



MINERALS COMPOSITION AND QUALITY INDEXES OF PRODUCTION OF BEEKEEPING AFTER FEEDING Ge AND Co CITRATE

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Introduction

Perspective direction in the enrichment feed bees micronutrients is to use nanokarboksylativ biotic metals that increase biological value of their products. Adding to feed bees compounds individual elements as metabolic stimulants organic and inorganic correction affects physiological and biochemical processes of the body, increases productivity and resistance. These mineral components include Co, Zn, Ge, Se, Ag and Cu. The expediency of their use not only in order to obtain a biocidal effect, but also as active nanotechnological compounds, which are much more effective than trace elements in the classical ionized form, has been proved. In this regard, of scientific and practical interest is the study of the effect of different levels of Co and Ge citrates obtained by nanotechnology, introduced into the components of feeding bees, on the content of certain trace elements in their products - in honey to determine quality and pers.

Material & Methods

Studies conducted on four groups of bee colonies, bees counterparts by weight, strength of family, the age of the uterus, a family of three in each group. Bees control (I) group received in spring fertilizing with 50% sugar syrup in quantities of 300 ml / family / week. The second group of bees (experimental) - additionally from 300 ml of sugar syrup received 30 mcg Co in the form of citrate, III group - from 300 ml of sugar syrup received 60 mcg Ge in the form of citrate, IV group - from 300 ml of sugar syrup received 30 mcg Co citrate and 60 µg Ge in the form of citrate. The duration of the watering citrate syrup and Co and Ge was 4 weeks. Samples of perga and honey in which the content of individual heavy metals (Cu, Fe, Co, Cr, Zn, Pb, Cd) was determined on the atomic absorption spectrophotometer SF-115 PC, as well as qualitative indicators of honey were taken for research. Statistical analysis of the results was performed with the definition of averages and install likelihood ratio for Student.

Results

Feeding sugar syrup with different amounts of citrate Ge and Co are not the same differences led some mineral elements content in perge and honey. In particular, samples cerago observed significantly higher concentrations of Fe ($p < 0,001$), Zn and Co ($p < 0.05$) compared to controls. There is a tendency to increase the level of Cu in the samples of perga of all experimental groups against the background of a decrease in the content of Pb and Cd ($p < 0.05$) compared with the control. In honey observed increased content Fe ($p < 0,001$), Co, Cu and Zn, amid falling Cd and Pb, as compared to the control. At the same time, the samples of honey of the experimental groups showed a probably higher level of proline and hydrogen ions ($p < 0,001$). This indicates the stimulating effect of sugar syrup and its combination with Ge and Co citrates on microbiological processes in honey and its enzymatic activity during ripening.



Conclusions

According to feeding with sugar syrup of Ge and Co citrates caused a certain corrective effect on the content of Fe, Zn, Cu, Co, Cr and a pronounced antagonistic effect on the level of toxic metals such as Pb and Cd in samples of perga and honey of honey bees. Studies have shown that both separate and complex addition of micronutrient citrates to honey bees leads to multidirectional changes in the content of individual mineral elements in their products. These relationships between mineral elements must be taken into account in the schemes of spring feeding of bees.