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TOXICITY OF *MADHUCA INDICA* SEED CAKE EXTRACT ON GLYCOGEN METABOLISM OF AQUATIC SNAIL *LYMNAEA (PSEUDOSUCCINEA) LUTEOLA F. OVALIS* (GRAY ,1822)

Bhavare M.K[1] and Magare S.R[2]*

[1]Department of Zoology, Vasantarao Naik College, Shahada. 425413 (MS)
[2]Department of Zoology, Zoology Research Laboratory, A.S. Mandal's, C.H.C. Arts, S.G.P.Comm. & B.B.J.P. Sci, College, Taloda, Dist- Nandurbar. 425 413. (MS) India

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ABSTRACT

Madhuca indica is a medicinal plant used by tribal peoples in ailment of various abnormalities. The effect of seed cake extract of M. *indica* on respiration and glycogen metabolism in an aquatic snail, *Lymnaea luteola f. ovalis.* was studied. Adult snails were collected from Gomati river, shahada. The rate of respiration in snails studied in control and treated snails with seed cake extract of *M. indica*. Behavior and several aspects of carbohydrate metabolism following acute treatment of *M. indica* seed cake extract was studied in different organs like Whole body, hepatopancreas, ovotestis and albumen glands in a snail, *Lymnaea luteola f. ovalis.*

The toxic effect *of M. indica* seed cake extract in a freshwater snail causes change in normal behavior as well as reproductive behavior. Due to toxicity the rate of oxygen consumption and concentration of glycogen were found to be reduced. Withdrawal of toxicants to the experimental snails could reverse these changes.

INTRODUCTION

The use of insecticides and pesticides has raised many environmental threats and also causes resistance to the pests. The use of pesticides is more dangerous for aquatic environment as well as terrestrial biotic life on earth. The natural toxicants of plant origin may be safer and could be useful to regulate bioactivity in pest and parasite control. Joshi (1986) reported that 18 different varieties of medicinal plants acts as stupefying agent. The action of such toxicant dull the activity sense of aquatic organisms like, fishes.

Crude extract of plants consists of mixtures of many active compounds which shows greater overall activity in control of pests (Brenham *et al*, 1991, Chen et. al., 1995). The overuse of pesticide causes harm to the non-target organisms and aquatic fauna is also found affected in many countries. Magare and Vasave, 2011). The overcrowding causes respiratory problems in pulmonate snails' species like *Helisoma anceps*.

The relationship between respiration and pollution is studied by many workers (Zambre et. al. 1996, Ramanna Rao and Ramamurthy, 1978, Magare, 1991, Ahirrao and Khedkar, 2012 and Borale, 2013)

*✉ ***Corresponding author:*** **Magare S.R**
Department of Zoology, Zoology Research Laboratory, A.S. Mandal's, C.H.C. Arts, S.G.P.Comm. & B.B.J.P. Sci, College, Taloda, Dist- Nandurbar. 425 413. (MS) India

The present work is undertaken to find out the effect of sub lethal concentration of *M. indica* seed cake extract on cellular metabolism of carbohydrates in whole body, foot, hepatopancreas and gonads of a freshwater snail, *L. luteola f. ovalis* for 1, 7&14 days of exposure. The chemical changes occurring in the body gives first indication of stress (Mayes, 1977).

MATERIALS AND METHODS

The healthy adult vector snail, *Lymnaea luteola f. ovalis. f.* was collected from Gomati river and nal has attached to it in and around shahada region. They were maintained in laboratory for acclimation for about a week. The snails of equal size and weight group were used for experimentation. The physicochemical properties of water were estimated (APHA, 1992). The snails were exposed to acute (3.52ppm, LC 50 / 0.8 ppm of 96 hrs.) treatment of the seed cake extract of *M. indica*. At the end of experiment control and treated animals were dissected and their whole body, foot, hepatopancreas and gonads were dried in oven at 60°C for 48 hours and dry powder was used for estimation. The glycogen level is expressed as µgm/gm. The rate of oxygen consumption was measured by Winkler's method. The 't' test was carried out on the percent change in oxygen consumption. The experiment was run with food supply. The behavioral changes during experimentation was recorded.

RESULTS AND DISCUSSION

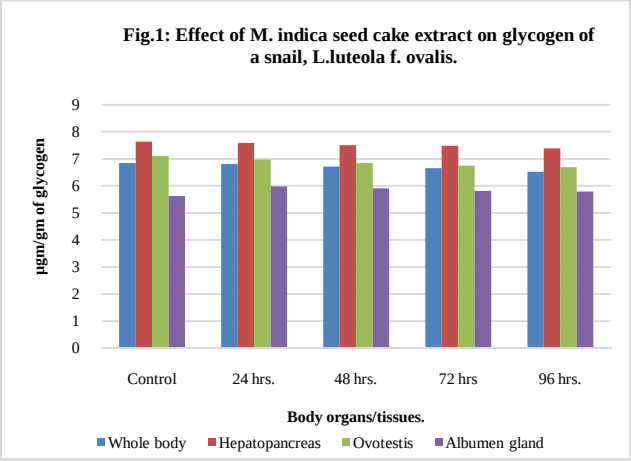
The result of analysis of physicochemical properties of water are presented in Table-1.

Table 1 Physicochemical parameters of Gomati river water.

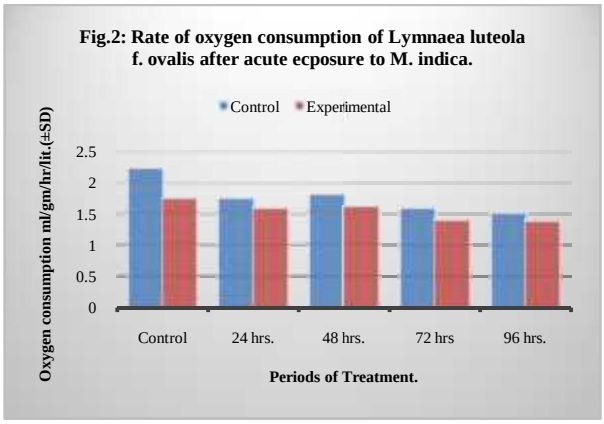
Taluka	Sample Name	pH	EC Mhos/ cm	OC (%)	N Kg/ha.	P Kg/ ha.	K Kg/ha.	Fe ppm	Cu ppm	Mg ppm	Zn ppm
Shahada	Min.	7.50	0.424	0.32.9	103.4	9.75	338.31	06.2	2.55	3.20	1.19
	Max.	7.86	1.072	0.43	148.80	19.11	392.33	10.3	9.87	4.88	1.95

The snails exposed to *M. indica* seed cake extract exhibited signs of distress and fast movement of contraction of body organs. They start releasing mucus outside the body. The seed cake extract intoxication caused number of changes in biochemical set up of glycogen. The level of glycogen contents in hepatopancreas and muscles were dropped remarkably due to toxic action. The utilization might be due to the toxic action of the seed cake extract of *M. indica*. The decline in glycogen level (µgm/gm) was utilized to counteract the toxicity stress. The present results correlates with the results of Jadhav *et.al*. Patil and Magare (2007) and Magare (2011) studied on effect of various chemical toxicants on different molluscs. Rao et. al. (1980) exposed an amphibious snail, *Pila globose* to Malathion pesticide and found that the glycogen reserves were found declined from foot and hepatopancreas. Results in present work correlates with the findings of Rao. *et. al*. and shows decline in glycogen level of hepatopancreas due to *M. indica* seed cake extract and was metabolized glycogen from hepatopancreas to other tissues of the body The glycogen stores are generally the reserve stores of energy to meet an immediate demand of energy need in body.

Due to toxic action of *M. indica* seed cake extract on glycogen reserves of an aquatic snail, *L. luteola* caused weakness in snails and slows down the routine metabolism of the body. The results also correlate with the findings of Sing and Agarwal (1990). [Fig.1]



The effect of seed cake extract of *M. indica* on rate of oxygen consumption in an aquatic snail, *L. luteolaf. ovalis*was also studied and showed that the snails displays decreasing an individual respiration rates with increasing concentrations. The present results correlates with the findings of Colin (1985) who worked on *Helisoma* snail and Patil and Magare (2007) studied on bivalve *Parreysia cylindrica*. Withdrawal of toxicants to the experimental snails showed reverse these changes in snails.[Fig.2].



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