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ALTERATION OF HAEMATOLOGICAL INDICES IN *CIRRHINUS MRIGALA* EXPOSED TO EXTRACT OF PARTHENIUM HYSTEROPHORUS L.

Zoology

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ABSTRACT

Effect of *Parthenium hysterophorus* L. leaves extract (@ 5 ml/L) on hematological indices in *Cirrhinus mrigala*. After 96 h of exposure, RBC count 1.83 (10^6/µL), hemoglobin 9.1 (g/dL) and haematocrit value 15.49 (%), over the control 4.250 10^6/µL, 12 g/dL and 24.58 % respectively.Mean corpuscular hemoglobin 72.43 pg and mean corpuscular volume 122.41 fL over control 51.77 pg and 106.26 fL respectively decreased significantly. In case of WBC count 7.89 10^3/µL and platelet count 428 10^3/µL over the control 12.7 10^3/µL and 650 10^3/µL respectively increased significantly.

KEYWORDS

RBC, haematocrit, platelet, *Cirrhinus mrigala.*

INTRODUCTION

In fishes most of the report is available on effect of synthetic pesticides. The effect have been reported, hematological indices (Svoboda *et al*., 2001), histochemical (Abdelmeguid *et al*., 2002), acetyl cholinesterase (Monserrat and Bianchini, 2001). Some plants contain compounds of various classes that have insecticidal, piscicidal and molluscicidal properties (Wang & Huffman, 1991). Indian and Chinese major carps displayed abnormal behaviuor exposed to different concentrations of *Nerium oleander*, *Cannabium sativum* and *Parthenium hysterophorus* leaf extracts respectively (Ashraf *et al*., 2010). Very limited work has been done on the effect of *Parthenium hysterophorus* on hematological parameters in fishes. In view of this in the present work attempts were made to study the effect of *Parthenium hysterophorus* L. leaves extract on hematological indices in *Cirrhinus mrigala*.

MATERIALS AND METHODS

Parthenium hysterophorus leaves collected from local area. The leaves liquid extract used for experiments. Healthy, disease free *Cirrhinus mrigala*, weight range 150-200 gm and length 20-25 cm were collected from the local fish market and brought to the laboratory. Fishes were acclimatized to laboratory conditions at room temperature 25^{0}C -27^{0}C for one week.

Glass aquaria (1.5'x1'x1') filled with dechlorinated water (10L) were used for experiments. The animals of experimental groups were exposed to *Parthenium hysterophorus* leaves extract 5ml/L for 96 h. The animals of the second group were exposed to equal volume of water to serve as a control. Ten fishes were kept in each group. Fishes were not fed during the experiments. Water parameters were analyzed temperature, pH and dissolved oxygen (APHA, 1975).

The blood samples of fishes were collected by cardiac region. Using 2ml hypodermic syringe into 2ml lithium heparin's tube. The hematological parameters were analyzed in private laboratory by using automated haemotology analyzers (Dacie and Lewis, 1977). Eight parameters were analyzed namely, total erythrocyte count (RBC), white blood corpuscles (WBC), haematocrit (PCV), hemoglobin (Hb), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC) and platelet count (PLT). The data were analyzed statistically by student's 't' test.

RESULTS AND DISCUSSION

Water parameters range observed pH 7-9; Temp. 25^{0}C -27^{0}C; dissolved oxygen 6.4 - 4.65 ppm.

Total count of RBC in control was 4.250 10^6/µL which is significantly decreased to 1.83 10^6/µL ($p<0.05$), hemoglobin of control 12 g/dL also significantly decreased to 9.1 g/dL ($p<0.01$) and haematocrit value of treated fish also showed significantly decreased 24.58 % to 15.49 % ($p<0.01$). Mean corpuscular hemoglobin 72.43 pg and mean corpuscular volume 122.41 fL over control 51.77 pg and 106.26 fL respectively decreased significantly ($p<0.01$). In case of WBC count 7.89 10^3/µL and platelet count 428 10^3/µL over the control 12.7 10^3/µL and 650 10^3/µL respectively increased significantly ($p<0.01$). Mean corpuscular hemoglobin concentration also showed significant increase over the control (37.19 g/dL to 67.09 g/dL, $p<0.01$). Erythropenia were evident as the RBC total counts decreased significantly. Hemoglobin % and packed cell volume (PCV) too decreased (Table 1). The results indicated that the fish suffered from acute anemia after exposure to *Parthenium hysterophorus*.

The red blood cells decreased below the control. This suggests that at higher concentrations, there could have been destruction of red blood cells. Similar results were also observed for hemoglobin values, which suggested hemodilution which could lead to aneamia. Decrease in erythrocytes has been reported in *Tilapia* due to water pollution (Abdelmeguid *et al*., 2002). Changes in blood cell profile has been reported in *Cyprinus carpio* due to the effect of diazinon by (Svoboda *et al*., 2001). Organophosphate effect on hematological indices has been reported by (Chindah *et al*., 2004) in *Tilapia guineensis*. Decrease in various indices of blood after exposure to *Parthenium hysterophorus* indicated that *Cirrhinus mrigala* became anemic. The same has been reported in *Tilapia guineensis* after exposure to chloropyrifos by (Chindah *et al*., 2004).

Decrease in hemoglobin in experimental animals might be due to destruction (decrease in hemoglobin) has been reported by (Bhaktavasalam, 1991). Lowering of erythrocyte values has been reported by (Svoboda *et al*., 2001) in *Cyprinus carpio* due to the effect of diazinon. Effect of paper and pulp mill effluent on haemopoietic alterations in *Oreochromis mossambicus* reported by (Prabha *et al*.,1999). Therefore, it is apparent that erythrocyte counts and PCV are the sensitive parameters suitable for measuring the *Parthenium hysterophorus* toxicity in fishes. This study also concluded that leaves extract of *Parthenium hysterophorus* adversely affects on various parameters of blood.

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Table 1. Blood profile of *Cirrhinus mrigala* exposed to leaves extract of *Parthenium hysterophorus* (dose 5 ml/L).

Parameters	Control	Experimental
Red blood corpuscles (10^6/µL)	4.250±0.062	1.83±0.058#
White blood corpuscles (10^3/µL)	7.89±0.071	12.7 ± 0.1310*
Hemoglobin (g/dL)	12±0.23	9.1± 1.55*
Packed cell volume (%)	24.58±2.091	15.49±1.620*
Platelate (10^3/µL)	428±16.236	650±21.146*
Mean corpuscular hemoglobin (pg)	72.43±1.310	51.77± 1.890*
MCHC (g/dL)	37.19±1.430	67.09 ±2.060*
Mean corpuscular volume (fL)	122.41±8.193	106.26±6.749*

Values expressed in Mean ± SD. *p < 0.01 and # p<0.05 (student's t test).

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