

The effect of fasting on lipid metabolism and on antioxidant enzyme activity in the myocardium of chickens fed with supplementary organic selenium

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The aim of this study was to investigate the effect of fasting on the lipid metabolism, the intensity of lipid peroxidation and the activity of anti-oxidative enzymes in the myocardium of chickens fed with organic selenium supplementation. The research was performed on broiler chickens (Ross 308), divided into two groups: the control group, fed with standard diet with 0.15 ppm inorganic selenium during growing, and the experimental group, where 0.3 ppm organic selenium was supplemented into the standard diet. After the end of growing, at the animals' 42nd day of life, ten chickens from the control group and ten chickens from the experimental group were randomly selected and sacrificed. The other birds were submitted to a 48-hour fast, having ad libitum access to drinking water. After fasting, at the 44th day of life, another ten chickens were randomly selected from both chicken groups and sacrificed.

After the sacrificing, heart samples were collected and homogenised. In these samples, the concentration of triglycerides, cholesterol and thiobarbituric acid reactive substances (TBARS), and the activities of lipoprotein lipase (LPL), glutathione peroxidase (GSH-Px), catalase (CAT), copper zinc superoxide dismutase (Cu,Zn-SOD) and manganese superoxide dismutase (Mn-SOD) were determined spectrophotometrically. The results were analysed statistically and the significance of the differences between pre- and post-fasting values, as well as the obtained values between the control and the experimental group was verified by Student t-test. After fasting, the myocardial activities of CAT and of Mn-SOD significantly rose in control ($P < 0.001$; $P < 0.02$) and experimental ($P < 0.001$; $P < 0.01$) groups. At the same time, the chickens fed with supplementary organic selenium had a significantly higher GSH-Px activity than the standard fed control group ($P < 0.02$). On the basis of the obtained results, it can be concluded that fasting resulted in an increase of catalase and of manganese superoxide dismutase activities, with the purpose of helping to prevent the development of oxidative stress. The results of the present investigation suggested a positive effect of organic selenium supplementation of chicken feeds, which presented as a higher GSH-Px activity, and, consequently, better anti-oxidative protection.

Keywords: antioxidant enzyme, lipids, chickens' heart, fasting, selenium