



CHAPTER V
**GENERAL
SUMMERY AND
CONCLUDING
REMARKS**

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A) GENERAL SUMMARY :-

The synthetic chemicals were majority used in the control of gastropods, hence the effects of these chemicals on the gastropods have been studied by different scientists. But the study of effects of molluscicides from plants are scanty. Hence efforts have been made to study the effects of molluscicides from plants *C. inerme*, *V. negundo* and *A. indica* on the freshwater snail *V. bengalensis*. The effects on bioactivities were studied in relation to the mortality, oxygen consumption and biochemical parameters.

a) MORTALITY STUDY :-

It is essential to study the mortality of snails by exposing them to the different concentrations of molluscicides for calculation of the lethal concentrations.

The snails *V. bengalensis* were exposed to the different concentrations such as 100, 200, 300, 400, and 500 ppm and for different exposure periods such as 24, 48, 72, 96 and 120 hrs. The mortality of snails was found increased with increased exposure period and increased concentrations of molluscicides.

The numerical data was prepared statistically from the percentage of mortality and LC_{50} values were calculated by probit analysis method.

The LC_{50} values of molluscicides for 120 hrs. are given below.

Plant toxins	LC ₅₀ values in ppm
<i>C. inerme</i>	241.8
<i>V. negundo</i>	176.4
<i>A. indica</i>	263.0

It is also found that high LC₅₀ values of molluscicides have less toxicity and low LC₅₀ values of molluscicides have high toxicity.

The increased mortality of snails seems to be due to the decreased resistance of snails to the molluscicides.

b) OXYGEN CONSUMPTION :-

Oxygen consumption is found as an indicator of pollution or stress condition in the aquatic animals. It is very sensitive physiological activity which gets affected due to the minor chemical and physiological changes in the environment.

The freshwater snails, *V. bengalensis* were exposed to the sublethal concentrations 125.20, 110.80 and 148.90 ppm of molluscicides respectively from plants *C. inerme*, *V. negundo* and *A. indica* for 2, 24, 48, 72, 96 and 120 hrs. of exposure period.

The intoxicated snails were then used for the study of the oxygen consumption. The rate of oxygen consumption of intoxicated snails was compared with the rate of oxygen consumption of the snails in the control set. It was observed that after 2 hrs. of exposure period the rate of oxygen consumption was increased, while the rate of oxygen consumption was reduced further with increase in exposure period. The highest percentage decrease after 120 hrs of exposure period was 28.1% , 30.75%, and 27.96% respectively due to the effect of molluscicides from *C. inerme*, *V. negundo* and *A. indica*.

Due to the high toxicity of molluscicides *V. negundo* there was more effect on oxygen consumption of the snail *V. bengalensis*, when they exposed to this molluscicide.

The increase in the oxygen consumption after two hrs. of exposure to the phytotoxin. It may be due to the increased metabolic activities in the snail due to stress condition. The gradual decrease in the oxygen consumption in the snail might be due to the effect of phytotoxins on their respiration. The secretion of mucus over the surface of gills as well as damages of gill epithelium might have affect the rate of oxygen consumption.

c) **BIOCHEMICAL PARAMETERS :-**

Carbohydrate proteins and total lipids were metabolized for the liberation of energy. Estimation of the rate of metabolism in the animals has been considered as one of the most important parameters of the toxic stress. Gill is the organ which get affected significantly during intoxication. The concentration of glycogen, proteins and lipids after intoxication of the snail was recorded to study the biochemical parameters.

The freshwater snail, *V. bengalensis* was exposed to the sublethal concentrations 125.20, 110.80 and 148.90 ppm respectively of phytotoxins *C. inerme*, *V. negundo* and *A. indica* for 24, 48, 72, 96 and 120 hrs. These intoxicated snails then used for the estimation of biochemical parameters such as glycogen, proteins and lipids. The percentage decrease of glycogen, proteins and lipids was decreased in the gills of intoxicated snail, *V. bengalensis* after exposure period of *V. negundo*. This highest decrease in glycogen, protein and lipids was respectively 71.83 %, 22.49% and 76.47 % in gills of snails was observed when exposed to *V. negundo* for 120 hrs.

In the present investigation, the depletion in the glycogen content suggests the possibility of glycogenolysis. The glycogen is used for the production of energy in the intoxicated snails to face the adverse condition produced due to planttoxin stress. Protein are decrease due to the effect of molluscicide. This decrease in protein is due to the increased proteolysis and decreased protein synthesis. Whereas contents of lipids were also decreased in the intoxicated snails. This depletion in lipids in these experimental snails might be due to the demand of additional energy required in the stress condition created by phytotoxins.

2) CONCLUDING REMARKS

A) MORTALITY :-

- a) Mortality of snails *V. bengalensis* was increased with increase in concentration of all molluscicides and with increase in exposure period.
- b) Thus the mortality is concentration and time dependent.
- c) Highest and lowest mortality was observed respectively in the molluscicide *V. negundo* and *A.indica*.
- d) Lowest LC₅₀ shows highest toxicity and highest LC₅₀ shows lowest toxicity.
- e) Depending upon LC₅₀ values the increasing order of toxicity of molluscicide plants is *A. indica* < *C.inerme* < *V. negundo*.

B) OXYGEN CONSUMPTION :-

- a) When snail *V. bengalensis* was exposed to the molluscicides from plants *C. inerme*, *V. negundo* and *A indica*, the rate of oxygen consumption is decreased with increase in exposure period.
- b) The rate of oxygen consumption in snails was found increased fastly after two hrs. of exposure in all three molluscicide

- c) The rate of oxygen consumption may be reduced due to the secretion of thick mucus or damage of gill epithelium.
- d) Thus decreased rate of oxygen consumption in snails shows that all three molluscicides from plants *C. inerme*, *V. negundo* and *A. indica* affect the respiratory activity in snails.

C) BIOCHEMICAL PARAMETERS :-

- a) The effect of molluscicides from plants *C. inerme*, *V. negundo* and *A. indica* created a stress condition in snails which results in increased glycogenolysis and reduced glycogen contents in gills of snails.
- b) Stress condition also results in the high demand of energy due to which proteins also get depleted in the gills of snails.
- c) Depletion in lipids in snails is a result of demand of additional energy to cope up with the adverse stress condition.