EFFECT OF COPPER TOXICITY ON FOOD INTAKE, SATIATION TIME AND PREDATORY EFFICIENCY IN CARP, *CYPRINUS CARPIO*

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Abstract : This study was carried out effect of copper toxicity on food intake, satiation time and predatory efficiency in carp, *Cyprinus cario.* The mean number of prey organism, *Artemia* consumed by control and copper exposed *C.carpio*. copper toxicity might be reduced the digestability and fish consumed the feed slowly and took maximum time for satiation time as compared to control fish. The copper exposed individuals were severely affected and thereby it could not take more food as compared to control fish. The maximum number of *Artemia* was consumed during the first 20 min feeding there after the predation was gradually declined. The rate of feed consumption and predatory efficiency was high in control fish compared to copper exposed fish.

Keywords: Cyprinus carpio, *Artemia*, copper, satiation time, predatory efficiency

Introduction

Water is one of the most important natural resources for all the living organisms, whether unicellular or multicellular, since it is required for their various metabolic activities. Fishes are widely used to evaluate the health of aqutic ecosystems because pollutants build up in the food chain and are responsible for adverse effects and death in the aquatic system (Farkas et al., 2002). Copper occurs in the environment and are toxic to fish James et al., 1992 ; James,2011). Food is the most significant factor affecting growth and metabolism in fish (James, 2009). The success of an organisams depends mainly on the choice of foods that provides all necessary nutrients. The quantity and quality of feed and feeding duration are the most important factors to obtain maximum growth of cultivable fish and substantially reduce the production cost. Hence, an attempt has been made to study the impact of sub lethal levels of copper on food intake, satiation time an predatory efficiency in carp, *cyprinus carpio.*

Materials and methods

Well acclimated fingerlings of experimental fish *C.carpio* were selected from the stock tanks . They were divided in two groups. The first groups was maintained freshwater and fed with control diet for 30 days .simultaneously, the second group was maintained in with sublethal concentration of copper at 0.5ppm and control diet for 30 days after 30 days of copper exposure and control group, they were separately subjected in to the assessment of food intake, satitation time and predatory efficiency in *C.carpio* .The experimental animals were individually reared in circular glass aquaria each containing 1*l* of water and five replicates were maintained .a weighed quantity of uniform sized prey organisms (wet weight of an *artemia*=2.57mg) were introduced into each aquarium containing test animals. The number of prey organisms consumed was contionuously observed with the help of a stop watch at 60 mins. The experiment was repeated for five days from 0800 to 1500 hrs at 29°C ±0.5°C. The prey organisms were completely removed from the aquaria after satiation of the chosen test animals. The rate of food consumption / predation was calculated by dividing the total weight of prey organisms consumed by the live weight of the fish.

Result and discussion

The mean number of prey organisms, *artemia* consumed by control and copper exposed. *C.carpio* gradually increased as a function of time. A predator is considered to be satiate when it does not accept any more food after continuous feeding.

(Brett,1971). The maximum number of *artemia* was consumed during the first 15mins feeding and thereafter the predation gradually declined at every consecutive 10 mins in both groups of *C.carpio* (table 1). The abrupt decline in predation rate after 20 min feeding duration in *C.carpio* was decrease in the fish hunger, which in turn caused a radical decline in attack rate until hunger was stabilized. Observably when the stomach of the predator is full, it ceases to attack and feed prey organisms. The rate of feed consumption was increased in control groups was 64.50 mg g^{-1} live fish day^{-1} and it extensively declined to 18.85mg g^{-1} live fish day^{-1} in respectively. It showed that copper toxicity reduce the feed consumption and predatory efficiency. The quantity of food consumed depends on the development of appetite (Brett, 1971; Pandian, 1975). Working on *artemia salina*, Hanaoka (1977) found a reduction in the digestability and decrease in food consumption to the tune of 33-50% at high concentration of copper. It is likely that, copper toxicity might be reduced the digestability and thereby copper exposed fish consumed the feed slowly and took maximum time for satiation time as compared to control fish.

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Table.1The mean number of prey organism, *Artemia* consumed by control and copper exposed *C.carpio*.

	Control fish		Copper exposed fish	
time	Mean no of artemia consumed	Mean wt (mg) of artemia	Mean no of artemia consumed	(mg) of artemia
1	2.00	5.00	0.33	0.83
2	4.00	10.00	1.00	2.50
3	3.33	8.33	1.33	3.33
4	4.33	10.83	0.67	1.68
5	-	-	-	-
6	7.00	17.50	1.00	2.50
7	5.00	12.50	1.67	4.18
8	-	-	1.00	2.50
9	8.00	20.00	-	-
10	7.00	17.50	0.33	0.83
11	4.33	10.83	0.67	1.68
12	-	-	1.00	2.50
13	5.00	12.50	2.00	5.00
14	7.00	17.50	2.67	6.68
15	7.00	17.50	-	-
16	-	-	1.00	2.50

17	-	-	1.33	3.33
18	4.33	10.83	1.67	4.18
19	-	-	2.00	5.00
20	5.00	12.50	-	-
21	-	-	1.00	2.50
22	4.33	10.83	1.67	4.18
23	5.00	12.50	1.33	3.33
24	-	-	-	-
25	4.33	10.83	1.67	4.18
26	4.00	10.00	1.33	3.33
27	-	-	1.33	3.33
28	4.33	10.83	-	-
29	3.00	7.50	1.00	2.50
30	1.00	2.50		
31-35				
36-40				
41-45				
46-50				
51-55				
56-60				
total	99.31	248.31	29.50	72.57
Rate of food consumption (mg/g fish/day)	64.50		18.85	