



RESEARCH ARTICLE

EFFECT OF DITHANE M-45 ON LIPASE ACTIVITY IN FRESH WATER SNAIL, *PILA GLOBOSA*

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ABSTRACT

The present study has been taken up to observe the toxic effect on a fresh water snail, *Pila globosa* induced by Dithane M-45. The present study shows alteration in lipase activity level in hepatopancrease and renal organ of *Pila globosa* at acute and chronic exposure of Dithane M-45. Significant depletion in ($P < 0.05$) in lipase activity level was observed in hepatopancrease and renal organ at chronic exposure while slight depletion was observed in both experimental tissues at acute exposure of Dithane M -45.

INTRODUCTION

The present day although use of pesticides and fertilizers has increased to a great extent to increase agriculture production, but they are causing serious problem of water pollution as they reach the ponds, lakes, rivers and other water bodies along with run-off water. Thus these surface water bodies get a significant concentration of agriculture chemicals, changing the quality of water and affect aquatic fauna and flora. The present study was aimed to investigate the toxic effects of corbamate pesticide. Dithane M-45 (Manacozeb 75% wp) on freshwater snail *Pila globosa*. In the present study an attempt has been made to find out cholesterol changes in hepatopancrease and renal organ of fresh water snail, *Pila globosa* after the administration Dithane M-45.

MATERIALS AND METHODS

Testing snail *Pila globosa* were collected from ponds around Dist. Moradabad, U.P. After cleaning the shell of snail from mud, snails were washed with 0.1% solution of potassium permanganate to eliminate any pathogens if present on their body.

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Now the snails were stocked in aerated aquaria for 24 hours without food before use for experiment. After washing with 0.1% solution of potassium permanganate, the snails were divided into three batches. The snails of first batch were exposed with 100mg/ litre for acute (1, 2 and 4 days), the snails of second batch were exposed with 60 mg/litre for chronic (15, 30 and 60 days) and the snails of third batch were kept in ordinary tap water under the ideal conditions. The hepatopancrease and renal organ were separated and their homogenates were prepared in ice cold distilled water to a known volume. The estimation of lipase activity has been done according to the method of (Sinha, 1976).

OBSERVATION AND RESULT

The present study shows alteration in lipase activity level in hepatopancrease and renal organ of *Pila globosa* at acute and chronic exposure of Dithane M-45. (Table 1-3 and Figure 4). The alteration in lipase activity level of hepatopancrease was found -2.772%, -6.569% and -10.316% at acute exposure and -13.998%, -22.222% and -39.659% at chronic exposure of Dithane M-45. Similarly depletion in lipase activity level in renal organ was found -1.587%, -4.852% and -8.102% at acute exposure and -9.904%, -14.468% and -8.102% at chronic exposure of Dithane M -45.

Table 1. Alteration in Lipase activity level of hepatopancreas and renal organ of *Pila globosa* at acute exposure of Dithane M- 45

S.No	Tissue	T ₁		T ₂		T ₃	
		Control	Experimental	Control	Experimental	Control	Experimental
1.	Hepatopancreas	4.690 ±0.115	4.560 ±0.124	4.688 ±0.107	4.380 ±0.120	4.672 ± 0.104	4.190 ±0.126
2.	Renal organ	0.945 ±0.021	0.9300 ±0.024	0.948 ±0.020	0.902 ±0.028	0.938 ±0.019	0.862 ±0.026

T₁ = 1 day *Values given in the table are the mean of 9 observations each,

T₂ = 2 days * Values are mean ± SE of 9 observations each,

T₃ = 4 days * Values are significant at P < 0.05.

Table 2. Alteration in Lipase activity level of hepatopancreas and renal organ of *Pila globosa* at chronic exposure of Dithane M- 45

S.No	Tissue	T ₄		T ₅		T ₆	
		Control	Experimental	Control	Experimental	Control	Experimental
1.	Hepatopancreas	4.679 ±0.101	4.024 ±0.124	4.680 ±0.105	3.640 ±0.118	4.700 ±0.107	2.836 ±0.120
2.	Renal organ	0.939 ±0.018	0.846 ±0.024	0.940 ±0.019	0.804 ± 0.028	0.942 ±0.022	0.762 ±0.030

T₄ = 15 days *Values given in the table are the mean of 9 observations each,

T₅ = 30 days * Values are mean ±SE of 9 observations each,

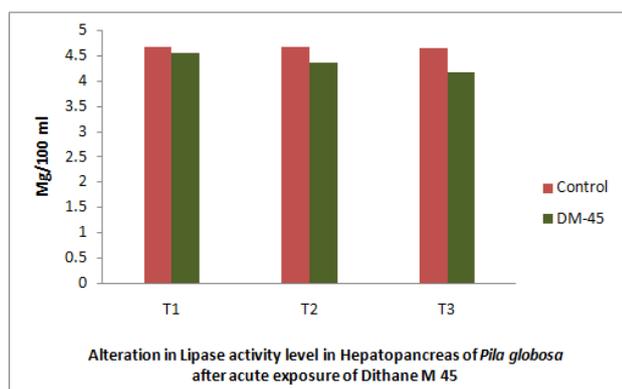
T₆ = 60 days * Values are significant at P < 0.05.

Table 3. Percentage alteration in Lipase activity level of hepatopancreas and renal organ of *Pila globosa* at acute and chronic exposure of Dithane M- 45

S.No	Tissues	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆
1.	Hepatopancreas	-2.772	-6.569	-10.316	-13.998	-22.222	-39.659
2.	Renal organ	-1.587	-4.852	-8.102	-9.904	-14.468	-19.108

T₁=1day, T₂ = 2 days, T₃ = 4 days, T₄= 15 days, T₅ = 30 days, T₆ = 60 days (+) Increase (-) Decrease

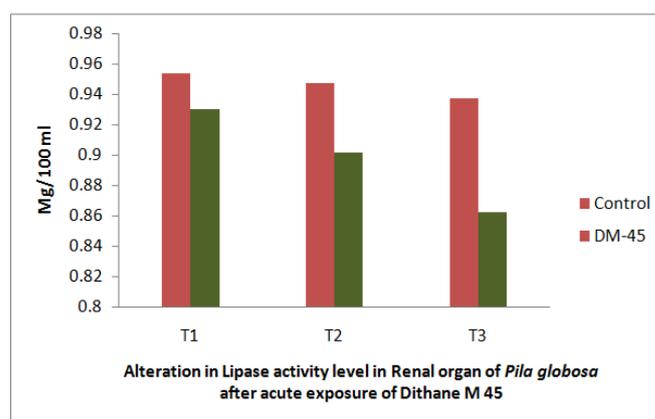
Significant depletion in (P<0.05) in lipase activity level was observed in hepatopancreas and renal organ at chronic exposure while slight depletion was observed in both experimental tissues at acute exposure of Dithane M -45.

**Figure 1.**

DISCUSSION

Lipases are a kind of esterases, which act upon tri-glycerides and related compounds. Lipids are stored and release large amount of energy in the body. The present study reveals a significant (P < 0.05) decrease in lipase activity in hepatopancreas and renal organ of *Pila globosa* following acute and chronic exposure of Dithane M-45 (Itavashi Yutaka and Toru Ota, 1994).

Reported depletion in the lipase activity in the bivalve, *Lamellidens marginalis* when treated with flodit and metacid. (Chaudhari and Lomte, 1992). Also observed decrease in lipase activity in digestive gland of *Bellamyia bengalensis*. (Patil, 1993) observed decrease in lipase activity in *Lamellidens marginalis* after heavy metal stress (Itavashi Yutaka and Toru Ota, 1994).

**Figure 2.**

Reported lipase activity in Scallop hepatopancreas (Sultana and Lomte, 1997). reported the decrease in the lipase activity in *Lamellidens marginalis* after acute exposure to the heavy metal (CuSO₄, HgCl₂ and ZnSO₄).

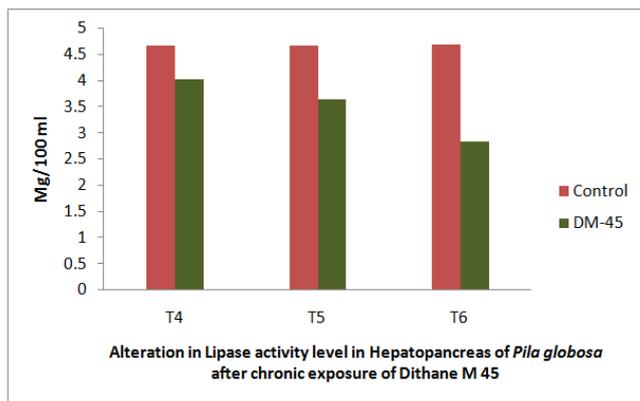


Figure 3.

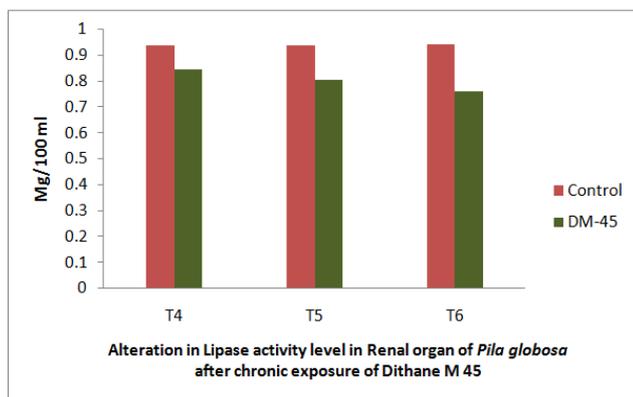


Figure 4.

The depletion in the enzymatic activity may be due to the damage caused by the heavy metal to the cells of alimentary canal (Zambre and Mahajan, 2001). Reported the decrease in lipase activity of hepatopancreas of fresh water bivalve, *Carbicula striatella* exposed to heavy metal (Cu and Hg).

Present findings are similar to those of (Chaudhari and Lomte, 1992; Patil, 1993; Zambre and Mahajan, 2001; Swami *et al.*, 1993) and Sultana and Lomte, 1997 who reported depletion in lipase activity in different tissues. Significant decrease activity in lipase activity upon chronic exposure of Dithane M-45 is probably due to the damage caused by the pesticides to the cell of alimentary canal.

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