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TOXIC EFFECTS OF WATER POLLUTION DUE TO LEATHER DYES ON WATER FAUNA

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ABSTRACT

The phospholipids are the principle compound of cell membrane and are essential for all vital cell processes. They are most important membrane building compound and are amphophilic molecules with unique physiochemical properties having both hydrophilic and hydrophobic parts to the molecules. The Phospholipid also plays a significant role in intracellular signaling. The phospholipid shows decreasing trend in present investigation after exposure to Bismarck brown and acid leather brown at different time intervals and at all three concentrations. However, the effect was more in acid leather brown exposure. Lipid peroxidation involves the direct reaction of oxygen and lipid to form free radical intermediate and to produce semi stable peroxide. Pathological free radical mechanism leading to lipid peroxidation and degradation of phospholipid with loss of membrane integrity are currently considered to be an important factor.

KEYWORDS

Phospholipids, leather dyes, toxicology, decreasing.

INTRODUCTION

The present study deals the effects of Tannery effluents which are exposed to us through water and make harmful effects. They reach us directly by drinking water or by fishes which we eat. Dye industry and related industries which use these dyes in every aspect of household products are the main source of water pollution. We can measure and assess the harm caused by this type of pollution by various methods as discussed in this investigation. Fishes are the sensitive indicator of water pollution and first alarm to aware us about the pollution of water body. Further, if we use fishes as indicator for water pollution, we can predict the harmful effect of dyes on living organisms. Keeping these points in view, the effect of two dyes- Bismarck brown and acid leather brown has been observed on various parameters of *Cirrhinus mrigala* (Ham.). Two dyes viz- Bismarck brown and acid leather brown were taken for study.

Methods

Serum phospholipids were determined by the method of Zilversmit *et al.* (1950).Proteins were precipitated by 10% trichloracetic acid and the precipitate which contained organic phospholipid. Phosphorus was converted to inorganic phosphorus by digesting in perchloric acid reagent. The inorganic phosphorus so formed react with ammonium molybdate at acid pH, forming ammonium phosphomolybdate which on

reduction and reaction with amino-naphthol sulphonic acid (ANSA) forms a stable blue color which was measured colorimetrically at 640 nm. The concentration of phospholipid is proportional to the intensity of color. The homogenate with 1.0 ml distilled water and 5 ml of 10% TCA was kept for few minutes and then centrifuged for 15 minutes. 0.5 ml of 60% PCA was added into the pipette and heated for few minutes till the solution becomes colourless. After cooling the test tube, 5.5 ml of distilled water, 0.4 ml molybdate and 0.2 ml of ANSA was added.

In a test tube marked as blank, 5.5 ml distilled water, 0.4 ml molybdate reagent, 0.5 ml 60% PCA and 0.2 ml ANSA was taken.0.5 ml of working standard solution was taken in a test tube marked as standard. In test tube 0.5 ml of 60% PCA, 5.0 ml distilled water, 0.4 ml molybdate reagent and 0.2 ml ANSA was taken.

Calculation

$$\text{Serum phospholipid (mg/gm)} = \frac{\text{O.D. test}}{\text{O.D. Standard}} \times \frac{\text{Conc. of Standard}}{\text{Serum taken}} \times 1000$$

RESULTS AND DISCUSSION

Fresh water fishes were treated with two leather dyes as Bismarck brown and Acid leather brown as in table 1 fig.A and table 2 and Fig.B

Table 1.

Phospholipids (mg/dl) in Cirrhinus mrigala (Ham.) after bismarck brown treatment

Conc.	Control (Mean±S.Em.)	24 hrs (Mean±S.Em.)	48 hrs (Mean±S.Em.)	96 hrs (Mean±S.Em.)	1 week (Mean±S.Em.)
0.6mg/L	49.32±2.71	28.0±2.51**	27.63±0.84***	27.30±1.21****	26.32±0.85****
0.7mg/L	48.31±1.79	28.5±1.53**	28.06±0.82***	27.01±1.11****	26.05±0.43****
0.8mg/L	50.12±2.43	29.8±2.20***	29.63±0.73****	27.30±0.98****	25.18±0.80****

* Non significant (P>0.05)
** Significant (P<0.05)
*** Highly significant (P<0.01)
**** Very highly significant (P<0.001)

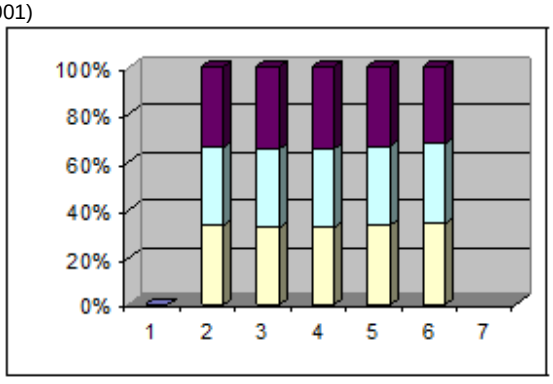

Fig.A

Table 2.
Phospholipids (mg/dl) in Cirrhinus mrigala (Ham.) after acid leather brown treatment

Conc.	Control (Mean±S.Em.)	24 hrs (Mean±S.Em.)	48 hrs (Mean±S.Em.)	96 hrs (Mean±S.Em.)	1 week (Mean±S.Em.)
8 mg/L	49.32±2.71	29.4±1.71**	28.60±0.81**	28.11±0.11***	26.99±0.10***
9 mg/L	48.31±1.79	28.9±1.40**	28.54±0.43**	27.98±1.10***	26.99±0.03***
10 mg/L	50.12±2.43	29.87±0.98**	29.76±0.70**	27.29±0.18***	25.64±0.09****

* Non significant (P>0.05)
** Significant (P<0.05)
*** Highly significant (P<0.01)
**** Very highly significant (P<0.001)

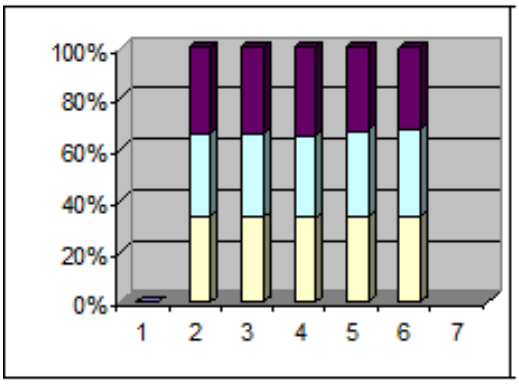

Fig.B

The phospholipids are the principle compound of cell membrane and are essential for all vital cell processes. They are most important membrane building compound and are amphophilic molecules with unique physiochemical properties having both hydrophilic and hydrophobic parts to the molecules. Phospholipid also plays a significant role in intracellular signaling. The **phospholipid** shows **decreasing** trend in present investigation after exposure to bismarck brown and acid leather brown at different time intervals (24 hrs, 48 hrs, 96 hrs and 1 week) and at all three concentrations. However, the effect was more in acid leather brown exposure. Lipid peroxidation involves the direct reaction of oxygen and lipid to form free radical intermediate and to produce semi stable peroxide. Pathological free radical mechanism leading to lipid peroxidation and degradation of phospholipid with loss of membrane integrity are currently considered to be an important factor. Fall in the phospholipid concentration is supported by the findings of Naqvi *et al*. (1988), Sivaramakrishna and Radhakrishna (1998) in *Cyprinus carpio*, Sharma (1999) in *Clarias batrachus* exposed to carbaryl, Rani *et al*. (2001) in *Tilapia mossambuca*, Desai (2002) after nickel administration in *Channa punctatus,* Radha *et al*. (2005) in *Cyprinus carpio*, Shanthi *et al*. (2005) in *Cyprinus carpio*, Borah (2005) after petroleum oil treatment in *Heteropneustes fossilis,* Dutta *et*

al. (2005) in *Labeo rohita,* Singh and Singh (2007) in *Heteropneustes fossilis* after endosulfan treatment and Shukla *et al*. (2007) in *Channa punctatus* respectively.

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