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# HAEMATOLOGICAL STUDY OF FRESH WATER FISH CHANNA PUNCTATA ON BEING FED BY OCIMUM TENUIFLORUM EXTRACT

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***Abstract:*** The present study was aimed to investigate the effect of ***Ocimum tenuiflorum*** extract on haematological parameters of ***Channa punctatus*** (Bloch). ***Ocimum tenuiflorum*** extract produced positive effects on haematological parameters of ***Channa punctatus*** after 7days, 28 days and 49 days exposure to 10 mg/kg, 20 mg/kg and 40 mg/kg of basal diet extract. The haemoglobin content was 4.90 g/dL ± 0.50 g/dL in control group that was gradually increased to 6.60 g/dL ± 0.50 g/dL. The platelet count was 170000/ cu.mm ± 10000 /cu.mm in control group that increased to 394000/cu.mm ± 10000/cu.mm. While the leucocyte content in control group was 62100/cu.mm ± 500 /cu.mm that decreased to 45000/cu.mm ± 500/cu.mm. The results indicate positive impact of ***Ocimum tenuiflorum*** extract on complete blood cell count of ***Channa punctatus***.

Keywords- Haematology, Herbal extract.

## 1. Introduction

The ever-growing interest in herbs has amplified world-wide because they are cheap, and have fewer side effects on animals and the environment. A wide range of herbal extracted compounds are being studied in various aquatic animals. The whole plant or its parts viz. roots, leaves, seeds, flowers or extract compounds can be used. The extraction process is simple, with ethanol and methanol being commonly used. Various chemicals used to extract compounds may lead to different degrees of effects on aquatic animals. The dosages and duration of time varies in different studies. Medicinal plants show their main properties as growth promoters, immunity enhancers, where they act as antibacterial and antiviral agents to the host immune system. Most authors did not recommend that their results be used directly, while suggestions are proposed for further investigations. Blood is the vital fluid in higher organisms that is essential for life. The health status of any organism can be detected by the health condition of its blood components. The fish haematological parameters such as RBC, WBC, Hb and PCV values etc., are thus shown to be inclined to many factors including environmental factors (Pandey, 1977), seasonal conditions (Joshi and Tondon, 1977; Khan, 1977), different period of reproductive cycle and chemical stress (Khan, and Siddiqui, 1970). Studies have been made on the effect of various toxicants on freshwater fishes in relation to the haematological changes Weils *et al*., (1983), Goel *et.al*., (1984), Benarjee (1986). Since, haematological fluctuations appear before the symptomalogic and histopathologic changes, the study of blood components in the fishes are therefore significant from the diagnostic view point.

## 2. Research Methodology

*Ocimum tenuiflorum* extract for the experimental diet were put together in four different concentrations, on the basis of the $L_c$ 50 values (0 mg, 10 mg, 20 mg, and 40 mg/kg of basal diet). Wheat flour 60 g, fish meal 35 g, vitamin-mineral mix 3 g, cod liver oil 2 ml formulate the basic diet (100 g). The control group was fed a meal devoid of herbal extract. Initially, all components were put together with above mentioned plant extract concentrations. The extractswere carefully homogenized with a little quantity of water before being formed into pellets with a hand pelletizer (Xie, *et al*., 2008). The pellets were dried for 24 hours and kept in an airtight container in the freezer for subsequent use. The fishes were exposed to ethanolic extract of *Ocimum tenuiflorum* in three concentrations for a period that lasted for 42 days, after which blood samples were collected from the control and experimental fish. Approximately 2 mL of blood was collected from the caudal peduncle using separate heparinized disposable syringes containing, an anticoagulant, ethylene diamine tetra acetic acid (EDTA) 0.5 mg; it was properly mixed and used for haematological analysis. All haematological parameters such as haematocrit value, haemoglobin content, total leukocyte count, erythrocyte count was estimated by an Auto Haematology Analyser BC-3000$^{plus}$ fully computerized.

## 3. Observation and Results

| Parameter | Control | 10 mg/kg (7 Days) | 10 mg/kg (28 Days) | 10 mg/kg (42 Days) |
|---|---|---|---|---|
| Total leucocyte count | 62100/cu.mm | 70000/cu.mm | 47700/cu.mm | 52600/cu.mm |
| Haemoglobin | 4.90 g/dL | 4.30 g/dL | 5.30 g/dL | 5.10 g/dL |
| Platelets | 170000/cu.mm | 190000/cu.mm | 320000/cu.mm | 223000/cu.mm |

Table 1. Effect of *Ocimum tenuiflorum* 10 mg/kg extract on *Channa punctatus* in 7, 28 and 42 days

| Parameter | Control | 20 mg/kg (7 Days) | 20 mg/kg (28 Days) | 20 mg/kg (42 Days) |
|---|---|---|---|---|
| Total leucocyte count | 62100/cu.mm | 56200/cu.mm | 48200/cu.mm | 68100/cu.mm |
| Haemoglobin | 4.90 g/dL | 3.90 g/dL | 5.70 g/dL | 6.30 g/dL |
| Platelets | 170000/cu.mm | 200000/cu.mm | 220000/cu.mm | 360000/cu.mm |

Table 2. Effect of *Ocimum tenuiflorum* 20 mg/kg extract on *Channa punctatus* in 7, 28 and 42 days

| Parameter | Control | 40 mg/kg (7 Days) | 40 mg/kg (28 Days) | 40 mg/kg (42 Days) |
|---|---|---|---|---|
| Total leucocyte count | 62100/cu.mm | 45600/cu.mm | 45000/cu.mm | 47500/cu.mm |
| Haemoglobin | 4.90 g/dL | 4.20 g/dL | 6.60 g/dL | 5.50 g/dL |
| Platelets | 170000/cu.mm | 150000/cu.mm | 320000/cu.mm | 394000/cu.mm |

Table 3. Effect of *Ocimum tenuiflorum* 40 mg/kg extract on *Channa punctatus* in 7, 28 and 42 days

| Parameter | Control | 10 mg (28 days) | 20 mg (28 days) | 40 mg (28 days) |
|---|---|---|---|---|
| Total leucocyte count | 62100/cu.mm | 47700/cu.mm | 48200/cu.mm | 45000/cu.mm |
| Haemoglobin | 4.90 g/dL | 5.30 g/dL | 5.70 g/dL | 6.60 g/dL |
| Platelets | 170000/cu.mm | 320000/cu.mm | 220000/cu.mm | 320000/cu.mm |

Table 4. Effect of *Ocimum tenuiflorum* extract (10 mg/kg, 20 mg/kg and 40 mg/kg concentrations) on Total leucocyte count, Haemoglobin and Platelet count of *Channa punctatus*, on treatment with herbal extract for 28 days.

As tabulated above, the Hb increased up to 28th day and then the increase ceased till the 42nd day. Increase in Hb boosts oxygen supply. The long-term use of herbal extract enhanced platelet growth. Increase in platelets leads to improved wound healing capability. The number of leucocytes decreased gradually, indicating decreased susceptibility to infections and a healthy state of body. Significant positive change in the blood components was observed on treatment with *Ocimum tenuiflorum* extract for long term.

## 4. Discussion

Haematology is an efficient tool of research in aquaculture. It has been reported that the blood values remarkably vary in different fishes and this is considered to reflect adaptations to various environmental conditions (Ramaswamy and Reddy, 1978: Moyle and Cech, 1982). Changes in the number of RBC, haematocrit percentage and Hb concentration are not only associated with the season and reproductive activities but also due to chemical stress (Srivastava and Agarwal 1981; Joshi and Tandon, 1977; Mahajan and Dheer, 1979). During the work fishes were kept in laboratory conditions and were not exposed to any toxic substances. Hence there is very slight chance of any contamination, the changes occurring therefore are a result of the herbal extract. This work was carried out for 42 days, there is further possibility of changes, in haematology, if the span of feeding herbal extract is exceeded and the concentrations are changed. The review of the literature on haematological studies in fishes indicated that the data attained from various fish species by several authors round the globe is not even. Subsequently the fish are the extremely delicate creatures, any slight change that occur in their living may have directly manipulated their physiology. However, in spite of all the known proofs there had been a necessity to acquire the unvarying information, which is obligatory for every research finding and the data obtained on haematological studies in fishes did not follow a uniform pattern which might remain a major obstacle in further scientific study. Authenticity of the previous conclusions is a dynamic base for upcoming research.

## 5. Conclusion

In fish, a change of the blood cell distribution also has been correlated with the changes in environmental conditions. The exposure of *C. punctatus* to *Ocimum tenuiflorum* extract caused a significant increase in erythrocyte count and haemoglobin of the fish. The increase in Hb was significant till 28th day, and then there is no significant elevation of Hb till 42nd day of treatment with herbal extract. Similar pattern of increase was observed for platelets as well, *i.e.*, the increase was significant till 28th day of treatment. There is a gradual decrease in Total leucocyte count of the fishes. *Ocimum tenuiflorum* extract has affected the haematological parameters in a positive way. The data illustrated (Table 4) express the effectiveness of the herbal extracts of all the three concentrations (10 mg/kg, 20 mg/kg and 40 mg/kg concentrations) on the 28th day of treatment. The use for longer term *i.e.*, 42 days, of herbal extracts is not as recommendable since the changes seen are not as significant as until 28th day.

## 6. Recommendation

Use of *Ocimum tenuiflorum* extract is highly recommended for *Channa punctatus* in moderate concentration (*i.e.*, 20 mg/kg) and for a short time period. The results observed on higher concentration (*i.e.*, 40 mg/kg) are considerable

though. A slight positive change can be observed on lowest concentration *(i.e.*, 10 mg/kg) of extract, the lowest concentration can be used in order to understand the mechanism of working of the above-mentioned herb.

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