



Effect of copper on aminotransferases serum activity in European carp

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Abstract

Intracellular enzymes activity level elevation in serum is a sign of hepatocytes toxic destruction and an indicator of profound cell alterations. The aim of this study is to assess toxic influence of heavy metals in fish. This research was intended to analyze aminotransferases (ALT, AST) serum activity under the influence of various copper concentrations in European carp.

Materials and methods

In this experiment 3 groups of fish (European carp) were formed, 10 fish in each group: control group; 1-experimental group – fish were contained in water with 0.01 mg/l copper acetate concentration (10 times higher than fishery waters permissible exposure limit according to the laws of the Russian Federation); 2-experimental group – fish were contained in water with 0.1 mg/l copper acetate concentration (100 times higher than fishery waters permissible exposure limit according to the laws of the Russian Federation). Exposure time was 4 hours. The blood samplings were taken from heart by syringe and placed in dry test tubes. After samplings centrifugation in non-hemolysed serum samples ALT and AST activities were assessed.

Results

The study revealed that there were meaningful elevation of ALT and AST serum activity ($p \leq 0.01$) by 19.77% (25.68 ± 0.59 IU/l) and 16.84% (264.85 ± 7.6 IU/l) accordingly in 1-experimental group in compare with control group (21.44 ± 0.72 IU/l and 226.68 ± 4.35 IU/l).

In case where the copper acetate concentration were 100 times higher than fishery waters permissible exposure limit were meaningful elevation of ALT and AST serum activity ($p \leq 0.01$) by 81.62 % (38.94 ± 0.83 IU/l) and 71.81% (389.46 ± 18.7 IU/l) accordingly in 2-experimental group in compare with control group.

Conclusion

After analyzing the received data there were established meaningful aminotransferases serum activity elevation under the influence of various copper concentrations in European carp. This was possibly due to gluconeogenesis activation in order to support an adequate glucose level in conditions of catabolic process dominance during copper poisoning.

References

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