



## Evaluation Report for Category B, Subcategory 2.1 Application

**Application Number:** 2011-0943  
**Application:** B.2.1 - Change Guarantee  
**Product:** Formic Acid 65 %  
**Registration Number:** 30108  
**Active ingredients (a.i.):** Formic Acid  
**PMRA Document Number :** 2541505

### Purpose of Application

The purpose of this application was to register the end use product Formic Acid 65 % as a treatment against varroa mites and tracheal mites in honey bee colonies.

### Chemistry Assessment

Formic Acid 65 % is a solution containing the active ingredient formic acid at a nominal concentration of 65 %. This product has a density of 1.140-1.160 g/mL and pH of 1.9. The chemistry requirements for Formic Acid 65% have been completed.

### Health Assessments

Technical formic acid is considered to be moderately acutely toxic via the oral route. As a volatile acid with a pH of 2, formic acid is extremely corrosive; therefore, it is considered to be highly acutely toxic via the dermal and inhalation routes of exposure. It is also considered to be corrosive to the skin and eyes, and is a potential skin sensitizer. Based on available information, and recognizing the long history of use of formic acid in foods and a lack of reporting of adverse effects of this nature, it is expected that exposure to formic acid from the proposed use is not likely to result in prenatal developmental toxicity, mutagenicity and/or genotoxicity. The primary endpoint of concern for formic acid is its corrosiveness, and there are no other reported toxicological endpoints of concern associated with acute or short-term exposure to formic acid. As the end use product Formic Acid 65% consists of food-grade formic acid (65 %) and a List 4A formulant, no end use product specific toxicology data was required to assess Formic Acid 65 %.

Significant risk from exposure to Formic Acid 65 % for the applicator is not expected if label directions, including precautionary statements and personal protective equipment, are followed. As Formic Acid 65 % is intended for direct application inside beehives in an apiary, bystander exposure is expected to be negligible and therefore not of concern. Post-application exposure is expected to be minimal as it only involves the removal of used pads from beehives for disposal. Because the formic acid concentration is expected to be lower at five to seven days post application, due to the high vapour pressure of formic acid resulting in dissipation of the active ingredient, post-application exposure is expected to be minimal and not of concern.

Label directions indicate that Formic Acid 65 % is not to be used during honey flow or while supers are on the hive, and includes a pre-harvest interval of two weeks. When used according to these amended label directions, the use of Formic Acid 65 % is not expected to result in formic acid residues in honey or honey products at concentrations of toxicological concern. In addition, the application of Formic Acid 65 % to beehives should not result in exposures to sources of drinking water. Therefore, the use of Formic Acid 65 % is not expected to result in a dietary risk from drinking water.

### **Environmental Assessment**

The use of a 65 percent solution of formic acid for control of mites in bee colonies is unlikely to result in significant environmental exposure. The product will be contained within the physical colony container where it will readily volatilize and dissipate; no liquid leakage to the environment is expected under these conditions.

### **Value Assessment**

To support the use of Formic Acid 65% at a rate of 30 to 40 ml for two-story colonies or 15 to 20 ml for one-story colonies to control honey bee tracheal mites and varroa mites in honey bee hives, the applicant provided a scientific rationale based on the long and well established use history of formic acid in Canada. This application method was both widely adopted by beekeepers across Canada and recommended as a method of treatment by provincial apiculturists since the publication of Note to CAPCO C94-05, *Proposed Scheduling of 65 Percent Formic Acid for the Detection and Control of Honey Bee Mites* in 1994. To provide control, at least 4 and up to 6 applications should be made at 1 to 10 day re-application intervals. This application method is expected to provide acceptable levels of control of tracheal and varroa mite in honey bees and is not expected to cause unacceptable injury to the treated hive provided that it is not applied in temperatures below 10°C or above 30°C.

To support the use of Formic Acid 65% using a slow release application method at a rate of 250 ml of Formic Acid 65%, five studies were submitted. These studies demonstrated that while acceptable levels of control (>95%) of varroa mite can be achieved using this method, the efficacy of the slow release treatment can be variable. Given the time of treatment (fall and spring), this result is expected because formic acid evaporation is effected by temperature. Low average daily temperatures or low night temperatures in fall and spring reduce the amount of product which evaporates. This leads to lower concentrations of formic acid in the hive air which can reduce the level of varroa mite control. To ensure acceptable levels of control and to reduce the chance of unacceptable injury to the hive, applications should only be made when temperatures are between 10°C and 26° in the spring or between 4° and 26°C in the fall, and pads should be removed if temperatures are above 30°C. The slow release method has additional value as it can be applied once to provide control, compared to the application method using 30 to 40 ml or 15 to 20 ml Formic Acid 65% which requires multiple treatments.

### **Conclusion**

PMRA has reviewed information provided in support of the product as described above. Based

on this review, Formic Acid 65 % for use as a treatment against varroa mites and tracheal mites in honey bee colonies is acceptable for registration.

## References

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- 2044795 2003. Timing of acaricide treatments for control of low-level populations of *Varroa destructor* (Acari: Varroidae) and implications for colony performance of honey bees, DACO: 10.2
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