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Kaolin as inert material in bio-pesticide formulations supplements the hazard to useful insects

Reet Karise, Riin Muljar, Marika Mänd

Institute of Agricultural and Environmental Sciences, Estonian Universtiy of Life Sciences, Kreutzwaldi 1, 51014, Tartu, Estonia

E-mail: reet.karise@emu.ee

Kaolin is an inert material with a broad range of applications, e.g. non-toxic insecticide, fungicide and additive substance to many plant protection products in agriculture. Inert materials and biocontrol agents as alternatives for classical chemical pesticides are gaining more and more attention especially in the context of the European IPM directive 2009/128. In this project we investigated the safety of two model inert materials, namely kaolin, that is used commercially against different pest insects and wheat flour that we considered as safe, and of two biocontrol agents, namely the biofungicide Prestop Mix and the bioinsecticide BotaniGard. We tested for lethal and sublethal effects on workers of the bumble bee *Bombus terrestris* L.

Kaolin and Prestop Mix treatments increased cuticular water loss. Kaolin affected also survival of bumble bee foragers. Prestop Mix (containing kaolin) had no effect on survival, we suppose because of lower concentration of kaolin. BotaniGard also decreased the survival as it should do because of insecticidal fungus *Beauveria bassiana.*

Our data indicates that products as inert materials and biocontrol agents which are used in IPM and organic farming systems also need adequate risk assessment testing as classical pesticides. Specifically, the data demonstrated negative effects of kaolin and BotaniGard to entomovectoring bumble bees.

Dose-dependent effects of stacked Bt maize pollen on *in vitro* reared honey bee larvae

Karin Steijven, Ingolf Steffan Dewenter, Stephan Härtel

Department of Animal Ecology and Tropical Biology (ZOOIII) , University of Würzburg. Biozentrum - Am Hubland. 97074 Würzburg, Germany

Email: Karin.steijven@uni-wuerzburg.de

In agricultural landscapes honey bees (*Apis mellifera*) are exposed to a number of different genetically modified (GM) pollen. To assess environmental risks of transgenic crops standardised first tier risk assessment studies are highly needed. Here we conducted an *in vitro* larvae rearing experiment to evaluate the potential effects of GM Bt maize pollen on honey bee larvae. The pollen was added to an artificial diet to mimic the natural exposure pathway. It was fed in increasing quantities to test for dose-dependent effects. In addition to the survival we also measured several sublethal effects; digestibility, prepupal weight, and developmental delay. Bt pollen was digested equally well as two control maize pollen types. Increasing amounts of Bt pollen did not have a negative effect on the survival of honey bee larvae, but prepupal weight decreased with higher doses of Bt pollen when compared to the multifloral pollen treatment. We detected no negative effects on development of bees that were fed Bt pollen. This study highlights the importance of including