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## Peer review of the pesticide risk assessment of the active substance fish oil

European Food Safety Authority (EFSA),  
Fernando Alvarez, Maria Arena, Domenica Auteri, Jorge Borroto, Alba Brancato,  
Luis Carrasco Cabrera, Anna Federica Castoldi, Arianna Chiusolo, Angelo Colagiorgi,  
Mathilde Colas, Federica Crivellente, Chloe De Lentdecker, Mark Egsmose, Gabriella Fait,  
Varvara Gouliarmou, Franco Ferilli, Luna Greco, Alessio Ippolito, Frederique Istace,  
Samira Jarrah, Dimitra Kardassi, Aude Kienzler, Roberto Lava, Renata Leuschner,  
Alberto Linguadoca, Christopher Lythgo, Oriol Magrans, Iris Mangas, Ileana Miron,  
Tunde Molnar, Laura Padovani, Juan Manuel Parra Morte, Ragnor Pedersen, Hermine Reich,  
Miguel Santos, Rositsa Serafimova, Rachel Sharp, Csaba Szentes, Andrea Terron,  
Manuela Tiramani, Benedicte Vagenende and Laura Villamar-Bouza

### Abstract

The conclusions of EFSA following the peer review of the initial risk assessments carried out by the competent authorities of the rapporteur Member State the Czech Republic and co-rapporteur Member State France for the pesticide active substance fish oil and the considerations as regards the inclusion of the substance in Annex IV of Regulation (EC) No 396/2005 are reported. The context of the peer review was that required by Commission Implementing Regulation (EU) No 844/2012, as amended by Commission Implementing Regulation (EU) No 2018/1659. The conclusions were reached on the basis of the evaluation of the representative uses of fish oil as a game repellent on deciduous and coniferous trees in forestry. The reliable end points, appropriate for use in regulatory risk assessment, are presented. Missing information identified as being required by the regulatory framework is listed.

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**Correspondence:** pesticides.peerreview@efsa.europa.eu

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## Summary

Commission Implementing Regulation (EU) No 844/2012, as amended by Commission Implementing Regulation (EU) No 2018/1659, lays down the procedure for the renewal of the approval of active substances submitted under Article 14 of Regulation (EC) No 1107/2009. The list of those substances is established in Commission Implementing Regulation (EU) No 686/2012 as amended by Commission Implementing Regulation (EU) No 2016/183. Fish oil is one of the active substances listed in that Regulation.

In accordance with Article 1 of Regulation (EU) No 844/2012, the rapporteur Member State (RMS), the Czech Republic, and co-rapporteur Member State (co-RMS), France, received an application from Flügel GmbH for the renewal of approval of the active substance fish oil. In addition, the applicant submitted an application for inclusion of the substance in Annex IV of Regulation (EC) No 396/2005.

An initial evaluation of the dossier on fish oil was provided by the RMS in the renewal assessment report (RAR) and subsequently, a peer review of the pesticide risk assessment on the RMS evaluation was conducted by EFSA in accordance with Article 13 of Commission Implementing Regulation (EU) No 844/2012, as amended by Commission Implementing Regulation (EU) No 2018/1659. The following conclusions are derived.

The uses of fish oil according to the representative uses as field applications by painting and by low pressure hand-held spraying on deciduous and coniferous trees in forestry in the central EU regulatory zone (CEU), result in a sufficient game repellent efficacy.

The assessment of the data package revealed no issues that need to be included as critical areas of concern or issues not finalised with respect to the **identity, physical, chemical and technical properties** of fish oil or the representative formulation.

For the **mammalian toxicology**, no critical area of concern or issue not finalised were identified for fish oil.

In the **residues section**, an assessment was conducted for the representative uses and in parallel for authorised uses according to Article 12 of Regulation (EC) No 396/2005. Considering the proposed Good Agricultural Practices (GAPs), residues from the use of fish oil are not expected. With regard to the five assessment criteria according to the Commission guidance SANCO/11188/2013 Rev. 2 (European Commission, 2015) for potential inclusion in Annex IV of Regulation (EC) No 396/2005, two criteria were considered to be met for fish oil.

The data available on **environmental fate and behaviour** were sufficient to carry out the required environmental exposure assessments at EU level for the representative uses assessed.

A low risk to all groups of **non-target organisms** was concluded for the representative uses.

Fish oil does not meet the criteria for **endocrine disruption** for humans and non-target organisms according to points 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009, as amended by Commission Regulation (EU) 2018/605.

## Table of contents

Abstract.....	1
Summary.....	3
Background .....	5
The active substance and the formulated product.....	6
Conclusions of the evaluation .....	7
1. Identity, physical/chemical/technical properties and methods of analysis .....	7
2. Mammalian toxicity.....	8
3. Residues.....	8
4. Environmental fate and behaviour .....	9
5. Ecotoxicology.....	9
6. Endocrine-disrupting properties .....	10
7. Overview of the risk assessment of compounds listed in residue definitions triggering assessment of effects data for the environmental compartments (Tables 1–4) .....	10
8. Particular conditions proposed to be taken into account by risk managers .....	11
9. Concerns and related data gaps .....	11
9.1. Concerns and related data gaps for the representative uses evaluated .....	11
9.1.1. Issues that could not be finalised .....	11
9.1.2. Critical areas of concern.....	12
9.1.3. Overview of the concerns identified for each representative use considered (Table 5).....	12
10. List of other outstanding issues .....	13
References.....	14
Abbreviations.....	15
Appendix A – Consideration of cut-off criteria for fish oil according to Annex II of Regulation (EC) No 1107/2009 of the European Parliament and of the Council.....	16
Appendix B – List of end points for the active substance and the representative formulation.....	17
Appendix C – Used compound codes .....	18

## Background

Commission Implementing Regulation (EU) No 844/2012<sup>1</sup>, as amended by Commission Implementing Regulation (EU) No 2018/1659<sup>2</sup>, (hereinafter referred to as 'the Regulation'), lays down the provisions for the procedure of the renewal of the approval of active substances, submitted under Article 14 of Regulation (EC) No 1107/2009<sup>3</sup>. This regulates for the European Food Safety Authority (EFSA) the procedure for organising the consultation of Member States, the applicant(s) and the public on the initial evaluation provided by the rapporteur Member State (RMS) and/or co-rapporteur Member State (co-RMS) in the renewal assessment report (RAR), and the organisation of an expert consultation where appropriate.

In accordance with Article 13 of the Regulation, unless formally informed by the European Commission that a conclusion is not necessary, EFSA is required to adopt a conclusion on whether the active substance can be expected to meet the approval criteria provided for in Article 4 of Regulation (EC) No 1107/2009 within 5 months from the end of the period provided for the submission of written comments, subject to an extension of an additional 3 months where additional information is required to be submitted by the applicant(s) in accordance with Article 13(3). Furthermore, in accordance with Article 13(3a), where the information available in the dossier is not sufficient to conclude the assessment on whether the approval criteria for endocrine disruption are met, additional information can be requested to be submitted in a period of minimum 3 months, not exceeding 30 months, depending on the type of information requested.

In accordance with Article 1 of the Regulation, the RMS the Czech Republic and co-RMS France received an application from Flügel GmbH for the renewal of approval of the active substance fish oil. In addition, the applicant submitted an application for inclusion of the substance in Annex IV of Regulation (EC) No 396/2005.<sup>4</sup> Complying with Article 8 of the Regulation, the RMS checked the completeness of the dossier and informed the applicant, the co-RMS (France), the European Commission and EFSA about the admissibility.

The RMS provided its initial evaluation of the dossier on fish oil in the RAR, which was received by EFSA on 10 September 2020 (Czech Republic, 2020). Furthermore, this conclusion also addresses the assessment required from EFSA under Article 12 of Regulation (EC) No 396/2005. On 27 November 2020, EFSA invited the Member States to submit their Good Agricultural Practices (GAPs) that are authorised nationally, in the format of specific GAP forms. All the GAPs were collected by EFSA and they are made publicly available as a background document to this conclusion, in the format of a specific GAP overview file.

In accordance with Article 12 of the Regulation, EFSA distributed the RAR to the Member States and the applicant, Flügel GmbH, for consultation and comments on 25 November 2020. EFSA also provided comments. In addition, EFSA conducted a public consultation on the RAR. EFSA collated and forwarded all comments received to the European Commission on 27 January 2021. At the same time, the collated comments were forwarded to the RMS for compilation and evaluation in the format of reporting table. In addition, the applicant was invited to respond to the comments received. The comments and the applicant's response were evaluated by the RMS in column 3.

The need for expert consultation and the necessity for additional information to be submitted by the applicant in accordance with Article 13(3) of the Regulation were considered in a telephone conference between EFSA, the RMS on 26 March 2021. On the basis of the comments received, the applicant's response to the comments and the RMS's evaluation thereof, it was concluded that additional information should be requested from the applicant, and that there was no need to conduct an expert consultation.

<sup>1</sup> Commission Implementing Regulation (EU) No 844/2012 of 18 September 2012 setting out the provisions necessary for the implementation of the renewal procedure for active substances, as provided for in Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market. OJ L 252, 19.9.2012, p. 26–32.

<sup>2</sup> Commission Implementing Regulation (EU) No 2018/1659 of 7 November 2018 amending Implementing Regulation (EU) No 844/2012 in view of the scientific criteria for the determination of endocrine disrupting properties introduced by Regulation (EU) 2018/605.

<sup>3</sup> Regulation (EC) No 1107/2009 of 21 October 2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC. OJ L 309, 24.11.2009, p. 1–50.

<sup>4</sup> Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC. OJ L 70, 16.3.2005, p. 1–16.

The outcome of the telephone conference, together with EFSA's further consideration of the comments, is reflected in the conclusions set out in column 4 of the reporting table. All points that were identified as unresolved at the end of the comment evaluation phase and which required further consideration were compiled by EFSA in the format of an evaluation table.

The conclusions arising from the consideration by EFSA, and as appropriate by the RMS, of the points identified in the evaluation table, together with the outcome of the expert consultation and the written consultation on the assessment of additional information, where these took place, were reported in the final column of the evaluation table.

A final consultation on the conclusions arising from the peer review of the risk assessment and on the Article 12 maximum residue level (MRL) review of Regulation (EC) No 396/2005 took place with Member States via a written procedure in November–December 2021.

This conclusion report summarises the outcome of the peer review of the risk assessment of the active substance and the representative formulation, evaluated on the basis of the representative use (s) of fish oil as a game repellent on deciduous and coniferous trees in forestry by painting and by low pressure hand-held spraying on individual trees, as proposed by the applicant. In accordance with Article 12(2) of Regulation (EC) No 1107/2009, risk mitigation options identified in the RAR and considered during the peer review, if any, are presented in the conclusion. Furthermore, this conclusion also addresses the assessment required from EFSA under Article 12 of Regulation (EC) No 396/2005. On 27 November 2020 EFSA invited the Member States to submit their GAPs that are authorised nationally, in the format of specific GAP forms. All the GAPs were collected by EFSA and they are made publicly available as a background document to this conclusion, in the format of a specific GAP overview file.

A list of the relevant end points for the active substance and the formulation is provided in Appendix B. In addition, the considerations as regards the cut-off criteria for fish oil according to Annex II of Regulation (EC) No 1107/2009 are summarised in Appendix A.

A key supporting document to this conclusion is the peer review report (EFSA, 2021a,b), which is a compilation of the documentation developed to evaluate and address all issues raised in the peer review, from the initial commenting phase to the conclusion. The peer review report comprises the following documents, in which all views expressed during the course of the peer review, including minority views, where applicable, can be found:

- the comments received on the RAR;
- the reporting table (26 March 2020);
- the evaluation table (10 December 2021);
- the comments received on the assessment of the additional information (where relevant);
- the comments received on the draft EFSA conclusion;
- The GAP overview file.

Given the importance of the RAR, including its revisions (Czech Republic, 2021), and the peer review report, both documents are considered as background documents to this conclusion and thus are made publicly available.

It is recommended that this conclusion and its background documents would not be accepted to support any registration outside the European Union (EU) for which the applicant has not demonstrated that it has regulatory access to the information on which this conclusion report is based.

## The active substance and the formulated product

The main constituents of the active substance fish oil are monoglycerides, diglycerides and triglycerides of fatty acids, free fatty acids, cholesterol and polymeric triglycerides.

The representative formulated product for the evaluation was 'FLU17516' a gel for direct application (GD) containing 120 g/kg fish oil and 178 g/kg calcium carbonate.

The representative uses evaluated comprise field applications by painting and by low pressure hand-held spraying on individual deciduous and coniferous trees in forestry as a game repellent in the central EU regulatory zone (CEU). Full details of the GAP can be found in the list of end points in Appendix B.

Data were submitted to conclude that the use of fish oil according to the representative uses proposed at CEU level results in a sufficient game repellent efficacy, following the guidance document SANCO/2012/11251-rev. 4 (European Commission, 2014b).

A data gap in the section on residues has been identified for a proper detailed evaluation by RMS of a search of the scientific peer-reviewed open literature on the active substance and its relevant metabolites, dealing with side effects on health, the environment and non-target species and published within the 10 years before the date of submission of the dossier, to be conducted and reported in accordance with EFSA guidance on the submission of scientific peer-reviewed open literature for the approval of pesticide active substances under Regulation (EC) No 1107/2009 (EFSA, 2011)<sup>5</sup>.

## Conclusions of the evaluation

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

The following guidance document was followed in the production of this conclusion (European Commission, 2000).

The proposed minimum purity specification for fish oil was based on batch data from industrial scale production. The proposed specification of the active substance as manufactured is min. 1,000 g/kg (i.e. 100% fish oil). Fish oil may contain environmental contaminants that are set out in maximum levels according to Commission Directive 2002/32/EC.<sup>6</sup> Consequent to this, it is proposed the following are the relevant impurity levels proportionate to a fish oil with a moisture content of 12%: 5 ng/kg of sum of polychlorinated dibenzo-pardioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) expressed in World Health Organization (WHO) toxic equivalent<sup>7</sup>; 20 ng/kg of sum of PCDDs, PCDFs and dioxin like polychlorinated biphenyls (PCBs) expressed in WHO toxic equivalents<sup>5</sup>; 0.5 mg/kg for mercury; 2 mg/kg cadmium; 10 mg/kg of lead and 175 µg/kg of non-dioxin like PCBs. There was no specification available at the time of the first evaluation due to missing batch data. Based on the renewal batch data, it is proposed to set the reference specification to the specification proposed by the RMS (see reference specification in the Appendix B). A FAO specification does not exist for fish oil.

For the active substance, data gaps were identified for a description of the manufacturing process<sup>8</sup>, identification of the undesirable chemicals that can be formed when fish oil is exposed to air<sup>7</sup>, data to address water solubility and ultraviolet/visible (UV/Vis) and infrared (IR) data of the main constituents of fish oil (see Section 10). For the representative formulation, data gaps were identified to address possible content of human pathogens<sup>7</sup>, the content of the relevant impurities before and after storage at ambient temperature and information on the producer of the formulation and the name and address of the producer of the active substances in the formulation<sup>7</sup> (see Section 10). Data on the physical, chemical and technical properties were submitted for a different formulation, a formulation comparison against 'FLU17516' was identified as a data gap<sup>7</sup> (see Section 10).

The main data regarding the identity of fish oil and its physical and chemical properties are given in Appendix B.

Analytical methods for the generation of pre-approval data required for the risk assessment were not provided, as risk assessment studies were not submitted. Validated methods using <sup>13</sup>C-NMR for the determination of triglycerides, diglycerides, free fatty acids in fish oil and <sup>1</sup>H-NMR for the determination of cholesterol in fish oil were provided. Data gaps were identified on validation data for the analytical method to determine polymeric triglycerides in fish oil and for a validated method for the determination of monoglycerides in fish oil<sup>7</sup> (see Section 10). A validated method using <sup>1</sup>H-NMR for the determination fish oil in the formulation was provided. A high-resolution gas chromatography (HRGC) coupled with high-resolution mass spectrometry (HRMS) method was provided for the determination of the relevant impurities PCDDs, PCDFs and PCBs in fish oil, a data gap was identified for method validation data (see Section 10). No method(s) was submitted for the analysis of the relevant impurities PCDDs, PCDFs and PCBs in the formulation (see Section 10). The ICP-MS method DIN EN ISO 17294-2 was submitted for the determination of lead and cadmium in fish oil and the formulation, a data gap was identified on method specificity data when the method is applied to the formulation (See Section 10). The ICP-MS method DIN EN 1483 was submitted for the determination of mercury in

<sup>5</sup> See open point 3.1 in Evaluation Table, Residues section.

<sup>6</sup> Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed - Council statement.

<sup>7</sup> Table of TEF (= toxic equivalency factors) for dioxins, furans and dioxin-like PCBs: WHO-TEFs for human risk assessment based on the conclusions of the World Health Organization (WHO) – International Programme on Chemical Safety (IPCS) expert meeting which was held in Geneva in June 2005 (van den Berg et al, 2006).

<sup>8</sup> See confidential evaluation table (December 2021).

fish oil and the formulation, data gaps were identified on method specificity data when the method is used for fish oil and for the formulation (see Section 10).

Methods for the analysis of residues in food and feed of plant and animal origin, in body fluids and body tissues are not required as residue definitions were neither required nor set. Methods for the analysis of residues in the environment are not required as no residue definitions were set.

## 2. Mammalian toxicity

The following guidance document was followed in the production of this conclusion (ECHA, 2017).

In the active substance as manufactured, toxicologically relevant impurities can be detected from environmental contamination (lead, cadmium, mercury, polychlorinated dibenzofurans and dioxins) and should not exceed the maximum concentrations permissible (see Section 1).

Due to its nature, fish oil does not present a toxicological concern by itself. Supportive information from the open literature indicates that fish oil does not have any skin irritating or sensitising potential. It is used as an additive in feedstuff and is obtained from fresh fish by-products that are not suitable for human consumption. Based on its chemical composition (i.e. triglycerides, fatty acids), all toxicological studies can be waived and reference values are not required for fish oil.

Thus, the risk from exposure to fish oil for operators and workers is considered to be negligible (if any). No exposure is anticipated for residents and bystanders.

EFSA notes that the representative plant protection product 'FLU17516' has two co-formulants of potential concern. The first one is titanium dioxide (TiO<sub>2</sub>) of unknown particle size at a final concentration higher than 1%. TiO<sub>2</sub> is classified as a suspected carcinogen (Category 2) by inhalation according to Regulation (EC) No 1272/2008.<sup>9</sup> This classification applies to TiO<sub>2</sub> in powder form containing 1% or more of particles with aerodynamic diameter ≤ 10 µm. The presence of TiO<sub>2</sub> at a level > 1% might trigger the classification of the product as carcinogen (category 2), pending further considerations of the aerodynamic diameter of particles in the product. Additionally, EFSA has recently revised its safety assessment of TiO<sub>2</sub> as a food additive (EFSA, 2021b) and has concluded that a genotoxic concern for TiO<sub>2</sub> particles (with unknown relationship to particles size) cannot be ruled out (data gap).

The second one is a co-polymer of styrene. The monomer of styrene is classified as Skin Irrit. 2, Eye Irrit. 2, Acute tox 4, STOT RE1 and Repr. 2 according to Regulation (EC) No 1272/2008<sup>8</sup>. The presence of styrene at a level ≥ 3% might trigger the classification of the product as reprotoxic (category 2). Additionally, EFSA has recently re-assessed styrene safety for use as a food contact material (EFSA CEP Panel, 2020) and concluded that a concern for genotoxicity associated with oral exposure to styrene cannot be excluded. Pending evidence of the release of styrene from the co-polymer in the formulation, further assessment of its potential for genotoxicity in the plant protection product may need to be provided (data gap).

## 3. Residues

For residues, no data and studies search were submitted. A proper detailed evaluation by RMS of a literature search according to the EFSA guidance on submission of scientific peer-reviewed open literature for the approval of pesticide active substances under Regulation (EC) No 1107/2009 (EFSA, 2011) was not provided (data gap; see Section 'The active substance and the formulated product' and Section 10).

The representative uses of fish oil on deciduous and coniferous trees in forestry applied via painting or spraying individual trees is unlikely to lead to residues in food. A consumer dietary risk assessment is therefore not necessary and can be waived.

In the context of Article 12 of Regulation (EC) No 396/2005 the collection of GAPs resulted also in uses on grapes in NEU and SEU. The application is foreseen as local treatment in form of dabbing or rubbing or as foliar treatment (broadcast spraying) at a growth stage (up to BBCH 69) where the fruits are not expected to be present. Also from these uses a consumer risk assessment is therefore not necessary as residues are unlikely to occur on fruits.

With regard to the five assessment criteria according to the Commission guidance SANCO/11188/2013 Rev. 2 (European Commission, 2015) for potential inclusion in Annex IV of Regulation (EC)

<sup>9</sup> Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.



No 396/2005, i.e. approval as basic substance (criterion I), listed in Annex I of Regulation (EC) No 396/2005 (criterion II), having no identified hazardous properties (criterion III), natural exposure is higher than the one linked to the use as plant protection product (criterion IV) and consumer exposure is not expected considering the representative uses (criterion V)), two criteria were considered to be met for fish oil for the following reasons:

The application technique reported for the proposed uses on deciduous and coniferous trees in forestry (via painting or spraying individual trees) and for the uses reported under Article 12 procedure are unlikely to result into consumer exposure (criterion V). Toxicological reference values are not required for fish oil (criterion III).

The other three criteria are either not fulfilled (criteria I and II) or cannot be evaluated as no data are available (criterion IV).

#### 4. Environmental fate and behaviour

The fate and behaviour of fish oil is expected to follow the normal pathways of dissipation and degradation common to naturally occurring residues of biological origin. During the degradation process of fish oil only natural compounds like glycerine and fatty acids are formed which are basic and ubiquitous substances.

For the representative uses related to the painting of individual trees, the environmental exposure except for the target treated tree can be considered too low to require an exposure assessment/a negligible additional exposure to the monoglycerides, diglycerides and triglycerides of fatty acids, free fatty acids, cholesterol and polymeric triglycerides that will already be present in soil and or natural water systems.

For the representative uses related to the spraying of individual trees, the surface water and sediment exposure assessments (predicted environmental concentration (PEC) calculations) were carried out for fish oil and fatty acids considering only the entry route via spray drift. The PEC surface water and sediment did not indicate negligible additional exposure; however, the concentrations might be overestimated as spraying individual trees with a low-pressure hand-held sprayer would result in a lower drift compared to hydraulic spraying or air assisted broadcast spraying.

The groundwater exposure assessments were carried out using FOCUS (European Commission, 2014a) scenarios and the models PEARL 4.4.4 and PELMO 5.5.3.<sup>10</sup> The potential for groundwater exposure by fish oil from the representative uses assessed would be expected to be low as a consequence of its expected low soil mobility and considering the very low water solubility. The potential for groundwater exposure from the representative uses related to spraying of individual trees by fatty acids above the parametric drinking water limit of 0.1 µg/L was concluded to be low in geoclimatic situations that are represented by all nine FOCUS groundwater scenarios.

Considering that fish oil is a natural compound and its degradation products are ubiquitous substances, it is not expected that the level of residues at the point of abstraction when surface water is abstracted for drinking water would be significantly impacted by the use of this active substance.

The PEC in soil, surface water, sediment and groundwater covering the representative uses related to the spraying of individual trees can be found in Appendix B.

#### 5. Ecotoxicology

Toxicity data with the active substance were not available for any group of non-target organisms. Although these data are not needed to assess the risk to aquatic organisms, according to Regulation 283/2013<sup>11</sup>, acute toxicity data with active substances should always be submitted for fish, aquatic invertebrates and algae. Therefore, a data gap was identified.

Valid toxicity studies with the representative formulation FLU17516 were available for honeybees (an acute oral and contact study), earthworms (a chronic study on *Eisenia fetida*) and soil micro-organisms (a nitrogen transformation study). Acute toxicity studies on aquatic organisms were also available but they were considered only as supplementary information since no analytical measurements of the test substance were performed during the tests (data gap; see Section 10). Chronic studies on aquatic organisms were not deemed necessary.

<sup>10</sup> Simulations utilised the agreed Q10 of 2.58 (following EFSA, 2008) and Walker equation coefficient of 0.7.

<sup>11</sup> Commission Regulation (EU) No 283/2013 of 1 March 2013 setting out the data requirements for active substances, in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market. OJ L 93, 3.4.2013, p. 1–84.

A qualitative weight-of-evidence approach was followed for those groups of non-target organisms for which reliable toxicity data were not available.

As reported in Section 4, environmental exposure to fish oil following the representative painting uses of fish oil on individual trees is expected to result in negligible additional exposure. Therefore, based on this, low risk was concluded for all non-target organisms.

For the spraying uses of fish oil, environmental exposure could not be excluded. However, a lower drift compared to hydraulic spray applications is expected since individual trees will be sprayed using a low-pressure handheld sprayer using a cone nozzle of size of 0.8–1.0 mm that produce large droplets.

A low acute and chronic risk for **birds** and **mammals** was concluded for the spraying uses considering the nature of fish oil (fish oil is a natural compound produced from fresh fish and it is used as an animal feed) and its non-toxic mode of action (game repellent for mammals).

A low acute risk for **aquatic organisms** was also concluded for the spraying uses of fish oil by considering the nature of the substance, the application method and the absence of the toxicity observed in the supplementary studies on fish, aquatic invertebrates and algae. A low chronic risk to aquatic organisms was also concluded.

Based on the available data with the formulation, low acute risk to **bees** was indicated. Chronic toxicity data were not available. Although exposure through flowering plants in the vicinity of sprayed trees cannot be excluded, it is expected that chronic risk will be low taking into account the application method and equipment. Considering the limited exposure and the toxicological profile of the substance, low chronic risk to bees or risk via contaminated water was also concluded. The same arguments were considered to conclude on a low risk to **non-target arthropods** other than bees.

Based on the available data and risk assessment, a low risk was concluded for **earthworms** and **soil micro-organisms** for the representative uses of fish oil following spray application on deciduous and coniferous trees. A low risk was for **soil macroorganisms other than earthworms** and **non-target terrestrial plants** was concluded by using the same lines of evidence as for the risk assessment to bees.

No exposure for **organisms involved in sewage treatment processes** would be expected for any of the representative uses and, therefore, a low risk was indicated.

## 6. Endocrine-disrupting properties

With regard to the assessment of the endocrine-disrupting potential of fish oil for humans and non-target organisms according to the ECHA/EFSA guidance (2018), although no (eco)toxicological data are available to assess the endocrine-disrupting properties, this does not appear scientifically necessary by considering (i) the nature of the substance and its use as feed additive, (ii) the non-toxic mode of action, i.e. use as repellent, and (iii) its physico-chemical properties, i.e. insoluble in water uses. Consequently, it is justified to waive the assessment of endocrine-disrupting properties of this substance for both humans and non-target organisms.

Considering the above, it can be concluded that fish oil does not meet the criteria for endocrine disruption for humans and non-target organisms according to points 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009, as amended by Commission Regulation (EU) 2018/60511.

## 7. Overview of the risk assessment of compounds listed in residue definitions triggering assessment of effects data for the environmental compartments (Tables 1–4)

**Table 1:** Soil

Compound (name and/or code)	Ecotoxicology
<b>Fish oil</b>	Low risk to soil organisms
<b>Fatty acids</b>	Low risk to soil organisms

**Table 2:** Groundwater<sup>(a)</sup>

Compound (name and/or code)	> 0.1 µg/L at 1 m depth for the representative uses <sup>(b)</sup> Step 2	Biological (pesticidal) activity/relevance Step 3a	Hazard identified Steps 3b and 3c	Consumer RA triggered Steps 4 and 5	Human health relevance
<b>Fish oil</b>	No	Not applicable <sup>(c)</sup>	–	–	Yes
<b>Fatty acids</b>	No	Not triggered	No	No	No for the representative uses assessed

(a): Assessment according to European Commission guidance of the relevance of groundwater metabolites (2003).

(b): FOCUS scenarios or a relevant lysimeter.

(c): Attractants and repellents are not defined as pesticides in Council Directive 98/83/EC.<sup>12</sup>

**Table 3:** Surface water and sediment

Compound (name and/or code)	Ecotoxicology
<b>Fish oil</b>	Low risk to aquatic organisms
<b>Fatty acids</b>	Low risk to aquatic organisms

**Table 4:** Air

Compound (name and/or code)	Toxicology
<b>Fish oil</b>	No toxicological concern by inhalation

## 8. Particular conditions proposed to be taken into account by risk managers

Risk mitigation measures (RMMs) identified following consideration of Member State (MS) and/or applicant's proposal(s) during the peer review, if any, are presented in this section. These measures applicable for human health and/or the environment leading to a reduction of exposure levels of operators, workers, bystanders/residents, environmental compartments and/or non-target organisms for the representative uses are listed below. The list may also cover any RMMs as appropriate, leading to an acceptable level of risks for the respective non-target organisms.

It is noted that final decisions on the need of RMMs to ensure the safe use of the plant protection product containing the concerned active substance will be taken by risk managers during the decision-making phase. Consideration of the validity and appropriateness of the RMMs remains the responsibility of MSs at product authorisation, taking into account their specific agricultural, plant health and environmental conditions at national level).

None.

## 9. Concerns and related data gaps

### 9.1. Concerns and related data gaps for the representative uses evaluated

#### 9.1.1. Issues that could not be finalised

An issue is listed as 'could not be finalised' if there is not enough information available to perform an assessment, even at the lowest tier level, for one or more of the representative uses in line with the uniform principles in accordance with Article 29(6) of Regulation (EC) No 1107/2009 and as set out

<sup>12</sup> Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption. OJ L 330, 5.12.1988, p. 32–54.

in Commission Regulation (EU) No 546/2011<sup>13</sup> and if the issue is of such importance that it could, when finalised, become a concern (which would also be listed as a critical area of concern if it is of relevance to all representative uses).

An issue is also listed as 'could not be finalised' if the available information is considered insufficient to conclude on whether the active substance can be expected to meet the approval criteria provided for in Article 4 of Regulation (EC) No 1107/2009.

**The following issues or assessments that could not be finalised have been identified, together with the reasons including the associated data gaps where relevant, which are reported directly under the specific issue to which they are related:**

Issues not finalised were not identified.

### 9.1.2. Critical areas of concern

An issue is listed as a critical area of concern if there is enough information available to perform an assessment for the representative uses in line with the uniform principles in accordance with Article 29 (6) of Regulation (EC) No 1107/2009 and as set out in Commission Regulation (EU) No 546/2011, and if this assessment does not permit the conclusion that, for at least one of the representative uses, it may be expected that a plant protection product containing the active substance will not have any harmful effect on human or animal health or on groundwater, or any unacceptable influence on the environment.

An issue is also listed as a critical area of concern if the assessment at a higher tier level could not be finalised due to lack of information, and if the assessment performed at the lower tier level does not permit the conclusion that, for at least one of the representative uses, it may be expected that a plant protection product containing the active substance will not have any harmful effect on human or animal health or on groundwater, or any unacceptable influence on the environment.

An issue is also listed as a critical area of concern if, in the light of current scientific and technical knowledge using guidance documents available at the time of application, the active substance is not expected to meet the approval criteria provided for in Article 4 of Regulation (EC) No 1107/2009.

**The following critical areas of concern are identified, together with any associated data gaps, where relevant, which are reported directly under the specific critical area of concern to which they are related:**

Critical areas of concern were not identified.

### 9.1.3. Overview of the concerns identified for each representative use considered (Table 5)

(If a particular condition proposed to be taken into account to manage an identified risk, as listed in Section 8, has been evaluated as being effective, then 'risk identified' is not indicated in Table 5.)

**Table 5:** Overview of concerns reflecting the issues not finalised, critical areas of concerns and the risks identified that may be applicable for some but not for all uses or risk assessment scenarios

Representative use		Deciduous and coniferous trees in forestry (painting individual trees)	Deciduous and coniferous trees in forestry (spraying individual trees)
<b>Operator risk</b>	Risk identified		
	Assessment not finalised		
<b>Worker risk</b>	Risk identified		
	Assessment not finalised		
<b>Resident/ bystander risk</b>	Risk identified		
	Assessment not finalised		

<sup>13</sup> Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products. OJ L 155, 11.6.2011, p. 127–175.

Representative use		Deciduous and coniferous trees in forestry (painting individual trees)	Deciduous and coniferous trees in forestry (spraying individual trees)
<b>Consumer risk</b>	Risk identified		
	Assessment not finalised		
<b>Risk to wild non-target terrestrial vertebrates</b>	Risk identified		
	Assessment not finalised		
<b>Risk to wild non-target terrestrial organisms other than vertebrates</b>	Risk identified		
	Assessment not finalised		
<b>Risk to aquatic organisms</b>	Risk identified		
	Assessment not finalised		
<b>Groundwater exposure to active substance</b>	Legal parametric value breached		
	Assessment not finalised		
<b>Groundwater exposure to metabolites</b>	Legal parametric value breached <sup>(a)</sup>		
	Parametric value of 10 µg/L <sup>(b)</sup> breached		
	Assessment not finalised		

The superscript numbers relate to the numbered points indicated in Section 9.1. Where there is no superscript number, see Sections 2-7 for further information.

(a): When the consideration for classification made in the context of this evaluation under Regulation (EC) No 1107/2009 is confirmed under Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008.

(b): Value for non-relevant metabolites prescribed in SANCO/221/2000-rev. 10 final, European Commission (2003).

## 10. List of other outstanding issues

Remaining data gaps not leading to critical areas of concern or issues not finalised but considered necessary to comply with the data requirements, and which are relevant for some or all of the representative uses assessed at EU level. Although not critical, these data gaps may lead to uncertainties in the assessment and are considered relevant.

These data gaps refer only to the representative uses assessed and are listed in the order of the sections:

- A description of the manufacturing process for fish oil (relevant for all representative uses evaluated; see Section 1).
- Identification of the undesirable chemicals that can be formed when fish oil is exposed to the air (relevant for all representative uses evaluated; see Section 1).
- Water solubility data for fish oil and UV/Vis and IR data of the main constituents of fish oil (relevant for all representative uses evaluated; see Section 1).
- Formulation comparison between the different formulation for which data were submitted and the representative formulation 'FLU17516' justifying that data on the physical, chemical and technical properties of the different formulation can be used for 'FLU17516' (relevant for all representative uses evaluated; see Section 1).
- Information on the possible content of human pathogens in the formulation 'FLU17516' (relevant for all representative uses evaluated; see Section 1).
- Information on the producer of the formulation 'FLU17516' and the name and address of the producer of the active substances in the formulation (relevant for all representative uses evaluated; see Section 1).
- The content of the relevant impurities in the formulation 'FLU17516' before and after storage at ambient temperature (relevant for all representative uses evaluated; see Section 1).
- Validation data for the analytical method used to determine polymeric triglycerides in fish oil (relevant for all representative uses evaluated; see Section 1).

- Validated method for the determination of monoglycerides in fish oil (relevant for all representative uses evaluated; see Section 1).
- Method validation for the determination of the sum of PCDDs and PCDFs and PCBs in fish oil and specificity data for method DIN EN 1483 for the determination of mercury fish oil (relevant for all representative uses evaluated; see Section 1).
- Analytical method for the determination of the sum of PCDDs, PCDFs and PCBs in the formulation 'FLU17516', specificity data for the method DIN EN ISO 17294-2 proposed for the determination of lead and cadmium in the formulation and specificity data for the method DIN EN 1483 proposed for the determination of mercury in the formulation (relevant for all representative uses evaluated; see Section 1).
- The genotoxic potential of the co-formulant TiO<sub>2</sub> (including its relationship with particle size) needs to be elucidated (relevant for all representative uses evaluated; see Section 2).
- Pending on evidence of the release of styrene from the co-polymer in the co-formulant, further assessment of its potential for genotoxicity in the plant protection product may need to be provided (relevant for all representative uses evaluated; see Section 2).
- A proper detailed evaluation by RMS of a literature search requirement in the Residues section (relevant for all representative uses evaluated; see Section 3).
- Further information on the toxicity of fish oil on aquatic organisms, i.e. acute toxicity data (relevant for all representative uses evaluated; see Section 5).

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## Abbreviations

BBCH	Biologische Bundesanstalt, Bundessortenamt und Chemische Industrie
CEU	Centre European zone
FAO	Food and Agriculture Organization of the United Nations
FOCUS	Forum for the Co-ordination of Pesticide Fate Models and their Use
GAP	Good Agricultural Practice
HRGC	high-resolution gas chromatography
HRMS	high-resolution mass spectrometry
InChIKey	International Chemical Identifier Key
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
MRL	maximum residue level
PCBs	dioxin like polychlorinated biphenyls
PCDDs	polychlorinated dibenzo-paradioxins
PCDFs	polychlorinated dibenzofurans
PEC	predicted environmental concentration
RMM	risk mitigation measure
RMS	Rapporteur Member State
SMILES	simplified molecular-input line-entry system
UV	ultraviolet
WHO	World Health Organization

## Appendix A – Consideration of cut-off criteria for fish oil according to Annex II of Regulation (EC) No 1107/2009 of the European Parliament and of the Council

Properties		Conclusion <sup>(a)</sup>
CMR	Carcinogenicity (C)	Fish oil is not considered to be carcinogenic, mutagenic or toxic for reproduction.
	Mutagenicity (M)	
	Toxic for Reproduction (R)	
Endocrine-disrupting properties		Fish oil is not considered to meet the criteria for endocrine disruption for human health and non-target organisms according to points 3.6.5 and 3.8.2 of Annex II of Regulation No 1107/2009, as amended by Commission Regulation (EU) 2018/605.
POP	<b>Persistence</b>	Fish oil is not considered to be a persistent organic pollutant (POP) according to point 3.7.1 of Annex II of Regulation (EC) 1107/2009.
	<b>Bioaccumulation</b>	
	<b>Long-range transport</b>	
PBT	<b>Persistence</b>	Fish oil is not considered to be a persistent, bioaccumulative and toxic (PBT) substance according to point 3.7.2 of Annex II of Regulation (EC) 1107/2009.
	<b>Bioaccumulation</b>	
	<b>Toxicity</b>	
vPvB	<b>Persistence</b>	Fish oil is not considered to be a very persistent, very bioaccumulative substance according to point 3.7.3 of Annex II of Regulation (EC) 1107/2009.
	<b>Bioaccumulation</b>	

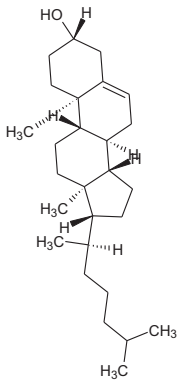
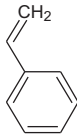
(a): origin of data to be included where applicable (e.g. EFSA, ECHA RAC, Regulation).



## **Appendix B – List of end points for the active substance and the representative formulation**

Appendix B can be found in the online version of this output ('Supporting information' section):  
<https://doi.org/10.2903/j.efsa.2021.7079>

## Appendix C – Used compound codes

Code/trivial name <sup>(a)</sup>	IUPAC name/SMILES notation/InChiKey <sup>(b)</sup>	Structural formula <sup>(c)</sup>
<b>cholesterol</b>	cholest-5-en-3 $\beta$ -ol  <chem>CC(C)CCC[C@@H](C)[C@H]1CC[C@H]2[C@@H]3CC=C4C[C@@H](O)CC[C@]4(C)[C@H]3CC[C@]12C</chem>  HVYWMOMLDIMFJA-DPAQBDFISA-N	
<b>titanium dioxide</b>	bis(oxido)titanium  <chem>O=[Ti]=O</chem>  GWEVSGVZZGPLCZ-UHFFFAOYSA-N	<chem>O=Tl=O</chem>
<b>styrene</b>	ethenylbenzene  <chem>C=Cc1ccccc1</chem>  PPBRXRYQALVMV-UHFFFAOYSA-N	

IUPAC: International Union of Pure and Applied Chemistry; SMILES: simplified molecular-input line-entry system; InChiKey: International Chemical Identifier Key.

(a): The compound name in bold is the name used in the report.

(b): ACD/Name 2020.2.1 ACD/Labs 2020 Release (File version N15E41, Build 116563, 15 June 2020).

(c): ACD/ChemSketch 2020.2.1 ACD/Labs 2020 Release (File version C25H41, Build 121153, 22 March 2021).