
Section 7 – Other

7.1.P Investigating the transfer of acaricides from beeswax into honey, nectar, bee bread, royal jelly and worker jelly

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Abstract

A main source of beeswax contaminants are acaricides which are used to control *Varroa destructor*. Since it is common practice to recycle wax, acaricides can accumulate in beeswax due to their fat-soluble properties. The purpose of this study was to compare contamination levels in different types of bee products depending on their chemical properties and their storage duration in-hive. Wax foundations were poured with a mix of nine different acaricides that had been most frequently detected in commercial beeswax and subsequently processed into honeycombs by bees. The used initial concentration mirrored field-realistic maximum concentrations. The bee products honey, nectar, bee bread, royal and worker jelly were manually applied to treated combs and incubated at in-hive conditions in the laboratory. The incubation time ranged from a few days for nectar and larval food up to two months for honey and bee bread, mimicking natural processing conditions in a hive. Samples were analysed by liquid and gas chromatography linked with mass spectrometry.

Results showed a negligible transfer of the active substances bromopropylate, chlorpyrifos, fenpyroximate, hexythiazox, tetramethrin and amitraz from beeswax into the tested bee products due to their low initial concentrations and degradation processes. In contrast, a significant transfer into bee bread, worker jelly and royal jelly was found for tau-fluvalinate, coumaphos and propargite, which occur at relatively high concentrations in beeswax at field-realistic conditions. Based on the initial maximum concentration in beeswax and the detected residues of tau-fluvalinate, coumaphos and propargite in bee bread, royal jelly, worker jelly, honey and nectar, maximum transfer rates of 6.9%, 3.4%, 1.6%, 0.2% and 0.03% could be calculated, respectively. Transfer rates of the tested acaricides were found to be dependent on the initial concentration in beeswax, the storage duration and the lipid/water content of the bee products. A biologically relevant exposure of bees at field realistic concentrations was classified as unlikely.