Miticide Microencapsulation: Evaluating the Effect of Microencapsulation of Thymol Miticide Treatments on Honey Bee [Apis mellifera] Colonies

Gostomski, Samuel

Varroa mites (Varroa destructor) have caused significant impacts on honey bees (Apis mellifera) in the United States through by introducing a new series of pathogens. The purpose of this research was to determine the effect of microencapsulation on thymol, a naturally occurring miticide. 10g of Thymol was dissolved in 20 mL of water and 20 g of melted beeswax to prepare a 25% (w/v) Thymol/Beeswax solution. The solution was microencapsulated via a dry-ice method to quickly solidify the solution. The microencapsulated Thymol/Beeswax solution was fed to the experimental hive while one hive received a traditional treatment and the control hive received a microencapsulated sugar solution. After six weeks of treatment samples were collected from wax in the frames of the hive, as well as samples of the worker bees. Samples were processed and analyzed using a Modified Lowry Protein Assay Spectrophotometric Analysis, which yielded concentrations of active ingredient in each sample: Microencapsulated Thymol was found at a mean concentration of 0.5895µg/mL in the Apis mellifera sample, traditional miticide and treatment was found to have a mean active ingredient concentration of 0.5132µg/mL in the Apis mellifera sample. Microencapsulated thymol was found at a mean concentration of 0.2992µg/mL in the wax sample, while traditional miticide treatment was found to have a mean active ingredient concentration of 0.1772µg/mL in the wax sample. The researcher concluded microencapsulated Thymol was found to have similar levels of active ingredient in as the traditional treatment in worker bee samples but have significantly higher concentrations in wax samples.