

Summary

Nowadays, we observe declines in honey bee populations, which is reflected in the entire natural environment. Factors such as: chemicalization, agricultural monocultures and natural pathogens and parasites weaken the immune system of bees, causing higher mortality of bee colonies. Immunostimulants may be helpful in this case. Therefore, the aim of the doctoral dissertation was to test the effect of hemp extract and CBD oil on the biochemical parameters of immunity in the hemolymph of honey bee workers in the cage and apiary experiment. Hemp extract was used in the cage experiment, and commercial CBD oil was used in the beekeeping experiment. Two experiments were divided into analogous groups: (1) sugar syrup with supplement, (2) supplement on textile strip, and (3) pure sugar syrup (control). The apiary experiment was carried out using 6 mating hives (2 hives/group) in which mini-colonies were obtained. 30 cages (10 cages/group) were used in the cage experiment. During the experiments, bees were collected once a week for hemolymph (10 bees/group/week), from which biochemical analyzes were then performed: total protein concentration, activity of the proteolytic system, enzyme biomarkers (alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase), concentration of non-enzymatic biomarkers (glucose, triacylglycerol, cholesterol, uric acid, urea, creatinine, albumin, calcium, magnesium and phosphorus ions) and the activity of the antioxidant system (total antioxidant capacity, superoxide dismutase, glutathione peroxidase, catalase, glutathione). The results obtained from the two experiments were mostly identical. The experiments showed: higher activity of protease inhibitors, lower activity of proteases, higher activity of all antioxidant enzymes, enzymatic and non-enzymatic biomarkers in the experimental groups in relation to the control group. In all cases, we noticed higher activities and concentrations in the group with the supplementation in sugar syrup. Bees in the cage experiment lived the longest: 56 days (extract in syrup), 49 days (extract on strips) and 35 days in the beekeeping experiment compared to the control (28 days). "Hemp" supplementations turned out to have a positive effect on the immunity of honeybees in the cage and apiary environment.

Key words: hemolymph, humoral immunity, cannabidiol, antioxidants