

## MACRO- AND MICROELEMENTS OF BLOOD AND ITS ANTIOXIDANT ACTIVITY IN LACTATING COWS UNDER THE ACTION OF IODINE CITRATE IN DIFFERENT DOSES

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The earlier studies indicate the important role of iodine in the life of the organism. The determinative influence of this element on the reproductive ability of females and their productivity has been proved. However, the use of mineral salts of iodine in animal rations is limited by their high chemical reactivity. Currently, the nanotechnology for the production of carboxylates of macro- and microelements has been developed in Ukraine, including iodine citrate, which makes it possible to use organic compounds of iodine as an environmentally safe feed additive. The purpose of the research was to find out the effects of various doses of iodine citrate on the content of macro- and trace elements in the blood and antioxidant protection of the body of cows in the first period of lactopoesis.

The research was carried out on 15 full-year-old cows of Ukrainian black-and-white milk breed, formed in the winter-stool period, having been anchored and divided into three groups, 5 animals in each, the analogs by age (3–5 lactation), body weight (580–620 kg), the period of lactation (1<sup>st</sup> month after calving). Cows of group I (control) received the basic diet, which was normalized according to the physiological state, productivity and body weight. The animals of the II (experimental) group from 18–23 to 78–83 days of lactation received daily iodine citrate in the feed of the basic diet at a rate of 0.6 mg I/kg of dry matter of the diet, and animals of the III (experimental) group received the basic diet and the iodine citrate at the rate of 0.06 mg I/kg of dry matter of the diet. For biochemical studies, selected samples of venous blood were used in the preparatory (prior to feeding I citrate) and experimental (60 days of supplementation of the iodine supplement) periods. The processes of mineral metabolism were evaluated by the concentration of Ca, P, Fe, Zn, Cu in the blood, and the antioxidant defense of the organism by the content of lipid hydroperoxides, TBK-active products and its catalase, glutathione peroxidase and superoxide dismutase activity.

The probable influence of iodine citrate on mineral metabolism and the antioxidant protection of cows in the beginning of lactation has been established. In particular, in the blood of cows of II and III groups, the content of Ca ( $P<0.001$ ), P ( $P<0.05$ ), Fe, and Zn was increased only by 0.6 mg of iodine. These data indicate a more pronounced effect of higher applied dose of iodine citrate for the exchange of Zn, and Ca, P and Fe — for both concentrations of iodine. The applied doses of iodine citrate resulted in activation of the enzyme level of antioxidant protection of the organism, as evidenced by an increase in the catalase activity ( $P<0.05$ ), glutathione peroxidase ( $P<0.05$ ) and superoxide dismutase ( $P<0.05$ ) blood counts in both experimental groups. However, the content of lipids hydroperoxy decreased significantly only in the blood of cows under the action of lower (0.06 mg I) dose.

Consequently, the use of iodine citrate, obtained by the method of nanotechnology, in doses of 0.6 and 0.06 mg I/kg of dry matter of the diet in the first 3 months of lactation causes an increase in Ca, P and Fe content, and Zn — only under the action of 0.6 mg of iodine citrate in the blood during the 1<sup>st</sup> period of lactopoesis and enhances the enzyme level of antioxidant protection of their organism. The obtained results of the research can be used to substantiate the approbation of iodine citrate application to their diet on the sufficient lactation cows in the range of experimentally determined doses (0.06–0.6 mg I/kg of dry matter of the diet).

**Keywords:** MINERAL METABOLISM, ANTIOXIDANT ENZYMES, LACTATION