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Toxicity Effect of Mercury Chloride ($HgCl_2$) on the Freshwater Gastropod, *Indoplanorbis exustus*

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Keywords

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Abstract

Toxicity of $HgCl_2$ was studied in immature & mature *Indoplanorbis exustus* snails exposed to different concentration for a period of 24,48,72 & 96 hours. LC 50 values were 0.617, 0.422, 0.327, 0.275 ppm in immature snails & 0.501, 0.335, 0.237, 0.199 ppm in mature snails for 24, 48, 72 96 hours respectively.

1. Introduction

The gastropod snails & slugs are of great importance to man because of the damage they cause in agriculture, horticulture, & forestry. So that in permanently moist regions or in rainy months & years, control measures are necessary. Furthermore, they are of importance in medical veterinary practice since they serve as intermediate hosts for certain parasitic worms of man & his domestic animals. *Indoplanorbis exustus* acts as intermediate host for Schistosome parasites. Saxena & Parashari (1983) reported acute toxicities of Lead, Mercury, Cadimium, Zinc, and Chromium & Nickel to the fish, *Channa punctatus* & LC 50 values were determines for 24, 48, 72 & 96 hrs. exposure. Bodhankar (1984) & Vyawahare (1986) studied the toxicity of Copper sulphate on slug, *Laevicaulis alte*. It is in this perspective that the present work was under taken to evaluate the toxicity of Mercuric chloride to *Indoplanorbis exustus*.

2. Materials and Methods

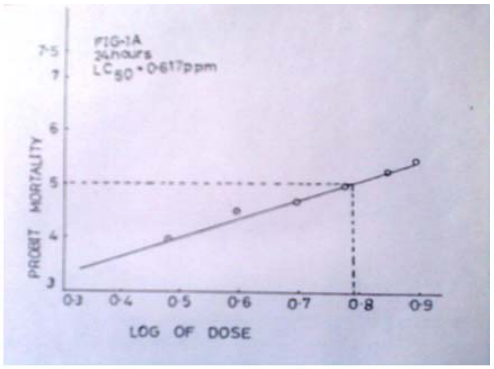
The freshwater basommatophoran snails, *Indoplanorbis exustus* were collected from Godavari river at Paithan, near Aurangabad Maharashtra state, India. The snails were brought to the laboratory and were fed once in a day with plant vegetation like *Hydrila* & *Spirogyra*. Prior to subjecting the snails to experiments they were cleaned to remove fouling, algal biomass & mud & were starved. For experimental studies healthy & active animals of approximately same size & weight were taken. The snails having length less than 4.0mm were considered to be immature & the snails having length 4.0 & 5.00 mm or more were considered to be mature (Chintawar, 1974)

Mercuric chloride was mixed with water in different concentration & group of 25 snails was released in trough. Simultaneously controls were maintained along with each group. The diluents water was changed once in a every 24 hrs. After exposure to 24, 48, 72 & 96 hours, the numbers of snails dead were counted. The criterion for death was the failure of snails to respond to prodding its foot with needle. The corrected mortality was calculated from the Abbott's formula (Abbott, 1925).Regression lines for LC 50 values were graphically calculated by using Finney's probit analysis method (Finney, 1971).

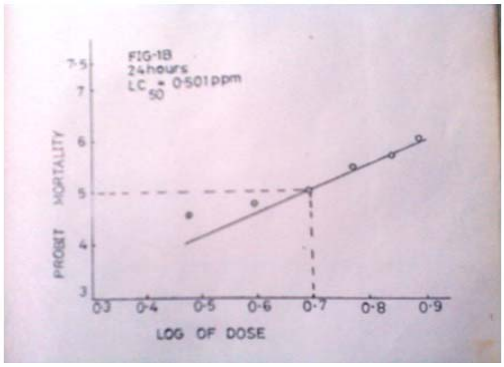
3. Results

LC 50 values for 24, 48, 72 & 96 hrs. exposures were 0.617ppm,0.422ppm,0.327ppm & 0.275ppm in the immature snails & .501ppm,0.335ppm,0.237ppm & 0.199ppm in the mature snails resp.(Figs.1A,1B,2A,2B,3A,3B,4A,4B). Thus the LC 50 values of the immature snails were maximum and that of mature snails were minimum in all exposure periods.

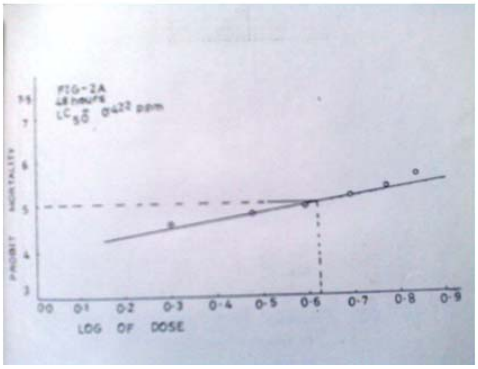
Graph 1A: 50 values for 24 hrs. at 0.617 ppm



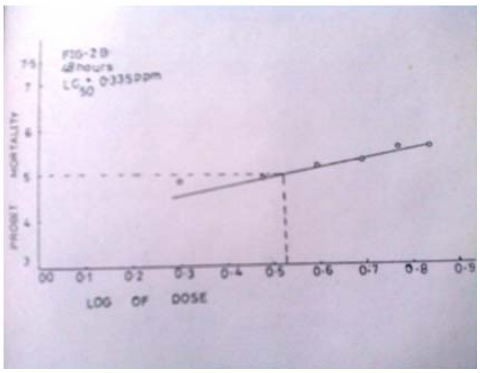
Graph 1B: 50 values for 24 hrs. at 0.501 ppm



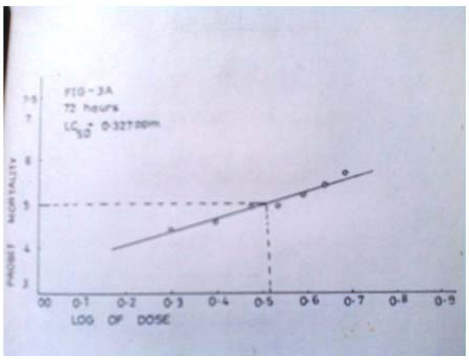
Graph 2A: 50 values for 48 hrs. at 0.422 ppm



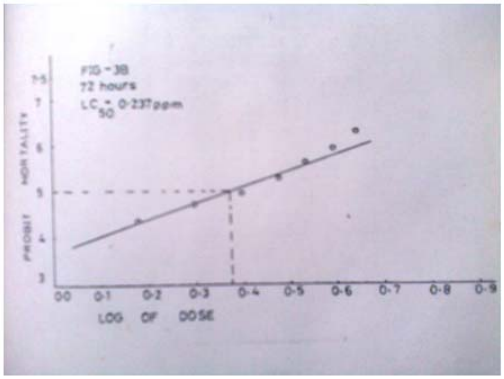
Graph 2B: 50 values for 48 hrs. at 0.335 ppm



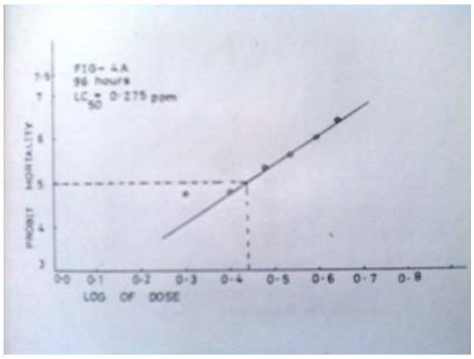
Graph 3A: 50 values for 72 hrs. at 0.327 ppm



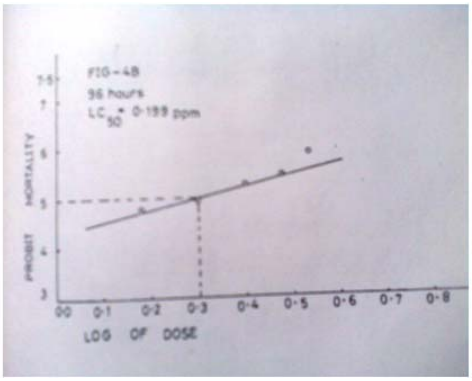
Graph 3B: 50 values for 72 hrs. at 0.237 ppm



Graph 4A: 50 values for 96 hrs. at 0.275 ppm



Graph 4B: 50 values for 96 hrs. at 0.299 ppm



4. Discussion

The molluscicide toxicity depends on the manner in which it is taken up by the molluscs. Thus the effect of heavy metal salt Mercuric chloride used as mollusicicide differs according to whether it comes in contact with the skin or is eaten & absorbed through the intestine. The same case is true with other mollusicicides.In a slug *Deroceros reticulatum* the mortality rate was always greatest when Metal-dehyde is absorbed through the skin rather than consumed orally, while in garden snail, *Helix aspersa* it exactly opposite. (Thomas, 1948, Cragg & Vincent, 1952).

Acute toxicity impact of Cadmium on freshwater bivalve mollusc *L.marginalis* were studied by Kulkarni *et al* ;(1990). Kulkarni & Magare (1990) studied the acute toxicity of Paratox to the freshwater snail, *Indoplanorbis exustus*. According to them the lethal concentration. of paratox was ranging from 1.4 to 2.2 ppm.LC 50 value was 1.27ppm for 96 hours exposure.Patil *et al* ; (1991) studied seasonal LC 50 variation in Monocrotphos exposed snail *Indoplanorbis exustus*. According to them LC 50 values after 7th & 14th day during prereproductive period were maximum & during post reproductive period minimum.

Chintawar (1974) & Vaidya (1977) calculated LC 50 values by plotting a graph of % mortality against concentration, whereas in the present study LC 50 values were calculated by plotting a graph of probit mortality against log concentration. In the present investigation the evaluation of age related mortality revealed that the immature snails were more resistant to the action of Mercuric chloride as compared to the mature snails, & the reason probably being the absorptive surface of the sole. According to Godan (1983) the juveniles before sexual maturity were extremely resistant to chemicals. The *Indoplanorbis exustus* were more sensitive to Mercuric chloride and showed aberrant and abnormal behavioral changes during toxicological experiments.

The toxicity of Mercuric chloride was inversely proportional to the time of exposure.

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References

Abbott W.S. (1925):The method of computing the effectiveness of insecticide. *J. Econ Ent.* 18: 265

Bodhankar, D.S.(1984):.Effects of pesticides on some ecophysiological aspects of the land slug, *Laevicautlis alte.* Ph.D. Thesis, Marathwada University, Aurangabad,India.

Chintawar, B.V. (1974): Studies on the biology of *Indoplanorbis exustus* Ph.D. Thesis, Marathwada University, and Aurangabad, India.

Cragg, J.B. and Vincent, M.H.(1952):The action of Metaldehyde on the slug *Agriolimax reticulates .Ann. Appl. Biol.* 39: 392 -406.

Finney, D.J. (1971): Probit analysis (3rd edition).Cambridge University press, London. Godon, D. (1983). Pest slugs and snails-Biology and control. Spinger-Verlag Berlin Heidelberg, New York

Kulkarni, A. B. and Magare, S.R.(1990):Acute toxicity of Paratox to the freshwater snail, *Indoplanorbis exustus* (Gastropoda : Pulmonata). Abstracts 11th *Ann. Sess. Acad. Environ. Bio. Aurangabad.*

Kulkarni, S.D.;& *et al* (1990):Seasonal variation in the acute toxicity impact of cadmium on the fresh water bivalve mollusc *Lamellidens marginalis* from Godavari river at Kaygaon near Aurangabad Maharashtra state, India. Abstracts 11th *Ann.Sess.Acad.Environ.Bio.Aurangabad.*

Patil V.T. and *et al.* (1991): Seasonal LC50 variation in monocrotophos exposed snail*, Indoplanorbis exustus cotoxicol Environ. Monit.*1 (4): 321-324.

Saxena , O.P.and Parashari.A.(1983): comparative study of six heavy metals to *Channa puntatus .Ibid.* 4(2) : 91-94.

Thomas,D.C.(1948):The use of metaldehyde against slugs.*Ann.Appl.Biol.*35 : 207-227.

Vaiday D.P.(1977):Studies on some aspects of physiology of *Indoplanorbis exustus*. Ph.D. Thesis Marathwada University, Aurangabad, India.

Vyawahare P.M.(1986):Effects of mollusicicide exposure to biology of the land Slug *Laevicaulis alte* .Ph.D.Thesis,MarathwadaUniversity,Auran gabad,India.