



Sublethal Malathion Induced Changes in The Liver of Fresh Water Fish, *Catla catla* : A Histopathological Study.

S. R. Katke(Bramhane)

Head, Dept. of Zoology, Brijlal Biyani Science College, Amravati, (Maharashtra),India.

shyamalakatke@gmail.com

Abstract

In the laboratory, fresh water static model ecosystem was established using glass aquaria to simulate natural ecosystem in which healthy *Catla catla* were introduced to study the toxic effects of malathion on the liver of fresh water fish *Catla catla*. The fishes were exposed to the sub lethal dose of Malathion (0.5ppm) for 30 days in the laboratory.

The normal structure of liver of fish *Catla catla* shows the hepatic parenchyma, bile canaliculi and blood vessels. Histopathological changes in the liver for 30 days of exposure to Malathion were studied. The observation revealed degenerative changes in the liver. Malathion exposed *Catla catla* exhibited highly vacuolated hepatic cells with loss of their polyhedral shape. Hepatic cells showed edema in hepatocytes. Cytoplasmic degeneration, nuclear displacement, cloudy swellings are some more changes seen in the liver of malathion exposed *Catla catla*. The cell membranes are prominently seen as ruptured.

Keywords: *Catla catla*, Sub lethal, Malathion, Histopathology, Liver

Introduction

The pesticides used to kill pests of agriculture, forestry and wild life have found their way to the aquatic ecosystem through the runoff water, intensively managed agriculture, forestry operations, through wind actions, effluents, release from the pesticide factories and to some extent through domestic effluents. This contamination of aquatic environment may be detrimental to aquatic food chain and ultimately to man. The pesticides are known to cause fish mortality or make them unsuitable for consumption, as fish is the most important factor of aquatic food chain and also it is a major component of human food. Malathion is a widely used organophosphorus pesticide, and is released into environment through its production, formulations, and its widespread use. In fish *Catla catla* the sub lethal concentration of Malathion induced histopathological alteration in liver.

Materials and Methods

Live specimen of major carp *Catla catla* were selected for the present study and were collected from the state government fish farm at Mahan (Dis. Akola) and were brought to the laboratory in well oxygenated bags. They were disinfected in 1% KMnO₄ and were maintained in glass aquaria. They were fed with food prepared from rice bran and groundnut cake daily after water was changed in the morning. After two weeks healthy and active fishes weighing about 125±2 gm and of approximately of equal length were sorted and kept in separate aquaria for experimental work. As per standard methods, the physicochemical parameters of aged tap water were determined periodically (APIHA, 1998).

To study the Malathion induced histopathological changes in various organs the experiments were conducted in two phases. In first

phase the lethal concentration and sub lethal concentrations of Malathion were studied (Finney, 1952). In second phase of experiment the fishes were exposed to sub lethal concentration of Malathion which was (0.5ppm) which agreed with the observation of Anees.M.A (1995) for 30 days. At the end, the control and experimental fishes were dissected after giving blow on head and liver was obtained.

Liver was blotted on filter paper to remove blood stains and was cut into pieces of small size. They were fixed in aqueous bouins fluid for 16 to 20 hours. After fixation the tissue were washed, dehydrated, cleared and infiltrated in wax. Blocks were prepared and sections were cut at 5µ thickness. Slides were stained with haematoxyline-eosine. Microphotography was done to study Malathion induced histological changes in the liver of fresh water fish *Catla catla*.

Result and Discussion

The normal structure of liver of fish *Catla catla* shows the hepatic parenchyma, bile canaliculi and blood vessels. The parenchymatous cells forming cords lie regularly and get separated by bile canaliculi and blood sinusoids. The polygonal hepatic cells bear a prominent central nuclei and granular cytoplasm. Each sinusoid consists of an outer peripheral connective tissue and an inner lining of endothelial cells (fig 1).



Studies on the histological changes in testes and analysis of serum hormonal level of *Aloe vera* treated male albino rat, *Rattus norvegicus*

Urmila Jiwantare, Varsha Dhurvey and Shyamala Katke

Department of Zoology, Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur M.S. India
 Department of Zoology, B. B. Science College SGB Amravati University, Amravati M.S. India
 Email: urmilajiwantare@gmail.com

Abstract – Many herbal plants have medicinal value and are used throughout the world as safe source of medicine. *Aloe vera* is a succulent herb used for various ailments and contains many healing properties. Its beneficial effect on diabetes, burns, wounds and gastrointestinal diseases has been proved. But there is scarce information of its effects on male reproductive system. In the present study the effect of crude extract of *Aloe vera* on testes and serum gonadotropins of male albino rats have been investigated. In this study 12 male albino rats weighing between 180-240 gm and aged 3-4 months were randomly divided into 2 groups of 6 animals each. The group I served as control, provided normal saline and group II is experimental and are treated with 25 mg/kgbw of crude extract of *Aloe vera* gel daily for 30 days orally. Histopathological studies showed that there were atrophic tubules, germ cell debris, vacuolization of sertoli cells and interstitial cells, disrupted basement membrane, empty lumen of seminiferous tubules and intercellular spaces in seminiferous tubules in testes of *Aloe vera* treated groups as compared to control group. Analysis of serum level of luteinizing hormone, follicle stimulating hormone and testosterone was found to be significantly decreased in treated group. Thus it is concluded that *Aloe vera* cause adverse effect on the testes of rat by affecting the secretion of reproductive hormones.

Key words: *Aloe vera*, testes, histoarchitecture, luteinizing hormone, follicle stimulating hormone, testosterone and albino rats.

Introduction:

Aloe is a cactus-like perennial herbaceous plant which grows easily in arid warm regions of Africa, North America, Europe and Asia. *Aloe vera* is reproduced via seed, leaves cuttings and other parts of origin plant. This plant contains many vitamins including antioxidant vitamins like A and C, vitamins of B group like thiamin, niacin, riboflavin, cobalamine and folic acid. Sodium, potassium, calcium, magnesium, manganese, copper, chromium and iron are found in *Aloe vera*. *Aloe vera* is a pharmaceutical plant which can be useful for curing various diseases and improving body's physiology. It can be used as a natural antioxidant with high potential of reducing fats oxidation and oxidative stresses (Vinson *et al.*, 2005).

The main chemical constituents of the *Aloe vera* plant are Anthraquinones (Aloin, Aloe Amodine, and Coumaric Acid), polysaccharides, glycoproteins, prostaglandins, phytoestrogens such as beta-cyosterol, cholesterol, and fatty acids like campesterol (Braun, 2005, Baby *et al.*, 2010 and Estakhr *et al.*, 2011).

A recent study on the effect of this plant on testosterone and gonadotropin hormones in adult male rats also showed that hydro-alcoholic extract of this plant has an anti-androgenic property that can reduce androgen-dependent parameters including secretion of gonadotropins and probably cause oligospermia (Shanati *et al.*, 2009). There are very few literature available related to antifertility

potential of *Aloe vera* on male reproductive system and also considering different compositions of *Aloe vera* plant including Aloe Amodin, and Phytoestrogens such as Beta-cyosterol, it is possible that these compounds could affect sex hormones (Poorfarid *et al.*, 2013). Thus, the present study was conducted to examine the effect of *Aloe vera* gel extract on serum gonadotropin level and histological changes in testes of male albinorats.

Materials and Methods:

Experimental location: The present experiment was performed in the Research Laboratory, PGTD of Zoology, MJF Campus, RTM Nagpur university, Nagpur.

Experimental Animal: For this study 12 male albino rats weighing between 180-240 gm and aged 3-4 months were obtained from Shree animal farms, Nimgao, dist. Bhandara, Maharashtra, India. The animals were allowed to acclimatize to the laboratory condition for 7 days prior to start of the experiment. The experimental protocol was approved by Institutional

Animal Ethics Committee (Registration number 478/01/a CPCSEA) of the RTM Nagpur University, Nagpur.

Preparation of *Aloe vera* gel extract: Fresh *Aloe vera* gel extracted daily as follows: The fresh *Aloe vera* leaf cut down with the help of sharp sterilized knife, washed with clean water and cut transversely into slices and then the gel extracted by squeezing the thick epidermis and collected in a small petriplate.