

API-monitoring of synthetic pyrethroids by gas chromatography with mass spectrometric detection

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Abstract

The article presents the results of API (Latin *Ápis* – bee) monitoring the content of residual amounts of synthetic pyrethroids in honey bees using gas chromatography with mass spectrometric detection (GC-MS).

The pesticides discussed in this article were selected based on the results of API monitoring of honey bees using GC / MS. The proposed GC-MS method for monitoring synthetic pyrethroids makes it possible not only to identify the causes of lethal intoxication of bees, but also to prevent the possible consequences of synthetic pyrethroids getting into beekeeping products and, consequently, their distribution along trophic routes. The latter has a direct impact on the quality of human life safety.

It has been shown that for the detection by GC-MS of synthetic pyrethroids contained in a bee matrix, an important role is played by correctly selected conditions for sample preparation and purification of the extract, which contribute to the isolation of the target compounds from a complex matrix, which are present in it, often at the level of the minimum permissible level (MDU). In this work, sample preparation was carried out by solid-phase extraction (SPE) on a chromatographic column using a C18 sorbent with grafted octadecyl groups. A GC-MS multimethod has been developed for the determination of synthetic pyrethroids (promethrin, bifenthrin, β -cyanoalotrin, isomers of permethrin and cypermethrin, fenvalerate, deltamethrin, which, along with other insecticides, for example, neonicotinoids, are frequent causes of lethal intoxication of bees.

Quantitative determination of synthetic pyrethroids under GC-MS conditions is carried out in the registration mode of selective ions (main and confirmatory ions, respectively). The proposed method for the determination of synthetic pyrethroids for the purposes of their API monitoring is characterized by a detection limit that does not exceed the MRL in ecomonitoring objects.

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