EFFECT OF CADMIUM SULPHATE ON PROTIEN AND CARBOHYDRATE LEVEL IN BRAIN AND OVARY OF FRESH WATER FISH *HETEROPNEUSTES FOSSILIS* (BLOCH)

Mishra A.*, Kumar A., Rawat A.

Department of Animal Applied Sciences, Babasaheb Bhimrao Ambedkar University, Lucknow, 226025, India
Email: drabhamishra@gmail.com

Introduction:

Cadmium is a non essential heavy metal and has been listed in the "Black list" of European community. Among the various heavy metal pollutants, cadmium merits special attention due to its potential hazards to aquatic biota as well as to human being. Cadmium alter morphological, physiological and biochemical parameters in fishes [1]. Such effects change digestive enzyme activities [2], decreased immunity state and efficiency of food assimilation [3]. The present report was based on toxicity effects of cadmium sulphate on biochemical property of brain-ovary of freshwater fish *Heteropneustes fossilis.*

Methods:

The live fish *Heteropneustes fossilis,* of similar body weight were acclimatized under normal photoperiod and temperature. Feeding was stopped before 24 hr of experiment. Fish were treated with different concentrations of cadmium sulphate (10, 50, 100, 500 and 1000 mg/l) for 24 hr to see its lethality and sub-lethal concentration (50 mg/l) was used to see the duration effect. A control set was maintained side by side for comparison. The fishes were sacrificed after completion of concentration and duration studies and dissected out the required tissues i.e. brain and ovary. Protein and carbohydrate estimation in both the tissue was done by the Lowery's and Anthrone reagent method respectively.

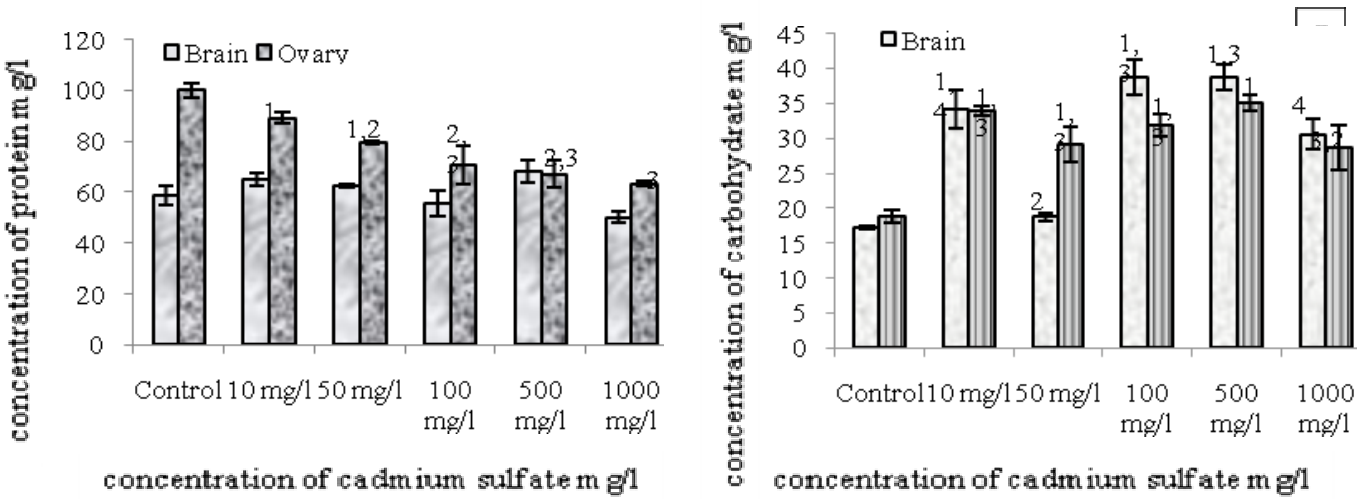
Results and Discussion:

Different concentrations of cadmium sulphate (mg/l) altered the protein and carbohydrate level in brain-ovary in different manner. With the increase of concentration and fish mortality (Table 1), protein concentration in the ovary was decreased while brain showed not much significant variation (Figure 1A). But as for carbohydrate concerned it showed fluctuations but with high values as compared to the control group (Figure 1B) in 24 hr. This may be due to immediate extra energy requirement of fish due to stress features (panting, surface activity, high mucous secretion etc) [4]. Stress caused by cadmium increased the glucose content in blood, because of intensive glycogenolysis and the synthesis of glucose from extrahepatic tissue protein and amino acid in many fishes [5]. When sub-lethal concentration i.e. 50mg/l (Table 1) was used

Table 1. Percent mortality of Heteropneustus fossilis after treatment of various concentration of cadmium sulphate for 24 hr (number of animal per group, n=10).

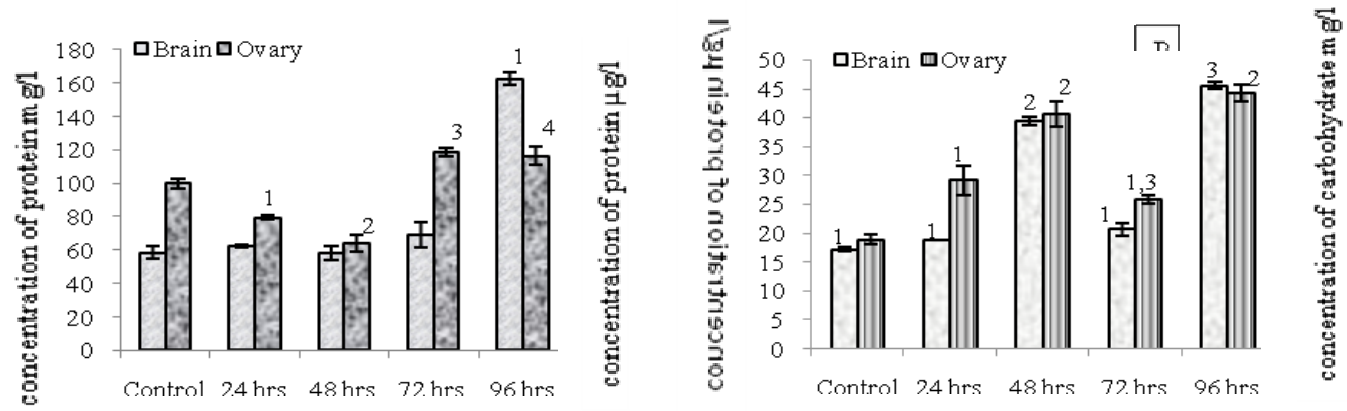
	Concentration of cadmium sulphate (mg/l)									
	0	10	50	100	500	600	800	900	1000	1200
% Mortality	0	0	0	0	20	20	40	60	100	100

Figure 1: Effect of different concentration cadmium sulfate on brain and ovarian protein and carbohydrate level after 24 hr duration (n=5). Superscripts showed significant difference among different groups (One way ANOVA followed by Newman Keuls' test).



for duration effect study, there was a significant increase in protein-carbohydrate content of brain-ovary with the duration (Figure 2A,B). This might be an indicator of environmental adaptation [4].

Figure 2: Effect of sub-lethal cadmium sulfate (50 mg/l) on brain and ovarian protein and carbohydrate level after 0, 24, 48, 72, 96 hr intervals (n=5). Superscripts showed e significant difference among different groups (One way ANOVA followed by Newman Keuls' test).



Conclusion:

The heavy metal caused deleterious effect on fishes and altered the biochemical characteristics. In sub-lethal, it may not be fatal for an individual organism but it does affect the biochemical parameters resulting in disturbance to whole community and tropic level of food chain, ultimately the ecosystem.

References:

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