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**THE ACTIVITY OF ENZYMES OF THE GLUTATHIONE  
SYSTEM IN ERYTHROCYTES OF SCALY CARP ON THE EFFECT  
OF LEAD**

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**Formulation of the problem.** The results of study of the effects of lead on the indices of antioxidant system in blood cells of carp (*Cyprinus carpio* L.) are presented in the article. It is known that the main mechanism of lead toxicity is the development of oxidative stress as evidenced by disturbances in the pro- and antioxidant blood system as an integral indicator  $\Phi$  of the body status. In this regard, important is to ascertain the metabolic effects of lead in red blood cells that are among the first to fall under the influence of toxins altered internal environment and possess strong antioxidant defense system. The purpose of our study was to investigate the effect of lead on the activity of enzymes of the glutathione system in erythrocytes of scaly carp.

**The main material.** Experiments were performed on 2-year old fishes, which after the catching from natural pond were kept in aquaria under standard laboratory conditions. In our studies we used a two-year carp flake (*Cyprinus carpio* L.) with average weight 300–350 g. Each experimental group included in 7 animals. We investigated the influence of lead ions ( $\text{Pb}^{2+}$ ) at a concentration of 0,2; 0,5 and 5 mg/l, corresponding to 2; 5 and 50 maximum permissible concentration (MPC) on the fish organism. After a period of acclimatization the fishes of studied groups were kept in the presence of  $\text{Pb}(\text{CH}_3\text{COO})_2 \times 3\text{H}_2\text{O}$ . Fish was kept in a medium with the addition of lead acetate for 96 h. The activities of enzymes of antioxidant system (glutathione peroxidase, glutathione reductase) in erythrocytes of carp (*Cyprinus carpio* L.) were analysed.

As a result of the studies we found a significant increase in the activity of antioxidant enzymes during exposure of 2 and 5 MPC lead ions, and inhibition of enzyme activity at 50 MPC, indicating significant stress protective systems against the background of activation of oxidative stress. These data indicate that under glutathione peroxidase, glutathione reductase activities is important factor of antioxidant defense in erythrocytes, protecting the cells of fish from the influence of heavy metals.

**Conclusions.** As a result of the studies we found a significant increase in the activity of antioxidant enzymes during exposure of 2 and 5 MPC lead, and inhibition of enzyme activity at 50 MPC, indicating significant stress protective systems against the background of activation of oxidative stress. The data showed

that the red blood cells of fish are particularly sensitive to oxidative stress induced by lead ions. The data showed that the red blood cells of fish are particularly sensitive to oxidative stress induced by lead ions, so urgent is to develop tools that would have warned accumulation of the free radical reactions products in these cells.

**Key words:** lead, erythrocytes, blood, antioxidant system, glutathione peroxidase, glutathione reductase, scaly carp.

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