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# CADMIUM CHLORIDE TOXICITY IN GLYCOGEN LEVEL FROM BODY PARTS AND WHOLE BODY OF MARINE EDIBLE GASTROPOD *BABYLONIA SPIRATA*

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Marine edible gastropod *Babylonia spirata* (shell length 40 - 50 mm) from Mirkarwada, Ratnagiri (West coast of India), in summer were exposed to Cadmium chloride at 0.1 ppm and 0.5 ppm ($1/10^{th}$ of $LC_0$ and $LC_{50}$ respectively), for 7 days exposure *i.e.* 7 days laboratory depuration and 7 days field depuration. Changes in glycogen level of both the groups occurred as compared to control group. The glycogen level of 7 days exposed $1/10^{th}$ $LC_0$ group showed increase in operculum, soft body and $1/10^{th}$ $LC_{50}$ group showed increase in operculum, whole body while 7 days laboratory depurated $1/10^{th}$ $LC_0$ and $LC_{50}$ groups showed increase in operculum, soft body whereas 7 days field depurated $1/10^{th}$ $LC_0$ and $LC_{50}$ groups showed decrease in the glycogen content in body parts and whole body. The observed results are discussed in relation to Cadmium toxicity.

## INTRODUCTION

Biochemical changes may give important indication on the mechanism of action of metals on the cell. Metals may interact with cell membrane (Rothstein, 1959) and with intracellular organelles, nuclei (Muro & Goyer, 1969; Choie & Richter, 1974). The biochemical change is considered mainly as a consequence of interference of metals with enzyme system which in turn lead to functional change. Mercury, Tin, Lead and Cadmium are among the metal ions known to inhibit the enzyme activity (Vallee & Wacker, 1970). Consequently, most heavy metals whether essential or not potentially toxic to living organisms.

Glycogen is the main constituent of the food of many gastropods. Tissue carbohydrate in the form of glucose and glycogen serve as important source of food energy with vital activities (Martin *et al.*, 1981). Mucopolysaccharides and glycoproteins are also produced in considerable amount by gastropod, which serve in providing mechanical and protective support, lubrication and as components of egg jellies and capsules (Livingstone & De Zwaan, 1983). Hence, the present investigation is undertaken to study the effect of Cadmium chloride on glycogen level in gastropod, *Babylonia spirata.*

## MATERIALS AND METHODS

The *Babylonia spirata* were collected from Mirkarwada, Ratnagiri. The adult measuring 40 - 50 mm (shell) length were kept for 24 hrs in laboratory for acclimatization. Static bioassay tests were conducted for 96 hrs performing 7 days exposure, 7 days laboratory depuration and 7 days field depuration of Cadmium chloride. Feeding was completely stopped before and during the experiment. The experiment was conducted in natural day-night rhythm.

From the data to know nominal and lethal concentration *i.e* $LC_0$ 0.1 ppm and $LC_{50}$ 0.5 ppm, knowing the $LC_0$ and $LC_{50}$ performed 7 days exposure ($1/10^{th}$ $LC_0$ and $LC_{50}$ values i.e. 0.01ppm and 0.05 ppm respectively), 7 days laboratory depuration and 7 days field depuration. In case of depuration after 7 days exposure, gastropods were returned to Cadmium free normal seawater for 7 days (in laboratory and field). The control was maintained simultaneously. At the end of $7^{th}$ day of exposure and $7^{th}$ day of depuration gastropods were sacrificed to analyze the glycogen content.

Table I : Effect of Cadmium chloride on glycogen content from body parts and whole body of marine edible gastropod *Babylonia spirata* (mg/100mg dry weight), ± S.D., % difference of control to 1/10$^{th}$ $LC_0$ and $LC_{50}$.

| Body parts and whole body | Control | 7 days exposed 1/10th | | 7 days laboratory depuration 1/10th | | 7 days field depuration 1/10th | |
|---|---|---|---|---|---|---|---|
| | | $LC_0$ | $LC_{50}$ | $LC_0$ | $LC_{50}$ | $LC_0$ | $LC_{50}$ |
| Operculum | 6.06 ± 0.11 | 7.89 ± 0.12 | 6.86 ± 0.11 | 7.97 ± 0.07 | 6.18 ± 0.12 | 5.84 ± 0.12 | 2.45 ± 0.14 |
| | | (30.20%) | (13.21%) | (31.52%) | (1.99%) | (-3.64%) | (-59.58%) |
| Soft body | 4.04 ± 0.07 | 5.26 ± 0.11 | 1.57 ± 0.24 | 6.52 ± 0.12 | 16.80 ± 0.11 | 2.33 ± 0.18 | 1.53 ± 0.13 |
| | | (30.20%) | (-61.14%) | (61.39%) | (315.85%) | (-42.33%) | (-62.13%) |
| Whole body | 7.47 ± 0.18 | 3.44 ± 0.12 | 9.83 ± 0.11 | 6.21 ± 018 | 5.80 ± 0.16 | 4.61 ± 0.07 | 7.36 ± 0.18 |
| | | (-53.95%) | (31.60%) | (-16.87%) | (-22.36%) | (-38.29%) | (-1.48%) |

The gastropods were dissected, pooled the operculum, soft body and whole body, dried in oven completely and powder was prepared for experimental as well as control group (3 individuals in each group). Standard methods were employed for estimation of glycogen (De Zwaan & Zandee, 1970). The glycogen content is expressed in mg/100mg of dry weight tissue.

## RESULTS AND DISCUSSION

The variation of glycogen level due to Cadmium chloride are presented in the Table I. As compared to control the glycogen level of 7 days $1/10^{th}$ $LC_0$ group showed increase in operculum [7.89 (30.20%)], soft body [5.26 (30.20%)] and decrease in whole body [3.44 (-53.95%)] while $1/10^{th}$ $LC_{50}$ group showed increase in operculum [6.86 (13.21%)], whole body [9.83 (31.60%)] and decrease in soft body [1.57 (-61.14%)]. 7 days laboratory depurated $1/10^{th}$ $LC_0$ group showed increase in operculum [7.97 (31.52%)], soft body [6.52 (61.39%)] and decrease in whole body [6.21 (-16.87%)] whereas $1/10^{th}$ $LC_{50}$ group showed also increase in operculum [6.18 (1.99%)], soft body [16.80 (9315.85%)] and decrease in whole body [5.80 (-22.36)]. Seven days field depurated $1/10^{th}$ $LC_0$ group showed only decrease in the content in operculum [5.84 (-3.64%)], soft body [2.33 (-42.33%)], whole body [4.61 (-38.29%)] and also $1/10^{th}$ $LC_{50}$ group showed decrease in operculum [2.45 (-59.58%)], soft body [1.53 (-62.13%)], whole body [7.36 (-1.48%)].

In the present investigation increased glycogen level was found in operculum, soft body of $1/10^{th}$ $LC_0$ group and in operculum, whole body of $1/10^{th}$ $LC_{50}$ group of 7 days exposed while in operculum, soft body of $1/10^{th}$ $LC_0$ and $LC_{50}$ groups of 7 days laboratory depurated animals whereas field depurated showed decreased glycogen level in both the groups. Increase in lipid level probably in these tissues, there was a switch over of anabolic metabolism in response to Cadmium toxicity. The present result is in good agreement with the findings of Bhagyalakshmi (1981) in the crab, *O. senex senex*, Farooqui (1982), Khan *et al.* (1990), in freshwater crab, Shaikh (1996) in crab and Patil & Mane (1997) in freshwater bivalve after exposing to the toxicant.

In this investigation there is decrease in the level of glycogen (especially in depuration) which may be due to increased utilization of glycogen for depurating the Cadmium stress. According to Bayne (1973) catabolism of stored carbohydrate reserves and disturbed protein metabolism are responses which partially characterise the stress syndrome of molluscs.

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