



### Short length Article

## Effect of the plant extracts on some biochemical constitute in freshwater snail, *Bellamyia bengalensis* (viviparous)

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#### ABSTRACT

This study was under taken to assess toxic effect of plant extract (Latex, *Euphorbia nerifolia*, leaf extract of *Annona squamosa*) to a freshwater snail work exposed to a pre- determine LC<sub>10</sub>, constituents of plant extracts for 24, 48, and 72 hours. The biochemical constituents namely total protein glycogen and lipids were estimated after different exposure periods due to the toxic effect of Latex of *Euphorbia nerifolia*. These organic constituents were count to be allowed altered significantly.

**Key words:** Plant extract, Snail, toxicity and biochemical aspect.

#### INTRODUCTION

The freshwater environment is becoming increasingly polluted with certain chemical since they get accumulated directly or indirectly to aquatic bodies and cause threat to the inhabiting fauna. They causes deleterious effect or even death to the organism exposed to them. A number of changes in biochemical parameters to different aquatic organism due to pesticide toxicity have been noted by several investigations. A little information available on biochemical diversions due to plant extracts in freshwater gastropod snails. Earlier studies indicated that plant extracts have potent molluscicidal activity against the freshwater harmful snail *L. acuminata* (Singh and Agarwal, 1988; Singh, 2000; Singh *et al.*, 2004; Singh and Singh, 2005) but their doses were high, so their further purification was needed. The use of synthetic molluscicides poses hazardous environmental effects and toxicities to non-target organisms, even man. This has generated the need to search novel natural molluscicidal compounds from plants as possible alternatives to synthetic products (Luna *et al.*, 2005 and Mello-Silva *et al.*, 2006).

In recent studies, focus on plant research has increased all over the world and a large body of evince has collected to show great potential of medicinal plants used in various traditional systems. More than 13,000 plants have been studied during, the last 5 year period. The present review aims to compile data generated through the research activity using modern scientific approaches and innovative scientific tools in last 5 year period. Chauhan and Singh (2012) reported that the molluscicidal activity of methanol extract of medicinally important plant *Euphorbia tirucalli* (Family: Euphorbiaceae) was evaluated against two freshwater harmful snails *L. acuminata* and *I. exustus* were tested in laboratory as well as in pond and their sub lethal effects were also observed on fecundity hatchability and survivability of hatchlings of these snails. Similarly extracts of *Annona squamosa* and *Cumla reJkxa* whole plant and the alcoholic attract of *iota la ria juncca* seeds showed antifertility effect (Saluja and Dantani, 1984). The present study was carried out to understand to impact of plant extract on some biochemical parameters to *Bellamyia bengalensis*.

**MATERIALS AND METHODS**

The freshwater snails were collected from Panzara River near Dhule city. They were brought to laboratory and kept for 6 days for acclimatization on the basis of predetermine LC<sub>10</sub> values of plant extracts. The snails were exposed for 24, 48, and 72 hours to plant extract the snails were into 3 sets. To first set served as controlled which was free from any pesticide or plant extracts. *Euphorbia nerrifolia* latex is the least toxic of all the herbicides. Its LC<sub>10</sub> values for 24, 48 and 72 hours are 0.0244ppm, 0.0179ppm and 0.0150 ppm respectively. LC<sub>10</sub> values for 24, 48 and 72 hours of

the leaf extract of *Annona squamosa* are 0.0228ppm, 0.0090ppm and 0.0069 ppm respectively. At the end of each exposure period 20 animals were sacrificed and made in to dry powder or biochemical estimation each set. The total protein estimated by Gornell *et al.*, (1949). The glycogen estimated by Kemp and Kits (1954). And lipid estimated by Barnes and Blackstock method (1973). The values exposed in mg/gm dry wt and were subjected to statistical analysis by Bailey (1965).

**RESULTS AND DISCUSSION**

The results are summarized in table 1, 2 and 3.

**Table 1: Impact of plant extracts on Glycogen contents in foot and Digestive glands of freshwater snail *Bellamya bengalensis* (Viviparous) (mg/gm dry wt).**

Organ	Control	Latex of <i>Euphorbia nerrifolia</i> (LC <sub>10</sub> )			Latex of <i>Annona squamosa</i> (LC <sub>10</sub> )		
		24 hrs	48 hrs	72 hrs	24 hrs	48 hrs	72 hrs
Foot	20.61	20.112	19.110	18.450	19.412	19.255	18.115
S.D.	±0.050	±0.040	±0.035	±0.030	±0.040	±0.035	±0.032
'P' value		P<0.01	P<0.001	P,0.001	P<0.01	P<0.001	P<0.001
%		-2.330	-7.206	-10.196	-5.672	-6.610	-11.995
Digestive gland	56.197	39.435	38.127	36.195	37.315	36.125	32.925
S.D.	±1.55	±0.080	±0.075	±0.070	±0.073	±0.075	±0.072
'P' value		P<0.01	P<0.01	P<0.01	P<0.001	P<0.001	P<0.001
%		-29.835	-32.165	-35.500	-33.606	-35.725	-41.422

**Table 2. Impact of plant extracts on Protein contents in foot and Digestive glands of freshwater snail *Bellamya bengalensis* (Viviparous) (mg/gm dry wt).**

Organ	Control	Latex of <i>Euphorbia nerrifolia</i> (LC <sub>10</sub> )			Latex of <i>Annona squamosa</i> (LC <sub>10</sub> )		
		24 hrs	48 hrs	72 hrs	24 hrs	48 hrs	72 hrs
Foot	56.900	45.212	45.465	43.910	42.315	38.412	33.115
S.D.	±1.12	±0.090	±0.090	±0.080	±0.075	±0.070	±0.065
'P' value		P<0.001	P<0.001	P,0.001	P<0.001	P<0.001	P<0.001
%		-17.172	-20.230	-22.945	-25.755	-32.615	-41.915
Digestive gland	100.500	659.150	67.541	64.725	58.375	54.635	49.110
S.D.	±2.00	±1.33	±1.20	±1.01	±0.95	±0.90	±0.81
'P' value		P<0.001	P<0.001	P<0.001	P<0.001	P<0.001	P<0.001
%		-31.275	-32.865	-35.65	-41.975	-45.690	-51.185

**Table 3. Impact of plant extracts on Lipid contents in foot and Digestive glands of freshwater snail *Bellamya bengalensis* (Viviparous) (mg/gm dry wt).**

Organ	Control	Latex of <i>Euphorbia nerrifolia</i> (LC <sub>10</sub> )			Latex of <i>Annona squamosa</i> (LC <sub>10</sub> )		
		24 hrs	48 hrs	72 hrs	24 hrs	48 hrs	72 hrs
Foot	72.600	57.455	55.275	62.855	56.115	53.205	51.525
S.D.	±3.50	±2.85	±2.80	±2.75	±2.72	±2.74	±2.70
'P' value		P<0.01	P<0.02	P<0.02	P<0.02	P<0.02	NS
%		-20.855	-23.855	-27.195	-22.70	-26.705	-29.05
Digestive gland	161.00	151.185	148.195	145.195	149.115	144.235	141.225
S.D.	±4.61	±4.45	±4.35	±4.30	±4.35	±4.28	±4.21
'P' value		P<0.001	P<0.001	P<0.001	P<0.001	P<0.001	P<0.001
%		-5.505	-7.378	-9.108	-4.27	-9.87	-11.729

Each Value is the mean of five observation  $\pm$ S.D.

Values are significant at  $P < 0.01$ ,  $P < 0.001$ .

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

An overall decrease in all the levels of different biochemical was observed due to toxic stress in *Bellamyia bengalensis*. Analyses of experimental data clear that latex contains highly toxic components which display high toxicity that is dose and time dependent. A number of changes in biochemical parameter of different organism due to pesticides toxicity have been noted several investigators viz. depletion in glycogen in the foot and digestive gland, tissues of estimating freshwater snail. *Mekenoides lineatus* (Wath Eknath M. *et al.*, 1992). The depletion of total protein metabolism was in correlation with stress conditions as reported by Kabeer and Singh (1978). Similar result of toxicity of various plants viz. *Euphorbia pulcherima*, *Lantana indica*, *Azadirachta indica* and *Annona squamosa* was also reported by many researchers against snail *Lymnaea acuminata* (Yadav and Singh, 2007). Agrawal (1996) studied the effect of Deltamethrin on quantitative extract of protein in snail *Lymnaea acuminata* and similarity depletion of total lipid in *Bellamyia bengalensis* on exposed due to melathion (Maruthi and Subbarao, 2000; Tiwari 2012).

A depletion level of glycogen in the test animals, suggested its excessive utilization during the energy crises under pesticidal impact similar effect have been noted by Kabeer and Ahmed *et al.*, (1978).

There is depletion of protein level in freshwater snail *Bellamyia bengalensis* due to plant extract similar finding were noted by several workers (Chaudhari, 1990; Tripathi *et al.*, 2004; and Swami *et al.*, 1986).

The present study noted that the decrease in total protein during the anaerobic respiration under plant extract stress.

The lipid level decreased in the foot and digestive gland of snail exposed to latex of *Euphorbia nerifolia* and leaf extract of *Annona squamosa* for the period of 24, 48 and 72 hrs. Similar results have been recorded by Swami *et al.*, 1983, Maruthi and Subbarao (2000). The decrease in lipid content might be to due to suppressed lipid synthesis and continuous utilization of organic constituents during every crisis.

Environmental and toxic stress can interfere with physiological and biochemical functions such as growth development, reproduction, respiration and circulatory system.

The overall decrease in the biochemical constituents indicates the existence of high catabolic activity during exposure of plant extract stress.

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#### LITERATURE CITED

**Bailey NTJ, 1965.** *Statistical methods in biology.* The English language book- society. The English University Press, Ltd., Great Britain.

**Barnes H and Blackstock, 1973.** Estimation of lipid in Marine animals, detail investigation of Sulpho-phospho-Vanillin method.

**Chaudhari TR and Lomte VS, 1990.** Impact of Pesticides on lipid content of foot, Mantle and Digestive Gland of *Bellamyia Bangalensis* (Viviparus) *Ind. J. Inv Zool. Aqua. Biol.*, **2**: 27-30.

**Chauhan S and Singh A, 2012.** A Comparative Study of Toxic Effect of a *Euphorbia's* Plant *Euphorbia tirucalli* Against Two Freshwater Harmful Snails in Laboratory as Well as in Pond and its Effect on Their Reproductive Physiology., *World Journal of Zoology*, **7**(3):258-263.

**Garnall AG, Bordall CJ and David MM, 1949.** Determination of serum protein by means of Biuret method. *J.Bio. Chem.*, **177**: 751-766.

**Kabeer Ahmed, I Begum, R Sivaiah S and Ramana Rao KV, 1978.** Effect of Malathion on free amino acids, total proteins, glycogen and some enzymes of *Lamellidens marginalis*. *Proc. Ind. Acad. Sci.* **37**(3):377—380.

**Kemp A and JMVH Kits, 1954.** A colorimetric micro-method for the determination of glucose in tissue. *Biochem. J.*, **56**:646-648. **Luna JS, Santos AF, Lima MRF, Omena MC, Mendonca FAC, Bieber LW, 2005.** A study of the larvicidal and molluscicidal activities of some medicinal plants from northeast Brazil. *J Ethnopharmacol.*, **97**:199-206.

- Maruthi YA. and Subba Rao MV, 2000.** Effect of distillery effluent on biochemical parameters of fish, *Channa punctatus* (Bloch). *J. Environ. Pollut.*, **7**:111-113.
- Mello-Silva CC, Vasconcellos MC, Pinheiro J, Rodrigus MLA, 2006.** Physiological changes in *Biomphalaria glabrata* (Say), (Pulonata: Planorbidae) caused by sublethal concentrations of the latex of *Euphorbia splendens* var. *hisloppii* N.E.B. (Euphorbiaceae). *Mem Inst Oswaldo Cruz.* **101**(1): 3-8.
- Saluja AK and D Dantani, 1984.** Antifertility activity of *Xeromphis spinose* and *Annona squamosa*. *J. Pharm. Sci.* **46**:21-23.
- Singh A, Agarwal RA, 1988.** Possibility of using latex of euphorbiales for snail control. *Sci Tot Environ.* **77**:231-236.
- Singh A, Singh SK, 2005.** Molluscicidal evaluation of three common plant species from India. *Fitoterapia*, **76**:747-751.
- Singh SK. 2000.** *Studies on molluscicidal properties of some local plants of eastern Uttar Pradesh against harmful snails.* Ph.D. thesis, D.D.U. Gorakhpur University, Gorakhpur (U.P. ) India.
- Singh RN and Agrawal RA, 1996.** Effect of deltamethrin on protein levels in the snail *Lymnea acuminata*. *Malayasian. Appl. Biol.* **25**(1): 1-5.
- Tiwari, F., 2012.** Bait formulation toxicity of plant derived molluscicides in attractant food pellets against vector snail, *Lymnaea acuminata*. *World Journal of Zoology*, **7**(1): 55-59.
- Tripathi SM, Singh VK, Singh S and Singh DK, 2004.** Enzyme inhibition by the molluscicidal agent *Punica granatum* Linn. Bark and *Canna indica* Linn. Root. *Phytotherapy Research*, **18**:501-506.
- Wath Eknath M, Manudhane US and Karnik AG, 1992.** Study of dhydrogenase in the tissues of aestivating freshwater snail, *Melanoides lineatus* (Gray). *J. Environ. Res.* **2**(2): 7-12.
- Yadav RP and Singh A, 2007.** Toxic effect of euphorbiales on freshwater snail *Lymnaea acuminata* in ponds. *Journal of Herbs Spices and Medicinal Plants*, **13**: 87-94.

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