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Alteration in Glucose-6-phosphatase Level in Brain & Liver of Fresh Water Fish Channastraitus Induced by Azodyes (Chloramine Blue and Malachite Green)

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Abstract

Present manuscript is an attempt to observe the toxic effect of Chloramine blue and Malachite green in fresh water fish Channastraitus following the acute exposure (48 and 96 hrs) and chronic exposure (10,15,20,25 and 30 days). it was observed that the Glucose-6-phosphatase content was found to be depleted significantly (P<0.001) in brain and liver.The depletion was recorded maximum at chronic exposure of Chloramines blue and Malachite green in brain and liver of Channastraiatus.

Keywords: Glucose-6-phosphatase Level, Azodyes, Channastraitus.

Introduction

Fish is a rich source of vitamins, the substances responsible for normal growth, maintenance and reproduction. Both fat and water soluble vitamins are present in fish. Regular consumption of fish helps to prevent disorders arising out of the deficiency of vitamins. Fish is therefore helpful to a large extent in solving the problem of food and malnutrition in developing countries.

The number of fish killed due to dye pollution every year is not known but a good number of mortality cases due to water pollution have been reported by Gordon (1960), Cottom (1960) and Pantulu (1965).

Objective

The present venture is an attempt to work out Glucose-6-phosphatase level in brain and liver of a fresh water fish Channastraitus due to effect of Chloromine blue and Malachite green.Glucose-6-phosphatase (D-glucose-6-phosphate phosphohydrolase) plays an important role in carbohydrate metabolism. It is the regulatory enzymes for glyconeogenic pathway.

Materials and Methods

Living healthy fish of 30 to 45 gm in weight was collected from local fresh water resources and acclimatized to the laboratory condition for a minimum period of 10 days before experiments. The fishes were divided into three batches. In which first batch served as control Second batch treated with Malachite greenand Third batch treated with Chloramine blue. The fishes of the first batch was kept in ordinary tap water under indentical Physio- -Chemical Condition. The fishes of second batch were exposed to sublethal concentration 0.21 mg/l of Malachite green and the fishes of third batch were exposed to sublethal concentration 9mg/l of chloramines blue for 96 hrs (acute) and 10,15,20,25 and 30 days (chronic) exposure intoxication.After acute and chronic exposure ,brain and liver were dissect out and processed according to Sackett (1925),Bathing Solution replaced periodically and black covering was used on the aquaria to prevent any possible photo oxidation of the dyes.

The 't' test of Fisher (1963) was used to calculate the significance of Data.

Result and Discussion

A significant (P<0.001 & 0.005) decrease in Glucose-6-phosphatase activities in the brain and liver of Channastriatus was observed with Malachite green and Chloramines blue.

The well marked depletion in brain found to be -23.8229% (T_1); -31.8267% (T_2); -41.1487% (T_3); -52.7307% (T_4); -60.4519% (T_5) and -

64.4067% (T_6) following the acute (96 hrs) and chronic (10,15,20,25 and 30 days) exposure of Malachite green and-25.4237% (T_1); -35.5932% (T_2); -48.4534%(T_3); -56.5913% (T_4); -65.8192% (T_5) and -73.8229% (T_6) under the all exposure of Chloramine blue respectively.

Similarly the Significant (P<0.001 & 0.005) depletion in liver -21.5601% (T_1); -26.8689% (T_2); -35.8613% (T_3); -45.6121% (T_4); -55.2546% (T_5); and -60.4550% (T_6) following the acute and chronic exposure of Malachite green and -40.8450% (T_1); -47.6706% (T_2); -56.4463% (T_3); -60.3467% (T_4); -68.3640% (T_5); and -74.8645% (T_6) were recorded at both acute and chronic exposure of Chloramine blue.

Our findings are in accordance with those of Feuer et al. (1965), Moulin and Daoust (1971), Keneko et al (1972), Shastry and Gupta (1978 a,b,c)Goel and Garg(1980)and Agarwal et al.(1982)who reported depletion in Glucose-6-phosphatase level in different tissues but the present findings do not tally with those of Radhakrishnaiah et al.(1992) who reported increase Glucose-6-phosphatase activities in the different tissues.

In present findings, the result indicated a significant decrease of Glucose-6-phosphatase activity in all the test tissues after azodyes (Chloromine blue and Malachite green) intoxication that suggests possible impairment in metabolic activity associated with endoplasmic reticulum of the cell under chemico-azo stress of the dyes.

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TABLE (4b-2)

ALTERATION IN THE GLUCOSE-6-PHOSPHATASE LEVEL IN BRAIN AND LIVER OF C. STRIATUS INDUCED BY AZODYES. THE VALUES GIVEN ARE THE MEAN OF 9 OBSERVATIONS.

TOXICANTS	TISSUE	NORMAL (CONTROL)	ACUTE EXPOSURE	CHRONIC EXPOSURE			
			T1(96hrs.)	T2(10days)	T3(15days)	T4(20days)	T5(25days)	T6(30days)
MALACHITE GREEN	BRAIN	1.062 ±0.0137	0.809 ±0.0329 -23.8229	0.724 ±0.0264 -31.8267	0.625 ±0.0152 -41.1487	0.502 ±0.0260 -52.7307	0.420 ±0.0062 -60.4519	0.378 ±0.0287 -64.4067
CHLORAMINE BLUE	BRAIN		0.792 ±0.0117 -25.4237	0.684 ±0.0341 -35.5932	0.547 ±0.0344 -48.4934	0.461 ±0.0190 -56.5913	0.383 ±0.0160 -65.8192	0.2781 ±0.1481 -73.8229
MALACHITE GREEN	LIVER	0.923 ±0.0138	0.724 ±0.0091 -21.5601	0.675 ±0.0148 26.8689	0.592 ±0.01907 -35.8613	0.502 ±0.0062 -45.6121	0.413 ±0.0104 -55.2546	0.365 ±0.1433 -60.4550
CHLORAMINE BLUE	LIVER		0.546 ±0.0131 -40.8450	0.483 ±0.0147 -47.6706	0.402 ±0.0076 -56.4463	0.366 ±0.0117 -60.3467	0.292 ±0.0161 -68.3640	0.232 ±0.0095 -74.8645

VALUES IN THE PARANTHESIS IS SHOWING PERCENTAGE ALTERATION.
VALUES ARE SIGNIFICANT AT P<0.001
(+) --> INCREASE (-) --> DECREASE

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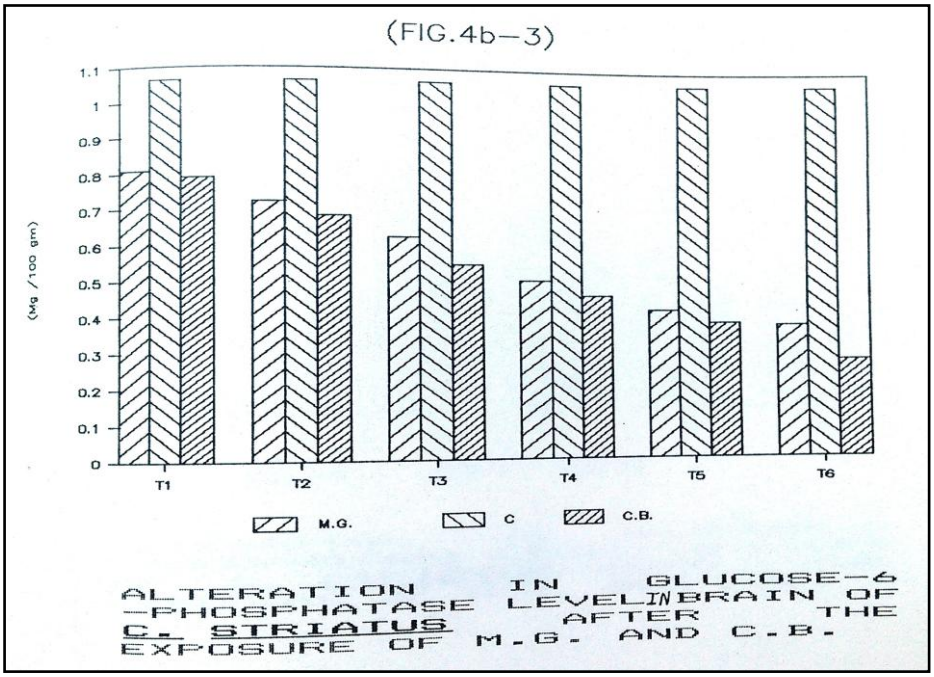
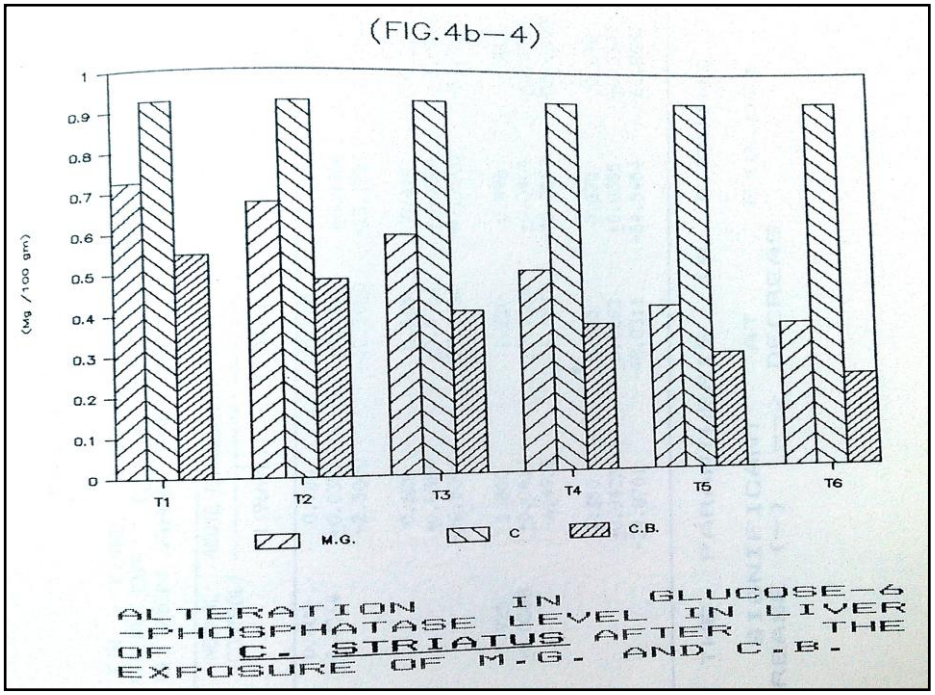
(FIG.4b–3)



ALTERATION IN GLUCOSE–6 –PHOSPHATASE LEVEL IN BRAIN OF C. STRIATUS AFTER THE EXPOSURE OF M-G- AND C-B-

(FIG.4b–4)



ALTERATION IN GLUCOSE–6 –PHOSPHATASE LEVEL IN LIVER OF C. STRIATUS AFTER THE EXPOSURE OF M-G- AND C-B-