micro-flora under laboratory test conditions. The tests were performed at rates of 1.6 mg a.s./kg soil dw (corresponding to 1.2 kg a.s./ha) and 0.016 mL formulation/kg soil dw (corresponding to 1.44 kg a.s./ha). It was concluded that neither respiration nor nitrogen mineralisation of soils treated with cymoxanil up to rates that correspond with all intended multiple use scenarios differed from untreated soils by more than 25 % after 28 days. The maximum PECsoil for cymoxanil was significantly below the highest test concentration with no lasting effects higher than 25 %. Based on the rapid degradation of cymoxanil and because the major metabolites IN-U3204, IN-W3595 and IN-JX915 could be

assumed to have occurred during the 28 day studies, soil metabolites of cymoxanil pose no unacceptable risk to soil microbes. Hence cymoxanil was not expected to cause any significant effects on soil microbial populations when applied according to GAP.

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

The most sensitive species determined in a vegetative vigour test was *Allium cepa* which showed a reduction of shoot biomass of 44.77 % at a rate of 240 g cymoxanil/ha. The relevant endpoint for risk assessment was an EC_{50} > 240 g a.s./ha. TERs were calculated based on drift deposition at 1 m from the edge of the field considering a multiple application factor (MAF) and the worst case application scenario for the crops lettuce and potatoes. The resulting TERs exceed the trigger for all intended uses and indicate that at a distance of 1 m to the edge of the field no significant damage would occur to non-target terrestrial plants. The assessment was based on the effects of the "single formulation" Cymoxanil 50 WP and this also covers the cymoxanil component of the formulation TANOS. The assessment for non-target plants indicated a low risk for all intended uses.

5.9. RISK TO BIOLOGICAL METHODS OF SEWAGE TREATMENT

In a test with activated sludge from a sewage treatment system an EC50 of > 19.4 mg a.s./L was determined. It could be assumed that no undue effects to sewage treatment would occur, when cymoxanil was applied according to the intended uses.

6. Residue definitions

Soil

Definition for risk assessment: cymoxanil, IN-U3204, IN-W3595, IN-JX915
Definition for monitoring: cymoxanil

Water

Ground water

Definition for exposure assessment: cymoxanil, IN-U3204, IN-W3595, IN-JX915, IN-KQ960
Definition for monitoring: cymoxanil, IN-KQ960

Surface water

Definition for risk assessment: cymoxanil, IN-U3204, IN-W3595, IN-JX915, IN-KQ960, IN-T4226, IN-R3273, IN-KP533, Metabolite fraction M5
Definition for monitoring: cymoxanil, IN-KQ960

Air

Definition for risk assessment: cymoxanil

Definitions for monitoring:	cymoxanil

Food of plant origin

Definition for risk assessment:	cymoxanil
Definition for monitoring:	cymoxanil

Food of animal origin

Definition for risk assessment:	cymoxanil **(for ruminant only)**
Definition for monitoring:	cymoxanil **(for ruminant only)**

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

Soil

Compound (name and/or code)	**Persistence**	**Ecotoxicology**
Cymoxanil	Very low to low persistence Pseudo single first order DT_{50} 0.2-7.3 days (20°C and 10kPa soil moisture content)	Low risk
IN-U3204	Very low persistence Single first order DT_{50} 0.2-0.9 days (20°C and 10kPa soil moisture content)	Low risk
IN-W3595	Low persistence Single first order DT_{50} 2.2-2.5 (n=2) (20°C and 10kPa soil moisture content)	Low risk
IN-JX915	Low persistence Single first order DT_{50} 1.0 (n=1) (20°C and 10kPa soil moisture content)	Low risk

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 activity
Cymoxanil	High to very high mobility Kfoc 15.1-87.1 mL/g	No	Yes	Yes	Yes

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 activity
IN-U3204	Very high mobility Koc 27.9 mL/g (n=1)	No	No	No	No groundwater relevance assessment demanded.
IN-W3595	Very high mobility Koc 2.3-27.4 mL/g	No	No	No information available, not needed	No groundwater relevance assessment demanded.
IN-JX915	Very high mobility Koc 4.4-34.3 mL/g	No	No	No information available, not needed	No groundwater relevance assessment demanded.
IN-KQ960	Very high mobility Koc 21.6 mL/g (n=1)	Yes; FOCUS standard calculation (Pearl) 1 scenario from 9, FOCUS calculation considering pH dependent degradation (Pearl), 2 scenarios from 4	No	No information available. The issue of relevance was not discussed in the PRAPeR meeting. Due to the toxicological profile of cymoxanil, the assessment of IN-KQ960 relevance should be considered.	Toxicity to *Daphnia magna* higher compared to cymoxanil. However, the risk to ground water organisms was considered low. max PEC_{gw} = 0.142 µg /L EC_{50} *D. magna* = 800 µg /L I.e. TER = 5634

Surface water and sediment

Compound (name and/or code)	Ecotoxicology
Cymoxanil	Risk to aquatic organisms assessed as low
IN-U3204	Risk to aquatic organisms assessed as low
IN-W3595	Risk to aquatic organisms assessed as low
IN-JX915	Risk to aquatic organisms assessed as low
IN-KQ960	Risk to aquatic organisms assessed as low
IN-T4226	Risk to aquatic organisms assessed as low
IN-R3273	Risk to aquatic organisms assessed as low
IN-KP533	Risk to aquatic organisms assessed as low
Metabolite fraction M5	Risk to aquatic organisms assessed as low

Air

Compound (name and/or code)	Toxicology
Cymoxanil	Not acutely toxic via inhalation

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

DuPont

- The ratio of the isomers must be specified (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- The outstanding details of the starting materials must be given (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- The specified limit for T3204 in the specification must be amended (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- Wettability and attrition before and after accelerated storage (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- Attrition before and after storage in a shelf life study (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- Methods of analysis for IN-KQ960 in surface water with an LOQ of <0.3 mg/L and ground/drinking water with an LOQ of 0.1 µg/L (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- To address a statement on the toxicological relevance of the metabolite IN-KP533 observed in the metabolism study performed on lettuce (data were submitted in 18 September 2007, presented in an addendum to volume 3 of June 2008. In view of the restrictions concerning the acceptance of new (i.e. newly submitted) studies after the submission of the DAR to EFSA, as laid down in Commission Regulation (EC) No. 1095/2007, the new studies could not be considered in the peer review.; refer to chapter 3.1).
- Clarification of the potential intermediates in the transformation pathway of ethyl urea route and assess their relevance (relevant for all uses evaluated, data gap identified by EFSA, proposed submission date unknown, refer to chapter 4)
- Assessment of relevance of metabolite IN-KQ960 in groundwater according to SANCO/221/2000 guidance document (relevant for all uses evaluated in geoclimatic conditions represented by Jokioinen FOCUS groundwater scenario, data gap identified by ESFA, proposed submission date unknown, refer to chapter 4.2.2)

Oxon

- The possible formation of compounds as detailed in the addendum to Vol 4 C.1.2.2 dated April 2008 (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, data evaluated in Vol. 4 dated June 2008 but not peer reviewed, refer to chapter 1).
- Evidence that the method for the active substance in the technical material is capable of separating the isomers (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, data evaluated in Vol. 4 dated June 2008 but not peer reviewed, refer to chapter 1).
- Batch data to include the results for the *Z* isomer content, of course following this a new specification will be required (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, data evaluated in Vol. 4 dated June 2008 but not peer reviewed, refer to chapter 1).
- Methods of analysis for IN-KQ960 in surface water with an LOQ of <0.3 mg/L and ground/drinking water with an LOQ of 0.1 µg/L (relevant for all uses evaluated, data gap identified by meeting of experts May 2008, proposed submission date unknown, refer to chapter 1).
- To address a statement on the toxicological relevance of the metabolite IN-KP533 observed in the metabolism study performed on lettuce (data were submitted in 18 September 2007, presented in an addendum to volume 3 of June 2008. In view of the restrictions concerning the acceptance of new (i.e. newly submitted) studies after the submission of the DAR to EFSA, as laid down in Commission Regulation (EC) No. 1095/2007, the new studies could not be considered in the peer review.; refer to chapter 3.1).
- Clarification of the potential intermediates in the transformation pathway of ethyl urea route and assess their relevance (relevant for all uses evaluated, data gap identified by ESFA, proposed submission date unknown, refer to chapter 4)
- Assessment of relevance of metabolite IN-KQ960 in groundwater according to SANCO/221/2000 guidance document (relevant for all uses evaluated in geoclimatic conditions represented by Jokioinen and Hamburg FOCUS groundwater scenarios, data gap identified by ESFA, proposed submission date unknown, refer to chapter 4.2.2)

CONCLUSIONS AND RECOMMENDATIONS

Overall conclusions

This conclusion was reached on the basis of the evaluation of the representative uses as a fungicide on lettuce and potato. Full details of the GAP can be found in the attached list of end points.

The representative formulated products for the evaluation were "CYM 50" and “Tanos”, a WP and WG formulation containing 500 g a.s. /kg and 250 g a.s. /kg respectively.

Residues in food of plant origin can be determined with a multi-method (The German S19 method has been validated). Single methods for the determination of residues in soil, water and air are available. However, a new data gap has been identified as the metabolite IN-KQ960 has been included in the residue definition for surface water and ground water. 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. There are some issues with the technical specifications as well as some physical properties of one of the formulations.

Tested in mammals, cymoxanil is harmful if swallowed (Xn R22 was proposed); it shows low toxicity after inhalation and dermal exposure. It is neither a skin nor an eye irritant. It showed positive results in a Magnusson Kligmann test (Xi; R43 – "May cause sensitisation by skin contact" proposed). Target organs in subchronic exposure were testes (organ weight, macroscopic and microscopic changes), epididymes (macroscopic and microscopic changes), kidney (organ weight) and thymus (histology). The relevant short term toxicity NOAEL is 1.3 mg/kg bw/day (1-year dog study). R48/22 ("Danger of serious damage to health by prolonged exposure") was proposed based on testicular effects in rats and dogs. Overall, cymoxanil does not have genotoxic potential nor carcinogenic potential up to and including the highest dose levels tested. In multigeneration studies, the NOAEL for both parental and offspring effects is 10.5 mg/kg bw/day; the reproductive NOAEL is 31.6 mg/kg bw/day. Fertility was not affected in multigeneration studies, however, based on findings in testes in rats and dogs, possible classification as R62 "Possible risk of impaired fertility" should be flagged to EChA. Tested in developmental toxicity studies, cymoxanil showed an NOAEL for maternal and developmental toxicity in rats of 10 mg/kg bw/day. Increased incidences of treatment related variations (partially ossified and unossified sternebra, wavy ribs and partially ossified pelvis) were observed in rats at maternal toxic dose levels. Incidences for hemi vertebra, exencephaly and fused ribs were shown to be above the range of historical controls at dose levels of clear maternal toxicity. In the rabbit increased incidences of skeletal malformations (vertebra and/or rib alterations linked with scoliosis) were observed at maternally toxic doses, as well as hydrocephaly and cleft palates in the highest dose tested. The incidence of dilation of heart ventricles was statistically significant increased in the high dose animals and was above historical control data, too. An overall maternal and developmental NOAEL of 8 mg/kg bw/day was set. The classification with R63 ("Possible risk of harm to the unborn child") should be reconsidered by EChA. The ADI is 0.013 mg/kg bw/day, based on the NOAEL of 1.3 mg/kg bw/day of the 1 year dog study, applying an SF of 100; the ARfD is 0.08 mg/kg bw based on the developmental NOAEL in the rabbit and an SF 100. An AOEL of 0.01 mg/kg bw/day was proposed based on the NOAEL in the dog studies of 1.3 mg/kg bw/day corrected for 75% oral absorption and an SF 100. Operator, worker and bystander exposure estimates showed levels below the AOEL.

Metabolism in plants has been investigated using foliar application of ^{14}C-cymoxanil on two crops, lettuce and potato, representing two groups of plants: leafy and root crop groups. These studies

indicated a rapid and extensive degradation of the parent compound over intermediates (IN-W3595[22], IN-KQ960[23] or IN-KP533[24]) to glycine which was further conjugated or incorporated in natural substances (carbohydrates, peptides or proteins). Based on these studies, the plant residue definition for monitoring and risk assessment was limited to the parent compound cymoxanil only. The rotational crop metabolism study performed on lettuce, sugar beet and wheat with two rotational crop intervals (30 and 120 days) showed that no significant residues of cymoxanil are expected in practice in rotational crops. A goat metabolism study was evaluated indicating that cymoxanil is rapidly and extensively metabolised essentially to natural products. The parent compound cymoxanil was proposed as residue definition for ruminant only. An overall animal residue definition cannot be proposed as no laying hen study was submitted. A residue data set was available for outdoor uses on lettuce in S-EU only and for potato uses in N-EU and S-EU. All residues being below the LOQ of 0.05 mg/kg at harvest, a MRL of 0.05* mg/kg was proposed for lettuce and potato. The chronic and acute consumer risk assessments showed that the TMDI and IESTI did not exceed 5% of the ADI and 10% of the ARfD respectively

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, however the transformation pathway of ethyl urea route of cymoxanil and the potential intermediates or degradation products and the assessment of their relevance is not available. For the applied for intended uses, the potential for groundwater exposure by cymoxanil and its soil metabolites IN-U3204, IN-W3595 and IN-JX915 above the parametric drinking water limit of 0.1 µg/L, is low. However, for the metabolite IN-KQ960, in geoclimatic regions represented by Jokioinen and Hamburg FOCUS groundwater scenarios contaminations of groundwater above the 0.1 µg/L limit cannot be excluded and the non relevance assessment is not available for this metabolite.

The acute toxicity to birds was considered to be low. The first tier acute and short-term risk assessment for insectivorous and herbivorous birds indicated a low risk for all intended uses. Further refinements were required to address the long-term risk to birds. Based on refined residue data the risk to herbivorous birds was considered low for all intended uses. Based on Yellow wagtail and Yellowhammer as focal species and refinement of PD and PT, a low risk was identified for insectivorous birds for all intended uses. Whereas at tier 1 the acute risk to insectivorous and herbivorous mammals was considered to be low for all intended uses, only the long-term risk to insectivorous mammals was considered to be low. Further refinements were required for the long-term risk assessment to herbivorous mammals. TER values were above the Annex VI trigger indicating a low risk to herbivorous mammals for all uses based on available residue data. Additionally, potato foliage was considered unpalatable to herbivorous mammals, hence it was

[22] IN-W3595: 2-cyano-2-methoxyiminoacetic acid
[23] IN-KQ960: 3-Ethyl-4-(methoxyamino)-2,5-dioxo-4-imidazolidinecarboxamide
[24] IN-KP533: ((Ethylamino)carbonyl)amino)oxoacetic acid

considered a non-relevant scenario. Secondary poisoning was not expected (logPow<3) and risk from consumption of contaminated drinking water was considered to be low. Cymoxanil was very toxic to aquatic organisms. The risk was considered to be low for the active substance, metabolites and the lead formulations. However, risk assessment for the combined formulation Tanos indicated a need for risk mitigation, e.g. non-spray buffer zones of 30m (to identify a low risk). No bioaccumulation was expected for aquatic organisms (logPow<3).

The risk to bees, non-target arthropods, earthworms, soil non-target micro-organisms, non-target plants and biological methods of sewage treatment was assessed as low.

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

- A 30 m buffer zone for Tanos should be taken into account.
- Use of PPE has to be considered for operator exposed to “Cymoxanil 50 WP”

Critical areas of concern

- None

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

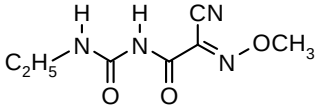
(Abbreviations used in this list are explained in appendix 2)

Identity, Physical and Chemical Properties, Details of Uses, Further Information

Active substance (ISO Common Name) ‡	Cymoxanil
Function (*e.g.* fungicide)	Fungicide

Rapporteur Member State	Austria
Co-rapporteur Member State	None

Identity (Annex IIA, point 1)

Chemical name (IUPAC) ‡	1-[(*E/Z*)-2-cyano-2-methoxyiminoacetyl]-3-ethylurea
Chemical name (CA) ‡	2-cyano-N-[(ethylamino)carbonyl]-2-(methoxyimino)acetamide
CIPAC No ‡	419
CAS No ‡	57966-95-7
EC No (EINECS or ELINCS) ‡	261-043-0
FAO Specification (including year of publication) ‡	Not less than 970 g/kg 419/TC (March 2006)
Minimum purity of the active substance as manufactured ‡	970 g/kg (both notifiers) Oxon: Ratio of isomers: open DuPont: Ratio of isomers: open
Identity of relevant impurities (of toxicological, ecotoxicological and/or environmental concern) in the active substance as manufactured	No relevant impurities present
Molecular formula ‡	$C_7H_{10}N_4O_3$
Molecular mass ‡	198.2 g/mol
Structural formula ‡	

Physical and chemical properties (Annex IIA, point 2)

Melting point (state purity) ‡	161 to 162 °C (99.2% to 99.6%)
Boiling point (state purity) ‡	Cymoxanil did not boil below its decomposition temperature
Temperature of decomposition (state purity)	Cymoxanil is thermally stable below 156 °C (i.e. offset of DSC thermogram (99.2% to 99.6%). No decomposition or chemical transformation observed through the melting point (162 ° C). Decompositionstarts above 180 °C (method: DSC)
Appearance (state purity) ‡	white crystalline solid (PGAI: 99.6%) pale pink or pale peach powdery, crystalline solid (TGAI: ≥ 97% and 98.1%)
Vapour pressure (state temperature, state purity) ‡	1.50 x 10^{-4} Pa (20 °C, 99.9%)
Henry's law constant ‡	3.3 x 10^{-5} Pa.m^3.mol^{-1} at pH 5 3.8 x 10^{-5} Pa.m^3.mol^{-1} at pH 7 (Cymoxanil hydrolyses rapidly at pH 9, so water solubility and hence Henry's law constant cannot be determined at an alkaline pH)
Solubility in water (state temperature, state purity and pH) ‡	890 mg/L (20 °C, pH 5, 99.9%) 780 mg/L (20 °C, pH 7, 99.9%) 782 mg/L (20 °C, unbuffered, pH 5.68, 99.9%)
Solubility in organic solvents ‡ (state temperature, state purity)	n-Hexane: 0.037 g/L Toluene: 5.29 g/L Acetonitrile: 57.0 g/L Ethyl-acetate: 27.9 -28.8 g/L 1-Octanol: 1.43 g/L Methanol: 22.9 - 29.0 g/L Acetone: 62.4 - 68.2 g/L Dichloromethane: 133.2 g/L n-Heptane: 0.017 g/L Xylene: 7.6 g/L Methylene chloride: 58.4 g/L (Purity 97.4% to 99.1% at 20 °C)
Surface tension ‡ (state concentration and temperature, state purity)	68.7 mN/m at 19 °C (90 % saturated solution, 98.8%)
Partition co-efficient ‡ (state temperature, pH and purity)	log $P_{O/W}$ = 0.64 at 20 °C pH (unbuffered, 99.1%) log $P_{O/W}$ = 0.59 at 20 °C, pH 5 (99.9%) log $P_{O/W}$ = 0.67 at 20 °C, pH 7 (99.9%)
Dissociation constant (state purity) ‡	pKa = 9.0 - 9.7 at 20°C (99.1% to 99.9%)

UV/VIS absorption (max.) incl. ε ‡ (state purity, pH)	ε in [L.mol-1.cm-1], Purity 99.6% (Applicant A): λmax [nm]: 244, ε= 9333.20 (25° C, pH 1.5) λmax [nm]: 244, ε= 9296.80 (25° C, pH 6.9) ε in [L.mol-1.cm-1], Purity 99.1% (Applicant B): λmax [nm]: 240, ε= 9287.6 (acid conditions) λmax [nm]: 240, ε= 9419.3 (neutral conditions) λmax [nm]: 240, ε= 7739.7 (alkaline conditions) Significant absorbance at all pH values > 290 nm at all pH conditions observed (i.e. peak offsets of the reported λmax)	
Flammability ‡ (state purity)	Not highly flammable	(97.8% to 98.8%)
Explosive properties ‡ (state purity)	Not explosive	(97.8% to 98.8%)
Oxidising properties ‡ (state purity)	Not oxidizing	(expert statement)

Summary of representative uses evaluated (*cymoxanil*)*

Crop and/or situation	Member state or Country (a)	Product Name (b)	F G or I (c)	Pests or Groups of pests controlled	Formulation		Application				Application rate per treatment			PHI (days)	Remarks (e)
					Type	Conc. of as	method kind	growth stage (d)	Number min max	Interval between application	kg as/hl min max	water l/ha min max	kg as/ha min max		
Lettuce	South	CYM 50	F	*Bremia lactucae*	WP	500 g/kg	Spray	40-49	3-4	7	0.03-0.048	500-800	0.240	10	Oxon
Potato	North	CYM 50	F	*Phytophthora infestans*	WP	500 g/kg	Spray	21-95	4	7-10	0.026-0.060-	200-450	0.120	7	Oxon
	South	CYM 50			WP	500 g/kg	Spray	21-95	5	7	0.012-0.024	500-1000	0.120	7	Oxon
	North	Tanos	F	*Phytophthora infestans*	WG	250g/kg	Spray	21-95	6-8	7-10	0.029-0.058	300-600	0.175	14	DuPont
	South														

(a) Southern Europe (South) Northern Europe (North).

(b) CYM 50 = Cymoxanil 50 %WP; Tanos = Cymoxanil/Famoxadone 250:250g/kg.

(c) Outdoor or field use (F), glasshouse application (G) or indoor application (I).

(d) Growth stage at the first application according to BBCH system for a uniform coding of phenologically similar growth stages of all mono- and dicotyledonous plant species.

(e) GAP for products supported by Oxon or DuPont.

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
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		Cymoxanil
Food of animal origin		Not applicable
Soil		Cymoxanil
Water	surface	Cymoxanil and IN-KQ960
	drinking/ground	Cymoxanil and IN-KQ960
Air		Cymoxanil
Body fluids and tissues		Not applicable

Monitoring/Enforcement methods

Food/feed of plant origin (analytical technique and LOQ for methods for monitoring purposes)	GC-NDP: LOQ = 0.04 mg/kg in potato, grape and tomato 0.1 mg/kg hop GC-NPD: LOQ = 0.05 mg/kg in commodities with high water content (potato, lettuce)
Food/feed of animal origin (analytical technique and LOQ for methods for monitoring purposes)	No residue definition is proposed, therefore no analytical method is required
Soil (analytical technique and LOQ)	HPLC-UV: LOQ = 0.01 mg/kg
Water (analytical technique and LOQ)	HPLC-UV: LOQ = 0.1 µg/L (drinking and surface water) An analytical method for IN-KQ960 in surface with an LOQ lower than 0.3 mg/L and in ground water with an LOQ of 0.1 µg/L is required
Air (analytical technique and LOQ)	HPLC-UV: LOQ = 0.46 µg/m^3
Body fluids and tissues (analytical technique and LOQ)	Cymoxanil is not classified as toxic or highly toxic, therefore no analytical method is required

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

	RMS/peer review proposal
Active substance	none

Impact on Human and Animal Health

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

Rate and extent of oral absorption ‡	Rapid (T_{max} 0.5 – 3 h in plasma) but incomplete 75% within 48 h (based on urinary and biliary excretion + carcass) after single low dose in rats
Distribution ‡	Widely distributed; highest residues in liver and kidneys
Potential for accumulation ‡	No evidence for accumulation
Rate and extent of excretion ‡	Rapid and extensive (≥ 80 %) within 48 h, mainly via urine (60 – 70 %)
Metabolism in animals ‡	Extensively metabolised (> 95 %); all metabolites identified are intermediates leading to the formation of glycine used for incorporation and conjugation
Toxicologically relevant compounds ‡ (animals and plants)	Parent compound
Toxicologically relevant compounds ‡ (environment)	Parent compound and IN-KQ960 (identified by EFSA)

Acute toxicity (Annex IIA, point 5.2)

Rat LD_{50} oral ‡	960 mg/kg bw	**R22**
Rat LD_{50} dermal ‡	> 2000 mg/kg bw	
Rat LC_{50} inhalation ‡	> 5.6 mg/L air/4h (nose only)	
Skin irritation ‡	Non-irritant	
Eye irritation ‡	Slightly irritating (no classification required)	
Skin sensitisation ‡	Sensitsing (M & K)	**R43**

Short term toxicity (Annex IIA, point 5.3)

Target / critical effect ‡	Testes (organ weight, macroscopic and microscopic changes), epididymides (macroscopic and microscopic changes), liver (organ weight, histology), kidney (organ weight) and thymus (histology)	**R48/22**
Relevant oral NOAEL ‡	1-year dog: 1.3 mg/kg bw/day 90-day rat: 6.5 mg/kg bw/day 90-day mouse: 84.4 mg/kg bw/day	

Relevant dermal NOAEL ‡	28 day, rat: > 1000 mg/kg bw/day	
Relevant inhalation NOAEL ‡	No data, not relevant	

Genotoxicity ‡ (Annex IIA, point 5.4)

Equivocal results *in vitro*; negative *in vivo* overall no genotoxic/mutagenic potential	

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

Target/critical effect ‡	Macroscopic as well as histological alterations in several organs (lungs, testes, retina, liver, pancreas, sciatic nerve, rectum, stomach, epididymides, duodenum, uterus) R 48/22	
Relevant NOAEL ‡	2-year rat: 4.08 mg/kg bw/day 18-month, mouse: 4.19 mg/kg bw/day	
Carcinogenicity ‡	No evidence of a cancerogenic potential	

Reproductive toxicity (Annex IIA, point 5.6)

Reproduction toxicity

Reproduction target / critical effect ‡	Parental: body weight and weight gain; increased relative testis weight Reproductive: reduced live pups born, reduced number of corpora lutea and implantations, and increase of post implantation loss at parental toxic dose levels) Offspring: Reduced viability and litter survival at parental toxic dose levels; reduced pup weight	
Relevant parental NOAEL ‡	10.5 mg/kg bw/day (150 ppm)	
Relevant reproductive NOAEL ‡	31.6 mg/kg bw/day (450 ppm)	
Relevant offspring NOAEL ‡	10.5 mg/kg bw/day (150 ppm)	

Developmental toxicity

Developmental target / critical effect ‡	Rat: increased incidences of malformations (hemi vertebra, exencephaly and fused ribs) at maternal toxic doses (clinical	**R63**

	observations, reduced body weight and food consumption); increased incidences of variants (incomplete/poor ossification) and minor anomalies at the lowest dose tested without maternal toxicity Rabbit: increased incidences of skeletal malformations (vertebra and/or rib alterations linked with scoliosis) at maternal toxic dose levels (clinical observations, reduced body weight gain); hydrocephaly and cleft palates; increased incidences of visceral malformations (dilation of heart ventricles) at maternal toxic dose levels (reduced body weight gain and food consumption)	
Relevant maternal NOAEL ‡	Rat: 10 mg/kg bw/day Rabbit: 8 mg/kg bw/day	
Relevant developmental NOAEL ‡	Rat: 10 mg/kg bw/day Rabbit: 8 mg/kg bw/day	

Neurotoxicity (Annex IIA, point 5.7)

Acute neurotoxicity ‡	No data available – not required (no concern from other studies)	
Repeated neurotoxicity ‡	90-day rat : no specific investigations but no evidence of neurotoxic effects up to 224 mg/kg bw/day	
Delayed neurotoxicity ‡	No data available – not required	
Developmental neurotoxicity ‡	Rats: no evidence of developmental neurotoxic effects up to 100 mg/kg bw/day	

Other toxicological studies (Annex IIA, point 5.8)

Mechanism studies ‡	No evidence of immunotoxicity in 28 day studies in rats and mice up to 107.71 mg/kg bw/day (rat) and 218.4 mg/kg bw/day (mouse)
Studies performed on metabolites/impurities ‡	Metabolite IN-3204 (3-ethyl-4-(methoxyimino)-2,5-dioxo-4-imidazolidine-carboxamide): LD_{50} > 7500 mg/kg bw

Medical data ‡ (Annex IIA, point 5.9)

No evidence of adverse effects to workers of manufacturing plants; no clinical cases and poisoning incidents related to the agricultural use of cymoxanil containing plant protection products have been reported

Summary (Annex IIA, point 5.10)

	Value	Study	Safety factor
ADI ‡	0.013 mg/kg bw/day	Dog, 1-year study [DuPont, OXON]	100
AOEL ‡	0.01 mg/kg bw/day	Dog, 1-year study [DuPont, OXON]	100 + enteral absorption of 75 %
ARfD ‡	0.08 mg/kg bw/day	Rabbit, teratogenicity study [DuPont]	100

Dermal absorption ‡ (Annex IIIA, point 7.3)

Formulation "Cymoxanil 50 % WP", [OXON]	75 % (default value)
Formulation "TANOS", [DuPont]	Concentrate: 1 %; Spray dilution: 5 % based on *in vivo* rat and comparative *in vitro* (human/rat skin)

Exposure scenarios (Annex IIIA, point 7.2)

Operator	"Cymoxanil 50 % WP", [OXON]: (lettuce: 0.24 kg a.i./ha; potatoes: 0.12 kg a.i./ha) **BBA model**: *tractor mounted equipment, without PPE:* 4183.5 % of AOEL (lettuce), 2091.8 % of AOEL (potatoes) *tractor mounted equipment, with PPE* *(*lettuce: gloves during mixing/loading as well as application, broad-brimmed headwear, coverall and sturdy footwear during application, RPE (A1P2) during mixing/loading; potatoes: gloves during mixing/loading and application and coverall during application): 91.0 % of AOEL (lettuce), 76.7 % of AOEL

	(potatoes) **POEM model**: *tractor mounted equipment, without PPE:* 24220 % of AOEL (lettuce), 13980 % of AOEL (potatoes) *tractor mounted equipment, with PPE (gloves and RPE (FFP3)):* 661.7 % of AOEL (lettuce), 624.7 % of AOEL (potatoes) "TANOS", [DuPont]: (potatoes: 0.175 kg a.i./ha). **BBA model:** *tractor mounted equipment, without PPE:* 65.5 % of AOEL (potatoes) **POEM model:** *tractor mounted equipment, without PPE:* 644.1 % of AOEL (potatoes) *tractor mounted equipment, with PPE (gloves and RPE (FFP3)):* 73.3 % of AOEL (potatoes)
Workers	"Cymoxanil 50 % WP", [OXON]: According to *Krebs et al., 2000* 1200 % of the AOEL ("unprotected") and 60 % of the AOEL ("protected") (lettuce) 600 % of the AOEL ("unprotected") and 30 % of the AOEL ("protected") (potatoes) "TANOS", [DuPont]: 58.3 % of the AOEL ("unprotected") and 2.9% of the AOEL ("protected") (potatoes)
Bystanders	"Cymoxanil 50 % WP", [OXON]: According to *Ganzelmeier et al., 1997* 25.2 % of the AOEL (lettuce), 9 % of the AOEL (potatoes) "TANOS", [DuPont]: According to *Ganzelmeier et al., 1997* 0.88 % of the AOEL (potatoes)

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

	RMS proposal	
Substance classified (name)	**Xn**	"harmful"
	Xi	"irritant"
	R22	"Harmful of swallowed"
	R43	"May cause skin sensitisation by skin contact"
	R48/22	"Harmful: danger of serious damage to health by prolonged exposure if swallowed"
	R63	"Possible risk of harm to the unborn child"

Residues

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

Plant groups covered	leaf vegetables (lettuce, lactuca sativa), root and tuber vegetables (potato); spray application for both crops
Rotational crops	leaf vegetables (lettuce, lactuca sativa), sugar plants (sugar beet), cereals (spring wheat). A "non residue" situation in rotational crops is established, therefore no further investigations were done on these crops.
Metabolism in rotational crops similar to metabolism in primary crops?	A similarity or non-similarity of metabolism in primary and rotational crops could not be confirmed, because of the rapid degradation of cymoxanil in soil (DT_{50}: 1.3 days) and plants and the very low detected initial TRR in rotational crops
Processed commodities	not applicable ("non residue" situation in lettuce or potato; human TMDI < 10% of ADI, no processing studies are regarded necessary)
Residue pattern in processed commodities similar to residue pattern in raw commodities?	not applicable
Plant residue definition for monitoring	cymoxanil (parent compound only), restricted to leafy and root vegetables
Plant residue definition for risk assessment	cymoxanil (parent compound only), restricted to leafy and root vegetables
Conversion factor (monitoring to risk assessment)	---

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	goat was daily oral dosed with 15 mg ^{14}C-cymoxanil over 3 consecutive days; after 24 hours a plateau concentration (0.27 - 0.33 mg eq/L) in the milk could be assessed
Animal residue definition for monitoring	cymoxanil provisionally The proposed residue definition is only set on the basis of the metabolism study in ruminants. Considering further uses a metabolism study on laying hen may also be required for MRL setting

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

Animal residue definition for risk assessment	cymoxanil provisionally The proposed residue definition is only set on the basis of the metabolism study in ruminants. Considering further uses a metabolism study on laying hen may also be required for MRL setting
Conversion factor (monitoring to risk assessment)	---
Metabolism in rat and ruminant similar (yes/no)	yes
Fat soluble residue: (yes/no)	no (log $P_{o/w}$ of cymoxanil: < 1.0 at pH 5 or 7, 20 ^{o}C). Additionally, no evidence of fat soluble residues with regard to animal metabolism (i.e. fat tissue of goat) is identifiable.

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

The application onto bar soil is equivalent to 1.212 kg labelled as/ha (1.3 N - intended lettuce use by Oxon; 0.9 to 2.0 N - intended potato uses by DuPont or Oxon); the rotational crop interval (RCI) was 30 (120) days, the detected TRR values of commodities are given below:	
lettuce head (mature)	<0.01 (<0.01) mg eq/kg
sugar beet foliage	0.02 (<0.01) mg eq/kg
sugar beet roots	0.01 (<0.01) mg eq/kg
spring wheat forage	0.07 (0.01) mg eq/kg
spring wheat straw	0.14 (0.12) mg eq/kg
spring wheat grain	0.04 (0.05) mg eq/kg
Note: No cymoxanil or structurally related metabolites were identified in any analysed lettuce, sugar beet or spring wheat sample. No evidence of relevant residues in succeeding crops is identifiable.	

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

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

Storage conditions: about -20 °C, darkness. Cymoxanil residues in homogenised lettuce/whole lettuce were stable for 30 days/12 months at least. Cymoxanil residues in homogenised potato tuber were stable for 12.5 months at least. Note: A storage period for whole potato was not tested.

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

	The trigger value of ≥0.1 mg residue/kg diet (dry weight) is reached for beef and pig formally. Nevertheless, feeding studies are regarded as not necessary, because a "non residue" situation (<0.05 mg cymoxanil/kg) on potato (relevant feedingstuff) is established. Additionally, according to the goat metabolism study no cymoxanil (< 0.05 mg/kg) or structurally related metabolites were detected in any got tissue (e.g. milk, liver, kidney, muscles or fat).		
	Ruminant:	Poultry:	Pig:
	Conditions of requirement of feeding studies		
Expected intakes by livestock ≥ 0.1 mg/kg diet (dry weight basis) (yes/no - If yes, specify the level)	0.1 mg/kg dry mass	< 0.1 mg/kg dry mass	0.1 mg/kg dry mass
Potential for accumulation (yes/no):	no	no	no
Metabolism studies indicate potential level of residues ≥ 0.01 mg/kg in edible tissues (yes/no)	no	no	no
	Feeding studies (Specify the feeding rate in cattle and poultry studies considered as relevant) Residue levels in matrices : Mean (max) mg/kg		
Muscle	not applicable	not applicable	not applicable
Liver	not applicable	not applicable	not applicable
Kidney	not applicable	not applicable	not applicable
Fat	not applicable	not applicable	not applicable
Milk	not applicable		
Eggs		not applicable	

‡ End point identified by the 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 (b)	HR (b), (c)	STMR (b), (d)
Lettuce (lactuca sativa)	Southern Europe	6x <0.05 mg cymoxanil/kg	residue trials submitted by Oxon only	0.05* mg/kg	0.05* mg/kg	0.05* mg/kg
Potato	Northern Europe	6x <0.05 mg cymoxanil/kg 4x <0.05 mg cymoxanil/kg	residue trials submitted by DuPont residue trials submitted by Oxon	0.05* mg/kg	0.05* mg/kg	0.05* mg/kg
Potato	Southern Europe	6x <0.05 mg cymoxanil/kg 15x <0.05 mg cymoxanil/kg	residue trials submitted by DuPont residue trials submitted by Oxon	0.05* mg/kg	0.05* mg/kg	0.05* mg/kg

(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) Expressed as mg cymoxanil/kg. Asterix on figure indicates LOQ (= 0.05 mg/kg) of cymoxanil in/on lettuce or potato matrix.
(c) Highest residue
(d) Supervised Trials Median Residue *i.e.* the median residue level estimated on the basis of supervised trials relating to the representative use

‡ End point identified by the 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	**0.013 mg/kg bw/day**		
TMDI (% ADI) according to WHO European diet, adult	adult 60.0 kg bw	0.013465 mg/person/day	1.7% of ADI
TMDI (% ADI) according to German diet model, VELS model, child	child 16.15 kg bw	0.002140 mg/person/day	1.0 % of ADI
TMDI (% ADI) according to UK (PSDs) diet model, 10 consumer groups	adult 76.0 kg bw	0.015 mg/person/day	1.5 % of ADI
	infant 8.7 kg bw	0.005 mg/person/day	4.4 % of ADI
	toddler 14.5 kg bw	0.007 mg/person/day	3.9 % of ADI
	4-6 year old child 20.5 kg bw	0.009 mg/person/day	3.4 % of ADI
	7-10 year old child 30.9 kg bw	0,012 mg/person/day	3.0 % of ADI
	11-14 year old child 48.0 kg bw	0.014 mg/person/day	2.2 % of ADI
	15-18 year old child 63.8 kg bw	0.016 mg/person/day	1.9 % of ADI
	vegetarian 66.7 kg bw	0.014 mg/person/day	1.6 % of ADI
	elderly - own home 70.8 kg bw	0.014 mg/person/day	1.5 % of ADI
	elderly - residential 61.6 kg bw	0.011 mg/person/day	1.3 % of ADI
EFSA model	Highest calculated TMDI: 2.3 % (NL child)		
ARfD	**0.08 mg/kg bw/day**		
NESTI (% ARfD) according to large portions of German diet model, VELS model, child	child 16.15 kg bw		
	lettuce:	0.0008071 mg/kg bw/day	1.0 % of ARfD
	potato:	0.0023492 mg/kg bw/day	2.9 % of ARfD
NESTI (% ARfD) according to large portions of UK (PSDs) diet model, 10 consumer groups	adult 76.0 kg bw		
	lettuce:	0.00049 mg/kg bw/day	0.6 % of ARfD
	potato:	0.00120 mg/kg bw/day	1.5 % of ARfD
	infant 8.7 kg bw		
	lettuce:	0.00063 mg/kg bw/day	0.8 % of ARfD
	potato:	0.00769 mg/kg bw/day	9.6 % of ARfD
	toddler 14.5 kg bw		
	lettuce:	0.00060 mg/kg bw/day	0.8 % of ARfD
	potato:	0.00532 mg/kg bw/day	6.6 % of ARfD

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

	4-6 year old child 20.5 kg bw lettuce: potato:	 0.00089 0.00400 mg/kg bw/day	 1.1 % of ARfD 5.0 % of ARfD
	7-10 year old child 30.9 kg bw lettuce: potato:	 0.00067 0.00275 mg/kg bw/day	 0.8 % of ARfD 3.4 % of ARfD
	11-14 year old child 48.0 kg bw lettuce: potato:	 0.00042 0.00195 mg/kg bw/day	 0.5 % of ARfD 2.4 % of ARfD
	15-18 year old child 63.8 kg bw lettuce: potato:	 0.00040 0.00145 mg/kg bw/day	 0.5 % of ARfD 1.8 % of ARfD
	vegetarian 66.7 kg bw lettuce: potato:	 0.00055 0.00149 mg/kg bw/day	 0.7 % of ARfD 1.9 % of ARfD
	elderly - own home 70.8 kg bw lettuce: potato:	 0.00035 0.00119 mg/kg bw/day	 0.4 % of ARfD 1.5 % of ARfD
	elderly - residential 61.6 kg bw lettuce: potato:	 0.00020 0.00130 mg/kg bw/day	 0.2 % of ARfD 1.6 % of ARfD
EFSA model	lettuce (DE child) potatoes (UK infant)	0.0013 0.0077 mg/kg bw/day	1.7 % of ARfD 9.6 % of ARfD
Factors included in NESTI	---		

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	
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No processing studies are required, since human TMDI accounts for less than 10 % of ADI.

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

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

Lettuce (lactuca sativa):	0.05* mg/kg
Potatoes:	0.05* mg/kg

When the MRL is proposed at the LOQ, this should be annotated by an asterisk after the figure.

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

Fate and Behaviour in the Environment

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

Mineralization after 100 days ‡	20/25 °C: 45.7, 28.7, 53.0, 28.6, 56.7 and 60.4 % AR (n = 6) after 1, 3, 10, 15, 90 and 92 days, respectively (Sterile conditions: Mineralization negligible) 10 °C: 38.6 % AR after 7 days (n=1)
Non-extractable residues after 100 days ‡	20/25 °C: 30.3, 43.5, 35.6, 47.0, 38.7 and 22.1 % AR (n = 6) after 1, 3, 10, 15, 90 and 92 days, respectively (Sterile conditions: 48.7 % of AR by 15 days) 10 °C: 55.2% AR after 5 days (n=1)
Metabolites requiring further consideration ‡ - name and/or code, % of applied (range and maximum)	**Soil risk assessment:** IN-U3204: max. 24.7 % AR by 0.33 day IN-W3595: max. 10.1 % AR by 1 day **Groundwater risk assessment:** I IN-U3204: max. 24.7 % AR by 0.33 day IN-W3595: max. 10.1 % AR by 1 day IN-KQ960: max. 6.3 % AR by 3 days IN-JX915: max. 7.6 % of AR by 0 day

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

Anaerobic degradation ‡

Mineralization after 100 days	No data available, not considered relevant
Non-extractable residues after 100 days	No data available, not considered relevant
Metabolites that may require further consideration for risk assessment – name and/or code, % of applied (range and maximum)	No data available, not considered relevant

Soil photolysis ‡

Metabolites that may require further consideration for risk assessment – name and/or code, % of applied (range and maximum)	**Soil risk assessment:** IN-JX915: 10.9 % AR (n = 1)

‡ End point identified by the 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)

Laboratory studies ‡

Cymoxanil	Aerobic conditions						
Soil type	pH / matrix[a]	t. °C / % MWHC	DT_{50}/ DT_{90} (d)	SFO-DT_{50}[b] (d) 20 °C pF2/10kPa	r^2	χ^2 error (%)	Method of calculation[c]
Sandy loam, UK	6.0 / uk	20 °C / 40 % MWHC	0.1 / 0.5	0.2	1.00	1.4	FOMC
Sandy loam, US	6.4 / uk	25 °C / 75 % 1/3 bar	1.2 / 18.8	5.8	0.86	17.6	FOMC
Sandy clay loam, J	6.8 / uk	25 °C / 50 % MWHC	0.2 / 0.8	0.4	0.98	5.9	FOMC
Sandy loam, DE	6.5 / uk	20 °C / 50 % MWHC	2.3 / 13.1	3.1	0.99	6.9	FOMC
Sandy loam, F	7.8 / uk	20 °C / 50 % MWHC	0.7 / 2.3	0.6	0.95	16.7	FOMC
Sandy clay loam, UK	5.7 / uk	20 °C / 50 % MWHC	2.5 / 33.3	7.3	0.98	6.5	FOMC
Silt loam, UK	4.3 / Ca	20 °C / 40 % MWHC	4.3 / 23.7	6.1	0.97	4.3	FOMC
Silt loam, UK	6.4 / Ca	20 °C / 40 % MWHC	0.9 / 3.1	0.8	1.00	2.6	SFO
Clay loam, UK	7.5 / Ca	20 °C / 40 % MWHC	0.2 / 0.8	0.2	0.99	5.7	SFO
Geometric mean				**1.2**	-	-	-
Silt loam, UK	6.5 / Ca	10 °C / 40 % MWHC	1.4 / 4.7	-	1.00	2.8	SFO

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)
[b] SFO-DT_{50} re-calculated from FOMC-DT_{90} by division with 3.32
[c] Best fit

IN-U3204	Aerobic conditions							
Soil type	pH / matrix[a]	t. °C / % MWHC	DT_{50}/ DT_{90} (d)	f. f. (from parent)	DT_{50} (d) 20 °C pF2/10kPa	r^2	χ^2 error (%)	Method of calculation
Sandy clay loam, J	6.8 / uk	25 °C / 50 % MWHC	0.6 / 1.9	0.48	0.9	0.93	11.0	$P_{SFO} \rightarrow M_{SFO}$
Silt loam, UK	6.4 / Ca	20 °C / 40 % MWHC	0.4 / 1.3	0.24	0.3	0.88	26.2	$P_{SFO} \rightarrow M_{SFO}$
Clay loam, UK	7.5 / Ca	20 °C / 40 % MWHC	0.2 / 0.6	0.36	0.2	0.95	12.2	$P_{SFO} \rightarrow M_{SFO}$
Geometric mean Arithmetic mean			**0.4 / 1.1** - / -	- **0.36**	**0.4** -	- -	- -	- -

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

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

IN-W3595	Aerobic conditions							
Soil type	pH / matrix[a]	t. °C / % MWHC	DT_{50}/ DT_{90} (d)	f. f. (from parent)	DT_{50} (d) 20 °C pF2/10kPa	r^2	χ^2 error (%)	Method of calculation
Sandy clay loam, J	6.8 / uk	25 °C / 50 % MWHC	1.7 / 5.5	0.15	2.5	0.85	14.5	$P_{SFO} \rightarrow M_{SFO}$
Sandy loam, F	7.8 / uk	20 °C / 50 % MWHC	2.8 / 9.4	0.07	2.2	0.60	69.3	$P_{SFO} \rightarrow M_{SFO}$
Worst case			**2.8 / 9.4**	**0.15**	**2.5**	-	-	-

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-KQ960	Aerobic conditions							
Soil type	pH / matrix[a]	t. °C / % MWHC	DT_{50}/ DT_{90} (d)	f. f. (from IN-U3204)	DT_{50} (d) 20 °C pF2/10kPa	r^2	χ^2 error (%)	Method of calculation
Sandy clay loam, J	6.8 / uk	25 °C / 50 % MWHC	7.6 / 25.2	0.16	11.2	0.84	19.2	$P_{SFO} \rightarrow M1_{SFO} \rightarrow M2_{SFO}$[b]

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)
[b] M1 = IN-U3204, M2 = IN-KQ960

IN-JX915	Aerobic conditions							
Soil type	pH / matrix[a]	t. °C / % MWHC	DT_{50}/ DT_{90} (d)	f. f. (from parent)	DT_{50} (d) 20 °C pF2/10kPa	r^2	χ^2 error (%)	Method of calculation
Sandy clay loam, J	6.8 / uk	25 °C / 50 % MWHC	0.6 / 1.9	0.10	1.0	0.73	27	$P_{SFO} \rightarrow M_{SFO}$

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

Field studies ‡

Cymoxanil	No data available, not triggered

pH dependence ‡ (yes / no) (if yes type of dependence)	Cymoxanil: Soil DT_{50} significantly ($p < 0.05$) depending on soil pH (lower under acidic conditions)
Soil accumulation and plateau concentration ‡	Not expected to occur

Laboratory studies ‡

Cymoxanil	Soil photolysis (net, converted to environmental midsummer days, approx. 40 °N)

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

Soil type	pH / matrix[a]	t. °C / % MWHC	Conditions	DT_{50} / DT_{90} (d)	DT_{50} (d) 20 °C pF2/10kPa	r^2	Method of calculation
Sandy loam, USA	6.4 / uk	25 °C / air dried	Irradiated	16.1 / 53.4	-	0.90	SFO
		25 °C / air dried	Dark	58.3 / 194	-	0.87	SFO
		25 °C / air dried	Net, lab	22.2 / 73.8	-	-	-
		-	Net, environment	64.7 / 215	-	-	-

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

Soil adsorption/desorption (Annex IIA, point 7.1.2)

Cymoxanil ‡							
Soil Type	OC %	Soil pH (H_2O)	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Silt loam, DE	0.59	6.9	-	-	0.090	15.1	0.88
Sandy loam, US	1.0	5.7	-	-	0.910	87.1	0.87
Loamy sand, UK	1.6	8.1	-	-	0.462	28.9	0.81
Clay, UK	2.0	7.2	-	-	0.856	43.4	0.87
Arithmetic mean			-	-	-	**43.6**	**0.86**
pH dependence, Yes or No			No				

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

IN-W3595 ‡							
Soil Type	OC %	Soil pH / matrix[a]	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Loamy sand, US	2.3	4.6 / uk	0.63	27.4	-	-	-
Sandy loam, US	0.99	7.6 / uk	0.026	2.6	-	-	-
Silt loam, US	3.2	7.8 / uk	0.074	2.3	-	-	-
Sandy loam, US	0.46	6.4 / uk	0.020	4.3	-	-	-
Arithmetic mean			-	**9.2**	-	-	**1.0**[b]
$K_{OC\text{-}acid}$ $K_{OC\text{-}base}$ pK_a		- - **5.2**		**33.3** **2.3** -			
pH dependence (yes or no)			Yes				

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)
[b] PRAPeR 32 agreed default value

IN-R3273 ‡							
Soil Type	OC %	Soil pH / matrix[a]	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Loamy sand, US	2.3	4.6 / uk	0.59	25.7	-	-	-
Sandy loam, US	0.99	7.6 / uk	0.49	49.5	-	-	-
Silt loam, US	3.2	7.8 / uk	1.5	46.9	-	-	-
Sandy loam, US	0.46	6.4 / uk	0.21	45.7	-	-	-
Arithmetic mean			-	**42**	-	-	**1.0**[b]
pH dependence (yes or no)			Yes				

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)
[b] PRAPeR 32 agreed default value

IN-JX915 ‡							
Soil Type	OC %	Soil pH / matrix[a]	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Loamy sand, US	2.3	4.6 / uk	0.13	5.4	-	-	-
Sandy loam, US	0.99	7.6 / uk	0.34	34.3	-	-	-
Silt loam, US	3.2	7.8 / uk	0.66	20.6	-	-	-
Sandy loam, US	0.46	6.4 / uk	0.021	4.4	-	-	-
Arithmetic mean			-	**16.2**	-	-	**1.0**[b]
pH dependence (yes or no)			No				

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

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)
[b] PRAPeR 32 agreed default value

IN-U3204 ‡							
Soil Type	OC %	Soil pH ($CaCl_2$)	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
HPLC method	-	-	-	**27.9**	-	-	**1.0**[a]
pH dependence (yes or no)			not applicable				

[a] PRAPeR 32 agreed default value

IN-KQ960 ‡							
Soil Type	OC %	Soil pH ($CaCl_2$)	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
HPLC method	-	-	-	**21.6**	-	-	**1.0**[a]
pH dependence (yes or no)			not applicable				

[a] PRAPeR 32 agreed default value

IN-T4226 ‡							
Soil Type	OC %	Soil pH ($CaCl_2$)	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
HPLC method	-	-	-	**17.7**	-	-	**1.0**[a]
pH dependence (yes or no)			not applicable				

[a] PRAPeR 32 agreed default value

IN-KP533 ‡							
Soil Type	OC %	Soil pH ($CaCl_2$)	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
HPLC method	-	-	-	**12.9**	-	-	**1.0**[a]
pH dependence (yes or no)			not applicable				

[a] PRAPeR 32 agreed default value

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

Column leaching ‡	Not studied - no data requested
Aged residues leaching ‡	Not studied - no data requested

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

Lysimeter/ field leaching studies ‡	One lysimeter study conducted in Lower Saxony, Germany Two soil monoliths (1 m^2, 1.2 m soil depth): 0 – 30 cm: sand 75.2 %, silt 21.2 %, clay 3.6 %, C_{org} 1.29 %, pH ($CaCl_2$) 5.4 Application (as Curzate 50 WP) onto potatoes: Lys1: 3 x 320 g ai/ha, June 30, July 6, July 14, 1993 3 x 320 g ai/ha, June 30, July 7, July 14, 1994 Lys2: 3 x 320 g ai/ha, June 30, July 6, July 14, 1993 Crop cover: potatoes, winter rye (1st year), potatoes, winter barley (2nd year) Precipitation: 1171 mm (1st year), 1176 mm (2nd year), 850 mm (3rd year) Mean annual temperature: 11.9 °C (1st year), 9.9 °C (2nd year), 8.5 °C (3rd year) Leachate (mean of both lysimeter): 894 mm (1st year), 738 mm (2nd year), 497 mm (3rd year) **Annual mean concentrations in leachates:** Total radioactivity in leachates: Lys1: 0.27, 0.56 and 0.19 µg ai equiv./L (1st, 2nd, 3rd year) Lys2: 0.26, 0.11 µg ai equiv./L (1st, 2nd year) Unidentified radioactivity in leachates (owing to loss during work-up, unidentified radioactivity of RP-C8 HPLC, unidentified polars): Lys1: 0.23, 0.46 and 0.16 µg ai equiv./L (1st, 2nd, 3rd year) Lys2: 0.21, 0.10 µg ai equiv./L (1st, 2nd year) **Maximum annual mean concentration in leachates:** Cymoxanil: < LOQ IN-U3204: < 0.01 µg L^{-1} (Lys2, 2nd year) IN-T4226: 0.02 µg L^{-1} (Lys1, 2nd year) IN-R3273: 0.01 µg L^{-1} (Lys1, 2nd year) IN-R3274: 0.02 µg L^{-1} (Lys1, 2nd year) Oxamic acid (IN-18474): < LOQ Oxalic acid: 0.03 µg L^{-1} (Lys1, 2nd year) LOQ = 0.01 µg L^{-1}

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

PEC (soil) (Annex IIIA, point 9.1.3)

Cymoxanil Method of calculation	DT_{50} (d): 7.3 Kinetics: SFO (*SFO-DT_{50} re-calculated from lab FOMC-DT_{90} by division with 3.32, normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2*) Representative worst-case from lab studies, representative worst-case for acidic soils
IN-U3204 Method of calculation	DT_{50} (d): 0.9 Kinetics: SFO *(normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2)* Representative worst case from lab studies Max. occurrence: 24.7 % (lab) Molar ratio: 198.2/198.2 = 1.00
IN-W3595 Method of calculation	DT_{50} (d): 2.5 Kinetics: SFO *(normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2)* Representative worst case from lab studies Max. occurrence: 10.1 % (lab) Molar ratio: 128.1/198.2 = 0.646
IN-JX915 Method of calculation	DT_{50} (d): 1.0 Kinetics: SFO *(normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2)* Representative worst case from lab studies Max. occurrence: 10.9 % (soil photolysis) Molar ratio: 198.2/198.2 = 1.00

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

Application data

Notifier:	DuPont
Crop:	**Potatoes**
Application rate(s):	175 g ai/ha
Number of applications:	8
Interval (d):	7
% plant interception:	50 (average canopy)
Notifier:	Oxon
Crop:	**Potatoes**
Application rate(s):	120 g ai/ha
Number of applications:	4 (North EU)
	5 (South EU)
(calculated with 5 applications, worst-case)	
Interval (d):	7
% plant interception:	50 (average canopy)
Notifier:	Oxon
Crop:	**Lettuce**
Application rate(s):	240 g ai/ha
Number of applications:	4
Interval (d):	7
% plant interception:	70 (full canopy)
Depth of soil layer:	5 cm
Soil bulk density:	1.5 g/cm^3

PEC$_{(s)}$ (mg/kg)

		Potatoes (DuPont)			
		Cymoxanil			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.117		0.239	
Short term	24 h	0.106	0.111	0.217	0.228
	2 d	0.096	0.106	0.198	0.218
	4 d	0.080	0.097	0.164	0.200
Long term	7 d	0.060	0.086	0.123	0.176
	14 d	0.031	0.065	0.063	0.134
	21 d	0.016	0.051	0.033	0.105
	28 d	0.008	0.042	0.017	0.085
	50 d	0.001	0.025	0.002	0.051

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

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		Cymoxanil			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
	100 d	0.000	0.013	0.000	0.026
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (Oxon)			
		Cymoxanil			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.080		0.159	
Short term	24 h	0.073	0.076	0.144	0.152
	2 d	0.066	0.073	0.131	0.145
	4 d	0.055	0.067	0.109	0.133
Long term	7 d	0.041	0.059	0.082	0.117
	14 d	0.021	0.045	0.042	0.089
	21 d	0.011	0.035	0.022	0.070
	28 d	0.006	0.029	0.011	0.057
	50 d	0.001	0.017	0.001	0.034
	100 d	0.000	0.009	0.000	0.017
Plateau concentration		Not expected to occur		Not expected to occur	

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

PEC$_{(s)}$ (mg/kg)		**Lettuce** (Oxon)			
		Cymoxanil			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.096		0.184	
Short term	24 h	0.087	0.092	0.167	0.176
	2 d	0.079	0.088	0.152	0.168
	4 d	0.066	0.080	0.126	0.153
Long term	7 d	0.049	0.070	0.095	0.135
	14 d	0.025	0.054	0.049	0.103
	21 d	0.013	0.042	0.025	0.081
	28 d	0.007	0.034	0.013	0.066
	50 d	0.001	0.021	0.002	0.039
	100 d	0.000	0.010	0.000	0.020
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		IN-U3204			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.029		0.029	
Short term	24 h	0.013	0.021	0.013	0.021
	2 d	0.006	0.016	0.006	0.016
	4 d	0.001	0.011	0.001	0.011
Long term	7 d	0.000	0.007	0.000	0.007
	14 d	0.000	0.004	0.000	0.004
	21 d	0.000	0.002	0.000	0.002
	28 d	0.000	0.002	0.000	0.002

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

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		IN-U3204			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
	50 d	0.000	0.001	0.000	0.001
	100 d	0.000	0.001	0.000	0.001
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (Oxon)			
		IN-U3204			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.020		0.020	
Short term	24 h	0.009	0.014	0.009	0.014
	2 d	0.004	0.011	0.004	0.011
	4 d	0.001	0.007	0.001	0.007
Long term	7 d	0.000	0.005	0.000	0.005
	14 d	0.000	0.002	0.000	0.002
	21 d	0.000	0.002	0.000	0.002
	28 d	0.000	0.001	0.000	0.001
	50 d	0.000	0.001	0.000	0.001
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

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

PEC$_{(s)}$ (mg/kg)		**Lettuce** (Oxon)			
		IN-U3204			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.024		0.024	
Short term	24 h	0.011	0.017	0.011	0.017
	2 d	0.005	0.013	0.005	0.013
	4 d	0.001	0.009	0.001	0.009
Long term	7 d	0.000	0.006	0.000	0.006
	14 d	0.000	0.003	0.000	0.003
	21 d	0.000	0.002	0.000	0.002
	28 d	0.000	0.002	0.000	0.002
	50 d	0.000	0.001	0.000	0.001
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		IN-W3595			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.008		0.009	
Short term	24 h	0.006	0.007	0.007	0.008
	2 d	0.004	0.006	0.005	0.007
	4 d	0.003	0.005	0.003	0.006
Long term	7 d	0.001	0.004	0.001	0.004
	14 d	0.000	0.002	0.000	0.002
	21 d	0.000	0.001	0.000	0.002
	28 d	0.000	0.001	0.000	0.001

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

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		IN-W3595			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
	50 d	0.000	0.001	0.000	0.001
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (Oxon)			
		IN-W3595			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.005		0.006	
Short term	24 h	0.004	0.005	0.005	0.005
	2 d	0.003	0.004	0.004	0.005
	4 d	0.002	0.003	0.002	0.004
Long term	7 d	0.001	0.002	0.001	0.003
	14 d	0.000	0.001	0.000	0.002
	21 d	0.000	0.001	0.000	0.001
	28 d	0.000	0.001	0.000	0.001
	50 d	0.000	0.000	0.000	0.000
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

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

PEC$_{(s)}$ (mg/kg)		**Lettuce** (Oxon)			
		IN-W3595			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.006		0.007	
Short term	24 h	0.005	0.006	0.006	0.006
	2 d	0.004	0.005	0.004	0.006
	4 d	0.002	0.004	0.002	0.005
Long term	7 d	0.001	0.003	0.001	0.003
	14 d	0.000	0.002	0.000	0.002
	21 d	0.000	0.001	0.000	0.001
	28 d	0.000	0.001	0.000	0.001
	50 d	0.000	0.001	0.000	0.001
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		IN-JX915			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.013		0.013	
Short term	24 h	0.006	0.010	0.006	0.010
	2 d	0.003	0.007	0.003	0.007
	4 d	0.001	0.005	0.001	0.005
Long term	7 d	0.000	0.003	0.000	0.003
	14 d	0.000	0.002	0.000	0.002
	21 d	0.000	0.001	0.000	0.001
	28 d	0.000	0.001	0.000	0.001

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

PEC$_{(s)}$ (mg/kg)		**Potatoes** (DuPont)			
		IN-JX915			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
	50 d	0.000	0.000	0.000	0.000
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

PEC$_{(s)}$ (mg/kg)		**Potatoes** (Oxon)			
		IN-JX915			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.009		0.009	
Short term	24 h	0.004	0.007	0.004	0.007
	2 d	0.002	0.005	0.002	0.005
	4 d	0.001	0.003	0.001	0.003
Long term	7 d	0.000	0.002	0.000	0.002
	14 d	0.000	0.001	0.000	0.001
	21 d	0.000	0.001	0.000	0.001
	28 d	0.000	0.001	0.000	0.001
	50 d	0.000	0.000	0.000	0.000
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

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

PEC$_{(s)}$ (mg/kg)		**Lettuce** (Oxon)			
		IN-JX915			
		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.010		0.010	
Short term	24 h	0.005	0.008	0.005	0.008
	2 d	0.003	0.006	0.003	0.006
	4 d	0.001	0.004	0.001	0.004
Long term	7 d	0.000	0.003	0.000	0.003
	14 d	0.000	0.001	0.000	0.001
	21 d	0.000	0.001	0.000	0.001
	28 d	0.000	0.001	0.000	0.001
	50 d	0.000	0.000	0.000	0.000
	100 d	0.000	0.000	0.000	0.000
Plateau concentration		Not expected to occur		Not expected to occur	

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

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

Hydrolytic degradation of the active substance and metabolites > 10 % ‡	**Cymoxanil:** DT_{50}: pH 4: Stable (20 °C) pH 5: 144 days (25 °C) pH 7: 1.1 days (25 °C), 2.1 days (20 °C) pH 9: 0.02 days (25 °C), 0.04 days (20 °C) **Metabolites > 10 % AR:** IN-U3204 (pH 7 max. 52.7 % AR, pH 9 max. 60.8 % AR) DT_{50} (pH 7) = 2.6 days (25 °C), 2.3 days (20 °C) DT_{50} (pH 9) = 0.4 days (25 °C), 0.5 days (20 °C) IN-JX915 (pH 7 max. 7.2 % AR, pH 9 max. 11.0 % AR) DT_{50} (pH 7) = 1.1 days (25 °C), 0.5 days (20 °C) DT_{50} (pH 9) = 1.7 days (25 °C), 1.7 days (20 °C) IN-W3595 (pH 7 max. 22.6 % AR, pH 9 max. 41.5 % AR) Stable at pH 7 and 9 IN-KP533 (pH 7 max. 57.4 % AR, pH 9 max. 34.4 % AR) Stable at pH 7 and 9 IN-R3273 (pH 7 max. 10.2 % AR, pH 9 max. 7.2 % AR) Stable at pH 7 and 9 IN-KQ960 (pH 7 max. 9.0 % AR, pH 9 max. 14.1 % AR) Stable at pH 7 and 9
Photolytic degradation of active substance and metabolites above 10 % ‡	**Cymoxanil:** <u>Sterilized buffer solution, pH 5.0, 25 °C:</u> Net photolysis DT_{50} = 1.7 / 3.0 days (n = 2) Converted to natural summer light (approx. 40 °N): Net photolysis DT_{50} = 4.3 / 12.1 days (n = 2) <u>Non-sterile pond water, pH 7.0:</u> Net photolysis DT_{50} = 0.42 days Converted to natural summer light (38 °N): Net photolysis DT_{50} = 1.1 days **Metabolites > 10 % AR:** IN-JX915 (pH 5 max. 52.6 % AR) DT_{50} (pH 5, hydrolysis/photolysis): 6.7 / 6.5 days (n = 2) IN-R3273 (pH 5 max. 35.4 % of AR) DT_{50} (pH 5, hydrolysis/photolysis): 32.7 days / stable (n = 2)

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

Quantum yield of direct photo-transformation in water at ☒ > 290 nm	**Cymoxanil:** Φ = 0.0052 / 0.00058 (n = 2) GC-SOLAR: DT_{50} (natural summer light, pH 5, 40 °N): 5.2 / 17.3 days (n = 2) **Metabolites:** GC-SOLAR: IN-JX915: Φ = 0.000504 DT_{50} (natural summer light, pH 5, 40 °N): 21.2 days IN-R3273: Φ = 0.0000241 DT_{50} (natural summer light, pH 5, 40 °N): 4.7 days
Readily biodegradable ‡ (yes/no)	Not readily biodegradable (based on data)

Degradation in water / sediment

Cymoxanil	Distribution (max. in sediment 3.9 % AR after 1 d)									
Water / sediment system	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	0.5 / 1.7	1.00	0.5 / 1.7	1.00	Nc	-	P_{SFO}
Sand	5.3	5.1 / uk	20	1.6 / 5.3	0.99	1.5 / 5.0	0.99	Nc	-	P_{SFO}
Silty clay loam	8.3	7.5 / Ca	20	0.1 / 0.2	1.00	0.1 / 0.2	1.00	Nc	-	P_{SFO}
Silt loam	8.3	7.5 / Ca	20	0.2 / 0.5	1.00	0.2 / 0.5	1.00	Nc	-	P_{SFO}
Geometric mean				**0.3 / 1.0**		**0.3 / 1.0**		**Nc**		

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-U3204	Distribution (max. in water 24.7 % AR after 0.13 d, max. in sediment 0.5 % AR after 3 d)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	0.6 / 2.0	0.92	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Silty clay loam	8.3	7.5 / Ca	20	0.2 / 0.5	0.98	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Silt loam	8.3	7.5 / Ca	20	0.5 / 1.7	0.96	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Geometric mean				**0.4 / 1.2**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

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

IN-W3595	Distribution (max. in water 26.1 % AR after 0.25 d, max. in sediment 2.3 % AR after 1 d)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	3.6 / 12.1	0.95	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Silty clay loam	8.3	7.5 / Ca	20	2.7 / 9.0	0.99	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Silt loam	8.3	7.5 / Ca	20	2.7 / 8.9	0.98	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Geometric mean				**3.0 / 9.9**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-KQ960	Distribution (max. in water 13.0 % AR after 1 d, max. in sediment 5.5 % AR after 30 d)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	154 / 521	0.76	Nc	-	Nc	-	M_{SFO}
Sand	5.3	5.1 / uk	20	45.4 / 151	0.97	Nc	-	Nc	-	M_{SFO}
Silt loam	8.3	7.5 / Ca	20	15.2 / 50.5	0.98	Nc	-	Nc	-	M_{SFO}
Geometric mean				**47.4 / 158**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-T4226	Distribution (max. in water 11.1 % AR after 3 d, max. in sediment 1.0 % AR after 8 d)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	3.9 / 12.9	0.99	Nc	-	Nc	-	M_{SFO}
Sand	5.3	5.1 / uk	20	5.4 / 17.9	0.91	Nc	-	Nc	-	M_{SFO}
Geometric mean				**4.6 / 15.2**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-JX915	Distribution (max. in water 7.2 % AR after 1 d, max. in sediment 1.2 % AR after 1 d)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	2.5 / 8.3	0.79	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Sand	5.3	5.1 / uk	20	1.1 / 3.7	0.96	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Silty clay loam	8.3	7.5 / Ca	20	2.1 / 7.1	0.88	Nc	-	Nc	-	P_{SFO}→M_{SFO}
Silt loam	8.3	7.5 / Ca	20	1.5 / 5.1	0.97	Nc	-	Nc	-	P_{SFO}→M_{SFO}

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

Geometric mean		**1.7 / 5.8**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-R3273	Distribution (max. in water 5.0 % AR after 3 d, max. in sediment 0.5 % AR after 3 d)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	6.0 / 19.9	0.93	Nc	-	Nc	-	M_{SFO}
Sand	5.3	5.1 / uk	20	6.7 / 22.2	0.98	Nc	-	Nc	-	M_{SFO}
Geometric mean				**6.3 / 21.0**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

IN-KP533	Distribution (max. in water 20.5 % AR after 10 d, max. in sediment 6.5 % AR after 1 d)[a]									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Sand	7.4	7.0 / uk	20	2.3 / 7.5	0.96	Nc	-	Nc	-	M_{SFO}
Sand	5.3	5.1 / uk	20	3.0 / 10.0	0.97	Nc	-	Nc	-	M_{SFO}
Geometric mean				**2.6 / 8.7**		**Nc**		**Nc**		**-**

[a] Worst-case assessment, individual amounts of IN-KP533 in two of four water/sediment systems not known (in two systems maximal 8.0 % of AR in the entire system)
[b] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

Metabolite fraction M5	Distribution (max. in water 22.9 % AR after 1 d, max. in sediment 0.0 % AR)									
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	t. °C	$DegT_{50}$ / $DegT_{90}$ (d) whole sys.	r^2	DT_{50} / DT_{90} (d) water	r^2	DT_{50} / DT_{90} (d) sed	r^2	Method of calculation
Silty clay loam	8.3	7.5 / Ca	20	1.2 / 4.0	1.00	Nc	-	Nc	-	M_{SFO}
Silt loam	8.3	7.5 / Ca	20	1.6 / 5.2	1.00	Nc	-	Nc	-	M_{SFO}
Geometric mean				**1.4 / 4.6**		**Nc**		**Nc**		**-**

[a] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$)

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

Mineralization and non extractable residues					
Water / sediment system (aerobic)	pH water phase	pH sed / matrix[a]	Mineralization (end of study)	Non-extractable residues in sed.	Non-extractable residues in sed. (end of the study)
Sand	7.4	7.0 / uk	45.6 %[a] after 127 d	27.4 % after 28 d	23.1 % after 127 d
Sand	5.3	5.1 / uk	39.6 %[a] after 70 d	35.2 % after 15 d	22.8 % after 70 d
Silty clay loam	8.3	7.5 / Ca	75.5 % after 100 d	22.5 % after 30 d	17.9 % after 100 d
Silt loam	8.3	7.5 / Ca	68.5 % after 100 d	29.7 % after 30 d	25.6 % after 100 d

[a] Not including significant formation of non trapped volatiles, likely to be methane
[b] Matrix of pH measurement (uk denotes unknown, Ca denotes $CaCl_2$, K denotes KCl)

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

Cymoxanil
Parameters used in FOCUSsw step 1 and 2

Version control no. of FOCUS calculator:	1.1
Molecular weight (g/mol):	198.2
Water solubility (mg/L):	783
K_{FOC} (L/kg):	43.6
DT_{50} soil (d):	1.3
(note: correct value is 1.2 days; geometric mean, lab, normalized, SFO-DT_{50} re-calculated from FOMC-DT_{90} / 3.32)	
DT_{50} water/sediment system (d):	0.3
DT_{50} water (d):	0.3
DT_{50} sediment (d):	0.3

IN-U3204
Parameters used in FOCUSsw step 1 and 2

Molecular weight (g/mol):	198.2
Water solubility (mg/L):	783
Soil or water metabolite:	Soil/water
K_{OC} (L/kg):	27.9
DT_{50} soil (d):	0.4
(geometric mean of normalized lab data, SFO)	
DT_{50} water/sediment system (d):	0.4
DT_{50} water (d):	0.4
DT_{50} sediment (d):	0.4
Maximum occurrence observed (% molar basis with respect to the parent):	
Soil:	24.7
Water:	24.7
Sediment:	0.5
Total system:	24.7

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

IN-W3595 Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol):	128.1
	Water solubility (mg/L):	783
	Soil or water metabolite:	Soil/water
	K_{OC} (L/kg):	9.2
	DT_{50} soil (d):	2.5
	(worst case of normalized lab data)	
	DT_{50} water/sediment system (d):	3.0
	DT_{50} water (d):	3.0
	DT_{50} sediment (d):	3.0
	Maximum occurrence observed (% molar basis with respect to the parent):	
	Soil:	10.1
	Water:	26.1
	Sediment:	2.3
	Total System:	27.5
IN-KQ960 Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol):	216.2
	Water solubility (mg/L):	783
	Soil or water metabolite:	Soil/water
	K_{OC} (L/kg):	21.6
	DT_{50} soil (d):	11.2
	(worst case of normalized lab data)	
	DT_{50} water/sediment system (d):	47.4
	DT_{50} water (d):	47.4
	DT_{50} sediment (d):	47.4
	Maximum occurrence observed (% molar basis with respect to the parent):	
	Soil:	6.3
	Water:	13.0
	Sediment:	5.5
	Total System:	14.3
IN-T4226 Parameters used in FOCUSsw step 1 and 2	Molecular weight:	142.1
	Water solubility (mg/L):	783
	Soil or water metabolite:	Water
	K_{OC} (L/kg):	17.7
	DT_{50} soil (d):	1000
	(degradation rate in soil unknown)	
	DT_{50} water/sediment system (d):	4.6
	DT_{50} water (d):	4.6
	DT_{50} sediment (d):	4.6
	Maximum occurrence observed (% molar basis with respect to the parent):	
	Soil:	1.7
	Water:	11.1
	Sediment:	1.0
	Total System:	12.0

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

IN-JX915 Parameters used in FOCUSsw step 1 and 2	Molecular weight: 198.2 Water solubility (mg/L): 783 Soil or water metabolite: Soil/water K_{OC} (L/kg): 16.3 (*note: correct value is 16.2 L/kg*) DT_{50} soil (d): 1.0 (*worst case of normalized lab data)* DT_{50} water/sediment system (d): 1.7 DT_{50} water (d): 1.7 DT_{50} sediment (d): 1.7 Maximum occurrence observed (% molar basis with respect to the parent): Soil: 10.9 (*value from soil photolysis used, worst-case assessment*) Water: 7.2 Sediment: 1.2 Total System: 8.5 Photolysis in sterile water, pH 5: 52.6 (*value from photolysis used, worst-case assessment*)
IN-R3273 Parameters used in FOCUSsw step 1 and 2	Molecular weight: 171.2 Water solubility (mg/L): 783 Soil or water metabolite: Water K_{OC} (L/kg): 41.9 (*note: correct value is 42.0 L/kg*) DT_{50} soil (d): 1000 (*degradation rate in soil unknown*) DT_{50} water/sediment system (d): 6.3 DT_{50} water (d): 6.3 DT_{50} sediment (d): 6.3 Maximum occurrence observed (% molar basis with respect to the parent): Soil: 2.4 Water: 5.0 Sediment: 0.5 Total System: 5.0 Photolysis in sterile water, pH 5: 35.4 (*value from photolysis used, worst-case assessment*)

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

IN-KP533 Parameters used in FOCUSsw step 1 and 2	Molecular weight: 160.1 Water solubility (mg/L): 783 Soil or water metabolite: Water K_{OC} (L/kg): 12.9 DT_{50} soil (d): 1000 *(degradation rate in soil unknown)* DT_{50} water/sediment system (d): 2.6 DT_{50} water (d): 2.6 DT_{50} sediment (d): 2.6 Maximum occurrence observed (% molar basis with respect to the parent): Soil: 2.7 Water: 20.5 Sediment: 6.5 Total System: 26.0 *(maximum occurrence in water/sediment system worst-case, individual amounts in two of four water/sediment studies not known, in two studies max. 8.0 % of AR in the entire system)*
Metabolite fraction M5 Parameters used in FOCUSsw step 1 and 2	Molecular weight: 198.2 *(unknown, value of parent used)* Water solubility (mg/L): 783 Soil or water metabolite: Water K_{OC} (L/kg): 9.2 (*K_{OC} unknown, value of IN-W3595 used*) DT_{50} soil (d): 1000 *(degradation rate in soil unknown)* DT_{50} water/sediment system (d): 1.4 DT_{50} water (d): 1.4 DT_{50} sediment (d): 1.4 Maximum occurrence observed (% molar basis with respect to the parent): Soil: 0.0 Water: 22.9 Sediment: 0.0 Total System: 22.9

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

Application rate

Notifier:	DuPont
Crop:	**Potatoes**
Application rate(s):	175 g as/ha
Number of applications:	8
Interval (d):	7
Crop interception:	50 % (average)
Application window:	March – May
Scenarios:	South/North EU
Notifier:	Oxon
Crop:	**Potatoes**
Application rate(s):	120 g as/ha
Number of applications:	4 (North EU), 5 (South EU)
Interval (d):	7
Crop interception:	50 % (average)
Application window:	June – September
Scenarios:	South/North EU
Notifier:	Oxon
Crop:	**Lettuce**
Application rate(s):	240 g as/ha
Number of applications:	4
Interval (d):	7
Crop interception:	70 % (full)
Application window:	June – September
Scenarios:	South EU

FOCUS STEP 1 Scenario	**Potatoes (DuPont)**		
	Substance	PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum
-	Cymoxanil	56.7	24.0
	IN-U3204	14.3	3.88
	IN-W3595	32.4	2.77
	IN-KQ960	33.2	7.05
	IN-T4226	6.66	1.01
	IN-JX915	7.07	1.01
	IN-R3273	13.1	4.84
	IN-KP533	12.7	1.29
	Metabolite fraction M5	0.37	0.02
FOCUS STEP 1	**Potatoes (Oxon)**		

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

	Substance	PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum
North EU	Cymoxanil	38.9	16.5
	IN-U3204	9.80	2.66
	IN-W3595	11.1	0.95
	IN-KQ960	11.4	2.42
	IN-T4226	2.28	0.35
	IN-JX915	4.85	0.70
	IN-R3273	4.49	1.66
	IN-KP533	4.36	0.44
	Metabolite fraction M5	0.25	0.01
South EU	Cymoxanil	38.9	16.5
	IN-U3204	9.80	2.66
	IN-W3595	13.9	1.19
	IN-KQ960	14.2	3.02
	IN-T4226	2.86	0.43
	IN-JX915	4.85	0.70
	IN-R3273	5.61	2.07
	IN-KP533	5.45	0.55
	Metabolite fraction M5	0.25	0.01
FOCUS STEP 1 Scenario	**Lettuce (Oxon)**		
	Substance	PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum
-	Cymoxanil	77.8	33.0
	IN-U3204	19.6	5.32
	IN-W3595	22.2	1.90
	IN-KQ960	22.7	4.83
	IN-T4226	4.57	0.69
	IN-JX915	9.70	1.39
	IN-R3273	8.98	3.32
	IN-KP533	8.72	0.89
	Metabolite fraction M5	0.51	0.03

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

FOCUS STEP 2 Scenario	Potatoes (DuPont)				
	Substance	Single application		Multiple application	
		PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum	PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum
North EU	Cymoxanil	1.61	0.28	0.88	0.29
	IN-U3204	0.40	0.01	0.22	0.01
	IN-W3595	0.29	0.02	0.22	0.02
	IN-KQ960	0.54	0.11	1.57	0.33
	IN-T4226	0.14	0.02	0.61	0.10
	IN-JX915	0.85	0.06	0.49	0.03
	IN-R3273	0.49	0.16	1.21	0.46
	IN-KP533	0.34	0.03	1.06	0.13
	Metabolite fraction M5	0.37	0.01	0.21	0.01
South EU	Cymoxanil	1.61	0.57	1.34	0.58
	IN-U3204	0.40	0.01	0.22	0.01
	IN-W3595	0.36	0.03	0.37	0.03
	IN-KQ960	0.84	0.18	2.41	0.51
	IN-T4226	0.21	0.03	1.15	0.20
	IN-JX915	0.85	0.06	0.49	0.04
	IN-R3273	0.53	0.20	2.11	0.84
	IN-KP533	0.36	0.04	2.04	0.26
	Metabolite fraction M5	0.37	0.01	0.21	0.01
FOCUS STEP 2 Scenario	**Potatoes (Oxon)**				
	Substance	**Single application**		**Multiple application**	
		PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum	PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum
North EU	Cymoxanil	1.10	0.20	0.74	0.20
	IN-U3204	0.27	0.01	0.18	0.01
	IN-W3595	0.20	0.01	0.16	0.01
	IN-KQ960	0.37	0.08	0.86	0.18

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

	IN-T4226	0.10	0.01	0.24	0.04
	IN-JX915	0.58	0.04	0.42	0.03
	IN-R3273	0.34	0.11	0.56	0.21
	IN-KP533	0.23	0.02	0.40	0.05
	Metabolite fraction M5	0.25	0.01	0.18	0.01
South EU	Cymoxanil	1.10	0.29	0.72	0.30
	IN-U3204	0.27	0.01	0.18	0.01
	IN-W3595	0.20	0.02	0.21	0.02
	IN-KQ960	0.47	0.10	1.21	0.26
	IN-T4226	0.12	0.02	0.40	0.07
	IN-JX915	0.58	0.04	0.40	0.03
	IN-R3273	0.34	0.12	0.83	0.31
	IN-KP533	0.23	0.02	0.70	0.09
	Metabolite fraction M5	0.25	0.01	0.17	0.01
FOCUS STEP 2 Scenario	**Lettuce (Oxon)**				
	Substance	**Single application**		**Multiple application**	
		PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum	PEC_{SW} (µg/L) global maximum	PEC_{SED} (µg/kg) global maximum
South EU	Cymoxanil	2.21	0.35	1.49	0.36
	IN-U3204	0.55	0.02	0.37	0.01
	IN-W3595	0.39	0.02	0.33	0.02
	IN-KQ960	0.69	0.15	1.62	0.34
	IN-T4226	0.19	0.03	0.44	0.07
	IN-JX915	1.17	0.08	0.84	0.06
	IN-R3273	0.67	0.21	1.06	0.40
	IN-KP533	0.46	0.03	0.74	0.09
	Metabolite fraction M5	0.51	0.02	0.35	0.01

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

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

Method of calculation and type of study (*e.g.* modelling, field leaching, lysimeter)	Modelling using FOCUS models, with appropriate FOCUSgw scenarios, according to FOCUS guidance Modelling approaches: 1st: Pseudo-application of metabolites (results not shown in the LoEP) 2nd: Metabolites linked to the parent (multi-compartment approach) Model(s) used: PEARL 3.3.3 FOCUS PELMO 3.3.2 Scenarios (list of names): All if appropriate Crops: Potatoes (DuPont) Potatoes (Oxon) Lettuce (Oxon) **Cymoxanil:** Geometric mean SFO-$DT_{50lab, norm.}$: 1.3 d (*Note: correct value is 1.2 days; re-calculated from lab FOMC-DT_{90} / 3.32, normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2, n = 9*) K_{FOC}: 43.6 L/kg (*arithmetic mean, n = 4*) $^1/_n$ = 0.86 (*arithmetic mean, n = 4*) Plant uptake: 0.5 **IN-U3204:** Geometric mean $DT_{50lab, norm.}$: 0.4 d (*normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2, n = 3*) K_{OC}: 27.9 L/kg (*HPLC, n = 1*) $^1/_n$ = 1.0 (*PRAPeR 32 agreed default value*) Maximum occurrence in soil: 24.7 % Formation fraction (from parent): 0.36 (*arith. mean, n = 3*) Plant uptake: 0.0 **IN-W3595** Worst case $DT_{50lab, norm.}$: 2.5 d (*normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2*) K_{OC}: pH depending (*batch, n = 4*) PEARL: $K_{OC-acid}$ = 33.3, $K_{OC-base}$ = 2.3, pK_a = 5.2 PELMO: Scenario specific, individual K_{OC} value depending on top soil pH $^1/_n$ = 1.0 (*PRAPeR 32 agreed default value*) Maximum occurrence in soil: 10.1 % Formation fraction (from parent): 0.15 (*worst case, n = 2*) Plant uptake: 0.0 **IN-JX915:**

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Worst case $DT_{50lab, norm.}$: 1.0 d (*normalisation to 10k Pa or pF2, 20 °C with Q_{10} of 2.2*) K_{OC}: 16.1 kg/L (*Note: correct value is 16.2 kg/L; batch, n = 4*) $^1/_n$ = 1.0 (*PRAPeR 32 agreed default value*) Maximum occurrence in soil: 10.9 % *(soil photolysis)* Formation fraction (from parent): 0.10 (*n = 1*) Plant uptake: 0.0 **IN-KQ960:** Worst case $DT_{50lab, norm.}$: 11.2 d (*normalisation to 10 kPa or pF2, 20 °C with Q_{10} of 2.2*) K_{OC}: 21.6 kg/L (*HPLC, n = 1*) $^1/_n$ = 1.0 (*PRAPeR 32 agreed default value*) Maximum occurrence in soil: 6.3 % Formation fraction (from IN-U3204): 0.16 (*n = 1*) Plant uptake: 0.0

Application rate

Notifier:	DuPont
Crop:	**Potatoes**
Application rate:	175 g/ha
Number of applications:	8
Interval (d):	7
% crop interception:	50 (1^{st} – 4^{th} application) 80 (5^{th} –7^{th} application) 50 (8^{th} application)
Time of 1^{st} application:	7 days after leaf emergence
Notifier:	Oxon
Crop:	**Potatoes**
Application rate:	120 g/ha
Number of applications:	4 (North EU), 5 (South EU)
Interval (d):	7
% crop interception:	50 (1^{st} – 3^{th} application) 80 (4^{th} – 5^{th} application)
Time of 1^{st} application:	28 days pre harvest (North EU) 35 days pre harvest (South EU)
Notifier:	Oxon
Crop:	**Lettuce**
Application rate:	240 g/ha
Number of applications:	4
Interval (d):	7
% crop interception:	70
Time of 1^{st} application:	31 days pre harvest

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

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

2nd approach: Metabolites linked to the parent (multi-compartment approach)

FOCUS PELMO 3.3.2	Scenario	Cymoxanil (µg/L)	Metabolite (µg/L)			
			IN-U3204	IN-W3595	IN-JX915	IN-KQ960
Potatoes (DuPont)	Chateaudun (C)	< 0.001	< 0.001	< 0.001	< 0.001	0.005
	Hamburg (H)	< 0.001	< 0.001	< 0.001	< 0.001	0.037
	Jokioinen (J)	< 0.001	< 0.001	< 0.001	< 0.001	0.033
	Kremsmünster (K)	< 0.001	< 0.001	< 0.001	< 0.001	0.007
	Okehampton (N)	< 0.001	< 0.001	< 0.001	< 0.001	0.016
	Piacenza (P)	< 0.001	< 0.001	0.003	< 0.001	0.017
	Porto (O)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla (S)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva (T)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Potatoes (Oxon)	Chateaudun (C)	< 0.001	< 0.001	< 0.001	< 0.001	0.002
	Hamburg (H)	< 0.001	< 0.001	0.001	< 0.001	0.059
	Jokioinen (J)	< 0.001	< 0.001	0.014	< 0.001	0.040
	Kremsmünster (K)	< 0.001	< 0.001	< 0.001	< 0.001	0.006
	Okehampton (N)	< 0.001	< 0.001	< 0.001	< 0.001	0.020
	Piacenza (P)	< 0.001	< 0.001	0.002	< 0.001	0.052
	Porto (O)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla (S)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva (T)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Lettuce (Oxon)	*Chateaudun (C)*[a]	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*0.002*
	Hamburg (H)[a]	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*0.031*
	Jokioinen (J)[a]	*< 0.001*	*< 0.001*	*0.014*	*< 0.001*	*0.067*
	Kremsmünster (K)[a]	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*0.005*
	Okehampton (N)[a]	*No cabbage (used as surrogate for lettuce)*				
	Piacenza (P)	No cabbage (used as surrogate for lettuce)				
	Porto (O)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla (S)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva (T)	< 0.001	< 0.001	0.006	< 0.001	0.012

[a] Indicative data only, no use in lettuce in North EU intended

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

PEARL 3.3.3	Scenario	Cymoxanil (µg/L)	Metabolite (µg/L)			
			IN-U3204	IN-W3595	IN-JX915	IN-KQ960
Potatoes (DuPont)	Chateaudun (C)	< 0.001	< 0.001	< 0.001	< 0.001	0.036
	Hamburg (H)	< 0.001	< 0.001	< 0.001	< 0.001	0.058
	Jokioinen (J)	< 0.001	< 0.001	< 0.001	< 0.001	0.093
	Kremsmünster (K)	< 0.001	< 0.001	< 0.001	< 0.001	0.044
	Okehampton (N)	< 0.001	< 0.001	< 0.001	< 0.001	0.051
	Piacenza (P)	< 0.001	< 0.001	0.001	< 0.001	0.060
	Porto (O)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla (S)	< 0.001	< 0.001	< 0.001	< 0.001	0.002
	Thiva (T)	< 0.001	< 0.001	< 0.001	< 0.001	0.003
Potatoes (Oxon)	Chateaudun (C)	< 0.001	< 0.001	< 0.001	< 0.001	0.009
	Hamburg (H)	< 0.001	< 0.001	0.001	< 0.001	0.095
	Jokioinen (J)	< 0.001	< 0.001	0.010	< 0.001	**0.108**
	Kremsmünster (K)	< 0.001	< 0.001	< 0.001	< 0.001	0.033
	Okehampton (N)	< 0.001	< 0.001	< 0.001	< 0.001	0.043
	Piacenza (P)	< 0.001	< 0.001	0.002	< 0.001	0.057
	Porto (O)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla (S)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva (T)	< 0.001	< 0.001	< 0.001	< 0.001	0.003
Lettuce (Oxon)	*Chateaudun (C)*[a]	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*0.011*
	Hamburg (H)[a]	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*0.038*
	Jokioinen (J)[a]	*< 0.001*	*< 0.001*	*0.010*	*< 0.001*	***0.150***
	Kremsmünster (K)[a]	*< 0.001*	*< 0.001*	*< 0.001*	*< 0.001*	*0.020*
	Okehampton (N)[a]	*No cabbage (used as surrogate for lettuce)*				
	Piacenza (P)	No cabbage (used as surrogate for lettuce)				
	Porto (O)	< 0.001	< 0.001	< 0.001	< 0.001	0.001
	Sevilla (S)	< 0.001	< 0.001	< 0.001	< 0.001	0.004
	Thiva (T)	< 0.001	< 0.001	0.006	< 0.001	0.083

[a] Indicative data only, no use in lettuce in North EU intended

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Additional runs with a worst case DT_{50} of 7.3 days for cymoxanil (highly conservative risk assessment taking into account pH dependent degradation of cymoxanil):

PEARL 3.3.3	Scenario[a]	Cymoxanil (µg/L)	Metabolite (µg/L)			
			IN-U3204	IN-W3595	IN-JX915	IN-KQ960
Potatoes (DuPont)	Châteaudun (C)	< 0.001	nc	nc	nc	nc
	Hamburg (H)	< 0.001	< 0.001	0.001	< 0.001	0.093
	Jokioinen (J)	< 0.001	< 0.001	0.008	< 0.001	**0.142**
	Kremsmünster (K)	< 0.001	nc	nc	nc	nc
	Okehampton (N)	< 0.001	< 0.001	< 0.001	< 0.001	0.060
	Piacenza (P)	0.001	< 0.001	0.002	< 0.001	0.072
	Porto (O)	< 0.001	nc	nc	nc	nc
	Sevilla (S)	< 0.001	nc	nc	nc	nc
	Thiva (T)	< 0.001	nc	nc	nc	nc
Potatoes (Oxon)	Châteaudun (C)	< 0.001	nc	nc	nc	nc
	Hamburg (H)	< 0.001	< 0.001	0.006	< 0.001	**0.123**
	Jokioinen (J)	< 0.001	< 0.001	0.038	0.001	**0.108**
	Kremsmünster (K)	< 0.001	nc	nc	nc	nc
	Okehampton (N)	< 0.001	< 0.001	0.001	< 0.001	0.071
	Piacenza (P)	0.003	< 0.001	0.005	< 0.001	0.086

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

	Porto (O)	< 0.001	nc	nc	nc	nc
	Sevilla (S)	< 0.001	nc	nc	nc	nc
	Thiva (T)	< 0.001	nc	nc	nc	nc
Lettuce (Oxon)	Châteaudun (C) [b]	< 0.001	nc	nc	nc	nc
	Hamburg (H) [b]	< 0.001	nc	nc	nc	nc
	Jokioinen (J) [b]	< 0.001	nc	nc	nc	nc
	Kremsmünster(K)[b]	< 0.001	nc	nc	nc	nc
	Okehampton (N)[b]	No cabbage (used as surrogate for lettuce)				
	Piacenza (P)	No cabbage (used as surrogate for lettuce)				
	Porto (O)	< 0.001	nc	nc	nc	nc
	Sevilla (S)	< 0.001	nc	nc	nc	nc
	Thiva (T)	0.001	< 0.001	0.010	< 0.001	0.085

[a] This additional calculation was only done for worst case scenarios following the standard FOCUS modelling with a geomean DT_{50} of 1.3 days for cymoxanil (compare to table before)
nc: not calculated
[b] Indicative data only, no use in lettuce in North EU intended

PEC(gw) - from lysimeter

IN-KQ960[a]	1st year	2nd year	3rd year
Annual average (µg/L)	< 0.1	< 0.1	< 0.1

[a] Not analysed for; however, no individual compound expected to exceed 0.1 µg/L in the leachate

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

Direct photolysis in air ‡	Not studied - no data requested
Quantum yield of direct photo-transformation	0.0052 / 0.00058 (n = 2)
Photochemical oxidative degradation in air ‡	DT_{50} of 21.3 hrs derived by the Atkinson model (version 1.91), OH^- concentration (12-hrs day) assumed = 1.5×10^6 cm^{-3}
Volatilisation ‡	Not studied – no data requested
	Not studied – no data requested
Metabolites	Not studied – no data requested

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

PEC (air)

Method of calculation	Expert judgement, based on vapour pressure and dimensionless Henry's Law Constant

PEC$_{(a)}$

Maximum concentration	Negligible

Residues requiring further assessment

Environmental occurring metabolite requiring further assessment by other disciplines (toxicology and ecotoxicology)	Soil:	Cymoxanil, IN-U3204, IN-W3595, IN-JX915 (the latter from soil photolysis)
	Surface Water:	Cymoxanil, IN-U3204, IN-W3595, IN-KQ960, IN-T4226, IN-KP533, metabolite fraction M5, IN-JX915, IN-R3273 (the two latter from water photolysis)
	Sediment:	Cymoxanil
	Groundwater:	Cymoxanil, IN-U3204, IN-W3595, IN-JX915, IN-KQ960
	Air:	Cymoxanil

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

Soil (indicate location and type of study)	No monitoring data
Surface water (indicate location and type of study)	No monitoring data
Ground water (indicate location and type of study)	No monitoring data
Air (indicate location and type of study)	No monitoring data

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

Not readily biodegradable

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

Appendix 1 – list of endpoints

Ecotoxicology

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

Species	Test substance	Time scale	End point (mg/kg bw/day)	End point (mg/kg feed)
Birds ‡				
Colinus virginianus	a.s.	Acute	LD_{50} > 2000	/
Coturnix c. japonica	Cymoxanil 50 WP	Acute	LD_{50} > 2000	/
Anas platyrhynchos	a.s.	Short-term	LD_{50} > 260*	2945
Anas platyrhynchos	a.s.	Long-term	NOAEL 14.9	100
Mammals ‡				
Rattus norvegicus	a.s.	Acute	LD_{50} (m) 760	/
Rattus norvegicus	Cymoxanil 50 WP	Acute	LD_{50} 1200	/
Rattus norvegicus	Tanos	Acute	LD_{50} (f) 566	/
Rattus norvegicus	a.s.	Long-term	NOEL 10.5	150
Additional higher tier studies ‡				
Not required				

* Since food consumption was reduced at dietary concentrations above and below the LC_{50} value, it is not possible to convert the LC_{50} to a reliable daily dose estimate. The highest sub-LC_{50} dietary concentration that caused no significant impact on food consumption was 625 ppm, corresponding to 260 mg a.s./kg bw/day.

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

Lettuce, 4 x 240 g a.s./ha

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
Tier 1 (Birds)				
medium herbivorous	Acute a.s.	29	> 70	10
insectivorous	Acute a.s.	13	> 154	10
medium herbivorous	Acute Cym 50WP	29	> 35	10
insectivorous	Acute Cym 50WP	13	> 127	10
medium herbivorous	Short-term	16	16	10
insectivorous	Short-term	7	36	10
medium herbivorous	Long-term	9	1.7	5
insectivorous	Long-term	2	2.1	5
Higher tier refinement (Birds): actual residues + decline considered for herbivores; focal species considered for insectivores: Yellow Wagtail: feeding on 80 % large + 20 % small insects				

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

Appendix 1 – list of endpoints

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
medium herbivorous	Long-term	2.8	5.4	10
insectivorous	Long-term	2.2	6.9	5
Tier 1 (Mammals)				
medium herbivorous	Acute a.s.	11	72	10
insectivorous	Acute a.s.	2	359	10
medium herbivorous	Acute Cym 50WP	11	57	10
insectivorous	Acute Cym 50WP	2	285	10
medium herbivorous	Long-term	3.2	3.3	5
insectivorous	Long-term	0.8	14	5
Higher tier refinement (Mammals): actual residues + decline considered				
medium herbivorous	Long-term	1	10	5

Potatoes, 8 x 175 g a.s./ha

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
Tier 1 (Birds)				
medium herbivorous	Acute a.s.	23	> 86	10
insectivorous	Acute a.s.	10	> 211	10
medium herbivorous	Short-term	13	20	10
insectivorous	Short-term	5	49	10
medium herbivorous	Long-term	7	2.1	5
insectivorous	Long-term	5	2.8	5
Higher tier refinement (Birds): actual residues + decline considered for herbivores; focal species considered for insectivores: Yellowhammer: feeding on 82 % large + 12 % small insects, PT 0.5; Yellow Wagtail: feeding on 80 % large + 20 % small insects				
medium herbivorous	Long-term	2	7.5	10
Insectivorous 1: Yellowh.	Long-term	0.53	28	5
Insectivorous 2: Y. Wagtail	Long-term	1.57	9.5	5
Tier 1 (Mammals)				
medium herbivorous	Acute a.s.	9	89	10
insectivorous	Acute a.s.	2	492	10
medium herbivorous	Acute Tanos	9	17	10

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

Appendix 1 – list of endpoints

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
insectivorous	Acute Tanos	2	92	10
medium herbivorous	Long-term	3	4	5
insectivorous	Long-term	2	19	5
Higher tier refinement (Mammals): actual residues + decline considered				
medium herbivorous	Long-term	0.7	14	5

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

Test substance	Test organism	Test system / Duration	Endpoints	NOEC [mg/L]	LC_{50} [mg/L]	Nominal/ mean meas.[a]
Cymoxanil	*Lepomis macrochirus*	s / 96 h	Mortality Subleth. effects	17	29	mm
	Oncorhynchus mykiss	f / 90 d	Growth Fry surv. & sublethal effects	0.044 [c]	-	mm
IN-T4226	*Oncorhynchus mykiss*	ss / 96 h	Mortality Subleth. effects	111	> 111	mmL
IN-KQ960	*Oncorhynchus mykiss*	s / 96 h	Mortality Subleth. effects	120	> 120	nL
IN-U3204	*Oncorhynchus mykiss*	ss / 96 h	Mortality Subleth. effects	97	> 97	mmL
IN-W3595	*Oncorhynchus mykiss*	s / 96 h	Mortality Subleth. effects	130	> 130	mmL
Cymoxanil 50 % WP	*Oncorhynchus mykiss*	ss / 96 h	Mortality	36 prod 18.2 a.s.	120 prod 60.6 a.s.	n
Tanos	*Oncorhynchus mykiss*	f / 96 h	Mortality Subleth. effects	0.014 prod	0.0287 prod	n
Cymoxanil	*Daphnia magna*	s / 48 h	Immobility	15	27	mm
	Daphnia magna	ss / 21 d	Mortality Reproduction	0.067	-	mm
IN-T4226	*Daphnia magna*	ss / 48 h	Immobility sublethal effects	116	> 116	mm
IN-KQ960	*Daphnia magna*	s / 48 h	Immobility sublethal effects	n.d.	0.8	mm
	Daphnia magna	ss / 21 d	Mortality Reproduction	0.302	-	mm
IN-U3204	*Daphnia magna*	ss / 48 h	Immobility sublethal effects	53	100	mm
IN-W3595	*Daphnia magna*	s / 48 h	Immobility sublethal effects	126	> 126	mm
Cymoxanil 50 % WP	*Daphnia magna*	ss / 48 h	Immobility	200 prod. 101 a.s.	> 200 prod. > 101 a.s.	nL

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

Appendix 1 – list of endpoints

Test substance	Test organism	Test system / Duration	Endpoints	NOEC [mg/L]	LC_{50} [mg/L]	Nominal/ mean meas.[a]
Tanos	*Daphnia magna*	f / 48 h	Immobility sublethal effects	0.014 prod.	0.0555 prod.	n
Cymoxanil	*Anabaena flos-aquae*	s / 96 h	Growth rate Biomass	0.0652 0.034	0.254 0.122	im
IN-T4226	*Anabaena flos-aquae*	s / 96 h	Growth rate Biomass	20 20	35.9 25.8	n
IN-W3595	*Anabaena flos-aquae*	s / 96 h	Growth rate Biomass	5	19.9 12.7	n
Cymoxanil 50 % WP	*Pseudokirchneriella subcapitata*	s / 72 h	Growth rate Biomass	0.11 ai 0.196 ai	0.41 ai [b] 0.11 ai	twa
DPX-KX007	*Pseudokirchneriella subcapitata*	s / 72 h	Growth rate Biomass	1.25 prod	11.0 prod 4.2 prod	n
Cymoxanil	*Lemna gibba*	s / 14 d	Growth rate Biomass	0.7 0.7	> 0.7 > 0.7	im

f…flow through, im…initial measured, mm…mean measured, mmL…mean measured/limit test, n…nominal, n.d....not derived, nL…nominal/limit test, s…static, ss….semi-static, twa…time weighted average concentration.
[a] This column states if toxicity estimates are based on nominal or measured concentrations.
[b] For classification and labelling of the plant protection product an E_rC_{50} of 4.72 mg Product/L based on nominal concentrations was used.
[c] This value is a NOAEC. The NOAEC was the lowest relevant endpoint from three studies. No NOEC could be derived as effects were seen at the lowest concentration. However, these effects were not considered relevant.

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

Plant protection product Cymoxanil 50 % WP, FOCUS step 1 and step 2

GAP: Lettuce, 4 x 240 g ai/ha (interval between applications: 7 d), South EU. This GAP is worst case compared to the intended use of Cymoxanil 50 % WP in lettuce in North EU or to the use in potatoes.

Test substance	Test organism	Toxicity estimate	Toxicity [mg ai/L]	PEC_{sw} [mg ai/L]		TER		Annex VI trigger
				Step 1	Step 2	Step 1	Step 2	
Cymoxanil	*Lepomis macrochirus*	LC_{50} (96 h)	29	0.0778	0.00221	373	13122	100
	Oncorhynchus mykiss	NOAEC (90 d)	0.044	0.0778	0.00221	**0.6**	20	10
IN-T4226	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 111	0.00457	0.00044	>24289	252273	100
IN-KQ960	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 120	0.0227	0.00162	>5286	> 74074	100
IN-U3204	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 97	0.0196	0.00055	>4949	176364	100
IN-W3595	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 130	0.0222	0.00039	>5856	333333	100
Cymoxanil 50 % WP	*Oncorhynchus mykiss*	LC_{50} (96 h)	60.6	0.0778	0.00221	779	27421	100

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

Appendix 1 – list of endpoints

Test substance	Test organism	Toxicity estimate	Toxicity [mg ai/L]	PEC_{sw} [mg ai/L]		TER		Annex VI trigger
				Step 1	Step 2	Step 1	Step 2	
Cymoxanil	*Daphnia magna*	EC_{50} (48 h)	27	0.0778	0.00221	347	12217	100
	Daphnia magna	NOEC (21 d)	0.067	0.0778	0.00221	**1**	30	10
IN-T4226	*Daphnia magna*	EC_{50} (48 h)	> 116	0.00457	0.00044	25383	263636	100
IN-KQ960	*Daphnia magna*	EC_{50} (48 h)	0.8	0.0227	0.00162	**35**	494	100
	Daphnia magna	NOEC (21 d)	0.302	0.0227	0.00162	13	186	10
IN-U3204	*Daphnia magna*	EC_{50} (48 h)	100	0.0196	0.00055	5102	181818	100
IN-W3595	*Daphnia magna*	EC_{50} (48 h)	> 126	0.0222	0.00039	5676	323077	100
Cymoxanil 50 % WP	*Daphnia magna*	EC_{50} (48 h)	101	0.0778	0.00221	1298	45701	100
Cymoxanil	*Anabaena flos-aquae*	E_rC_{50} (96 h) E_bC_{50} (96 h)	0.254 0.122	0.0778	0.00221	**3** **2**	115 55	10
IN-T4226	*Anabaena flos-aquae*	E_rC_{50} (96 h) E_bC_{50} (96 h)	35.9 25.8	0.00457	0.00044	7856 5646	81591 58636	10
IN-W3595	*Anabaena flos-aquae*	E_rC_{50} (96 h) E_bC_{50} (96 h)	19.9 12.7	0.0222	0.00039	896 572	51026 32564	10
Cymoxanil 50 % WP	*Pseudokirchneriella subcapitata*	E_rC_{50} (72 h) E_bC_{50} (72 h)	0.41 0.11	0.0778	0.00221	**5** **1**	186 50	10
Cymoxanil	*Lemna gibba*	E_rC_{50} (14 d) E_bC_{50} (14 d)	> 0.7 > 0.7	0.0778	0.00221	**9**	317	10

Plant protection product Tanos, FOCUS step 1 and step 2

GAP: Potatoes, 8 x 175 g ai/ha (interval between applications: 7 d), South EU. This GAP is worst case copared to the intended use of Tanos in North EU.

TER values for the active substance:

Test substance	Test organism	Toxicity estimate	Toxicity [mg ai/L]	PEC_{sw} [mg ai/L]		TER		Annex VI trigger
				Step 1	Step 2	Step 1	Step 2	
Cymoxanil	*Lepomis macrochirus*	LC_{50} (96 h)	29	0.0567	0.00161	511	18012	100
	Oncorhynchus mykiss	NOAEC (90 d)	0.044	0.0567	0.00161	**0.8**	27	10
IN-T4226	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 111	0.00666	0.00115	>166 67	96522	100
IN-KQ960	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 120	0.0332	0.00241	>361	>49793	100

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

Appendix 1 – list of endpoints

Test substance	Test organism	Toxicity estimate	Toxicity [mg ai/L]	PEC_{sw} [mg ai/L]		TER		Annex VI trigger
				Step 1	Step 2	Step 1	Step 2	
						4		
IN-U3204	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 97	0.0143	0.00040	>6783	242500	100
IN-W3595	*Oncorhynchus mykiss*	LC_{50} (96 h)	> 130	0.0324	0.00037	>4012	>351351	100
Cymoxanil	*Daphnia magna*	EC_{50} (48 h)	27	0.0567	0.00161	476	16770	100
	Daphnia magna	NOEC (21 d)	0.067	0.0567	0.00161	**1**	42	10
IN-T4226	*Daphnia magna*	EC_{50} (48 h)	> 116	0.00666	0.00115	17417	100870	100
IN-KQ960	*Daphnia magna*	EC_{50} (48 h)	0.8	0.0332	0.00241	24	332	100
	Daphnia magna	NOEC (21 d)	0.302	0.0332	0.00241	**9**	125	10
IN-U3204	*Daphnia magna*	EC_{50} (48 h)	100	0.0143	0.00040	6993	250000	100
IN-W3595	*Daphnia magna*	EC_{50} (48 h)	> 126	0.0324	0.00037	3889	>340541	100
IN-JX915	*Daphnia magna*	EC_{50} (48 h)	0.27	0.00707	0.00085	38	318	100
IN-R3273	*Daphnia magna*	EC_{50} (48 h)	0.27	0.0131	0.00211	21	128	100
IN-KP533	*Daphnia magna*	EC_{50} (48 h)	0.27	0.0127	0.00204	21	132	100
Metabolite fraction M5	*Daphnia magna*	EC_{50} (48 h)	0.27	0.00037	0.00037	730	730	100
Cymoxanil	*Anabaena flos-aquae*	E_rC_{50} (96 h) E_bC_{50} (96 h)	0.254 0.122	0.0567	0.00161	**4** **2**	158 76	10
IN-T4226	*Anabaena flos-aquae*	E_rC_{50} (96 h) E_bC_{50} (96 h)	35.9 25.8	0.00666	0.00115	5390 3874	31217 22435	10
IN-W3595	*Anabaena flos-aquae*	E_rC_{50} (96 h) E_bC_{50} (96 h)	19.9 12.7	0.0324	0.00037	614 392	53784 34324	10
Cymoxanil	*Lemna gibba*	E_rC_{50} (14 d) E_bC_{50} (14 d)	> 0.7 > 0.7	0.0567	0.00161	12 12	435 435	10

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

Appendix 1 – list of endpoints

Ganzelmeier drift input of the plant protection product Tanos:

TER values for the active substance:

Test substance	Test organism	Toxicity estimate	Toxicity [mg prod/L]	Buffer zone	Drift [%]	PEC_{sw} [mg prod./L]	TER	Annex VI trigger
Tanos	*Oncorhynchus mykiss*	LC_{50} (96 h)	0.0287	0 m	2.77	0.006463	4.4	100
				20 m	0.15	0.000350	82	
				30 m	0.10	0.000233	123	
	Daphnia magna	EC_{50} (48 h)	0.0555	0 m	2.77	0.006463	9	100
				20 m	0.15	0.000350	159	
DPX-KX007	*Pseudokirchneriella subcapitata*	NOEC	1.25	0 m	2.77	0.006463	193	10

Bioconcentration		
$logP_{O/W}$	Active substance	log $P_{O/W}$ = 0.59-0.67 at 20 °C
	IN-KQ960	**-1.64 (KOWWIN)**
	IN-U3204	**0.39 (KOWWIN)**
	IN-T4226	**0.16 (KOWWIN)**
	IN-JX915	**-0.37 (KOWWIN)**
	IN-R3273	**2.07 (KOWWIN)**
	IN-KP533	**-1.29 (KOWWIN)**
	IN-W3595	**4.27 (KOWWIN)**
Bioconcentration factor (BCF)[1] ‡	Not demanded	
Annex VI Trigger for the bioconcentration factor		
Clearance time (days) (CT_{50})		
(CT_{90})		
Level and nature of residues (%) in organisms after the 14 day depuration phase		

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

Appendix 1 – list of endpoints

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

Test substance	Acute oral toxicity (LD_{50} µg/bee)	Acute contact toxicity (LD_{50} µg/bee)
a.s. ‡	> 85.29	> 100
Preparation Cymoxanil/Famoxadone 52.5WG	> 186 [formulation] > 55.5 [a.s.]	> 200 [formulation] > 60 [a.s.]
Field or semi-field tests		
not required		

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

lettuce, 4 x 240 g a.s./ha

Test substance	Route	Hazard quotient	Annex VI Trigger
a.s.	Contact	< 2.8	50
a.s.	oral	< 2.4	50

potatoes, 8 x 175 g a.s./ha

Test substance	Route	Hazard quotient	Annex VI Trigger
a.s.	Contact	< 2.1	50
a.s.	oral	< 1.8	50

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

Laboratory tests with standard sensitive species

Species	Test Substance	End point	Effect (LR_{50})
Typhlodromus pyri ‡	Cymoxanil 50 WP	Mortality	> 480 g a.s./ha
Aphidius rhopalosiphi ‡	Cymoxanil 50 WP	Mortality	> 480 g a.s./ha

lettuce, 4 x 240 g a.s./ha

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

Appendix 1 – list of endpoints

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field[1]	Trigger
Cymoxanil 50 WP	*Typhlodromus pyri*	> 480 [a.s.]	< 1.35	< 0.02	2
Cymoxanil 50 WP	*Aphidius rhopalosiphi*	> 480 [a.s.]	< 1.35	< 0.02	2

[1] indicate distance assumed to calculate the drift rate
potatoes, 8 x 175 g a.s./ha

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field[1]	Trigger
Cymoxanil 50 WP	*Typhlodromus pyri*	> 480 [a.s.]	< 1.28	< 0.02	2
Cymoxanil 50 WP	*Aphidius rhopalosiphi*	> 480 [a.s.]	< 1.28	< 0.02	2

[1] 1 m distance

Further laboratory, extended laboratory and semi-field studies ‡

Species	Life stage	Test substance, substrate and duration	Dose (g a.s./ha) [1]	End point	% effect[3]	Trigger value
Aphidius rhopalosiphi	adults	extended lab, Cymoxanil/F 20SC, leaves 48 h + 10 d	264 3 x 264 6 x 264	mortality fecundity mortality fecundity mortality fecundity	0 34 33 35 25 23	50 %
Aphidius colemani	adults	semi-field, 12 d Cymoxanil/F 50WG, potato leaves	179 3 x 179 6 x 179 9 x 179	parasitation parasitation parasitation parasitation	-7 25 / 26[2] 5 / 52[2] -43	50 %
Trichogramma cacoeciae	adults	extended lab, Cymoxanil/F 52. 5WG, grape leaves 8 d	120 3 x 120 6 x 120 9 x 120 12 x 120	reproduction reproduction reproduction reproduction reproduction	-11.7 -50.5 13.1 8.1 -5.6	50 %
Typhlodromus pyri	protony mphs	lab, 21 d Cymoxanil/F 20SC, glass plate	132	mortality reproduction	98.9 100	50 %

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

Appendix 1 – list of endpoints

Species	Life stage	Test substance, substrate and duration	Dose (g a.s./ha) [1]	End point	% effect[3]	Trigger value
Typhlodromus pyri	protony mphs	extended lab, Cymoxanil/F 20SC, leaves 14 d	120 3 x 120 6 x 120 9 x 120 12 x 120	mortality benef.capacity mortality benef.capacity mortality benef.capacity mortality benef.capacity mortality benef.capacity	22.5 24.8 40 28.6 37.5 27.5 23.9 23.9 21.2 16.5	50 %
Typhlodromus pyri	protony mphs	extended lab, Cymoxanil/F 20SC, leaves 14 d	1-6 x 159	mortality benef.capacity	25.3 65-89	50 %
Typhlodromus pyri	protony mphs	extended lab, Cymoxanil/F 52. 5WG, leaves 14 d	1-6 x 134 1-6 x 268	mortality benef.capacity mortality benef.capacity	34.7 85-100 42.4 100	50 %
Chrysoperla carnea	larvae	lab, 9 w Cymoxanil 50WP glass plate	480	mortality fecundity	7.1 9	50 %
Chrysoperla carnea	larvae	lab, 21+28 d Cymoxanil/F 20SC, glass plate	132	mortality fecundity	-7.3 17.3	50 %
Chrysoperla carnea	larvae	lab, 21+28 d Cymoxanil/F 50WG, glass plate	186	mortality fecundity	-8.4 4.1	
Chrysoperla carnea	larvae	extended lab, Cymoxanil/F 50 WG leaves 10 d	179 3 x 179 6 x 179	mortality mortality mortality	23 0 13	50 %
Episyrphus balteatus	larvae to adults	lab, 22 d Cymoxanil/F 50WG, glass plate	186	mortality fecundity	1.2 33.5	50 %

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

Appendix 1 – list of endpoints

Species	Life stage	Test substance, substrate and duration	Dose (g a.s./ha) [1]	End point	% effect[3]	Trigger value
Episyrphus balteatus	larvae to adults	extended lab, Cymoxanil/F 20SC, leaves 3 w	289 3 x 289 6 x 289	mortality fecundity mortality fecundity mortality fecundity	1.1 33.4 -3.4 26.3 -0.3 23.2	50 %
Episyrphus balteatus	larvae to adults	extended lab, Cymoxanil/F 50 WG leaves 4 w	3 x 186 6 x 186	mortality fecundity mortality fecundity	0 69 7 50	50 %
Episyrphus balteatus	larvae to adults	semi-field, 14 d Cymoxanil/F 50WG, buck-wheat plants	181 363	mortality reproduction mortality reproduction	-1.3 -58.1 2.8 -94.6	50 %
Poecilus cupreus	adults	lab, 14 d Cymoxanil 50WP, glass plate	480	mortality	0	50 %
Poecilus cupreus	adults	lab, 14 d Cymoxanil/F 20SC, glass plate	132	mortality	0	50 %
Poecilus cupreus	adults	lab, 14 d Cymoxanil/F 50WG, glass plate	186	mortality	0	50 %
Poecilus cupreus	adults	extended lab, Cymoxanil/F 50 WG, soil 7 d	186 4 x 186 6 x 186 9 x 186	mortality mortality mortality mortality	0 0 0 0	50 %
Poecilus cupreus	adults	semi-field, 7 d Cymoxanil/F 20SC, silty sand soil	289 3 x 289 6 x 289	mortality mortality mortality	11.3 18.9 7.5	50 %
Aleochara bilineata	larvae to adults	lab, 10 w Cymoxanil/F 50WG, quartz sand	186	mortality parasitic capacity	7.5 2.6	50 %

F = Famoxadone
[1] initial residues
[2] site 1/site 2
[3] positive percentages relate to adverse effects

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

Appendix 1 – list of endpoints

Field tests
Typhlodromus pyri : treatment of 6 x 120 – 168 g a.s./ha (Cymoxanil/F 52.5WG), vineyard: transient reductions in abundance (mites + eggs), no long-term effect *Typhlodromus pyri* : treatment of 5 x 240 or 4 x 480 g a.s./ha (Cymoxanil/F 50WP), vineyard: no adverse effects on abundance (mites + eggs)

Effects on earthworms, other soil macro-organisms and soil micro-organisms (Annex IIA points 8.4 and 8.5. Annex IIIA, points, 10.6 and 10.7)

Test organism	Test substance	Time scale	End point[1]
Earthworms			
Eisenia foetida	a.s. ‡	Acute 14 days	LC_{50} > 1000 mg a.s./kg d.w.soil
Eisenia foetida	Preparation Cymoxanil 50 WP	Acute	LC_{50} > 505 mg a.s./kg d.w.soil
Eisenia foetida	Preparation Cymoxanil/Famoxadone 52.5 WP	Acute	LC_{50} 297 mg a.s./kg d.w.soil
Eisenia foetida	Preparation Cymoxanil/Famoxadone 50 WG	Chronic	NOEC 6.6 mg a.s./kg soil dw
Other soil macro-organisms			
Soil mite	a.s. ‡		
/	Preparation		
Collembola			
/	a.s. ‡	Chronic	NOEC mg a.s./kg d.w.soil (mg a.s/ha)
Soil micro-organisms			
Nitrogen mineralisation	a.s. ‡		- 15.5 % effect at day 28 at 1.6 mg a.s./kg d.w.soil (1.2 kg a.s./ha)
	Cymoxanil/Famoxadone 20SC		- 0.3 % effect at day 28 at 0.016 mL prod./kg d.w.soil (1.44 kg a.s./ha)
Carbon mineralisation	a.s. ‡		- 8.4 % effect at day 28 at 1.6 mg a.s./kg d.w.soil (1.2 kg a.s./ha)
	Cymoxanil/Famoxadone 20SC		- 10 % effect at day 28 at 0.016 mL prod./kg d.w.soil (1.44 kg a.s./ha)

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

Appendix 1 – list of endpoints

Test organism	Test substance	Time scale	End point[1]
Field studies[2]			
not required			

[1] indicate where end point has been corrected due to log Pow >2.0 (e.g. LC_{50corr})
[2] litter bag, field arthropod studies not included at 8.3.2/10.5 above, and earthworm field studies

Toxicity/exposure ratios for soil organisms

Lettuce, 4 x 240 g a.s./ha

Test organism	Test substance	Time scale	Soil PEC[2] (mg/kg)	TER	Trigger
Earthworms					
Eisenia foetida	a.s. ‡	Acute	0.184	> 5435	10
Eisenia foetida	Cymoxanil 50 WP	Acute	0.184	> 2745	10
Eisenia foetida	Cymoxanil/Famoxadone 50 WG	Chronic	0.184	36	5
Other soil macro-organisms: no studies required					
Soil mite	a.s. ‡			/	
Collembola	a.s. ‡			/	

Potatoes, 5 x 120 g a.s./ha (Oxon)

Test organism	Test substance	Time scale	Soil PEC[2] (mg/kg)	TER	Trigger
Earthworms					
Eisenia foetida	a.s. ‡	Acute	0.159	> 6289	10
Eisenia foetida	Cymoxanil 50 WP	Acute	0.159	> 3176	10
Eisenia foetida	Cymoxanil/Famoxadone 50 WG	Chronic	0.159	42	5
Other soil macro-organisms: no studies required					
Soil mite	a.s. ‡			/	
Collembola	a.s. ‡			/	

Potatoes, 8 x 175 g a.s./ha (DuPont)

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

Appendix 1 – list of endpoints

Test organism	Test substance	Time scale	Soil PEC[2] (mg/kg)	TER	Trigger
Earthworms					
Eisenia foetida	a.s. ‡	Acute	0.239	> 4184	10
Eisenia foetida	Cymoxanil/Famoxadone 52.5 WP	Acute	0.239	1241	10
Eisenia foetida	Cymoxanil/Famoxadone 50 WG	Chronic	0.239	28	5
Other soil macro-organisms: no studies required					
Soil mite	a.s. ‡			/	
Collembola	a.s. ‡			/	

Effects on non target plants (Annex IIA, point 8.6, Annex IIIA, point 10.8)

Preliminary screening data

Not required

Laboratory dose response tests

Most sensitive species	Test substance	ER_{50} (g/ha) vegetative vigour	ER_{50} (g/ha) emergence	Exposure[1] (g/ha)	TER	Trigger
lettuce						
Allium cepa	Cymoxanil 50 WP	> 240 g [a.s.]	/	18 [a.s.]	> 13	5
potatoes						
Allium cepa	Cymoxanil 50 WP	> 240 g [a.s.]	/	17 [a.s.]	> 14	5

[1] based on Ganzelmeier drift data at 1 m distance

Additional studies (e.g. semi-field or field studies)

not required

Effects on biological methods for sewage treatment (Annex IIA 8.7)

Test type/organism	end point
Activated sludge	19.4 mg a.s./L

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

Appendix 1 – list of endpoints

Ecotoxicologically relevant compounds (consider parent and all relevant metabolites requiring further assessment from the fate section)

Compartment	
soil	Parent (cymoxanil)
water	Parent (cymoxanil), metabolite IN-KQ960
sediment	Parent (cymoxanil)
groundwater	Parent (cymoxanil)

Classification and proposed labelling with regard to ecotoxicological data (Annex IIA, point 10 and Annex IIIA, point 12.3)

	RMS/peer review proposal
Active substance	N, R50/53

	RMS/peer review proposal
Preparation (Cymoxanil 50 % WP)	N, R51/53
Preparation (TANOS)	N, R50/53

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

Appendix 2 – abbreviations used in the list of endpoints

APPENDIX 2 – ABBREVIATIONS USED IN THE LIST OF ENDPOINTS

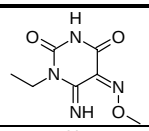
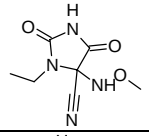
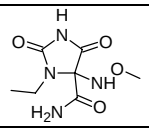
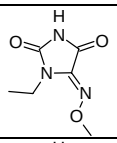
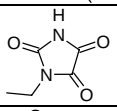
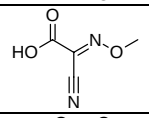
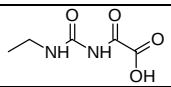
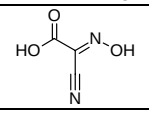
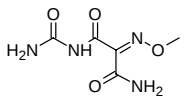
ADI	acceptable daily intake
AOEL	acceptable operator exposure level
ARfD	acute reference dose
a.s.	active substance
bw	body weight
CA	Chemical Abstract
CAS	Chemical Abstract Service
CIPAC	Collaborative International Pesticide Analytical Council Limited
d	day
DAR	draft assessment report
DM	dry matter
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

Appendix 2 – abbreviations used in the list of endpoints

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)

APPENDIX 3 – USED COMPOUND CODE(S)

Code/Trivial name	Chemical name	Structural formula
IN-U3204	1-ethyl-6-iminodihydropyrimidine-2,4,5(3H)-trione 5-(O-methyloxime) (E-configuration)	
IN-JX915	3-ethyl-4-(methoxyamino)-2,5-dioxoimidazolidine-4-carbonitrile (stereomer racemate)	
IN-KQ960	3-ethyl-4-(methoxyamino)-2,5-dioxoimidazolidine-4-carboxamide (stereomer racemate)	
IN-R3273	1-ethylimidazolidine-2,4,5-trione 5-(O-methyloxime) (E-configuration)	
IN-T4226	1-ethylimidazolidine-2,4,5-trione	
IN-W3595	Cyano(methoxyimino)acetic acid (E-configuration)	
IN-KP533	{[(ethylamino)carbonyl]amino}(oxo)acetic acid	
IN-R3274	Cyano(hydroxyimino)acetic acid	
Metabolite fraction M5	N-(aminocarbonyl)-2-(methoxyimino)malonamide (E-configuration)	

Remark: Metabolite fraction M5 comprises at least 2 compounds, one is considered to be represented by the structure shown in the table, the other compound(s) is/are unknown