PP-463 [Bee Biology]
The use of fungal extracts as a dietary supplement to improve bee health and immunity

Leticia Salvioni Ansaloni[1], Valentina Videčnik[1], Patrycja Anna Staniszewska[2], Aneta Strachecka[2],
Caio Eduardo da Costa Domingues[1], Ales Gregorc[1]
[1]Faculty of Agriculture and Life Sciences, University of Maribor, Pivola 10, 2311 Hoče, Slovenia
[2]University of Life Sciences, Department of Zoology and Animal Ecology, 13 Akademicka Street, Lublin, Poland

Bees are key pollinators for a wide variety of crops and contribute significantly to maintaining biodiversity worldwide. However, various stressors, including pathogens, contribute to colony decline and are linked to the detriment of honey bee health. Recent studies suggest that fungal extracts have antimicrobial and antioxidant properties, which can prevent viral infections in bees and may be used as a dietary supplement. Despite this, limited research exists on the effects of fungal extracts on honey bee immune system enzymes. In this study, we aimed to investigate the potential of fungal extracts as a dietary supplement for honey bees, focusing on their effects on immune system enzymes. Ten experimental honey bee colonies (Apis mellifera carnica Pollmann, 1879) were divided into five groups, each consisting of two colonies. The colonies were fed with the following fungal extracts: Ganoderma lucidum (4%), Inonotus obliquus (4%), Trametes versicolor (4%), and Hericium erinaceus (4%), diluted in sugar syrup (sugar: water; 1:1), along with one control group, where bees received only sugar syrup without fungal extracts. The colonies were fed three times a week for three weeks, with a total of three liters of food provided to each colony by the end of the experiment. From each group, 3 µL of hemolymph was collected individually from 10 bees per treatment group at 7, 14, and 21 days, respectively. The samples were then added to a sterile microtube containing 127 µL of 0.6% NaCl and promptly chilled at -25°C for biochemical analyses. Cholesterol, Glutathione S-Transferase, and Triglycerides were analyzed, and our results showed that when bees were fed with fungal extracts, the activities of these enzymes increased ($p<0.0001$), especially after 14 days, compared to bees that were only fed syrup without fungal extracts. Our study has demonstrated that fungal extracts can improve the natural immunity of bees, and based on these results, we can suggest that this supplementation can help bees during their development, but more studies on this area are needed.