International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)
doi : https://doi.org/10.32628/IJSRST229145

Effect of Endosulfan on Intestine and Pancreas of frog Rana tigrina

Rathod S. H, N. R, Thorat
Department of Zoology, Vidya Bharati Mahavidalaya, Amravati, Maharashtra, India

Article Info
Volume 9, Issue 1
Page Number : 256-260
Publication Issue
January-February-2022
Article History
Accepted : 08 Feb 2022
Published : 17 Feb 2022

ABSTRACT

Now a day's use of pesticides is the matter of great discussion for environmentalist to gain more relevant information on tolerance of organism to the pesticides. *Rana tigrina* were exposed to sub lethal concentration of Endosulfan **(0.073 ml/lit)** for 7 days regularly. The globlet cells of intestine was found to be swollen, enlargement of cells, cell shrinkage, damage of cell membrane, vacuoles formation and pancreas exocrine secreatory acini cells was found to be damaged and connective tissue was loosely bounded also observed on exposure to Endosulfan.

Keywords : Endosulfan, Intestine, Pancreas.

I. INTRODUCTION

Now days the tremendous increase in environmental pollution is seen. Environmental pollution is due to the introduction of pollutants into natural environment that causes instability disorders, harms or discomfort the living organism in the ecosystem. Pollution can take the form of toxic chemical substance and contaminated water, soil, air which showed effect on the targeted and non- targeted organisms. It has been studied that acute toxicity of endosulfan on *Bufo bufo* gills & stream near sprayed agriculture field, after 24, 48, and 96 hours of exposure showed 50% mortality (LC 50) (**Ilaria Bernabo *et.al.,* 2008).** It has been found that exposure to natural and synthetic estrogenic chemicals may adversely affect wildlife and human health **(Colborn et al., 1993**). There are various pesticides such as, Organochlorine (*Endosulfan, Endrin*) are used in fields and gardens. The environmental toxicological studies on vertebrates is rapidly expanding, fishes have become valuable indicator for the evaluation of the effects of toxic compounds **(Khidr and Mekkawy, 2008).** Histology and histopathology can be used as biomonitoring tools for health in toxicity studies **(Meyers and Hendricks, 1985).** Histoplathological alterations are biomarkers of effect exposure to environmental stressors, revealing alterations in physiological and biochemical function **(Hinton *et.al.,* 1992)**. Histopathology, the study of lesions or abnormalities on cellular and tissue levels is useful tool for assessing the degree of pollution, particularly for sublethal and chronic effects (**Bernet *et. al.,* 1999**). There are various ways of spread of pesticidal

pollution in the environment such as rain water drained off from the pesticides spread field through which pesticides residues reach to environment and cause toxic effect on the aquatic and other organisms. In past several decades, decline in amphibian population has been occurring all over the world, for unexplained reasons which are thought to be varied but of which pesticides may be a part. Mixtures of multiple pesticides appear to have a cumulative toxic effect on frogs. Tadpoles from ponds with multiple pesticides present in the water lake longer period to metamophosis into adult frogs, decreasing their ability to catch prey and to avoid predators. **(Benoit *et.al.,* 2003**) studied that the effect of cadmium , Endosulfan and atrizine on African frog (*Xenopus leavis*) and Bull frog *Rana catesbeiana* showed adverse impact on secreatory capacity of adrenal cells of amphibians. Amphibians itself acts as a pest controlling organism plays a vital role in food web and are commonly found in agriculture fields, near ponds and rivers. When they came in contact with pesticides they absorb orally, cutaneously or by inhalation and get affected even though when they feed on the affected insects they get affected indirectly.

II. Material and Method

Adult frog (*Rana tigrina*) of both sexes where collected by net or hand from their spwaning ponds at unpolluted and non-agriculture site. The collected frogs were transported to laboratory in covered baskets. Adult frogs of the same size and same weight (35-40 gm) were acclimatized in glass aquarium tank for the time period of 10 to 15 days in laboratory condition; frogs were feed twice a day alternatively by insects. Stock solutions of experimental dose were prepared by using Endosulfan and ethanol as a vehicle. From 0.073 ml stock solution is used as dose in per liter water after acclimatization of 10-15 days frogs has become divided into two groups:

GROUP I - Control

GROUP II – Experimental

Group I and Group II consist of six adult frogs respectively. Group I were placed in plane water glass aquarium. While Group II is treated with 0.073 ml/lit of dose of Endosulfan for 7 days. On eighth day frogs of both groups were sacrifice for further experimentation.

For Histopathalogical observation, after 7 days, frog of each group were removed and dissected. Small pieces of the intestine and pancreas were taken and immediately fixed in alcholic bouin's fluid. Fixed tissues were processed routinely for paraffin embedding technique. Embedded tissues were sectioned at 5-7µ in thickness and then stained with double staining method. Finally the sections were proceed for microscopic studies for observation and collect their respective photographs for observation.

III. Observations

Histopathalogical changes in intestine exposed to Endosulfan:

Frog *Rana tigrina* exposed to sub lethal concentration of Endosulfan showed the morphological changes. In the present investigation cells of intestine of treated frog showed flaccid and degenerative stage. Cells of intestine showed shrinkage, damaged and ruptured membrane of the cells, and space between the intestinal goblet cells was clearly observed.

Histopathalogical changes in pancreas exposed to Endosulfan:

Frog *Rana tigrina* exposed to sub lethal concentration of Endosulfan showed the morphological changes in the cells of pancreas. It showed the disruptor of the secreatory acini cells and damage of the islets of langerhans cells of pancreas, as well as connective tissue was loosely bounded also observed.

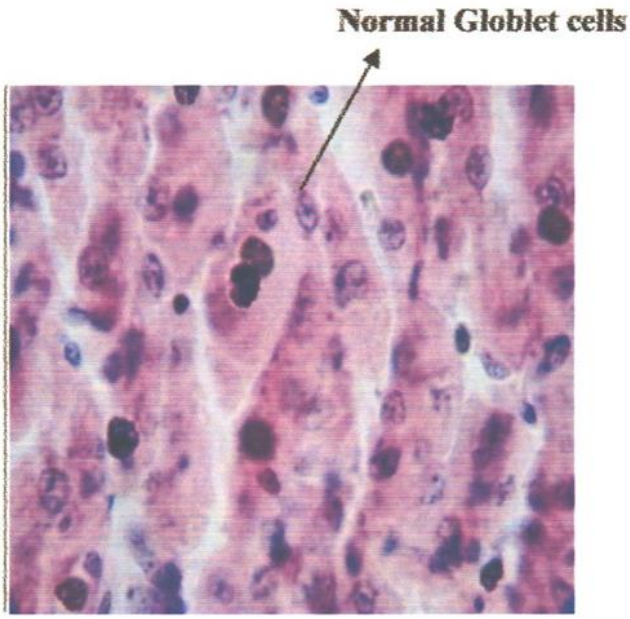

Fig no.1) Section of control frog intestine-Goblet cells of normal size are observed before treatment to endosulphan.

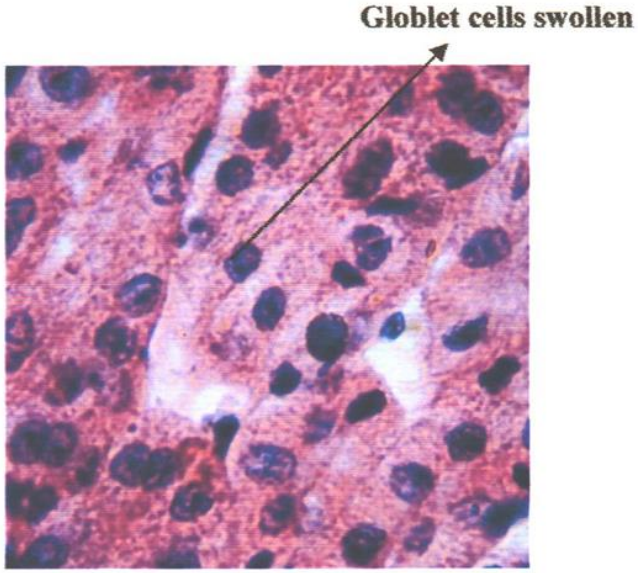

Fig. 1.1 Section of endosulfan treated intestine Globlet cells become swollen and enlarged after 7 days treatment of endosulfan

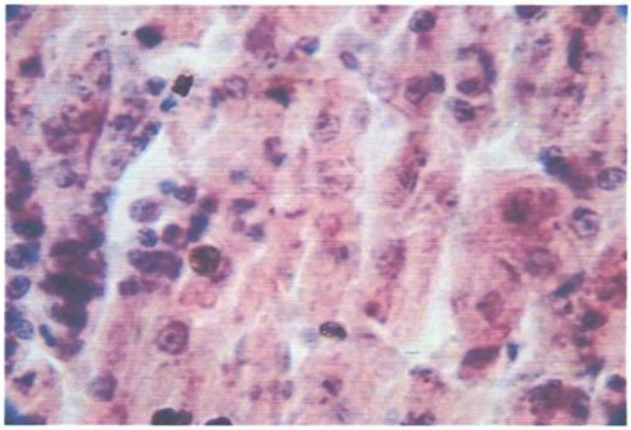

Fig.2) Section of Control frog intestine

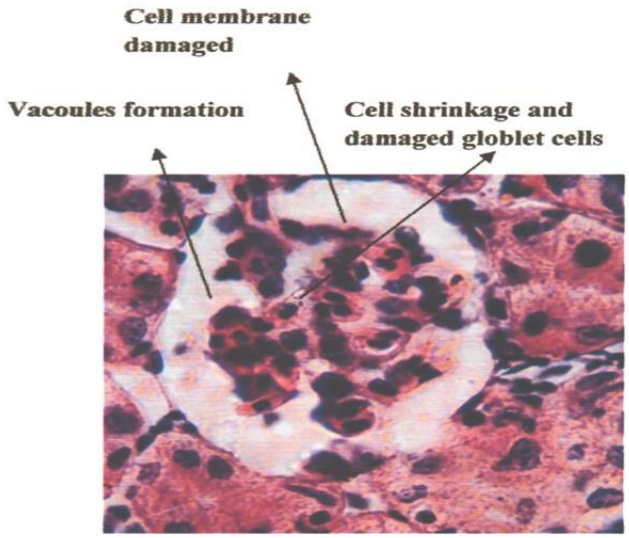

Fig.2.1) Section of Endosulfan treated frog intestine-Shows the endosulfan effects, goblet cells shrinkage, damage of cell membrane and vacoule formation.

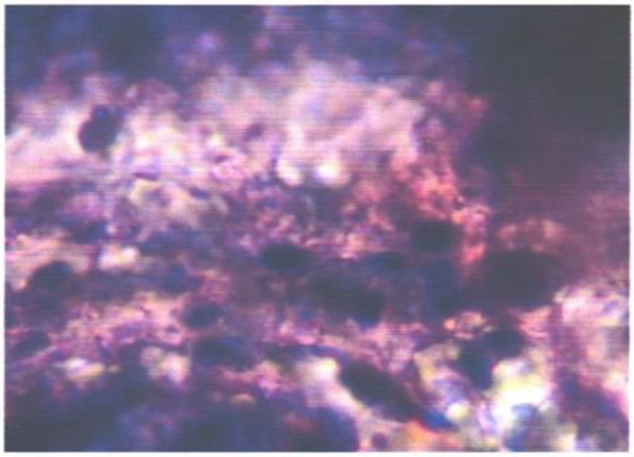

Fig. 3) Section of control frog Pancreas-Connective tissue and exocrine secreatory normal of frog Rana tigrina

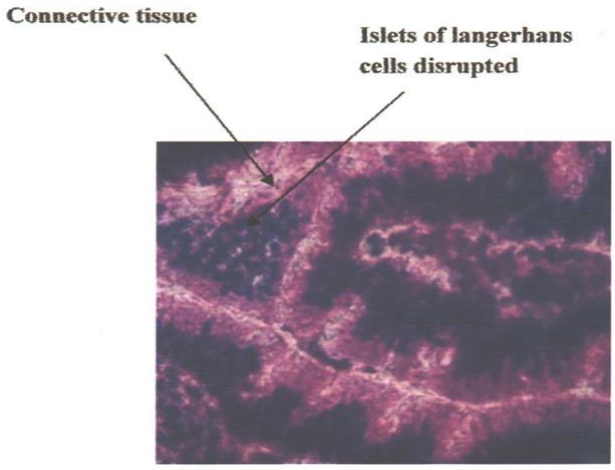

Fig. 3.1) Section of Endosulfan treated Pancreas- shows exocrine secreatory acini cells suspended and islets of langerhans cells become disrupted.

IV. RESULTS AND DISCUSSION

Pesticides indirectly and directly affect on non-targeted organism and may interfere the physiological process of the living organism. A pesticide not only affects the physiochemical properties of the ecosystem but also affects the flora and fauna. The proper and safe use of pesticides will be ensuring only a good knowledge of their toxicological characteristics and behavior in biological media to be reviewed. Here we study the effect of Endosulphan on intestine and pancreas of frog *Rana tigrina* which shows morphological changes.

Histological changes in the Pancreas:

In the present investigation the effect of *endosulfan* shows the morphological changes in the intestinal cells the cell become swollen, cell membrane of intestinal cell was highly affected and disturbed, vascularization and degeneration of intestinal cell were also observed. Similar finding by **Chayya Roy Kundu *et.al.,*(2011)** observed the effect of malthion at subleathal concentration (0.006) on the intestine of cricket frog (*Fegarvarya limnocharis*) was observed for 24 hour to 240 hour of exposure and remarkable histopathological alteration were observed it showed acute pathological condition in intestinal wall, due to toxicity the cytoplasm of cells disintegrated become empty and vacuolated, cell membrane was ruptured and degenerative villi of intestine also observed.

Similar finding also observed by **T. Braunbeck and S. Appelhum (1999)** on the exposure of endosulfan to carp *Cyprinus carpio* for 5 weeks it showed the liver alteration and enlargement of nucleolus, Golgi complex and rough endoplasmic reticulum and ultra structure of intestine shows complete lack of chylomicrons in epithelial lining which indicates disturbance of intestinal absorption.

Histological changes in the Pancreas:

In the present investigation toxicity of endosulfan showed impact on morphological changes in pancreatic cells .The cells of islets of langerhans secretory acini cells becomes ruptured and degeneration of pancreatic cells were observed. Similar Study were observed by **Ozlem Oznien *et.al.,*(2010)** studied the exposure of endosulfan and vitamin C on rabbit pancreatic cells. It was showed remarkable degenerative changes and decrease in proinsulin-insulin and amylin secreating cells also slight decrease in glucagon secreating cells. From the present investigation it was suggested that endosulphan may show impact on the endocrine organs of frog, endosulfan is toxic to the amphibians and other organism so there is need to more research to develop a less toxic pesticides which will not harmful for targeted and non-targeted organism.

V. REFERENCES

[1]. Bernabò, I., Brunelli, E., Berg, C., Bonacci, A., Tripepi, S., (2008): Endosulfan acutetoxicity in Bufo bufo gills: ultrastructural changes and nitric oxide synthaselocalization. Aquat. Toxicol. 86, 447–456.

[2]. Bernet, D., Schmidt, H., Meier, W., Brkhardt-Holm, P. & Wahli, T. (1999): Histopathology in fish: Proposal for a protocol to assess aquatic pollution. Journal of Fish Diseases.Vol. 22: 25–34.

[3]. Benoit N. Goulet., Alice Hontela (2003): Toxicity of cadmium, endosulphan, and atrazine in Adrenal striodogenic cells of two amphibian species, Xenopus laevis and Rana catesbeiana. Environmental Toxicology and Chemistry, Vol. 22, No. 9, pp. 2106–2113,

[4]. Braunbeck T, Appelbaum S (1999): Ultra structural alterations in the liver and intestine of carp Cyprinus carpio induced orally by ultra-low doses of endosulfan. Dis. Aquat. Org. 36: 183-200.

[5]. Colborn, T., Vom Saal, F.S. & Soto, A.M. (1993): Developmental effects of endocrine disrupting chemicals in wildlife and humans. Environmental Health Perspectives. Vol. 101: 378–384..

[6]. Chayya R Kundu., S. Roychoudhury, M. Capcarova (2011): Malathion-induced sublethal toxicity on the intestine of cricket frog (Fejervarya limnocharis) Journal of Enviro Sci and Health Part B Pesticides Food Contaminants and Agricultural Wastes 46(8):691-6

[7]. Hinton, D.E., Baumann, P.C., Gardner, G.R., Hawkins, W.E., Hendricks, J.D., Murchelano, R.A. & Okihiro, M.S. (1992): Histopathological biomarkers, In: Huggett, R.J.,

[8]. Khidr, M. B. & Mekkawy, I.A.A. (2008): Effect of separate and combined lead and selenium on the liver of the cichlid fish Oreochromis niloticus: ultrastructural study. Egyptian Journal of Zoology. Vol. 50: 89-119.

[9]. Ozlem Ozmen., M. Firdevs (2010) : Effects of vitamin C on pathology and caspase-3 activity of kidneys with subacute endosulfan toxicity Biotechnic and Histochemistry 90(1):1-6 · August 2010

[10]. Meyers, T.R. & Hendricks, J.D. (1985): Histopathology. In: Loux, D.B., Dorfman, M., (Eds.), Fundamentals of Aquatic Toxicology: Methods and Applications, Hemisphere USA, pp. 283–330.

Cite this article as :

Rathod S. H, N. R. Thorat, "Effect of Endosulfan on Intestine and Pancreas of frog Rana tigrina", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 9 Issue 1, pp. 256-260, January-February 2022. Available at doi : https://doi.org/10.32628/IJSRST229145
Journal URL : https://ijsrst.com/IJSRST229145