

	<p>Journal Homepage: - www.journalijar.com</p> <h2>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</h2> <p>Article DOI: 10.21474/IJAR01/4347 DOI URL: http://dx.doi.org/10.21474/IJAR01/4347</p>	
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RESEARCH ARTICLE

HISTOPATHOLOGICAL CHANGES IN THE KIDNEY TISSUES FROM *LABEO ROHITA* TREATED WITH PESTICIDE LAMBDA CYHALOTHRIN UNDER SHORT TERM AND LONG TERM EXPOSURE PERIODS.

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Manuscript Info

Manuscript History

Received: 26 March 2017
Final Accepted: 23 April 2017
Published: May 2017

Key words:-

Pesticide, Lambda Cyhalothrin,
Histopathological Study

Abstract

The Present Study Was Conducted To Assess The Histopathological Effect Of Pesticide Lambda Cyhalothrin On Freshwater Fish *Labeo Rohita*. The Exposure Of The Fresh Water Fish, *Labeo Rohita* To Lambda Cyhalothrin Water, For Short Term (24, 48, 72, 96 Hours) And Long Term Duration (10, 20, 30 Days) Lead To The Formation Of Histopathological Lesions Of Varying Intensities On The Kidney Tissues.

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Water Pollution Is Mainly Due To Contamination With Chemical Pesticides From Agricultural Runoff And Waste Water From House Hold And Industries. The Usage Of Pyrethroid Insecticides Have Been Increased Day By Day. These Pollutants Cycle Through The Food Web And Adversely Affect Human Health And Aquatic Organisms. Studies Reported That Aquatic Species Mainly Fishes Affects Behaviourally And Physiologically. The Histopathological Study Reveals That Gills, Liver And Kidney Get Affected. (Thophon S. (2003); Kulshrestha S.K. & Arora N. (1984); Advait Bhagade (2012); Oliveira Ribeiro C. A., Vollaie Y., Sanchez-Chardi A. & Roche H. (2005)). Fishes Are A Good Indicator Of Pollution In Aquatic Resources Because Its Biochemical Stress Responses Are Quite Similar To Those Found In Mammals (Mishra And Shukla, 2003). Gills, Liver, Kidney And Intestine In Fishes Plays A Vital Role In Respiration, Excretion Etc. So Their Study When Treated With Chemicals, Their Differences Noted Are Helpful In The Future To Save Our Environment And Aquatic Organisms From Pollution. Fishes Shows Many Danger Signs With Help Of This We Can Predict And Study Affected Areas Of Animal Health. (Hinton & Laurén, 1990). Kidney Is The Major Organ Affected With Chemical Pollution In Water. (Thophon, Kruatrachue, Upathan, Pokethitiyook, Sahaphong, & Jarikhuan, 2003). Histopathological Studies Are Very Helpful For Understanding The Environmental Pollution Factors That Causing Damage To Fishes (Teh Et Al., 1997; Handy Et Al., 2002). Like In Higher Vertebrates Kidney Plays A Major Role In Maintaining The Internal Environment Of Fishes. Following Exposure Of Fish To Toxic Agents Such As Pesticides, Histological Alterations Have Been Found At The Level Of The Tubular Epithelium And Glomerulus (Teh Et Al., 1997). The Nitrogenous Waste Products Such As Ammonia And Urea Are Eliminated Through Kidney. With The Help Of This Study We Can Conclude That The Usage Of Lambda Cyhalothrin Creates Problems In The Metabolic And Physiological Activities.

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Objectives Of The Study:-

To Assess The Sublethal Effects Of The Pesticide, Lambda Cyhalothrin For Short And Long Term Exposure On The Histopathological Status Of The Fish, *Labeo Rohita*.

Materials And Methods:-**Histopathological Analysis Of Tissue Sample:-**

After Exposure Of 24hrs -30 Days At The Sublethal Concentration, The Kidney Of The Fish *Labeo Rohita* Were Collected And Used For The Histopathological Study. Gills, Liver And Kidney Of Fish Once Removed From Fish Were Preserved In 10% Formalin For Nearly Six Hours. The Well Preserved Kidney Tissues Were Processed Through Dehydration (Removing Water From Tissues) With Dehydrating Agents For 4 To 6 Hours (Alcohol Or Acetone) In Three Changes And The Dehydrating Agent Within The Tissue Was Cleared By Clearing Agent Like Xylene For 2-3 Hours. After That The Tissues Were Treated In Melted Paraffin Wax Of Having Melting Points And 58-60 Impregnated In The Melted Wax For 4 Hours. Now The Kidney Were Well Processed And Impregnated, Were Embedded, Within The Wax. The Blocks With Embedded Processed Tissues Were Submitted For Taking Thin Sections Of 3 To 5 Micron Size By Using Rotary Microtome. These Sections Taken On The Glass Slide Were Stained With Haematoxyline And Eosin Stain. The Stained Sections Were Taken For Microscopical Study. The Kidney Tissues Excised From Fishes Of The Control And Experimental Groups Were Fixed In 10 Per Cent Formalin Solution. After Proper Dehydration By Graded Alcohols, Paraffin Blocks Were Prepared And 4-5 μ Thick Ribbons Were Cut In Rotary Microtome And Were Stained With Eosin And Haematoxylin. The Histopathological Changes Observed Were Photographed.

Results- Kidney Histology:-

The Exposure Of The Fresh Water Fish, *Labeo Rohita* To Lambda Cyhalothrin Water, For Short Term (24, 48, 72, 96 Hours) And Long Term Duration (10, 20, 30 Days) Lead To The Formation Of Histopathological Lesions Of Varying Intensities On The Kidney Tissues. In The Present Investigation, The Histopathological Changes In Kidney Of *Labeo Rohita* In Normal Condition And Exposed To Condition For Short And Long Term Period Of Lambda Cyhalothrin Water At Selected Periods Have Been Observed.

Control:-

The Kidney Consisted Of Head And Body Kidneys. Head Kidney, The Anterior Portion Consisted Of Lymphoid Tissues. Body Kidney Composed Of Many Nephrons And Interstitial Lymphoid Tissues. The Glomerular Capsule Was Formed Of An Inner And Outer Layer Of Single Flattened Epithelia. Renal Tubules Consisted Of A Single Layer Of Epithelial Cells. Mesangium Filled The Space Between The Loops Of Glomerular Capillaries (Plate.A).

Short Term Exposure:-

When The Fish Was Exposed For 24 Hours To The Short Term Exposure Of Lambda Cyhalothrin Water, The Kidney Showed Degenerative Changes With Dilated Glomeruli And Bowman's Capsules (Plate.B). After 48 Hours Of Exposure Highly Degenerative Changes Were Found In Haemopoietic Tissues (Lymphoid Tissues) (Plate.C). After 72 Hours Of Exposure Severe Necrosis And Moderately Dilated Renal Tubules With Infiltration Of Parenchyma By Inflammatory Cells (Plate.D). After 96 Hours Of Exposure, Shrunken Glomerulus And Nephrotic Changes Were Seen, Bowman's Capsules Were Dilated (Plate.E).

Long Term Exposure:-

When The Fish Was Exposed For 10 Days To Long Term Exposure Of Lambda Cyhalothrin Water, The Kidney Showed Intercellular Space And Shrunken Cells Were Noted (Plate.F). After 20 Days Of Exposure, Tubular Necrosis, Shrunken Glomerulus Were Observed (Plate. G). After 30 Days Of Exposure, The Glomeruli And Bowman's Capsules Were Dilated. Severe Pathological Changes Included Necrosis, Cloudy Swelling Of Renal Tubules, Disintegration Of Interstitial Tissues And Pycnotic Nuclei Where Also Observed(Plate. H).

Discussion:-**Kidney Histology:-**

Cirrhinus Mrigala After Short Term And Long Term Exposure To The Herbicide Glyphosate Water Showed Damages In The Kidney. Dilation Of The Tubules And Glomeruli Was Found Degeneration Of Necrotic Changes Was Also Found According To Mohamed Fatma, (2009) Exposure Of The Fish, *Tilapia Zillii* To Agricultural Chemicals Resulted In Several Pathological Changes In The Kidney Tissues.

Indirabai *Et Al.* (2010) Have Observed Disintegration Of Convolute Tubules With Large Intra Cytoplasmic Vacuoles In The Epithelial Cells And Lumen With Invariably In-Filtered Mononuclear Cells. Shrinkage And Degeneration Of The Glomeruli, Increase Of Space Within The Bowman's Capsule A Time Dependent Shrinking And Degeneration Of The Glomerulus And Vacuolization Of Epithelial Cells Of Uriniferous Tubules In The Fish, *Labeo Rohita* Exposed To Endosulfan. Olufayo And Alade, (2012) Have Found Disorganization Of Renal Corpuscles Of The Kidney And Consequently Obstruction To Their Physiological Functions Were Observed In The Fish, *Heterobranchus Bidorsalis* Exposed To Cypermethrin.

Plate A. Kidney Control

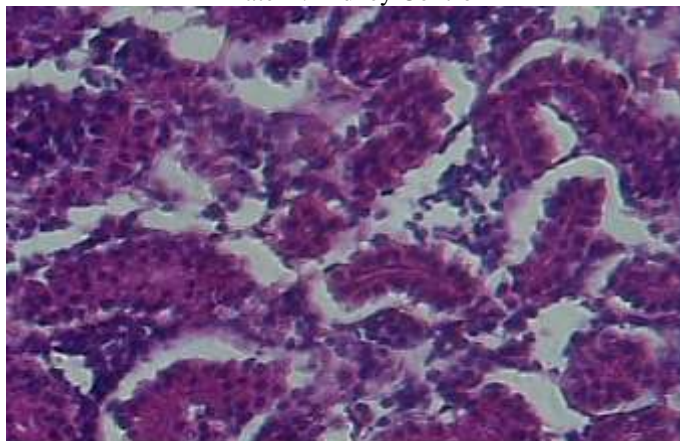


Plate.B Kidney 24 Hours

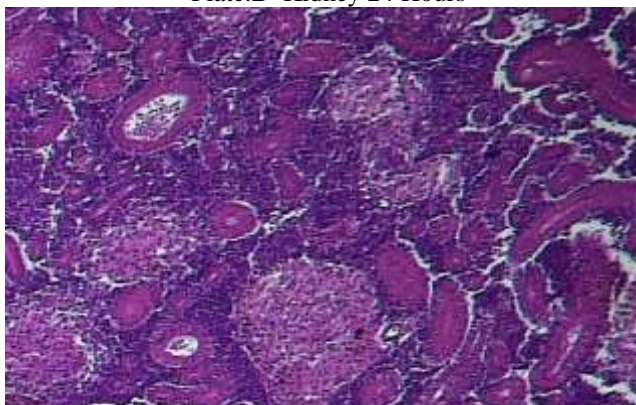


Plate.C Kidney 48 Hours

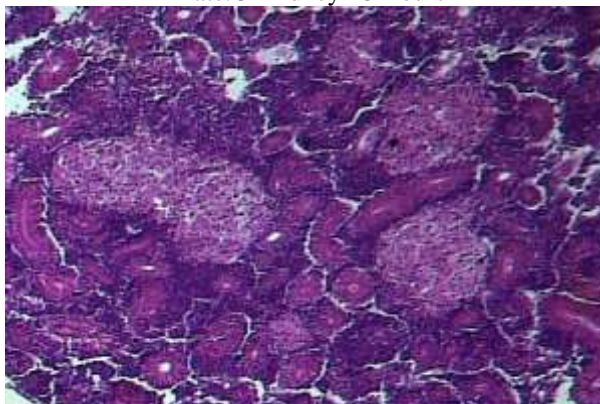


Plate.D. Kidney 72 Hours

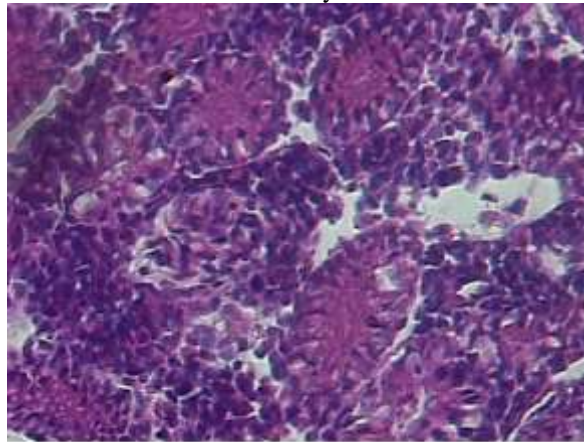


Plate. E Kidney 96 Hours

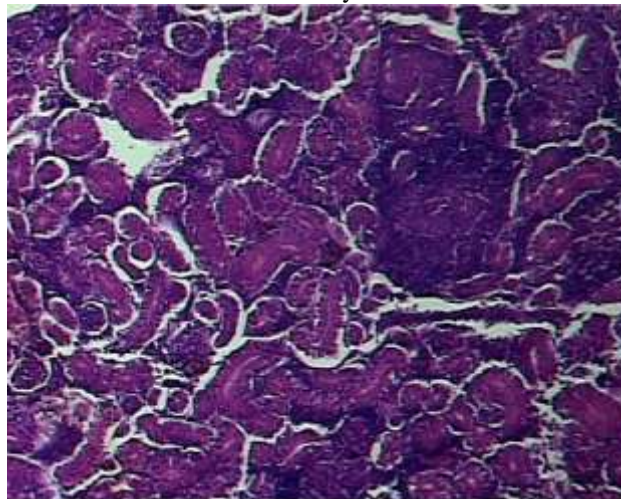


Plate.F Kidney 10 Days

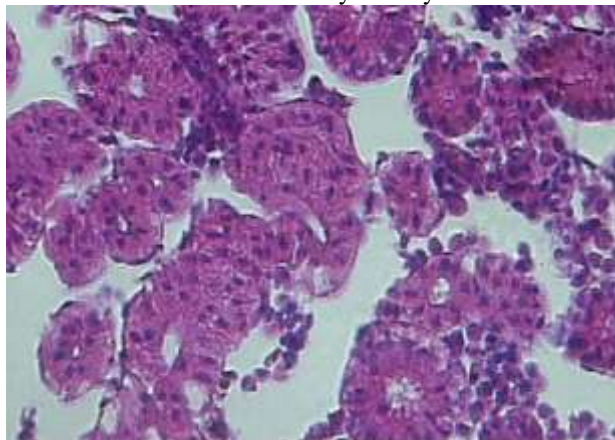


Plate.G Kidney 20 Days

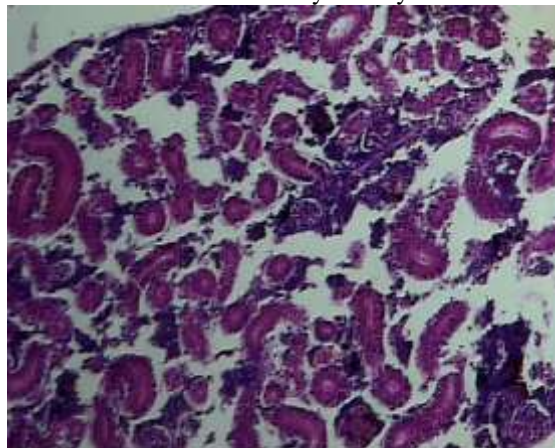
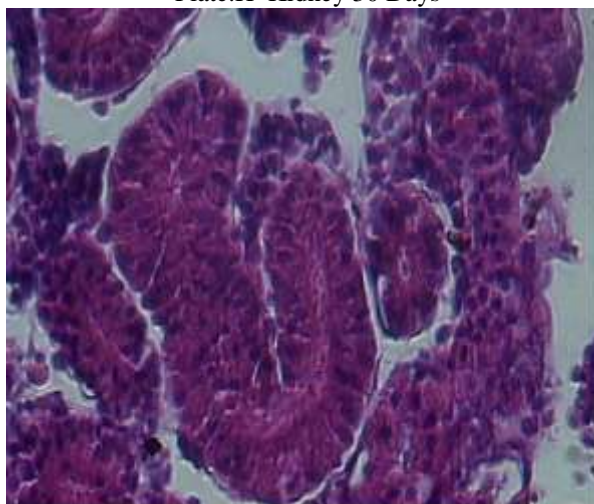


Plate.H Kidney 30 Days



References:-

1. Mohamed, F. A. (2009). Histopathological Studies On Tilapia Zillii And Solea Vulguris From Lake Qarun, Egypt. World J. Fish And Mari. Sci., 1(1):29-39.
2. Indirabai, W. P. S. Geetha Tharani, G. And Seetha, P. 2010. Impact Of Sublethal Concentration Of Endosulfan On Biochemicals And Histology Of Organ Tissues Of Freshwater Fish, *Labeo Rohita* (Hamilton, 1822). 5(2): 215-218.
3. Olufayo, M. O. And Alade, O. H. 2012. Acute Toxicity And Histological Changes In Gills, Liver And Kidney Of Catfish, *Heterobranchus Bidorsalis* Exposed To Cypermethrin Concentration. *African Journal Of Agricultural Research* Vol. 7(31), Pp. 4453-4459.
4. Mishra, R.; Shukla, S. P. (2003), Endosulfan Effects On Muscle Malate Dehydrogenase Of The Freshwater Catfish *Claria Batrachus*. *Ecotox. Environ. Safe.*, **56**, 425-433.
5. Hinton D.E. & Lauren D.J (1990). Liver Structural Alterations Accompanying Chronic Toxicity In Fishes: Potential Biomarkers Of Exposure. In: Biomarkers Of Environmental Contamination (Eds.), Pp. 17-52. J.F. McCarthy And L.R. Shugart. Lewis Publishers
6. Thophon S.; Kruatrachue M.; Upathan E. S. ; Pokethitiyook P., Sahaphong S. & Jarikhuan S. (2003). Histopathological Alterations Of White Seabass, *Lates Calcarifer* In Acute And Subchronic Cadmium Exposure. *Environmental Pollution*, 121, 307-320.
7. Kulshrestha S.K. & Arora N. (1984) Fish And Pesticides-Histopathological Parameters. *Intl. J. Acad. Ichthyol.* 5:1 - 9.

8. Advait Bhagade (2012) Impact Of Bioaccumulation Of Few Pcb's And Pahl In Freshwater Fish Rasbora Daniconius And Puntius Ticto. Thesis Submitted For Ph.D. In Zoology To Rtm Nagpur University, Nagpur.
9. Thais De Cruz Alves Dos Santos, Phan Van Ngan, Maria Jose De Arrunda Campos Rocha Passos & Vincente Gomes (2006) Effects Of Naphthalene On Metabolic Rate And Ammonia Excretion Of Juvenile Florida Pompano Trachionotus Carolinus. J. Of Experimental Marine Biology And Ecology. 335 (1) : 82 – 90.
10. Oliviera Ribeiro C. A., Vollaie Y., Sanchez-Chardi A. & Roche H. (2005) Bioaccumulation And The Effect Of Organochlorine Pesticides, Pah And Heavy Metals In The Eel (*Anguilla Anguilla*) At The Camargue Nature Reserve, France. Aquatic Toxicology. 74 (1) : 53 – 69. [12].
11. Esam Agamy (2012) Histopathological Liver Alterations In Juvenile Rabbit Fish (*Siganus Canaliculatus*) Exposed To Light Arabian Crude Oil, Dispersed Oil And Dispersant. Ecotoxicology & Environmental Safety. 15 : 171 – 179.
12. Marina M. P. Camargo & Claudia B.R. Martinez (2007) Histopathology Of Gills, Kidney And Liver Of Neotropical Fish Caged In An Urban Stream. Neotropical Ichthyology 5(3): 327 - 336.
13. Mario Pacheco & Maria Ana Santos (2002) Biotransformation, Genotoxic And Histopathological Effects Of Environmental Contaminants In European Eel (*Anguilla Anguilla* L.). Ecotoxicology & Environmental Safety 53(3) : 331 - 347
14. Teh S.J., Adams S.M. And Hilton D.E., 1997. Histopathologic Biomarkers In Feral Freshwater Fish Populations Exposed To Different Types Of Contaminant Stress. Aquat. Toxicol., 37: 51- 70
15. Handy R.D., Runnalls T. And Russell P.M., 2002. Histopathologic Biomarkers In Three Spined Sticklebacks, *Gasterosteus Aculeatus* From Several Rivers In Southern England That Meet The Freshwater Fisheries Directive. Ecotoxicology, 11: 467-479.