

Effect of ziram on pyruvate and lactate levels in fresh water teleost, *Labeo rohita* (Hamilton)

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SUMMARY

Freshwater fish, *Labeo rohita* were exposed to technical grade dithiocarbamate fungicide, ziram for 96 hours and the LC_{50} was determined as 0.66 mg/l. One-tenth of LC_{50} (0.066mg/l) was selected as sublethal dose for studies on pyruvate and lactate levels for a period of 1,7,15 and 30 days. The depletion in pyruvate and lactate levels and an increase in muscle lactate were observed significantly.

Key words :

Ziram, Pyruvate,
Lactate, Sub-
lethal studies,
Labeo rohita.

Pesticides are chemical substances which are used to kill or to control pests. Although pesticides produce many results in the control of pests, their harmful effects results on non-target animals, because pesticides leave residues in the soil and water even after several days of their application. These possess a constant threat to the non-target organisms, especially to the fish (Pandey, 2000). Dithiocarbamate fungicides form a large group of chemicals that have numerous uses in agriculture and medicine. It may be applied to the foliage of plants, as seed treatment and also used as a bird and rodent repellent. Ziram (zinc dimethyldithiocarbamate) belongs to a class of fungicide used worldwide in agriculture. It is generally used because of low cost, good efficacy and broad spectrum of antifungal activity. The fungicides have caused extensive damage to various tissues of fish as reported by many workers (Rani *et al.*, 1990; Tiwari and Mishra, 1996; Nivedhitha *et al.*, 1998; Banurekha and Dawood 1999; Thangavel *et al.*, 2004; Sindhe *et al.*, 2006).

Lethal effects are rare in nature because the organisms are exposed to low concentrations, which are normally sublethal (Dehn and Schriff, 1986). Hence, the objective of this study was to investigate sublethal effects of ziram on pyruvate and lactate levels of freshwater fish, *Labeo rohita* which are one of the commercially important edible fish.

MATERIALS AND METHODS

The fish, *Labeo rohita* were procured

from the Department of Fisheries, Anantapur, Andhra Pradesh. They were acclimated to laboratory conditions for fifteen days prior to the experiment. During acclimatization, fish were fed daily with rice bran and oil cake in the ratio of 2:1. *Labeo rohita* weighing 10 ± 2 gm were selected from the stock. Technical grade ziram (90%) was obtained from Rallis India Ltd., Bangalore. The toxicity tests were conducted as per the recommendations of APHA *et al.* (1998). Fish were exposed to different concentrations of ziram and mortality rate was recorded. The data were subjected to Probit analysis (Finney, 1971) and Dragstedt-Beherens equation (Carpenter, 1975) to determine LC_{50} values. In the present study, $1/10^{\text{th}}$ of 96 hours LC_{50} value of ziram (0.066 mg/l) was selected as sublethal concentration for chronic studies (1, 7, 15 and 30 days) to observe the pyruvate and lactate levels in various tissues of fish, *Labeo rohita*. Pyruvate was estimated by the method of Friedman and Haugen (1942) and lactate was estimated by the method of Barker and Summerson (1941). The values were expressed as mg/gm wet weight of tissue.

RESULTS AND DISCUSSION

Pyruvate and lactate levels were observed in gill, liver and muscle tissues of *L. rohita*. In the present study, relative to controls, the level of pyruvate progressively decreased (Table 1) and the level of lactate decreased in gill and liver, where as the lactate levels increased in muscle tissue (Table 2).

Evaluation of carbohydrate metabolism in

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