



# “ EFFECT OF LEAF EXTRACT OF ANNONA SQUAMOSA AND EUPHORBIA NERRIFOLIA ON BIOCHEMICAL COMPONENTS OF FRESH WATER SNAIL LYMNEA ACUMINATA ”

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## Abstract :

Experiment were conducted to evaluate the alterations in different metabolites caused due to the sublethal concentration ( $L_{c10}$ ) of the leaf extract of *Annona squamosa* and latex of *Euphorbia nerrifolia* exposed for 24 and 48 hours were studied in freshwater snail *Lymnea acuminata*. The protein and glycogen content was decreased in the foot at all exposure periods. The toxic effect of herbicides was time as well as dose dependent.

## Keywords:

*Lymnea acuminata* , protein, glycogen, *Annona squamosa*, *Euphorbia nerrifolia*.

## Introduction:

Extensive use of agricultural pesticides led to contamination of aquatic systems and public health problems. In adverse conditions, these chemicals also affect non-target organisms. Many of these pesticides are considered hazardous because of their ability to kill or immobilize the aquatic organisms even at extremely low concentrations. As compared to this botanical insecticides are relatively safe and degradable and are readily available source of biopesticides and achieved widespread applications in an environmental health due to their highly insecticidal properties [A.Shafeek, et. al.(2003)]. Therefore now a days, it is propagated to use herbal pesticides in lieu of the chemical ones.

Now herbicides are widely used, for that purpose we need to be study to evaluate their toxic impact on aquatic animals. Herbicides disrupt the metabolic activities and later the physiological activities. The biochemical changes in different tissues of animals brought about by the herbicidal exposure have no definite pattern and physiological state of metabolic activity of an organisms reflex in the utilization of their biochemical energy to counteract the toxic stress [Swami et.al.(1983)].

Most of the informations regarding the effect of these compounds has been obtained from mortality studies. But little is known about their effect on physiological processes. The present study was undertaken to



evaluate the toxic effect of *Annona squamosa* and *Euphorbia nerrifolia* on protein and glycogen in the foot and digestive gland of *Lymnea acuminata*.

### Material and Method :

The freshwater snails *Lymnea acuminata* were collected from the Gomai river backside to PSGVPMS ASC College Shahada ,Dist- Nandurbar -425409 at Dhule Lonkheda Sahahada Tehsil.. After bringing to the laboratory they were washed with the fresh water and maintained in well aerated water in laboratory conditions for acclimatization.

**Collection of plant material :** *Annona squamosa* and *Euphorbia nerrifolia* were collected from botanical garden of PSGVPMS ASC College Shahada ,Dist- Nandurbar -425409

**Preparation of plant extract:** After collection of *Annona squamosa* was thoroughly wash with water ,dried in incubator at 37°C and powdered. The dried powder was stored in air tight desiccators, for further use .The dried powder was extracted in distilled water for one hour, centrifuged at 1000 r.p.m. for 10 minutes and only the supernant was used for treatment.

**Isolation of latex:** The white milky latex produced by *Euphorbia nerrifolia* was drained into glass tubes by cutting the stem apices. The latex was centrifuged at 2500 r.p.m. for 20 minutes to remove resin. This resin free latex was lyophilized at 40°C and lyophilized, dried powdered latex was used for experiments and stored in airtight desiccators for further study.

The healthy and active snails were selected for the experimental study . The tissue of foot and digestive gland of snails were exposed to 24 hours and a control group having no mortality was run simultaneously. Mortality was recorded at 24 hours and 48 hours and also  $L_{c10}$  &  $L_{c50}$  values upper and lower confidence limit.

On the basis of predetermined  $L_{c50}$  values (0.0228 ppm for 24 hr. and 0.0090 ppm for 48 hr. for *Annona squamosa* ; 0.0244 ppm for 24 hr. and 0.0179 ppm for 48 hr. for *Euphorbia nerrifolia* ) these snails were exposed to sub-lethal concentration of plant *Annona squamosa* and *Euphorbia nerrifolia* (0.0120 ppm for 24 hr. and 0.0043 ppm for 48 hr. for *Annona squamosa* ; 0.0109 ppm for 24 hr. and 0.0102 ppm for 48 hr. for *Euphorbia nerrifolia* ).

After exposure, foot was isolated from snails and pooled seperately from which two samples of each were drawn to analyse protein and glycogen. Protein was estimated by the method of Lowry et.al. (1951).Glycogen determination was done by Kemp et.al. (1954). Each analysis was confirmed after repeating it at least three times.

### Results And Discussion :

The changes in glycogen and protein of foot of *Lymnea acuminata* exposed to sub-lethal concentrations of leaf extract of *Annona squamosa* and latex of *Euphorbia nerrifolia* were studied (Table -1 and 2). A significant decrease in the level of glycogen and protein in all the tissues were observed in animals treated by plant extracts.



Table No.1

Impact of herbicides on Glycogen content in Foot of fresh water snail *Lymnea acuminata* (mg/gm dry wt)

		<i>Annona squamosa</i>		<i>Euphorbia nerrifolia</i>	
Organ	Control	24 Hrs	48 Hrs	24 Hrs	48 Hrs
Foot	20.600	19.430	19.260	20.120	19.115
S.D	±.0.52	± .038	± .037	± .039	±.0.32
'P' value		P<.01	P<.001	P<.01	P<.001
%		- 5.679	- 6.504	- 2.330	- 7.208

Note:

- i) Each value is the mean of five observations ± S.D.
- ii) Values are significant at **P<.01, P<.001**.
- iii) Values indicate % stimulation (+ve) or %inhibition (-ve).

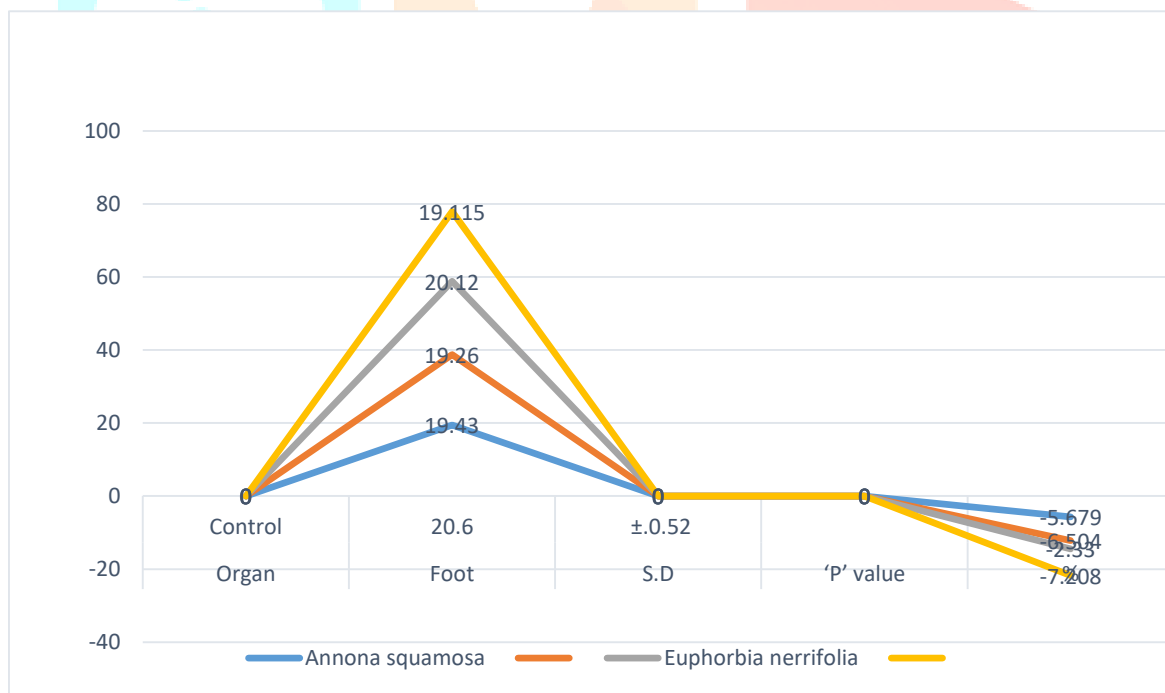


Table No.1

Impact of herbicides on Glycogen content in Foot of fresh water snail *Lymnea acuminata* (mg/gm dry wt)



Table No.2

Impact of herbicides on Protein content in Foot of fresh water snail *Lymnea acuminata* (mg/gm dry wt)

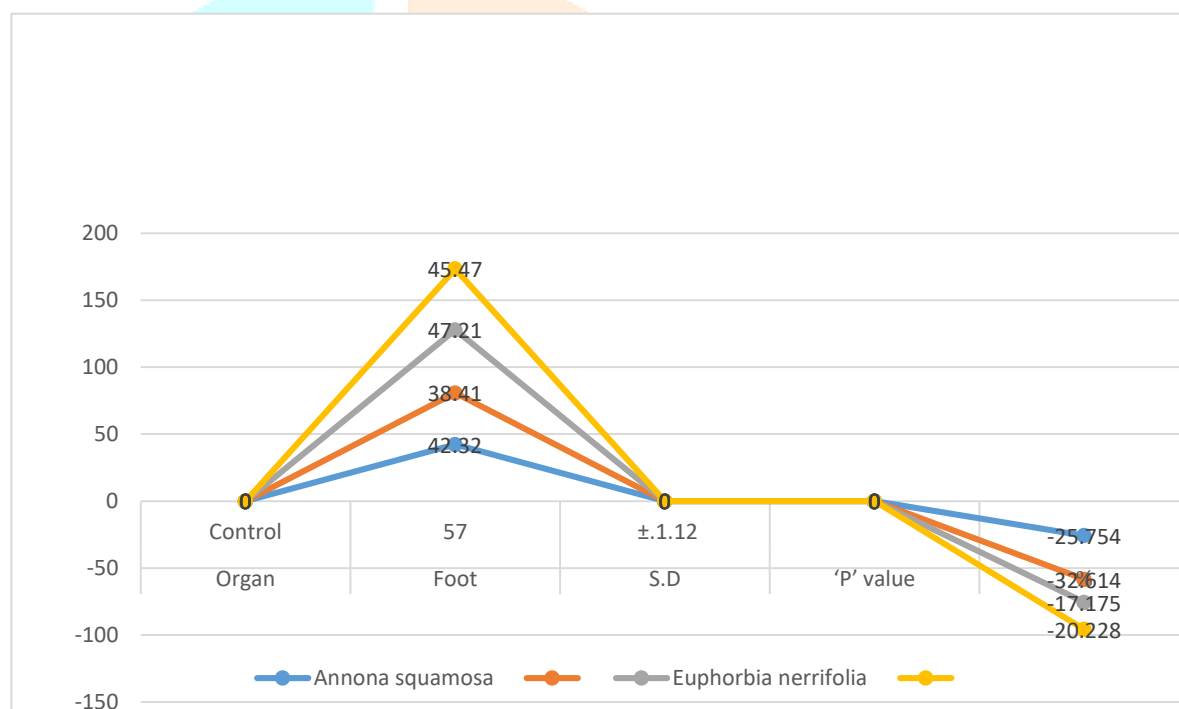
		<i>Annona squamosa</i>		<i>Euphorbia nerrifolia</i>	
Organ	Control	24 Hrs	48 Hrs	24 Hrs	48 Hrs
Foot	57.00	42.320	38.410	47.210	45.470
S.D	±.1.12	± .076	± .069	± .091	±.0.87
'P' value		P<.001	P<.001	P<.001	P<.001
%		- 25.754	- 32.614	- 17.175	- 20.228

Note:

i)Each value is the mean of five observations ± S.D.

ii)Values are significant at P&lt;.01, P&lt;.001.

iii) Values indicate % stimulation (+ve) or %inhibition (-ve).

Table.No.2 Impact of herbicides on Protein content in Foot of fresh water snail *Lymnea acuminata* (mg/gm dry wt)

Carbohydrates are important metabolites that provide the animal body with the energy required for performing the different vital processes. The depletion in glycogen level showed disrupted carbohydrate metabolism because of enhanced glycogen breakdown to meet the high energy demand during toxic stress. This findings is in agreement with result of many workers who have worked on molluscs and species of animals with different herbicides.

Effect of Sewage, Cypermethrin and Cypermethrin cum *Vibrio* inoculation on the tissue carbohydrates of *Oreochromis mossambicus* [Ramlingam K. et.al.(2007)]. The contribution of the anticholinesterase activity of *Pedialanthus tithymaloide* to its molluscicidal activity [Sudhanshu Tiwari et.al.(2005)]. Toxicological effects and biochemical alterations induced by herbicides and various plant extracts in fresh water snail *Lymnea acuminata* (Lamarck). [Shweta Sane (2009)]



Proteins are the most important organic constituents forming a major part of the cell boundaries. Amino acids are the building blocks of the proteins and have key roll to play in cellular metabolism . They are involved in major physiological events to maintain homeostasis of the cell. Therefore the assessment of the protein content can be considered as diagnostic tool to determine the physiological process of the cell.[Kapil and Ragothoman (1999);Mushigiri (2003)]

A marked fall in protein level in the foot of snail indicates a rapid break down of proteins to meet the energy demands during stress conditions.

and Bhide (2001). Decreased in the protein level is observed by R.P.Yadav and its co-workers in *Lymnea acuminata* and *Channa punctatus* after exposure of *Croton tiglium* (2002,2003). Same results observed by Sudhanshu Tiwari after exposure of *Euphorbia royleana* latex(2003). “Alternation In Carbohydrate, Protein And Fat Metabolism Of The Harmful Fresh Water Snail *Lymnea Acuminata* (Lamark) Induced By Synthetic Pesticides.[ Sarika P. Fulpagare., (2009)].

The overall description in the biochemical constituent indicates the existence of catabolic activity during herbicidal stress. Further studies are needed to assess the changes induced in the cellular architecture due to herbicides.

### Conclusion ;

It can be concluded that the herbicides like *Annona squamosa* and latex of *Euphorbia nerrifolia* due to their potential toxicity produce biochemical changes in the organ of animals. Therefore, further studies are needed to assess the changes induced in the cellular architecture due to herbicides.

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