

## **IN VITRO EVALUATION OF *Bacillus* spp. AGAINST *Varroa destructor* AND EFFECT IN ADULT OF *Apis mellifera***

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**Introduction:** *Varroa destructor*, is the most destructive and important pest in beekeeping worldwide. For control, beekeepers use chemical miticides, but this mite has developed resistance, also, the chemical miticides leave residues in honey and other products and are toxic to bees. An alternative to controlling *V. destructor* is the use of entomopathogenic bacteria, mainly, spore-forming which belong to the genus *Bacillus*. The objective of this study was to evaluate bacteria of the genus *Bacillus* isolated from corpses of *V. destructor* against the mite and determine the effect in *Apis mellifera*.

**Materials and methods:** Fifty-four strains of *Bacillus* spp. were isolated from 250 corpses of *V. destructor*. Twenty two isolates were tested for pathogenicity; for this, groups of 30 mites were immersed in a concentration of 100 ng/μL of total protein. Subsequently, two strains that caused higher mortality were selected for virulence test. Also, we used a strain to assess pathogenicity in 450 *A. mellifera* adults which were fed for seven days with 1, 5, 25, 50 and 100 ng/μL of total protein, at end of period; the consumption of food was measured. In each treatment, 30 bees were used to evaluate the effect on motion activity and proboscis extension response.

**Results:** All strains tested against *V. destructor* were pathogenic; nine produced over 80% mortality at 48 hours after treatment with 100 ng/μL. The LC<sub>50</sub> (Lethal concentration to kill 50% of the population) of the EA3 and EA11.3 strains was of 7.11 and 22.83 ng/μL respectively. The results also show that the EA3 strain produces low mortality (less than 5.55%) in *A. mellifera* and not alter the syrup consumption, motion activity, or the proboscis extension response.

**Discussion:** Strains of *Bacillus* spp. evaluated in this research can be used successfully in the biological control of *V. destructor* without adverse effects on *A. mellifera*.