

Poster

Chronic larval and adult honey bee laboratory testing: which dietary additive should be considered when a test substance is not solubilized in acetone?

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Abstract

Chronic toxicity tests on adult and larval honey bees (*Apis mellifera*) can require the use of dietary additives (solvents, emulsifiers, adjuvants and viscosifier agents) when the active ingredient of plant protection products cannot be dissolved or does not remain stable and homogeneous within the test diets. Acetone is the widely used and accepted solvent allowed for in the international regulatory guidelines, but it can be ineffective in keeping certain compounds in solution and can cause toxicity to adults and larvae at certain levels. Here we evaluate six dietary additives including five solvents (ethanol, isopropanol, n-propanol, propylene glycol and triethylene glycol) and a viscosifier agent (xanthan gum) at five concentrations as alternative additives in the adult and larval diets. The safe levels for bees were determined for each of the additives used in the 10-day chronic adult and 22-day chronic larval tests. Ethanol and isopropanol were the least toxic dietary additives for both endpoints in the 10-day chronic adult study and in the emergence endpoint in the 22-day chronic larval study and therefore can be used at higher concentrations to achieve solubility of a test substance while xanthan can only be used safely and effectively at lower concentrations. The optimal agent selected for a study will vary based upon the physical and chemical properties of the test substances, yet our study provides empirical data to support the use of alternatives to acetone to generate robust honey bee toxicity data for adults and larvae.