Research Paper

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# The Effect of Imiprothrin on Histological Aspects in The Freshwater Fish *Labeorohita*

Zoology

**KEYWORDS :** Labeorohita, imiprothrin, muscle, kidney, brain.

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## ABSTRACT

*The impact of sublethal concentrations of imiprothrin on different tissues of Labeo rohita has been studied in the present work. Muscles, kidney and brain were selected to elicitate the toxic nature of the pesticide on fresh water fishes. The muscle exhibited haemorrage along with atrophy of muscle fibers in addition to vacculization with the resultant deformation of myofibrils. Alteration such as glomerular disintegration rupture of kidney tubules and necrosis and vacculisation cells due to precipitation and reduction of protoplasmic materials. A number of alterations at various levels were evident as structural abnormalities such as vacculation, dialation of blood capillaries, fibrosis and agglutination of neurons.*

**INTRODUCTION:**

Man uses water, soil and other resources by imposing changes on natural ecosystems. The introduction of substances by man into the environment results in deleterious effects endangering living resources and the environment in addition to human health. A review of toxicological literature reveals that the exposure to toxic elements can produce adverse effects in non target animals. Sandhya Rani, P.N and Venkataaramamana, G.V., (2012), Selvanathan.j *et al*., (2013), Magar. R.S. and Afsar Shaikh 2013, Khalid Abdullah Al Ghanim 2014 have reported that the freshwater bodies are contaminated by heavy metals, pesticides, organic materials, phenols and so on. Among the toxicants the pesticides in the water bodies produce lethal and harmful effects through biological magnification in organisms.

India is endowed with rich fishery resources for the development of agriculture, this increasing the aquatic food production. But the production of fish is being adversely affected either because of overfishing or through altering the physicochemical nature of the aquatic environment. The indiscriminate use of pesticides and other toxicants are found to induce biochemical, dermatological and histological impacts in higher animals (Kaoud H.A and Dashan 2010, Muthukumar vel *et al* 2013,Bijoy Nandan and Nimila 2011, Ajit Hundet and Barun 2014; Excessive studies have been made pertaining to the mortality and growth rate of fishes. However a few studies have focused on the effects of pollutants at organ system level in fishes (Joshi *et al*., 2007, Peebua *et al.,* 2008, Sahar Masud., 2009, Devakrishnan *et al*., 2012,) studies on his to pathological alterations in fishes on exposure to pesticides are meager, so that the histopathological changes in the muscle, kidney and brain of a fresh water fish *L. rohita* has been reported in the present paper.

**MATERIALS AND METHODS:**

For the present work the fresh water teleost fish *L. rohita* which were collected from the local pond by using dipnet. They were acclimatized in the laboratory conditions for one week in glass aquaria. Imiprothrin which is a syntetic pyrithroid was made into various concentrations by using 0.5% Wt/Volume acetone. Bioassays were carried out by using the pesticide to find out LC 50 90 hour value as per the method given by Sprague (1973). Then a group of ten fishes having the same size and weight were introduced in various sublethal concentrations of the pesticide (1.0%, 2.0%, 3.0%, 4.0% and 5.0%) separately for five weeks. The experimental media were renewed daily and the fishes were fed with artificial fish meal.

At the end of experimental period, the fishes in each concentration were scarified and the muscle, kidney and brain were dissected out individually in physiological saline for further histological preparation by the method given by Humason (1972). The sections were micro photographed.

**RESULTS AND DISCUSSION:**

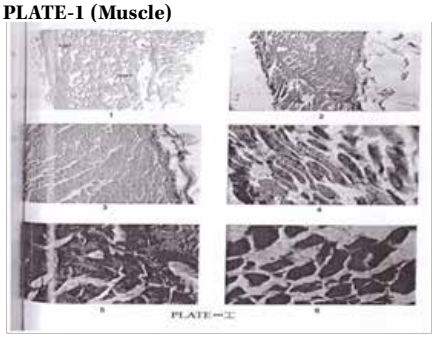
It is quiet evident that the pesticide imiprothrin has affected various tissues studied in dose and duration dependent manner. In control fishes the skeletal muscles were normal whereas in pesticide trated muscle, the muscle exhibited haemorrage along with atrophy of muscle fibers, in addition to vacculization with resultant deformation of myofibrils (Plate 1). Similar findings were made in the muscle fibers of fishes under the influence of pesticide (Johndevadoss Gobinath and Ravichandran Ramanibai (2014). Nagaraju and Venkata Rathnamma (2014).

Kidney is highly susceptible to the toxicants as it is highly vascularised. In the present study the pesticide induced alterations (Plate II) causing glomerular disintegration, rupture of kidney tubules and necrosis and vacculisation cells due to precipitation and reduction of protoplasmic materials. The findings similar to the present investigation have also been made by Asia Al –Mansoori *et al.,* (2010), Prabhahar *et al*., (2012), Ikele chika bright *et al*., (2011), Olufayo and Alade (2012).

In control fishes, the structure of brain was normal, whereas alterations at various levels were evident in structural abnormalities. The major impact was the loss of definite demarkation between different layers of brain. In addition the pesticide was found to cause many abnormalities such as vacculation, dialation in of blood capillaries, fibrosis and agglutination of neurons in different sublethal concentrations as shown in (plate III). The resent finding has also been supported by Gaafar *et al.,* (2010), Adeogun *et al.,* (2012) and Kreutz *et al.,* (2014).

Thus, the present study indicates that the pesticide has resulted a number of pathological changes in different tissues in *L.rohita* and there alterations were more severe in long exposure period and higher concentrations. This could be due to the cumulative accumulation of imiprothrin as observed by Pallavi srivastava and Ajay Singh (2014) who have reported cumulative Toxicity of fungicide in fishes.

**PLATE-1 (Muscle)**



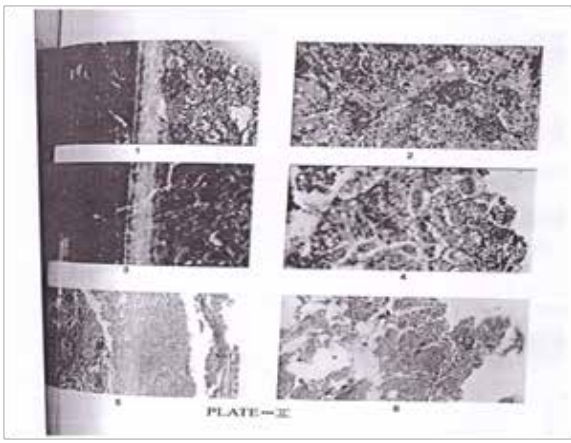

Ph.m.1 Muscle of control fish showing Red muscle fibre

(RMF), white nuscle fibre (WMF), clearly.

Ph.m.2&3 Muscle of lower concentrations (0.1% and 0.2%) ex posed fish showing, necrosis (N) and vacuoles (V)

Ph.m.4,5&6 Muscle of higher concentration (0.3%, 0.4% and 0.5%) showing disintegrated cells necrosis (N) and vacuoles (V)

**PLATE-II (Kidney)**

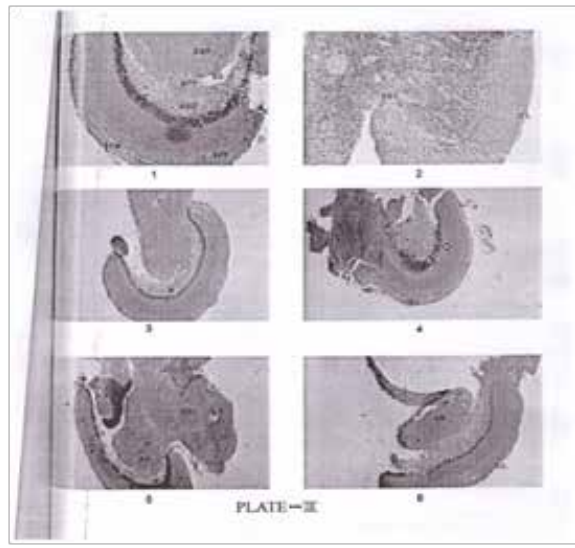



Ph.m.1 Kidney of control fish showing kidney tubules (KT), Glomerulus (G), Haemopoietic (HT).

Ph.m.2&3 Kidney of lower concentrations (0.1% and 0.2%) ex posed fish showing, Glomeruli disintegration (GD), Ruptured Kidney tubules (RT).

Ph.m.4,5&6 Kidney of higher concentration (0.3%, 0.4% and 0.5%) exposed fish showing vacuoles (V), necrosis (N) and necrosis in heamopoietic tissues (NHT).

**PLATE-III (Brain)**




Ph.m.1 Brain of low control fish showing Stratum Fibrosum Marginali (SFM), Stratum Plexiform Fibrosum (SPF), Blood spces (BS), Stellate cells (SC), Stratum Griseum Centrale (SGC), Stratum fibrosum profundem (SFP) and stratum Griseum periventtricle clearly.

Ph.m.2&3 Brain of lower concentrations (0.1% and 0.2%) ex posed fish showing dilation of blood capillary (DBC), Dilation of fibrosis (DF), Vacuole (V), necrosis (N).

Ph.m.4,5&6 Brain of higher concentration (0.3%, 0.4% and 0.5%) showing dilation of fibrosis (DF), Irregula epindymal layer (IEL), Neuron agglutination (AN).

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