Acute Toxicity Of Zolone To A Fresh Water Gastropod
Thira Lineate Changes In Rate Of Respiration

S. J. Pawar

Kalwan Education Society’s Arts, Commerce and Science College Kalwan (Manur) Tal.
Kalwan, Dist. Nashik Maharashtra India.

Abstract

Fresh water field crab has been studied by Bhagya and Rammurti (1981) Aness (1975) and verma et.al. (1978) observed the toxicity of same organophosphate compounds. The oxygen consumption has been estimated by Alom and Lomte (9184) after exposing the gastropods.

Viviparous bangalensis in Zink sulphate Lowry, O.N; Rosenbrough N. J; Farr, A.L. and Randall R.J. et.al. (1951 1983) have observed the effects of carboryl on oxygen consumtion of the fish, Channa punctatus chaudari. et. al (1988) have observed rate of oxygen consumption considering the studies on pesticide pollution on the fresh water gastropod Thiara, on the fresh water gastropod. Thiara on the fresh water gastropod. Thiara Lineata the present investigation has under taken with the view to understand the acute toxicity and the effect on the rate of oxygen consumption. Organochloride compounds are now extensively use in place of organochloride compounds on account of thir lesser residuals toxicity but the aquatic animal mortality remains an important object of water pollution research. Kaviraj Konar (1982) has studied the effects of heavy metals on acute toxicity of mercury chromium and cadmium and cadmium to the fish.

Introduction

The fresh water environment is becoming increasingly polluted with various pesticides since they are applied directly to aquatic fauna. The need of pesticides is to increase the agriculture production None of the pesticides are specific to target species and so these chemicals causes deleterious effects or even death to the organisms in habiting the same ecosystem. Whatever the mode of transport and introduction these pesticide are causing undesirable effects to the organisms are particularly susceptible to the organisms are particularly susceptible to these pollutants since their habitats are continued to the pollutants since their habitats are continued and escape from such circumstances and polluted habitat is impossible. The aquatic animals have to pass quantities of water over their respiratory surfaces and hence they get exposed more to the toxic compounds
which are dissolved in their medium depending upon the chemical nature the pesticides, they are classified in to the groups

A) Inorganic compounds which includes heavy metal salts

B) Natural organic compounds like Nicotine, pyrethrum etc. and

C) Synthetic organic compounds like organochlorides, organo phosphate and carbonate zolone (phosalone 35EC) is on organophosphate pesticides. The organophosphate insecticides are powerful inhibitors of Acetyl choline esterages.

Organophosphate compounds are now extensively use in place of organochloride compounds on account of their lesser residual toxicity, but the prevention of aquatic animal’s mortality remains an important object of water pollution research. Kaviraj and konar (1982) have studied the effects of heavy metals on acute toxicity of mercury, chromium and cadmium to the fish Thyllapia mossambica. Mane and Akarte (1987) have studied the effects of cythion malathian on the Esturine clam catalsia opima.

The rate of oxygen consumption can be considered as a tool to evaluate the toxicity of a pesticide many environmental factor are responsible for the alternation of metabolic rate in aquatic animals Most dangerous are the pesticidal run of from the agricultural fields which cause great mortality to easily susceptible aquatic fauna including fresh water snails. The oxygen consumption has been estimated by alam and Lomte after exposing the gastropods viviparous Bengalensis to Zink Sulpahte et. al. (1984) have observe the effects of carbaryl on oxygen consumption of the fish, charma pancatus chaudhari et.al. (1988) have observed the effect of Basalin on the rate of oxygen consumption of B. bengalensis.

Considering the pancyty of studies on pesticidal pollution on the fresh water gastropod Thiara Lineata, the present investigation has under taken with the view to understand the acute toxicity and the effect on the rate of oxygen consumption.

Material and Methods

The snails Thiara Lineata were collected from Girna river near Kalwan city. Animals were brought to the laboratory and they were cleaned to remove algal biomass and mud etc. They wee maintained in laboratory conditions for a period of five days in aerated dechlorinated water. During experimentation no food was provided. The analysis of physic chemical parameters of water was deteminal periodically from the laboratory tap warer and the riverine water the physic chemical parameters like temperature , PH, total carbonates and dissolve oxygen contents were determine by the standard techniques of Apha (1985)

The healthy specimens ranging from 2.0 to 2-3 cms in length and 0.7 to 0.9 cms in width were used for experimentation . The zolone .35 EC was dissolved so as to get the appropriate concentrations for the exposure periods All the experiments were conducted in natural day light
rhythms. The aeration has been withdrawn during toxic exposures. During the experimentation water of the control and experimental groups were renewed twice in day with an interval of 12 to 13 hours. A concurrent control runned simultaneously. Before each change of static bioassay behavior and mortality of snails wee recorded. The acute toxicity tests were performed by using zolone 35 Ec for a period of 24,48,72, and 96 hours. It is an organophosphate pesticide manufactured by VOLRHO INDIA LIMITED Pondicherry and Secunderabad.

After exposing the animals for 24,48,72 and 96 hours to the pesticide survival and the behavior of gastropods were recorded. The criteria for the death record was observed by the observations like failure of snails to respond to producing the foot in to the shell when it is pricked by needl. From the number of dead animals the percentage mortality was calculated and then it has been converted in to the paper values by means of probit table and the concentrations. The regressions line is obtained by plotting the graph using log concentration and probit mortality (Bailey 1965) The regression line is obtained by plotting the graph using log. Concentrations and probit mortality by using formula \( Y=bx+a \) from this equation the values of \( Lc_{50} \) for 24,48,72, and 96 hours were calculated. The \( Lc_{1} \) value also determined with the help of the same regression equation.

The rate of oxygen consumption has been estimated by using oxygen electrode which has been provide all the values of respiration are subjected for the statistical analysis for the confirmation using “t” test (Dowdeswell 1957)

**Results**

The physic – chemical parameters of the water used for holding the animals and used as diluents is given in table No.1. The water dees not contain any toxic substance to the snails as hence no mortality was recorded in controlled group. The animals were exposed for ten deferent concentration of zolone. The animals were exposed from the range of 0.0001 to 0.0015ppm for a period of 24,48,72, and 96 hours.

Depending upon the criteria the following conditions of the gastropods were recorded during the experimentation and they are considered as the behavioral changes.

- Gastropood attached to substratum and tentacles out of shell
- Foot and tentacles out of the shell
- Just prior ot the death the gastropod s retracted the body inside the shell at is max extent and they could not extent even when they are subjected to mechanical stimulus. During the initial period of exposer from 0.0001 to 0.0075ppm. concentration the behavior of gastropods close not show any significant change but from 0.0090 to 0.0150 ppm there was retraction of foot and tentacles inside the shell and mucus and excreta was comparatively less as compared with controlled group.
The rate of oxygen consumption was estimated in controlled LC1 and Lc50 groups after exposing the animals for the period of 24, 48, 72, and 96 hours to zolone.

The effect of zolone on the rate of oxygen consumption of fresh water gastropod, Thiara Lineata from Kalwan has been given in graph No. 1. All the values are expressed in mg of 02/gm/1/4.

The rate of oxygen consumption in LC1 and Lc50 exposed groups were fluctuated from 0.167 + 0.014 to 0.426 + 0.030 mg/lm/kg/h. In LCI group it is fluctuated from 0.2991 + 0.482 to 0.426 +0.030 mg/gm/1/h. The oxygen consumption was decreased to its max in Lc50 exposed group after 96 hours of exposure period (58.63% p<0.01) The min decreased was noted during 72 hours of exposure in Lc50 group (39.58%P<0.10) In LC1 exposed the oxygen consumption decreased to its max after 72 hours exposure (17.36%P<0.02) The result Physico – chemical parameters of riverine and tap water used for Table No. 1 Experimentation

**Table No. 1**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>PARAMETERS</th>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temperature</td>
<td>20.0-22.1°C</td>
</tr>
<tr>
<td>2</td>
<td>PH</td>
<td>7.1-7.5</td>
</tr>
<tr>
<td>3</td>
<td>Dis solve cl</td>
<td>8.82-9.0 mg/l</td>
</tr>
<tr>
<td>4</td>
<td>Total carbonates</td>
<td>12.3-12.5 ppm</td>
</tr>
</tbody>
</table>

![Diagram showing period of exposure and LC1](http://www.webology.org)
Discussion

Many chemical pesticides like organophosphate pesticide have been used in agricultural fields since long time such careless use of dangerous chemicals has laid to environment and occupation hazards.

But the careless used of pesticides resulted in the contamination of most of the fresh water bodies causing many fold hazards to several non target organisms many pesticides are considered hazardous because of their ability to keep and immobilized in the bodies of aquatic organisms in low concentration (Eisler 1961) the different toxicity of pesticides to aquatic organisms (verma etc 1979) Warner (1967) in the review of bioassay using behavioral changes suggested that region of such test provide the most sensitive indicator yet develop. In the present study it has been observed that there were considerable changes in the behavioral pattern of the gastropods.

In the experimental group the content of excreta and mucus decreases.

Summary

The present investigation has been carried out in order to assess the acute toxicity of zolone to Thiara Lineata and changes in respiratory rate due to it. The static bioassay tests were conducted for the periods of 24, 48, 72, and 96 hours. The regression lines are obtained by using log concentration and profit mortality values. The LC 50 values are determined for 24, 48, 72, and 96 hours. The regression lines are obtained by using log concentration and profit mortality values. The LC50 values are determined for 24, 48, 72, and 96 hours. It was further observed that the rate of oxygen consumption significantly decreased due to the pesticide toxicity. The results are discussed in the light of available literature.

References