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Impact of fenvalerate on whole body of freshwater snail, *Bellamya Bengalensis*

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Abstract
Effect of sub lethal concentration of pyrethroid pesticide Fenvalerate on Whole body of freshwater prosobranch snail, *Bellamya bengalensis* was evaluated. The biochemical analysis for 1, 7 and 15 days exposed snail was made in the present work. The amount of biochemical components was greatly influenced by Fenvalerate in 15 days in post reproductive period in whole body.

Keywords: *Bellamya bengalensis*, glycogen, whole body, fenvalerate

1. Introduction
Mobile The prosobranch molluscs are much economic importance, as they act as an intermediate hosts for a number of trematode parasites, which causes severe diseases to man and his domestic animals (Chneg and Lee, 1971; Jong-Brink, 1973) [5, 7]. The predilection of snails for fungal foods increases the attractiveness of diseased plant and possibility of spreading of the disease by these snails (Jong-Brink, 1973) [7].
The structure and function of the reproductive tract of snails and slugs have been studied with increasing interest in recent years. The functions of different reproductive organs have also been investigated (Lavioletta 1954; Arionidae and Quattizini 1967; Plesch *et al*. 1971; Nanaware 1975; Bhatlawande 1989; Ahirrao and Kulkarni, 2011 and Ahirrao and Phand, 2013 and 2015) [11, 18, 14, 4, 1, 2, 3].
Bhatlawande (1989) [4] studies histochemistry of the reproductive tract of *Laevicaulis alte* and revealed that the glycogen and alkaline phosphates were found throughout the epithelium of reproductive tract. Horne (1973) revealed utilization of carbohydrate and protein in *Bullimus delbatus*. The histochemical work on different metabolites and enzymes in the reproductive tract of different gastropods was reviewed by Nanaware (1974) [13].
As there is paucity of information on this aquatic snail, the present work was undertaken to investigate its biochemical changes due pyrethroid pesticide, Fenvalerate on freshwater prosobranch snail, *Bellamya bengalensis*.

2. Materials and Methods
The freshwater prosobranch snail, *Bellamya bengalensis* were collected from Aner Dam near Shirpur, Dist. Dhule, Maharashtra (India) and maintained in the laboratory condition for acclimation. LC_{50} values for 24 hr were determined by exposing the snails to pesticides fenvalerate during breeding season. A group of 25 animals were released into 0.0016 ppm fenvalerate concentration in water. After treatment the animals were sacrificed after 1, 7 and 15 days of exposure during pre-reproductive, reproductive and post-reproductive periods. The snails were subjected to pyrethroid, fenvalerate at 9.00 a.m. every time and were sacrificed only during morning hours between 8 to 9 a.m. in order to avoid changes in the concerned parameters due to circadian rhythms (Shankaraiah, 1978) [21].
The tissues were subjected into alcoholic Bouin's fluid for detection of glycogen. For Histochemical detection of glycogen Best's Carmine method (Glick, 1949) was used as described by Pearse (1961) [16]. For biochemical estimations dry powder was used and its weight was kept practically constant through the experimental work. Glycogen was estimated by Kemp *et al*. (1954) [8], the experimental data was analyzed statistically by adopting statistical method (Pillai and Sinha, 1968) [17].

Each value given here is the mean and standard deviation of three different preparations and each preparation was assayed three times. A variation was considered significant at 5% level of probability.

3. Results

The freshwater prosobranch snail, *Bellamya bengalensis* show the marked histochemical changes after 1, 7 and 15 days of exposure during pre-reproductive, reproductive and post-reproductive periods. The freshwater prosobranch snail, *Bellamya bengalensis* show the marked biochemical changes after 1, 7 and 15 days of exposure during pre-reproductive, reproductive and post-reproductive periods.

The biochemical estimation of glycogen in whole body after 1 day exposure to the fenvalerate, the maximum depletion was observed in post-reproductive period (10.91%, $P<0.01$) while upon 7 and 15 days of exposure a significant depletion in the glycogen content was found. The present depletion as compared to the control ranges from 7% to 28%. The maximum percent depletion was found to be 28.30% in 15 days during post-reproductive period.

Table: Effect of Fenvalerate on Glycogen contents of Whole body in a freshwater snail, *B. bengalensis* in mg %.

Period	Control	1 Day	7 Day	15 Day
Pre-Reproductive	31.42 ± 1.12	28.92 ± 1.08 – 7.95 *	26.74 ± 1.51 – 14.89 * *	25.34 ± 0.81 – 19.35 * * *
Reproductive	28.66 ± 0.98	25.86 ± 1.48 – 9.76 *	23.84 ± 1.31 - 18.82 * * *	21.92 ± 1.66 - 23.52 * * *
Post-Reproductive	26.68 ± 1.29	23.77 ± 1.00 - 10.91 * *	21.00 ± 0.61 - 21.29 * * *	19.13 ± 0.83 - 28.30 * * *

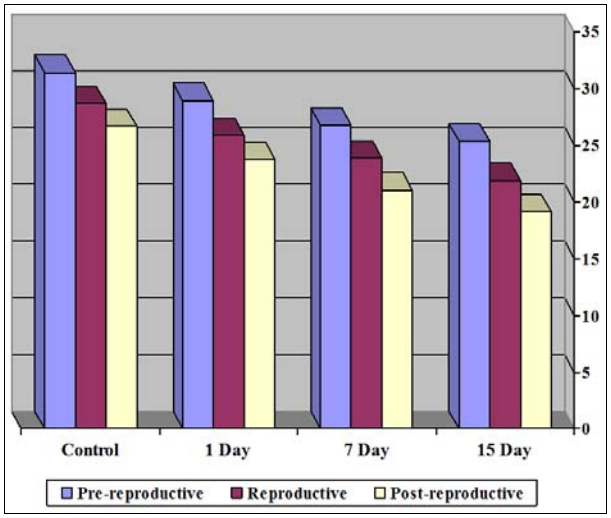

Fig: Effect of Fenvalerate on Glycogen contents of Whole body in a freshwater snail, *B. bengalensis* in mg %.

4. Discussion

The metabolic needs are dependant on nutritional and reproductive state and some phylogenetic factors. For maximizing the power of reproduction, individuals naturally devoted its more energy to the reproduction. In the present investigation the biochemical studied were carried out on whole body of a freshwater prosobranch snail, *Bellamya bengalensis* is exposure to pyrethroid pesticides fenvalerate. In *Pila globosa* there was significant decrease in glycogen reserves of foot and hepatopancreas exposed to Malathion (Ramanarao and Ramamurti, 1980). Mercury intoxication in the fish, *Channa punctatus* Sharma (1984) [22] found a significant depletion in the glycogen reaction in liver and muscles. The present investigation on *B. bengalensis* exposed to fenvalerate, the glycogen reserves whole body were going to be depleted significantly after 1, 7 and 15 days of exposure.

In the invertebrates the glycogen is the most suitable reserve carbohydrate. Stellen and Stellen, (1956) [24] observed the nutrible percentage of glycogen in reproductive as well as in the whole body in *Siphanaria japonica*. The glycogen was being more during pre-reproductive period in *B. bengalensis*, the stored glycogen might be utilized for the formation of reproductive components and due to this the decrease in concentration during reproductive period. The stored glycogen was the ultimate source of energy during reproductive period. Similar results were obtained by Kulkarni and Shinde (1992) [9]; Ahirrao and Kulkarni (2011) [1] A.

The results show that the glycogen is very sensitive marker of pyrethroid toxicity, in the sense that within one day of exposure considerable decrease in glycogen was noticed in all tissues. The glycogen is the first metabolite to be used under stress conditions, is found decrease gradually during the entire exposure span (Rao and Rao, 1979; Patil et. al., 1995; Sonawane and Lomte, 2000; Lomte and Waykar, 2000; Magare and Patil, 2010; Ahirrao and Kulkarni, 2011 [1] and Ahirrao and Phand, 2013 and 2015) [1, 2, 3, 20, 15, 23, 11, 12,]. Disturbance in glycogen profile was considered as one of the most nutrible biochemical change due to action of pesticide (De Bruin, 1976) [6].

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