

## Toxic effects of *Parthenium hysterophorus* on Muscles of freshwater fish *Labeo rohita*.

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### ABSTRACT

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The present study is conducted and assessed the toxicity of *Parthenium hysterophorus* on locally available fresh water fish. The present study deals with to determine histological effects on fresh water fish, *Labeo rohita*. The fishes were collected from nearby water body and brought to the laboratory for determination of histological parameters up to 96hr. period. The muscles of fish exposed lethal concentration for different time exposure (24hrs. 48hrs. 72hrs. and 96hrs.) showed lesion, inflammation, pigment and necrosis of primary and secondary gill lamellae during low concentration while, increasing concentration for different time exposure showed necrosis, malignancy and cellular degeneration were seen at later time of exposure.

**Keywords:** *Parthenium hysterophorus*, Muscles, Histology, *Labeo rohita*

### I. INTRODUCTION

Water pollution, has been increasing at an alarming rate due to rapid industrialization, civilization and green revolution. Urban, agricultural and industrial activities release xenobiotic compounds that may pollute the aquatic habitat. Industrialization and growth of human population have led to a progressive deterioration in the quality of the earth's environment. India is a country having great cultural diversity associated with all kinds of climates, rich flora and fauna, and supporting an estimated total of eight percentages of the globally documented species. It is experiencing increasing pressure on its bio-resource and ecosystem services due to high demand of food (Kannupandi et al., 2003; Varadharajan et al.,

2009). The higher concentration of toxicants brings 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). Rohu is the natural inhabitant of freshwater sections of the rivers. Rohu thrives well in all fresh waters below an altitude of approximately 549 m. Rohu is a bottom feeder and prefers to feed on plant matter including decaying vegetation. Rohu attains maturity towards the end of the second year in ponds. The spawning season of rohu generally coincides with the southwest monsoon. Spawning takes place in flooded rivers. The fecundity of rohu varies from 226,000 to 2,794,000,

depending upon the length and weight of the fish and weight of the ovary. The spawn of this fish is collected from rivers during monsoon and reared in tanks and lakes (Talwar and Jhingran 1991). Rohu is very commonly eaten in Bangladesh and the Indian states of Bihar, West Bengal, Odisha, Assam, and Uttar Pradesh. The Maithil Brahmins and the Kayastha community of Nepal, Bihar and Uttar Pradesh treats it as one of their most sacred foods, to be eaten on all auspicious occasions. Rohu is the most commonly used fish in Pakistan and is usually eaten fried, or in a sauce with spices.

*Parthenium hysterophorus* is an aggressive ubiquitous annual herbaceous weed. This erect, ephemeral herb known for its vigorous growth and high fecundity especially in warmer climates is a native of north-east Mexico and is endemic in America. It is commonly known as 'altamisa', carrot grass, star weed, white top, wild feverfew, the "Scourge of India" and congress grass. *Parthenium hysterophorus* is a prolific weed belonging to Asteraceae family, producing thousands of small white capitula each yielding five seeds on reaching maturity. In the past century it has found its way to Africa, Australia, Asia and Pacific Islands and has now become one of the world's seven most devastating and hazardous weeds. Exposure to *P. hysterophorus* also causes systemic toxicity in livestock. *Parthenium hysterophorus* is a serious invasive weed of pasture systems, reducing pasture productivity 90%. (*Parthenium hysterophorus* L.) Congress grass is an exotic weed comes under Asteraceae family, accidentally introduced in India, 1955 in Pune through the imported food grains (Dhawan and Dhawan, 1996). It has become naturalized and is spreading at an alarming rate all over India (Sivakumar et al. 2009) and can adopt any climate very easily. Adewoye and Fawole, (2002; 2005) studied the concentration of metals in the tissue of *Clarias gariepinus* fingerlings exposed to lethal concentration of cassava Waste water. The histopathological examination of the gill, liver, and

muscle of the exposed fish indicated that the gill and liver were the organs most affected. This is similar to the observation of (Rahman et al., 2002; Aguiw, 2002; Omitoyin et al., 2006; Ayoola, 2008).

## II. MATERIALS & METHODS

Labeo rohita fish were collected from Nal Damayanti Dam, local fish market Amravati washed with 10% solution of Potassium Permanganate to free any fungal infections. Then acclimatized to the laboratory condition for fifteen days in large aquarium. The fish size 15 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 ad 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 changes to maintain the concentration of *Parthenium hysterophorus* extract and histological changes were recorded.

## III. RESULT AND DISCUSSION

For lethal concentration at control there are no lesion, no necrosis, no pigments, no malignancy, no inflammation and cellular degradation seen for the 24hrs, 48hrs, 72hrs, and 96hrs.

At 6.00ml/l lesion occurs on muscle bundle and nucleus for 24hrs, for 48hrs lesion, inflammation on muscle bundle, nucleus and muscle striation while, for 72hrs necrosis occurs in muscle bundle and

nucleus, for 96hrs necrosis, cellular degradation occurs on muscle bundle, nucleus and muscle striation.

Muscle (Section) of *Labeo rohita* exposed to lethal concentration (control) of root water extract of *Parthenium hysterophorus*

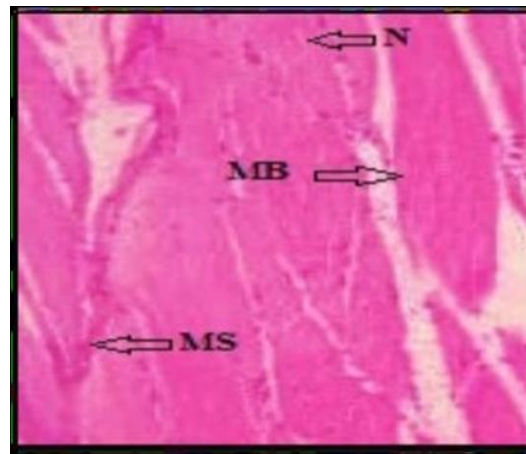


Fig.: Muscle of *Labeo rohita* (Control).

MB: Muscle bundles, N: nucleus, MS: muscle striation, M: microfilament. No lesion (L), inflammation (I), pigment (P), necrosis (N), malignancy (M) and cellular degeneration(C).

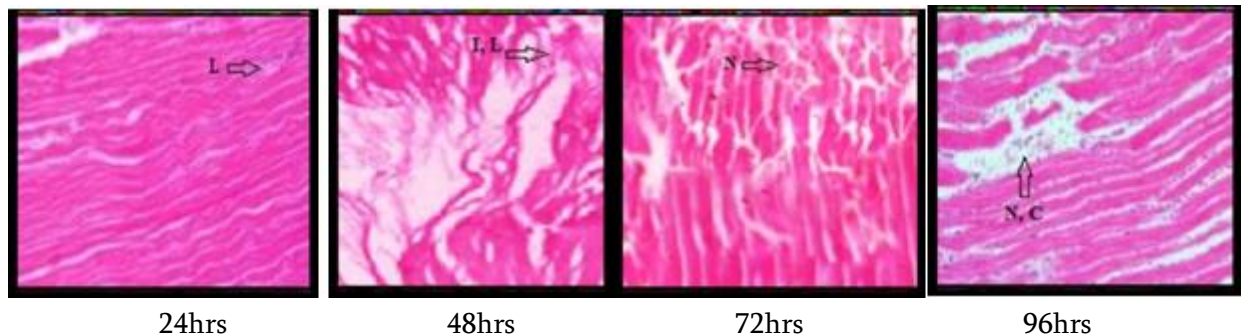


Fig.: Muscle (Section) of *Labeo rohita* exposed to lethal concentration (6.00 ml/l) of root water extract of *Parthenium hysterophorus* showing lesion (L), inflammation (I), necrosis (N) and cellular degeneration(C).

The muscle of fish exposed to lethal concentration for different time exposure (24hrs. 48hrs. 72hrs. and 96hrs.) showed lesion, inflammation and necrosis of muscle bundle, nucleus and muscle striation during low concentration while, increasing concentration for different time exposure showed necrosis and cellular degeneration and muscle bundle, nucleus and muscle striation were seen at later time of exposure.

In the present work, severe damage of muscle bundles, shortening of muscle bundles, thickening of muscle bundles, severe intra muscular oedema and necrosis of muscle bundle. This similar finding was observed by

(Bharat Bhusan Patnaik et al., 2011). All these changes indicate the fish under the highly stressful

conditions. Mohamed, 2009 observed the degeneration of muscle bundles with aggregation of inflammatory cells between them and focal areas of necrosis. Similar result is observed in present work. A focal area of myolysis was seen in the muscles of *O. spilurus* exposed to contra / insect 500/50E.C. observed by (Elnemaki and Abuzinadah, 2003). Abbas and Ali (2007) observed destruction and vaculation of the muscle cells in *Oreochromis* spp. exposed to chromium. The histological alteration in the fish muscle was reported by many investigators who have

studied the effect of different pollutants on fish muscle (Rakhi et al., 2013; Jeheshadevi et al., 2014).

#### IV. CONCLUSION

The muscle of fish exposed to lethal concentration for different time exposure (24hrs. 48hrs. 72hrs. and 96hrs.) showed lesion, inflammation and necrosis of muscle bundle, nucleus and muscle striation during low concentration while, increasing concentration for different time exposure showed necrosis and cellular degeneration and muscle bundle, nucleus and muscle striation were seen at later time of exposure.

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