

Environmental & Social Risk Assessment (ESRA)

Product name: Cellu-Treat®

CAS number: 12280-03-4

Active ingredient: Disodium Octaborate Tetrahydrate

Manufacturer: Nisus Corporations

Introduction

Heterobasidion root disease (HRD) causes growth loss, root and butt rot, and mortality of conifers. In Wisconsin, it is caused by the fungus, *Heterobasidion irregulare*. Infection often occurs after fungal spores released from conks land on fresh wounds or fresh cut stumps. Cellu-Treat is one of the two pesticides that are registered in Wisconsin and legal for treatment of stumps to prevent Heterobasidion root disease. This treatment practice has been implemented on public and private lands in Wisconsin for over a decade, and recently in-depth environmental assessment documents were published for the use of the pesticide on federal lands in Wisconsin and Michigan (USDA 2012, USDA 2017). Many of the contents and conclusions from the federal environmental analysis documents as well as a comprehensive human health and ecological risk assessment report of Cellu-Treat (Durkin, 2016) are adopted in this ESRA.

Assessment Considerations

1. What are the human health risks (applicator and the public)?

Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and developmental effects. Primary targets for borate toxicity are the developing fetus and the male reproductive system. GHS Classification of this product is Category 2 for Reproductive toxicity, and signal word: "Warning!" is used. A human study of occupational exposure to borate dust showed no adverse effect on reproduction.

Inhalation is the most significant route of exposure in occupational and other settings. Occasional mild irritation effects to nose and throat may occur from inhalation of Cellu-Treat dust at levels greater than 10 mg/m³. Dermal exposure is not usually a concern because Cellu-Treat is poorly absorbed through intact skin. Cellu-Treat is not a known carcinogen, neurotoxin, or mutagen, and does not bioaccumulate or biomagnify.

Cellu-Treat has a low acute toxicity when ingested and is not directly regulated by the Safe Water Act or Clean Water Act. Small amounts (e.g., a teaspoonful) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms. Cellu-Treat is not intended for ingestion.

Non-accidental hazard quotients (HQs) are below the level of concern by a factor of over 300 for workers and over 100 for members of general public. The highest accidental HQ, for example, due to consumption of contaminated water by a small child, is below the level of concern by a factor of 100.

While concern exists that Cellu-Treat possesses reproductive toxicity, the risk is considered acceptable for the proposed use patterns if appropriate personal protective equipment is used. Proper PPE can mitigate inhalation exposure risk particularly in a field setting where it is implausible that concentrations would reach a high level.

2. What are the potential negative environmental impacts and risks?

Borate is a naturally occurring form of boron found in the ground, soil, plants, and animals. It is water soluble and is leachable through normal soil. Adsorption to soils or sediments is insignificant.

The highest non-accidental HQ for Cellu-Treat for aquatic organisms was below the level of concern by a factor of about 17. The longer-term HQ for small birds consuming contaminated water as well as birds consuming fish over a longer period of time was below the level of concern by a factor of 500.

The risk assessment for mammals and birds consuming borates from treated stumps, for example, by licking treated stumps, concluded that there is no compelling basis to assert that adverse effects in these animals are likely.

Boron is an essential micronutrient for plants. High quantities of Boron can be harmful to boron sensitive plants. Stump application of borates does not substantially increase concentration of boron in the soil, with the exception of areas immediately adjacent to treated stumps. There is no basis for asserting that stump applications of borates would cause adverse effects in terrestrial plants, invertebrates, or microorganisms through soil exposures. Because application is made to near ground level, the potential for adverse effects associated with foliar exposure is remote.

The application has limited potential to contaminate water because the chemical solution will be directly applied to tree stumps, limiting both the volume of borax to an area and the potential for it to be applied directly to water.

3. How effective is the proposed pesticide for the proposed target(s)?

There are numerous peer-reviewed papers that demonstrated the effectiveness of the proposed pesticide on fresh cut stumps. In a review paper, Pratt reviewed over 80 published experimental results from North America and Europe and concluded that disodium octaborate tetrahydrate was effective at controlling the fungus when applied to stumps as liquid solutions with concentrations above 5 per cent. A small-scale experiment conducted in Wisconsin on red pine by artificially inoculating fresh cut wood cookies with solution of *H. irregulare* isolates from Wisconsin found that the use of Cellu-Treat reduced infection by *H. irregulare* by 78%. A research field study to evaluate the effectiveness of Cellu-Treat and RotstopC using natural inoculum is in progress in Michigan and Wisconsin.

4. What is the specificity of the proposed pesticide to the proposed target(s)?

Cellu-Treat kills many wood destroying insects and fungi, including termites, powderpost beetles, scolytid beetles, carpenter ants, and decay fungi. Though the

pesticide is non-selective, since liquid solution is directly applied to one targeted stump at a time, the unwanted effect of the pesticide on residual vegetation is minimal. Because the pesticide inhibits the growth of decay fungi, treated stumps will decompose at a much slower rate than untreated stumps.

5. Is there a need for a maximum application site frequency and/or area other than specified on the product label?

Since the chemicals are expected to move through the upper soil layers within one year following application and additional treatments would not be expected to occur within that time frame in the forest setting, no cumulative effects on soils are expected overtime.

6. Is there another pesticide and/or Integrated Pest Management (IPM) technique that should be considered in lieu of the proposed pesticide?

RotstopC is another pesticide that is registered and available in Wisconsin for the same purpose. RotstopC is a biological fungicide that contains spores of the naturally occurring wood decay fungus, *Phlebiopsis gigantea*. A field study to evaluate its efficacy with natural inoculum in the Lake States is being evaluated.

Due to limited viable spore availability under cold temperatures, the risk is low when harvesting occurs during winter (December through March). Planting at wide spacing can delay and reduce the number of thinnings.

7. Other Considerations

The product should be used in accordance with label directions, including necessary PPE (Personal Protective Equipment) to minimize human health risks and negative environmental impact.

Reference:

- Durkin, P.R. 2016. Sporax and Cellu-Treat (Selected Borate Salts) Human Health and Ecological Risk Assessment FINAL REPORT. Manlius, NY: Syracuse Environmental Research Associates, Inc, (SERA) 191pp.
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