

Abstract

Paenibacillus larvae is a gram-positive spore-forming bacterium that affects and kills the larvae of the honey bee (*Apis mellifera*) and causes the American foulbrood disease. Adult bees do not become infected, but they transmit tenacious spores within the hive and between hives and can infect larvae while caring for them. It is not allowed by law to treat bees in the Czech Republic, but the recommended preventive method for reducing the amount of spores in the hive is the shook swarm method (bees are moved to a new clean hive and the old hive is destroyed with all brood and supplies). The aim of this work was to detect and quantify *P. larvae* in bee workers using the quantitative real-time polymerase chain reaction (qPCR). In the first experiment, the two sets of samples were taken – bees before and after the shook swarm method, but the expected decrease in spores in the samples taken after shook swarm was not confirmed, and conversely, non-specific products were amplified. In the second experiment, the presence of *P. larvae* spores in samples from heavily infected hives (with clinical symptoms of American foulbrood) and from hives with almost no findings of *P. larvae* spores, both originating from the same habitat, were compared. In this case, the differences were clearly visible. There were not enough suitable data for the planned finding of limits of detection of *P. larvae* by qPCR. Finally, detection and quantification of *P. larvae* were successful in heavily infected hives and the causes of non-specific amplification were discussed.

Key words:

Paenibacillus larvae, American foulbrood, *Apis mellifera*, European honey bee, interaction, shook swarm method, qPCR