CONCLUSION ON PESTICIDES PEER REVIEW

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Peer review of the pesticide risk assessment of the active substance *Pythium oligandrum* strain M1

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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 Sweden and co-rapporteur Member State Hungary for the pesticide active substance *Pythium oligandrum* strain M1 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 *Pythium oligandrum* strain M1 as a fungicide on oil seed rape, wheat and spring barley (field use). 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. Concerns are identified.

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Keywords: *Pythium oligandrum* strain M1, peer review, risk assessment, pesticide, fungicide

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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. *Pythium oligandrum* strain M1 is one of the active substances listed in Regulation (EU) No 686/2012.

In accordance with Article 1 of Regulation (EU) No 844/2012, the rapporteur Member State (RMS), Sweden, and co-rapporteur Member State (co-RMS), Hungary, received an application from Biopreparaty, spol. s r.o. for the renewal of approval of the active substance *Pythium oligandrum* strain M1. In addition, the RMS submitted an application for inclusion of the substance in Annex IV of Regulation (EC) No 396/2005.

An initial evaluation of the dossier on *Pythium oligandrum* strain M1 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 the European Food Safety Authority (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 *Pythium oligandrum* strain M1 according to the representative uses as a fungicide on oil seed rape, wheat and spring barley (field use), as proposed at the European Union (EU) level result in a sufficient fungicidal efficacy against the target fungal pests.

The assessment of the data package revealed no issues that need to be included as critical areas of concern with respect to the identity of the active substance, physical and technical properties of the representative formulation.

In the area of mammalian toxicology, two issues that could not be finalised were identified for *Pythium oligandrum* strain M1; a conclusion on pathogenicity and infectivity cannot be drawn and information on its potential to form toxins and/or secondary metabolites under Good Agricultural Practice (GAP) directed conditions of use is insufficient. Consequently, the risk assessment for operators, workers, bystanders and residents cannot be finalised. Similarly, the consumer risk assessment cannot be finalised until conclusive information on the pathogenicity, infectivity, number of viable counts and toxicological relevance of metabolites present on edible plant parts at harvest is available.

*Pythium oligandrum* strain M1 is not proposed to be included into Annex IV of Regulation (EC) No 396/2005.

Satisfactory information was not provided in relation to potential interference of *Pythium oligandrum* strain M1 with the analytical systems for the control of the quality of drinking water. Consequently, this resulted in an assessment that could not be finalised.

Satisfactory information was not provided in relation to *Pythium oligandrum* strain M1 not being expected to persist and multiply in soil and surface water in concentrations considerably higher than the natural background levels, taking into account repeated applications over the years. Consequently, this resulted in an assessment that could not be finalised.

Satisfactory information was not provided in relation to the identification of secondary metabolites/toxins produced by *Pythium oligandrum* strain M1 and potentially present after the application of the product and their levels, and an assessment of their risk to non-target organisms. Consequently, this resulted in an assessment that could not be finalised.

The risk assessment could not be finalised for birds, wild mammals, aquatic organisms, bees and soil organisms, including soil microorganisms.
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Background

Commission Implementing Regulation (EU) No 844/2012\(^1\), as amended by Commission Implementing Regulation (EU) No 2018/1659\(^2\), (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\(^3\). This regulates for the European Food Safety Authority (EFSA) the procedure for organising the consultation of Member States, the applicant 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 in accordance with Article 13(3).

In accordance with Article 1 of the Regulation, the RMS Sweden and co-RMS Hungary received an application from Biopreparaty, spol. s r.o. for the renewal of approval of the active substance *Pythium oligandrum* strain M1. In addition, the RMS submitted an application for inclusion of the substance in Annex IV of Regulation (EC) No 396/2005\(^4\) (according to Art 6.3 of this Regulation). Complying with Article 8 of the Regulation, the RMS checked the completeness of the dossier and informed the applicant, the co-RMS (Hungary), the European Commission and EFSA about the admissibility.

The RMS provided its initial evaluation of the dossier on *Pythium oligandrum* strain M1 in the RAR, which was received by EFSA on 26 September 2018 (Sweden, 2018).

In accordance with Article 12 of the Regulation, EFSA distributed the RAR to the Member States and the applicant, Biopreparaty, spol. s r.o., for consultation and comments on 8 January 2019. 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 10 March 2019. At the same time, the collated comments were forwarded to the RMS for compilation and evaluation in the format of a reporting table. The applicant was invited to respond to the comments in column 3 of the reporting table. 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 and the RMS on 28 June 2019. 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 EFSA should conduct an expert consultation in the area of mammalian toxicology.

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, including those issues to be considered in an expert consultation, 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.

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\(^1\) 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.

\(^2\) 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.

\(^3\) 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.

\(^4\) 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.
A final consultation on the conclusions arising from the peer review of the risk assessment took place with Member States via a written procedure in August–September 2020.

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 uses of *Pythium oligandrum* strain M1 as a fungicide on oil seed rape, wheat and spring barley (field use), 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 are presented in the conclusion. A list of the relevant end points for the active substance and the formulation is provided in Appendix A.

In addition, a key supporting document to this conclusion is the peer review report (EFSA, 2020), 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 (8 July 2019);
- the evaluation table (28 September 2020);
- the report of the scientific consultation with Member State experts (where relevant);
- the comments received on the assessment of the additional information (where relevant);
- the comments received on the draft EFSA conclusion.

Given the importance of the RAR, including its revisions (Sweden, 2020), 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 report 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 identity of the microorganism and the properties of the formulated product**

*Pythium oligandrum* strain M1 is a fungus-like eukaryotic microorganism deposited at the American Type Culture Collection (ATCC) under the accession number: ATCC 38472. *Pythium oligandrum* strain M1 is an indigenous wild-type strain, it is a necrotrophic mycoparasite naturally found in soil, initially isolated from free soil in Semplice in the Czech Republic.

The representative formulated product for the evaluation was ‘Polyversum’, a wettable powder (WP) containing minimum $1 \times 10^9$ oospores/kg (nominal content of the technical MPCA: 175 g/kg, minimum content 100 g/kg, maximum 250 g/kg) *Pythium oligandrum* strain M1. An FAO specification does not exist for this product.

The representative uses evaluated comprise applications by spraying against *Sclerotinia sclerotiorum* and *Leptoshaeria maculans* in oilseed rape and against *Fusarium* sp. in wheat and spring barley in Central Europe. Full details of the Good Agricultural Practices (GAPs) can be found in the list of end points in Appendix A.

Data were submitted to conclude that the uses of *Pythium oligandrum* strain M1 according to the representative uses proposed at CEU level result in a sufficient fungicidal efficacy against the target organisms, following the guidance document SANCO/2012/11251-rev. 4 (European Commission, 2014).

A data gap has been identified for 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, 2011a; relevant for Sections 1, 2, 4 and 5).
Conclusions of the evaluation

1. Identity of the microorganism/biological properties/physical and technical properties and methods of analysis

The following guidance documents were followed in the production of this conclusion: SANCO/12116/2012–rev. 0 (European Commission, 2012).

The technical grade microbial pest control agent (MPCA) contains $4 \times 10^9 - 1 \times 10^{10}$ oospores/kg of *Pythium oligandrum* strain M1.

Microscopic taxonomic analysis of species-characteristic spiny-walled oospores and oogonia can be used to distinguish *Pythium oligandrum* from other *Pythium* species, and most significantly *Pythium insidiosum*. Molecular methods are available to distinguish *Pythium oligandrum* strain M1 from other strains of the same species, but only by single base pair differences. Considering the lack of genetic information on oomycetes, this level of identification was considered as sufficient at the time of the evaluation.

*Pythium oligandrum* strain M1 is able to synthesise a number of metabolites, the metabolite pattern produced showed large differences depending on the growth substrate. It may produce immunoglobulin A peptidases; however, the amount is not known and considered a data gap. Tryptamine was considered a metabolite of potential concern, as a consequence a data gap was identified for information on the metabolite production.

The level of bacterial contamination in the technical grade *Pythium oligandrum* strain M1 meets the requirements set in the Working document on microbial contaminant limits for microbial pest control products (European Commission, 2012).

There is no evidence of direct relationships of *Pythium oligandrum* strain M1 to known plant, animal or human pathogens.

*Pythium oligandrum* strain M1 grows at temperatures up to 37°C and is not sensitive to UV light. The optimum pH range for growth was between 5.6 and 8.6. *Pythium oligandrum* is sensitive to common disinfectants. *Pythium oligandrum* strain M1 was sensitive to the antibiotic (antimycotic) substances natamycin (pimaricin) and cyclopinoxolamine which can be used as topical treatment therapies.

Oospores of *Pythium oligandrum* strain M1 in the product are determined by enumeration using a light microscope. The viability of the oospores is determined by a method based on the plasmolysis of the viable oospores.

Residue definitions were not applicable for *Pythium oligandrum* strain M1, therefore post-registration monitoring methods are not needed.

2. Mammalian toxicity

*Pythium oligandrum* strain M1 was discussed at the Pesticide Peer Review Meeting Teleconference 25 in March 2020.

General data

From the medical data, no significant side effects have been reported with *Pythium oligandrum* strain M1 used in human cosmetics, medical products (dermal preparations) and veterinary products since at least 1998. It is noted that no detailed regulatory evaluation for these uses in human cosmetics and medical/veterinary products has been made available (data gap). Similarly, the medical surveillance on manufacturing plant personnel (using protective equipment) does not report any adverse health effect attributable to *Pythium oligandrum* strain M1 exposure. The absence of clinical cases of *Pythium oligandrum* infections in humans from the literature review could not be used to waive animal data since this review was considered as insufficient. Multiple limitations of this review were noted, i.e. lack of the relevance criteria provided, no date of the review reported, low quality of the report, abstracts not provided for excluded references (data gap).

Toxicity/infectivity/pathogenicity studies

In the acute toxicity studies, no treatment-related effects were observed after oral, inhalation and intraperitoneal administration in rats or mice, but the clearance was not sufficiently investigated and uncertainties remained about the dose levels administered. Therefore, these studies could only be used as supportive of a low infectivity/pathogenicity potential. As the available methods for testing
dermal sensitisation are not suitable for testing microorganisms and there are no validated test methods for sensitisation by inhalation, it is proposed that *Pythium oligandrum* strain M1 may have the potential to provoke sensitising reactions.

An Ames test with the MPCA containing only 0.5% of *Pythium oligandrum* strain M1 was considered supplemental, as not appropriate for microorganisms and performed with non-representative test material. No information was available on the possible presence of metabolites and their levels.

An *in vitro* study showing low survival of *Pythium oligandrum* strain DV74 (equivalent to M1) in blood and caecum was not considered sufficient to replace investigation of infectivity/clearance in animal studies. Based on the deficiencies of the available infectivity/pathogenicity studies and the limited information from the use of *Pythium oligandrum* strain M1 in other products (cosmetics, medical and veterinary products), a conclusion on pathogenicity and infectivity cannot be drawn (data gap).

**Secondary metabolites/toxins**

In a 75-day neurotoxicity study with rats (considered unacceptable for the assessment of the microorganism), some neurotoxic effects were observed and might be related to potential metabolites (such as tryptamine, metabolite produced by many fungi and reported as having pharmaceutical effects in the nervous system). These findings supported the need for further investigations in relationship with the production of secondary metabolites (including tryptamine and immunoglobulin A peptidases) by *Pythium oligandrum* strain M1 (see data gaps in Section 1).

**Reference values and non-dietary exposure**

Due to the fact that infectivity and pathogenicity cannot be concluded, and that further investigations are required in relationship with the production of secondary metabolites (including tryptamine and immunoglobulin A peptidases), the risk assessment for operators, workers, bystanders and residents cannot be concluded (issue not finalised). In the absence of a quantitative risk assessment, the use of personal and respiratory protective equipment (PPE/RPE) for the operators and workers might be considered to reduce the exposure (because all microorganisms are regarded as potential sensitisers via dermal and inhalation routes).

### 3. Residues

*Pythium oligandrum* strain M1 was discussed at the Pesticide Peer Review Meeting Teleconference 25 in March 2020. Data gaps identified in the mammalian toxicology section with respect to pathogenicity and infectivity of the microorganism and further information on production and toxicity of secondary metabolites are relevant for the assessment of residues of *Pythium oligandrum* strain M1 in food and feed (see Section 2).

With regard to viable residues, noting particularly the concerns in the toxicology section, the residue behaviour regarding persistence following GAP directed use of *Pythium oligandrum* strain M1 still needs to be demonstrated (data gap on viable residues).

Furthermore, (quantitative) information on presence or formation of toxins/metabolites of toxicological relevance following GAP directed use in/on edible plant parts post treatment is required (data gap on non-viable residues).

Concerning the formation of tryptamine, this biogenic amine is known to be formed by microbial activities directly in mainly protein rich food raw materials and food. Tryptamine including the whole group of biogenic are undesired compounds in food; however, tryptamine has not been implicated as causative agent in food poisoning outbreaks (EFSA, 2011b).

The consumer risk assessment cannot be finalised until conclusive information on the pathogenicity, infectivity and amounts of viable counts and toxicological relevance of metabolites on edible plant parts at harvest is available.

*Pythium oligandrum* strain M1 is not proposed to be included into Annex IV of Regulation (EC) No 396/2005.

### 4. Environmental fate and behaviour

Satisfactory information was not provided in relation to potential interference of *Pythium oligandrum* strain M1 with the analytical systems for the control of the quality of drinking water
provided for in Directive 98/83/EC\(^5\) (see specific Annex VI decision making criteria in Part II Commission Regulation (EU) No 546/2011\(^6\)). Therefore, it cannot be excluded that *Pythium oligandrum* strain M1 would interfere with the methodologies used for such determinations. Consequently, this resulted in a data gap and assessment that could not be finalised.

*Pythium oligandrum* strain M1 is a ‘wild type’ and there are no marker genes in the strain which would permit analysis of a frequency of genetic exchange. As the genetic diversity and drift in the wild-type population has not been ascertained, it would not be possible to distinguish any genetic drift from that in the wild population based on the information provided. Though it is acknowledged that the possibility and effects of transfer of genetic material is not different for *Pythium oligandrum* strain M1 than for other naturally occurring *Pythium oligandrum* strains, transfer of genetic material by *Pythium oligandrum* strain M1 after application is possible and could not be excluded based on the information available in the dossier.

### 4.1. Fate and behaviour in the environment of the microorganism

Information was mainly derived from published literature on different strains of *Pythium oligandrum* in relation to its persistence and multiplication in soil. The studies on different strains of *Pythium oligandrum* in soil were considered insufficient to conclude on the likely competitiveness, persistence and multiplication of *Pythium oligandrum* strain M1 in soil. Consequently, EFSA concluded that the information is insufficient to address the uniform principles criterion of the strain not being expected to persist and multiply in soil in concentrations considerably higher than the natural background levels, taking into account repeated applications over the years. This resulted in a data gap and assessment that could not be finalised. The predicted environmental concentration (PEC) in soil for the intended field use have been calculated (see Appendix A).

With respect to the persistence and multiplication in surface water, published studies were available providing information on the persistence of *Pythium oligandrum* in water. There was a specific study available for *Pythium oligandrum* strain M1 which indicated that the strain could germinate in water/sediment systems. According to the author, it was difficult to quantify the percentage of germinated oospores. A published paper on the occurrence of *Pythium oligandrum* in surface water showed that the species of *Pythium oligandrum* is present and that it is likely that it can increase in water after flooding. Consequently, EFSA concluded that the information is insufficient to address the uniform principles criterion of the strain not being expected to persist and multiply in surface water in concentrations considerably higher than the natural background levels, taking into account repeated applications over the years. The information on the persistence/multiplication/germination of the strain in natural surface water was considered insufficient to demonstrate that *Pythium oligandrum* strain M1 is likely to decline in surface water. This conclusion identifies a data gap and assessment that could not be finalised. PEC surface water for the intended field use have been calculated (see Appendix A).

Limited information was provided on the occurrence and behaviour of *Pythium oligandrum* strain M1 in air.

Limited information was provided on the mobility of *Pythium oligandrum* strain M1. Some general information was provided that *Pythium oligandrum* strain M1 is not expected to be mobile.

### 4.2. Fate and behaviour in the environment of any relevant metabolite formed by the microorganism under relevant environmental conditions

According to scientific papers from the literature search, the species *Pythium oligandrum* is able to produce secondary metabolites such as tryptamine. Production of e.g. tryptamine constitutes part of the mode of action of *Pythium oligandrum* strain M1.

It is not known to what extent *Pythium oligandrum* strain M1 will produce any metabolites following its application once the spores reach the soil, should they grow. Adequate information to address the potential concentrations of secondary metabolites/toxins to be produced by *Pythium oligandrum* strain

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5 Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption. OJ L 330, 5.12.1998, p. 32-54.

6 Commission Regulation (EU) 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.
M1 in all environmental compartments was not available. Therefore, a data gap was identified. Consequently, it is not clear if such metabolites might fulfil the criteria according to Part B section 7 (iv) of Commission Regulation (EU) 283/2013\(^7\) namely:

- the relevant metabolite is stable outside the microorganism;
- a toxic effect of the relevant metabolite is independent of the presence of the microorganism;
- the relevant metabolite is expected to occur in the environment in concentrations considerably higher than under natural conditions.

Therefore, data on the potential for *Pythium oligandrum* strain M1 to produce metabolites in relation to these criteria are necessary to assess, if the further data requirements and the corresponding risk assessment according to Commission Regulation (EU) No 283/2013, part A, section 7 (standard data requirements and assessment mandatory for chemical plant protections active substances) are triggered. Consequently, this resulted in a data gap and risk assessment that could not be finalised (see also Section 5).

### 5. Ecotoxicology

As discussed in Section 4.2, the identification and exposure assessment of secondary metabolites in the environment could not be finalised. Consequently, the risk to non-target organisms from such metabolites cannot be assessed and a data gap is identified resulting in an issue not finalised.

No studies were available on the toxicity, pathogenicity or infectiveness in birds. Additionally, the information to address infectiveness and pathogenicity in mammals (see Section 2) was considered insufficient. Consequently, the risk assessment for birds and mammals could not be finalised (data gap and issue not finalised). Additionally, in all the available studies with non-target organisms the viability of the oospores was not clarified (data gap).

Acute studies were available with fish and aquatic invertebrates. However, those studies were too short to assess infectivity and pathogenicity to fish and invertebrates (data gap). No valid studies were available on algae and aquatic plants (data gap). Based on the lack of suitable toxicity data, the risk assessment for aquatic organisms could not be finalised.

Several studies, both acute and chronic, were available on honeybee adults and larvae. Although no adverse effects were observed, all the available studies were not suitable to assess infectivity and pathogenicity to bees (data gap and issue not finalised).

Several studies were available on different species of non-target arthropods. Based on the available information, low risk to non-target arthropods other than bees was concluded for all representative uses.

Only an acute toxicity study was available on earthworms and no information was available to address infectivity/pathogenicity (data gap and issue not finalised).

Several studies, both standard and from publicly available literature, were available on soil microorganisms. The majority of those studies presented deficiencies and were only considered as supportive information. However, two long-term field studies were available on the effects of the representative formulation on i) fungal and bacterial rhizosphere and on non-rhizosphere communities after seed dressing and spraying of *Phaseolus vulgaris* plants and ii) on the formation of rhizosphere microorganism populations of soybean. Results from those studies showed that *Pythium oligandrum* strain M1 may alter the soil microbial community composition (increase in bacteria and decrease in fungi). Therefore, additional information is needed to exclude effects of *Pythium oligandrum* strain M1 on soil microorganisms (data gap and issue not finalised) when the microorganism is applied according to the representative uses. The RMS, however, considered the effects on the composition of soil microorganisms as not adverse and disagreed with the conclusion drawn.

Additional information was available on non-target terrestrial plants and a low risk was concluded for the representative uses.

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7 Commission Regulation (EU) 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.
6. Overview of the risk assessment of compounds listed in residue definitions triggering assessment of effects data for the environmental compartments

**Table 1:** Soil

| Compound (name and/or code) | Persistence | Ecotoxicology |
|-----------------------------|-------------|---------------|
| *Pythium oligandrum* strain M1 | Open regarding strain specific information | Open |
| Toxins/secondary metabolites such as tryptamine | Open | Open |

**Table 2:** Groundwater

| Compound (name and/or code) | Mobility in soil | > 0.1 µg/L at 1 m depth for the representative uses\(^{(a)}\) | Pesticidal activity | Toxicological relevance |
|-----------------------------|------------------|-------------------------------------------------|-------------------|------------------------|
| Toxins/secondary metabolites such as tryptamine | Open | Open | Yes | Open |

\(^{(a)}\): FOCUS scenarios or a relevant lysimeter.

**Table 3:** Surface water and sediment

| Compound (name and/or code) | Ecotoxicology |
|-----------------------------|---------------|
| *Pythium oligandrum* strain M1 | Open |
| Toxins/secondary metabolites such as tryptamine | Open |

**Table 4:** Air

| Compound (name and/or code) | Toxicology |
|-----------------------------|------------|
| *Pythium oligandrum* strain M1 | LC\(_{50}\) > 5 mg/L corresponding to \(1.3 \times 10^8\) oospores/L (uncertain dose of viable spores) |
| Toxins/secondary metabolites such as tryptamine | Open |

LC\(_{50}\): lethal concentration, median.
7. Data gaps

This is a list of data gaps identified during the peer review process, including those areas in which a study may have been made available during the peer review process but not considered for procedural reasons (without prejudice to the provisions of Article 56 of Regulation (EC) No 1107/2009 concerning information on potentially harmful effects).

- 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, 2011a; relevant for all representative uses evaluated; see Sections 1, 2, 4 and 5).
- Information on production and level of immunoglobulin A peptidases and tryptamine in the MPCA (relevant for all representative uses evaluated; see Sections 1, 2, 3, 4 and 5).
- Existing regulatory evaluations for uses of Pythium oligandrum strain M1 in human cosmetics and veterinary products (relevant for all representative uses; see Sections 1, 2, 3, 4 and 5).
- Further investigations of infectivity and pathogenicity (including clearance assessment) of Pythium oligandrum strain M1 (relevant for all representative uses; see Section 2).
- Residue behaviour of viable counts of Pythium oligandrum strain M1 following GAP directed use (relevant for all representative and authorised uses evaluated in the residue section; see Section 3).
- Residue behaviour of toxin/metabolites of Pythium oligandrum strain M1 following GAP directed use (relevant for all representative and authorised uses evaluated in the residue section; see Section 3).
- Further data to address the potential interference of Pythium oligandrum strain M1 with the analytical systems for the control of the quality of drinking water (relevant for all representative uses; see Section 4).
- Further data to address Pythium oligandrum strain M1 not being expected to persist and multiply in soil and surface water in concentrations considerably higher than the natural background levels, taking into account repeated applications over the years (relevant for all representative uses; see Section 4.1).
- Pending the outcome of the data gap to identify secondary metabolites/toxins produced by Pythium oligandrum strain M1 potentially present after the application of the product and their levels, an assessment of their risk to non-target organisms may be needed (relevant for all representative uses; see Sections 4.2 and 5).
- Further information to clarify the viability of oospores in the available studies with non-target organisms (relevant for all representative uses; see Section 5).
- Further data to address the potential for infectivity and pathogenicity to birds (relevant for all representative uses; see Section 5).
- Further data to address the potential for infectivity and pathogenicity to aquatic organisms (relevant for all representative uses; see Section 5).
- Further data to address the potential for infectivity and pathogenicity to bees (relevant for all representative uses; see Section 5).
- Further data to address the potential for infectivity and pathogenicity to soil organisms i.e. earthworms and soil microorganisms (relevant for all representative uses; see Section 5).

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

In the absence of a quantitative risk assessment, the use of PPE/RPE for the operators and workers might be considered to reduce the exposure (and the risk of adverse effects due to the sensitisation potential of microorganisms) (see Section 2).
9. Concerns

9.1. 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 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 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.

1) The assessment of the potential risks for humans (i.e. operators, workers, residents, bystanders and consumers), the environment including the assessment of potential groundwater exposure, and all non-target organisms (except non-target terrestrial plants and non-target arthropods other than bees) could not be finalised considering the missing information regarding infectivity/pathogenicity of *Pythium oligandrum* strain M1, identification of secondary metabolites/toxins produced by *Pythium oligandrum* strain M1 and their potential toxicological relevance (see Sections 2, 3, 4 and 5).

2) Satisfactory information was not provided in relation to potential interference of *Pythium oligandrum* strain M1 with the analytical systems for the control of the quality of drinking water. Consequently, this resulted in an assessment that could not be finalised (see Section 4).

3) Satisfactory information was not provided in relation to *Pythium oligandrum* strain M1 not being expected to persist and multiply in soil and surface water in concentrations considerably higher than the natural background levels, taking into account repeated applications over the years. Consequently, this resulted in an assessment that could not be finalised (see Section 4.1).

9.2. 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.

- None identified.

9.3. Overview of the concerns identified for each representative use considered

(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

| Representative use                        | Oil seed rape | Wheat | Spring Barley |
|-------------------------------------------|---------------|-------|---------------|
| Operator risk                             | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Worker risk                               | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Resident/bystander risk                    | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Consumer risk                             | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Risk to wild non-target terrestrial vertebrates | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Risk to wild non-target terrestrial organisms other than vertebrates | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Risk to aquatic organisms                 | Risk identified | | | |
|                                           | Assessment not finalised | X | X | X |
| Groundwater exposure to active substance   | Legal parametric value breached | | | |
|                                           | Assessment not finalised | X | X | X |
| Groundwater exposure to metabolites        | Legal parametric value breached | | | |
|                                           | Parametric value of 10 μg/L \(^a\) breached | | | |
|                                           | Assessment not finalised | X | X | X |

Columns are grey if no safe use can be identified. The superscript numbers relate to the numbered points indicated in Sections 9.1 and 9.2. Where there is no superscript number, see Sections 2-6 for further information.

(a): When the final classification decision under 1272/2008 has been made or if the metabolite is relevant independent of any classification decision.

### References

EFSA (European Food Safety Authority), 2011a. Submission of scientific peer-reviewed open literature for the approval of pesticide active substances under Regulation (EC) No 1107/2009. EFSA Journal 2011;9(2):2092, 49 pp. https://doi.org/10.2903/j.efsa.2011.2092

EFSA (European Food Safety Authority), 2011b. EFSA Panel on Biological Hazards (BIOHAZ); Scientific Opinion on risk based control of biogenic amine formation in fermented foods. EFSA Journal 2011;9(10):2393, 93 pp. https://doi.org/10.2903/j.efsa.2011.2393. Available online: www.efsa.europa.eu/efsajournal

EFSA (European Food Safety Authority), 2020. Peer review report to the conclusion regarding the peer review of the pesticide risk assessment of the active substance *Pythium oligandrum* strain M1. Available online: www.efsa.europa.eu

European Commission, 2012. Working Document on Microbial Contaminant Limits for Microbial Pest Control Products. SANCO/12116/2012-rev. 0, September 2012.

European Commission, 2014. Guidance document on the renewal of approval of active substances to be assessed in compliance with Regulation (EU) No 844/2012. SANCO/2012/11251-rev. 4, 12 December 2014.

Sweden, 2018. Renewal Assessment Report (RAR) on the active substance *Pythium oligandrum* strain M1 prepared by the rapporteur Member State Sweden, in the framework of Commission Implementing Regulation (EU) No 844/2012, September 2018. Available online: www.efsa.europa.eu

Sweden, 2020. Revised Renewal Assessment Report (RAR) on *Pythium oligandrum* strain M1 prepared by the rapporteur Member State Sweden in the framework of Regulation (EC) No 1107/2009, April 2020. Available online: www.efsa.europa.eu

### Abbreviations

| Abbreviation | Description |
|--------------|-------------|
| ATCC         | American type culture collection |
| EEC          | European Economic Community |
| 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 |
| InChiKey     | International Chemical Identifier Key |
IUPAC       International Union of Pure and Applied Chemistry
LC<sub>50</sub>  lethal concentration, median
MPCA        microbial pest control agent
PEC         predicted environmental concentration
PPE         personal protective equipment
RAR         Renewal Assessment Report
RMS         rapporteur Member State
RPE         respiratory protective equipment
SMILES      simplified molecular-input line-entry system
WP          wettable powder
WHO         World Health Organization
Appendix A – List of end points for the active substance and the representative formulation

Appendix A can be found in the online version of this output (‘Supporting information’ section): https://doi.org/10.2903/j.efsa.2020.6296
**Appendix B – Used compound codes**

| Code/trivial name<sup>(a)</sup> | IUPAC name/SMILES notation/InChiKey<sup>(b)</sup> | Structural formula<sup>(c)</sup> |
|---------------------------------|-----------------------------------------------|----------------------------------|
| tryptamine                      | 2-(1H-indol-3-yl)ethanamine                    | ![Structural formula](image)     |
|                                 | NCCc1c[NH]c2cccccc21                             |                                  |
|                                 | APJYDQYYACXCRM-UHFFFAOYSA-N                      |                                  |

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

(a): The metabolite name in bold is the name used in the conclusion.

(b): ACD/Name 2019.1.1 ACD/Labs 2019 Release (File version N0SE41, Build 110555, 18 July 2019).

(c): ACD/ChemSketch 2019.1.1 ACD/Labs 2019 Release (File version CDSH41, Build 110712, 24 July 2019).