Coniothyrium minitans

Microbial pest control agent against *Sclerotinia spp.*

Dossier according to OECD dossier guidance for microbial pest control agents and microbial pest control products – August 2006

Summary documentation, Tier II

Annex IIM, Section 6

Point IIM 9: Summary and evaluation of environmental impact

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IIM 9 Summary and evaluation of environmental impact

IIM 9.1 Distribution and fate of MPCA

Fate and behaviour in soil

Coniothyrium minitans is an autochthonous soil micro-organism frequently isolated from agricultural soil. The fungus is closely associated with sclerotia of susceptible hosts, which are parasitized.

The nature of this biofungicide does not allow application of soil degradation studies and calculation of time weighted average concentrations, as employed for chemical substances, since 'degradation' or decline of populations of micro-organisms does not follow first order kinetics of degradation.

Data on the density of natural *C. minitans* populations in soil are not available. However, as the concentration of *C. minitans* in soil depends on the concentration of sclerotia, the vegetative form of *C. minitans* decreases along with the degrading host cells. In laboratory studies mycelium of *C. minitans* was not able to grow in non-sterile soil, indicating that *C. minitans* is a poor competitor.

Naturally occurring spores of *C. minitans* can persist ungerminated in disintegrated sclerotia for at least one year and the fungus can be recovered from soil in sclerotia for up to 18 months following application. At soil temperatures above 25° C no isolation of *C. minitans* from sclerotia after 6 months was possible.

Due to the host specificity of *C. minitans*, it can be assumed that long-term survival of the mycoparasite in soil is possible only if sclerotia are present. Hence, any multiplication or long-term persistence of the mycoparasite in soil after treatment with Contans WG is rather unlikely to occur. As the fungus is no saprophyte, *C. minitans* can be regarded as less competitive to other soil micro-organisms.

- ➢ Therefore, it can be assumed that applied amounts of viable spores of *C. minitans* strain CON/M/91-08 will not accumulate in soil over time after the maximum application rate of Contans WG. Moreover there is no risk for unlimited growth of this fungus.

With regard to its mobility, a soil column leaching study provides evidence that vertical distribution of CON/M/91-08 does not occur. In contrast, localised horizontal spread by water splash has been documented. Dispersal of *C. minitans* in aerosol particles is promoted by air movement, although this is considered of minor importance. There is some evidence that soil organisms may be responsible for dispersal in soil. Among these are fungus gnats (Mycetophilidae), enhancing degradation of sclerotia of *S. sclerotiorum* infected with *C. minitans* and increasing local dispersal of the mycoparasite. Possible vectors for localised spread of *C. minitans* are slugs, collembola, mites and sunflower maggots.

In order to evaluate the environmental and health concern of the spread of *C. minitans* strain CON/M/91-08 into the agricultural soil environment it needs to be considered that this strain is non-pathogenic to humans and mammals in general, and also for non-target organisms due to its host specificity. Moreover, based on composition of the formulated product with washed, metabolically inactive spores and only one additional formulant of food-grade quality, which will be metabolised by micro-organisms, and in the absence of impurities, the preparation is considered safe to human health and the environment. Finally, the soil is the natural reservoir of this fungus.

- ➢ Therefore, establishment of a population of *C. minitans* in the treated soil under favourable environmental conditions presents no health or environmental concern, but even is desired for efficient parasitic control of *Sclerotinia* spp.

Fate and behaviour in water

Surface water

Coniothyrium minitans is an autochthonous soil micro-organism and its activity is strictly associated to the presence of sclerotia in soil. Water is not the natural habitat of this soil-borne fungus. Spores will be subject to sedimentation, and may persist for some time, but will not find conditions favourable for germination or growth. In addition, the intended fields of use of Contans WG imply minimum contamination of natural surface waters.

Ground water

Results from a soil column study indicate that vertical movement of CON/M/91-08 is limited as no spores were found in the leachate. The species does not produce any toxins or secondary metabolites

of toxicological concern and therefore leaching of metabolites to groundwater is not relevant to this fungus.

Fate and behaviour in air

The formulated product Contans WG is incorporated or drenched in soil after application. Based on its composition any volatilization either from soil or from the formulated product can therefore be excluded. There is no evidence for persistence or multiplication of the fungus in air. Further information on the persistence in air is not required, since the toxicological studies and the temperature growth profile of this strain prove that it is not able to infect humans, and imposes no risk for workers, operators or bystanders via the inhalation route or any other route. Mobility of *C. minitans* in air is not considered relevant because above-ground spore release followed by long-distance transport of spores is not likely to occur at significant levels.

In conclusion, *C. minitans* may survive in soil for several months. However, due to its host specificity, it can be assumed that long-term survival of the mycoparasite in soil is possible only if sclerotia are present. Hence, any multiplication or long-term persistence of the mycoparasite in soil after treatment with Contans WG is rather unlikely to occur. As the fungus is no saprophyte, *C. minitans* can be regarded as less competitive to other soil micro-organisms. Thus, there is no risk for uncontrolled growth due to competition and antagonism in its natural habitat. *C. minitans* is not known as an aquatic fungus. Any contamination of or survival in water has not been reported in the literature. As parasitism of *C. minitans* is limited to *Sclerotinia* spp. and since the fungus is unable to grow above 33°C (see Section 1, IIM, Point 2.8 and section 3, IIM, Point 5), any potential dispersal of this fungus imposes no health or environmental risk.

IIM 9.2 Identification of non-target species at risk and extent of their exposure

Coniothyrium minitans is an autochthonous soil fungus naturally present in the environment. Hence, no risk to non-target species is anticipated. Due to the host specificity of the mycoparasite limiting its growth and survival to the availability of sclerotia of *Sclerotinia* spp., no effects to soil organisms other than the target fungi are likely to occur. The experience that *C. minitans* presents no risk for the environment and for non-target organisms has been confirmed by studies with strain CON/M/91-08 and the published literature.

IIM 9.3 Identification of precautions necessary to minimize environmental contamination and to protect non-target species

Coniothyrium minitans strain CON/M/91-08 is not toxic to aquatic and terrestrial species, and considering the expected environmental concentration, will not be hazardous to populations of non-target species.

In conclusion, no special precautions to minimize environmental contamination and to protect non-target species are necessary.