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Effects of water extract of *Parthenium hysterophorus* on Haematological contents of freshwater fish *Labeo rohita*.

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ABSTRACT: The present study was conducted and assessed the toxicity of *Parthenium hysterophorus* is on locally available fresh water fish. The present study deals with to determine haematological effects on fresh water fish, *Labeo rohita*. The fishes were collected from nearby water body and brought to the laboratory for determination of haematological parameters up to 96hr. period. The blood parameters are important in diagnosing the structural and functional status of the animal. Hematological and biochemical indices provide extensive information about fish oxygen transport capacity, immune potential, level of stress, disease, intoxication, nutritional status etc.

(KEYWORDS: *Parthenium hysterophorus*,WBC,Platelets count,*Labeo rohita.)*

INTRODUCTION:

Fresh water can be defined as water with less than 500 parts per million (ppm) of dissolved salts **(Walter,C.and Maguire,J.1996).** Water is an essential issue for the survival of all living organisms especially aquatic animals like fishes. Water is a critical issue for the survival of all living organisms. To encourage the fishery is necessary for ever increasing demands for protein rich food to earn valuable foreign exchange **(Varadharajan, 2012)**.Water of good quality is required for living organisms. Water quality characteristics influence histopathological appearances of poisonous effects **(Bhavan and Geraldine, 2000).**

Rohu is the natural inhabitant of freshwater sections of the rivers. Rohu is a bottom feeder. It is diurnal and generally solitary. It is commonly eaten in Bangladesh and the Indian states of Bihar, West Bengal. The higher concentration of toxicants bring the adverse effects on aquatic organisms, at cellular level or molecular level and ultimately lead to disorder in biochemical composition which is useful in determining different toxicants and

protective mechanism of the body to resist the toxic effects of the substances **(Jain and Kulshreshta, 2000).** *Parthenium hysterophorus L.*(Congress grass) is an exotic weed comes under Asteraceae family, accidently introduced in India, 1955 in Pune through the imported food grains**(Dhawan and Dhawan, 1996)**. It is harmful to all the living beings; it has nearly destroyed all the useful crops and plants, even though growing near to it. It is known to cause asthma, bronchitis, dermatitis, and hay fever in man and livestock **(Narasimhan et al. 1977)**. Root extracts are useful in dysentery **(Singh et al. 1996)**. It is used as folk remedies in West Indies and Central America **(Navie et al. 1996)**. **Sharma and Bhutani, (1988)** also reported as *parthenium* is promising remedy against hepatic amoebiasis. It contains several important chemical constituents, mainly histamine, saponin, glucosides and triterpene (sesquiterpene).

Blood is most important and abundant body fluid. Its composition often reflects the total physiological condition Blood of living organisms are very sensitive to changes and are widely used in Ichthyology research, aquaculture research as well as toxicology and biological monitoring **(Svoboda *et al.*, 2001; Adedeji *et. al.*, 2009; Adeyemo, 2008)**.WBCs and platelets being the essential cellular components of fish blood Significant reduction in rat WBC count after oral treatment of Parthenium extract signifies its immune system weakening ability **(Yadav et al. 2010).** Significant decreases in the number of circulating thromobocytes in a teleost leads to increases in clotting time, loss of haemoglobin content and immature erythrocytes.The methanol extract of the flowers showed significant antitumour activity and parthenin exhibited cytotoxic properties against T cell leukaemia, HL-60 and Hela cancer cell lines **(Das et al. 2007). Panigrahi and Mishra (1978)** have reported a increase in WBC in *Colis fasciatus* exposed to metals. The leucocytosis may also be attributed for the removal of cellular debris of necrosed tissue in the rats under the toxic stress **(Mcleay and Brown, 1974)**. An increase in WBC count after chemical stress recorded in the present study is in accordance with various workers **(Sharma et al., 1984; Tyagi, 1984; Goel and Maya, 1986).** White blood corpuscles (WBC) play a major role in defence mechanism **(Adedeji *et al.*, 2009)**The response of the leucocytes to the changes in water quality and chemicals is variable **(Nussey *et al.*, 1995)**. Several other authors also reported an increase in leucocyte count in various fresh water fishes exposed to different heavy metal salts which supports findings in the present study **(Ali *et al.*, 2000)**. Platelets are first line of defense against accidental blood loss and platelets play an important role in the inflammatory response **(Smith *et al.*, 1976)**.

MATERIAL AND METHODS:

Labeo rohita fish were collected from Nal Damayanti Dam,local fish market Amravati washed with 10% solution of Potassium Permagnate to free any fungal infections. Then acclimatized to the laboratory condition for fifteen days in large aquarium. The fish size15 to 20 cm in length and weight 150 to 200 gm. Fishes maintained in well water and its physico-chemical characteristics analyzed following the method given in **APHA (2005)**. Fishes fed with add libitum food, oil cake and rice bran to keep them more or less in the same state of metabolic requirement.

A group contain ten fishes were taken in both container experimental and control respectively. The dose starting from 10 ml in 10 lit. Well water. The dose increased daily by 10 ml. Their behavioral changes recorded daily and throughout the exposure period. Everyday water change to maintain the concentration of *Parthenium hysterophorus*

extract and histological changes were recorded.

RESULT AND DISCUSSION:

The exposure of ***Labeo rohita*** to lethal levels of extract resulted in time-and concentrations dependent significant.

A) Total leukocyte count or White Blood Cell

In the present investigation the control values for haematological parameter WBCs for lethal concentration is (9.80±0.017). At different concentration 0.50 ml/l to 6.00 ml/l of extract of ***Parthenium hysterophorus*** at 24hrs (10.40±0.005 to 14.89±0.005), 48hrs (10.42±0.025 to 14.37±0.025), 72hrs (10.43±0.061 to 12.76±0.38) and 96hrs (10.55±0.032 to 11.37±0.30). It is significantly increase to increasing the concentration but decrease at the end.

Table 1: Total leucocyte count of ***Labeo rohita*** exposed to ***Parthenium hysterophorus*** extract at different time intervals.

Total Leucocyte Count (× 10mm^3)							
Exposure Period (hrs.)	**Lethal Concentration**						
	0.50	**1.00**	**1.50**	**3.00**	**4.00**	**5.00**	**6.00**
Control	9.80 ±0.017	9.80 ±0.017	9.80 ±0.017	9.80 ±0.017	9.80 ±0.017	9.80 ±0.017	9.80 ±0.017
24hrs.	10.40 ±0.005	10.51 ±0.023	10.86 ±0.030	11.19 ±0.037	11.83 ±0.055	12.43 ±0.035	14.59 ±0.005
48hrs.	10.42 ±0.025	10.57 ±0.045	11.26 ±0.10	11.53 ±0.037	12.22 ±0.045	12.65 ±0.015	14.37 ±0.025
72hrs.	10.43 ±0.061	10.76 ±0.011	11.33 ±0.020	11.89 ±0.15	12.53 ±0.026	13.62 ±0.020	12.76 ±0.38
96hrs.	10.55 ±0.032	11.19 ±0.01	11.82 ±0.060	12.48 ±0.020	12.93 ±0.085	12.22 ±0.015	11.37 ±0.30

Each value is the mean ± SD of three observations; p value represents significant of differences between control and experimental animal. Significant at $p< 0.05$.

B) Total thrombocyte count or Platelets

While the control values for hematological parameterThrombocytes or Platelets for lethal concentration is (19.52±0.20). At different concentration 0.50 ml/l to 6.00 ml/l of extract of ***Parthenium hysterophorus*** at 24hrs (19.68±0.15 to 27.60±0.02), 48hrs (20.2±0.3 to 28.36±0.03), 72hrs (21.30±0.37 to 29.3±0.26) and 96hrs (22.34±0.25

to 30.46±0.20). It is significantly increased to increasing the concentration.

Table2: Total Thrombocyte count of ***Labeo rohita*** exposed to ***Parthenium hysterophorus*** extract at different time intervals.

Total Thrombocyte Count (× 10^3 mm^3)							
Exposure Period (hrs.)	**Lethal Concentration**						
	0.50	**1.00**	**1.50**	**3.00**	**4.00**	**5.00**	**6.00**
Control	19.52 ±0.20	19.52 ±0.20	19.52 ±0.20	19.52 ±0.20	19.52 ±0.20	19.52 ±0.20	19.52 ±0.20
24hrs.	19.68 ±0.15	20.44 ±0.15	21.63 ±0.15	22.32 ±0.30	24.50 ±0.26	25.40 ±0.1	27.60 ±0.2
48hrs.	20.20 ±0.3	21.20 ±0.05	22.14 ±0.25	23.44 ±0.35	25.55 ±0.20	26.17 ±0.15	28.36 ±0.30
72hrs.	21.30 ±0.37	21.86 ±0.20	23.35 ±0.40	24.27 ±0.20	26.47 ±0.45	26.15 ±0.35	29.30 ±0.26
96hrs.	22.34 ±0.25	23.30 ±0.1	24.47 ±0.40	25.10 ±0.36	27.60 ±0.26	28.56 ±0.25	30.46 ±0.20

Each value is the mean ± SD of three observations; p value represents significant of differences between control and experimental animal. Significant at $p< 0.05$.

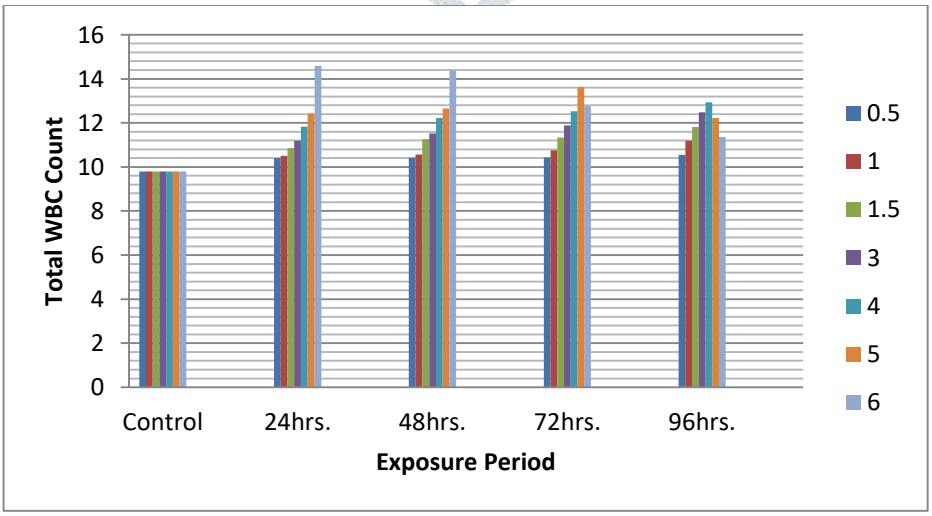

Fig.1: Total leucocytes count for ***Labeo rohita*** exposed to ***Parthenium hysterophorus*** water extract of lethal concentration at different time intervals.

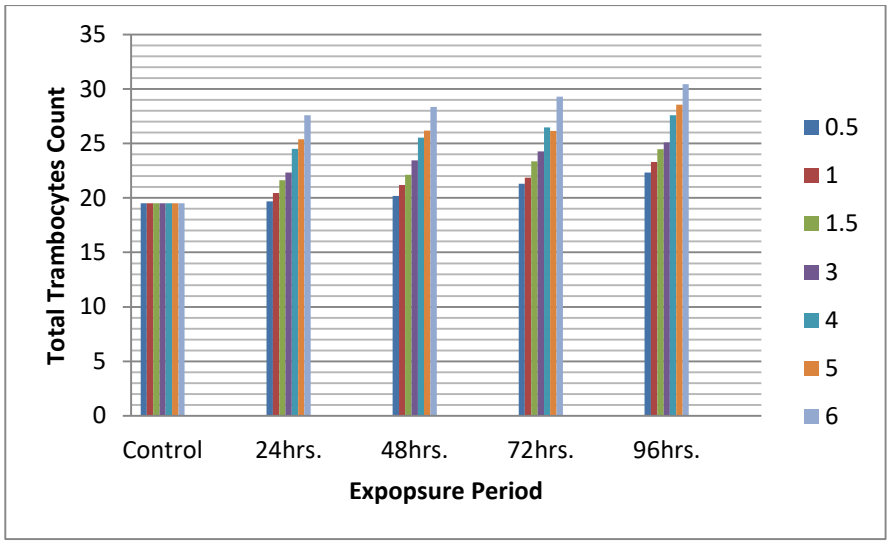

Fig2.: Total Thrombocytes count for ***Labeo rohita*** exposed to ***Parthenium hysterophorus*** water extract of lethal concentration at different time intervals.

In the present work the TLC or WBC increase continued in lethal effect at different exposure periods in fish exposed to the two lower concentrations (Table1). But, it reduced in higher concentration at 96 h exposure period in lethal effect it decreases during long exposure period (Table1). White Blood Cells (WBC) count decrease with increasing level of the toxicant and prolonged exposure to extract that affected leucopoiesis. This assumption is also in line with, **(Das *et al.*, 2006)**. Decrease in total WBC counts reflects a state of stress in fish and points to the role of compound present in to extract as a potential environmental stressor. The findings of the present study is in coincide with the work of **(Subeena Begum and Navaraj, 2012)** who reported that WBC counts are higher in *Labeo rohita* fingerlings treated with *Mangifera indica* when compared to control. Thrombocytes are involved in blood clotting and vital to the haemostatic plug after vascular injury. The increase in the level of thrombocytes in the present study during lethal effect at different exposure period up to 96 h (Table2) suggests the toxicant may have enhanced thrombocytopoiesis through increased rate of conversion of arachidonic acid to thromboxane B2 **(Craig *et al.*, 2002)**. In the present work, the thrombocytes count of fish exposed to the extract steadily increased up to end of the experiment. These findings are supported by **(Vijayamohonan, 2000)**. There is steady increase in thrombocyte count as the exposure period increased, in the present study must be due to entry of toxicant root extract in blood, which causes haemolysis and tissue damage that librates more platelets in the circulation.

CONCLUSION:

A) Total leukocyte count or White Blood Cell

In the present investigation the control values for hematological parameters for lethal concentration is (9.80±0.017). At different concentration 0.50 ml/l to 6.00 ml/l of extract of ***Parthenium hysterophorus*** at 24hrs (10.40±0.005 to 14.89±0.005), 48hrs (10.42±0.025 to 14.37±0.025), 72hrs (10.43±0.061 to 12.76±0.38) and 96hrs (10.55±0.032 to 11.37±0.30). It is significantly increase to increasing the concentration but decrease at the end.

B) Total thrombocyte count or Platelets

In the present investigation the control values for hematological parameters for lethal concentration is (19.52±0.20). At different concentration 0.50 ml/l to 6.00 ml/l of extract of ***Parthenium hysterophorus*** at 24hrs (19.68±0.15 to 27.60±0.02), 48hrs (20.2±0.3 to 28.36±0.03), 72hrs (21.30±0.37 to 29.3±0.26) and 96hrs (22.34±0.25 to 30.46±0.20). It is significantly increase to increasing the concentration

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