



Content of total protein and its fractions in hemolymph of bees depending on the level of citrates Mg introduction to sugar syrup

¹Kovalchuk I.I., ²Androshulik R.L., ²Tsap M.M.

¹Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies, Lviv

²Institute of Animal Biology NAAS, Lviv



Introduction

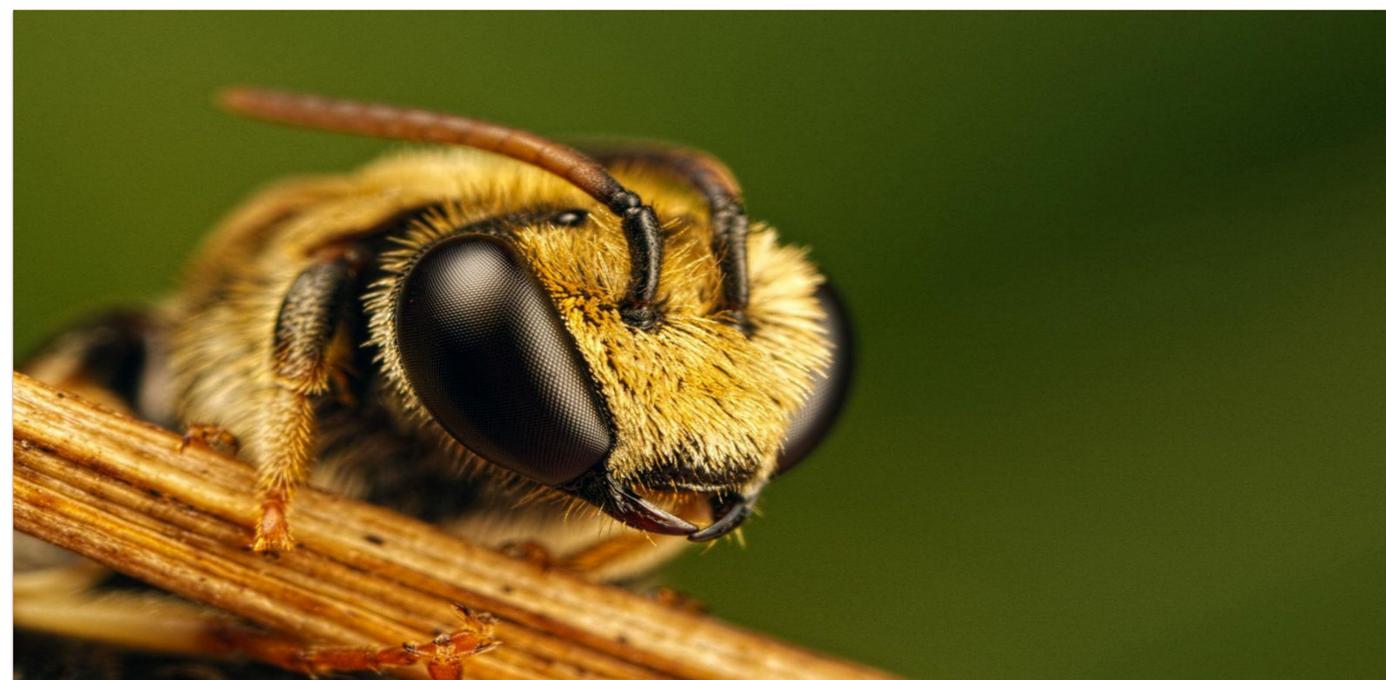
It is known that bee hemolymph is directly related to all major metabolic processes in its body. The protein content in the hemolymph of worker bees is labile and depends on many factors, the most important of which is the level of protein nutrition, as well as the physiological state and related functional activity of bees. In adult bees, the protein content in the hemolymph is more constant, it varies significantly depending on the season. The highest value is observed in fall and winter. Given the physiological characteristics of bee hemolymph, which are associated with the main metabolic processes in its body, studies have been conducted on the effectiveness of the use of Mg citrate in the spring feeding with sugar syrup.

Results

The results showed that levels of total protein in the hemolymph of research groups' bees were not significantly different from the control. However, under conditions of feeding bees with Mg citrate at a dose of 0.01 mg / l, the protein level was lower by 4%. Results of the study of protein fractions of bees' hemolymph showed that albumin is reduced in III and IV groups ($p < 0.01$), the highest content was in the second group. At the same time, there was a decrease in $\alpha 1$ - globulins in the hemolymph of IV group bees, on the background of higher content in group II ($p < 0.05$). However, the percentage of $\alpha 2$ - globulins was characterized by a tendency to a higher content in the hemolymph of bees of groups II, III, and was probably higher ($p < 0.05$) in group IV compared to the control. Analyzing the changes in the percentage of β - globulins in the hemolymph of bees, a decrease in their level was found in the II and IV ($p < 0.05$) experimental groups compared to the control. The percentage of γ - globulins was characterized by a decrease in hemolymph of II group ($p < 0.05$) on the background of higher levels in IV ($p < 0.05$) experimental groups. Such changes may be due to the regulatory effect of Mg citrate on the intake of individual protein fractions from adipose tissue into hemolymph in the absence of protein feed in bees under thermostat conditions, where carbohydrate nutrition prevailed for 30 days of the study period.

Material & Methods

Research was conducted at the Institute of animal biology NAAS on 4 groups of Carpathian breed bees (25-30 insects in each group), which were selected for experiments in laboratory, vivarium apiary. Isolated bees of control (I) group received 1 ml of 50% sugar syrup and 1 ml of H₂O daily; Group II (experimental) - 1 ml of sugar syrup with the addition of 1 ml of Mg citrate containing 0.04 mg Mg / l; Group III (experimental) - 1 ml of sugar syrup with the addition of 1 ml of Mg citrate (0.02 mg Mg / l); Group IV (experimental) - 1 ml of sugar syrup with the addition of 1 ml of Mg citrate (0.01 mg Mg / l). Bees of control and experimental groups were kept in similar conditions of microventilation laboratory thermostat by temperature 30° within 30 days of research. On day 30, bee hemolymph was obtained and the protein concentration was determined using the biuret method. The relative spectrum of soluble proteins of bee hemolymph was determined by electrophoresis in 7.5% polyacrylamide gel. The obtained digital data were processed using a standard package of statistical programs *Microsoft EXCEL*.



Conclusions

According to use of Mg citrate during the feeding of honey bees, the ratio of individual protein fractions of hemolymph changed with a decrease in the relative content of albumin, β -globulin and an increase in $\alpha 2$ - and γ -globulins under the action of 0.01 mg Mg. The effect of 0.04 mg Mg caused an increase in the relative content of $\alpha 1$ and a decrease in β and γ -globulins in the hemolymph of honey bees of the studied groups. According to results, we can expect an additional study of influences of changes in the protein composition of hemolymph on the development and productivity of bees.