ISSN No:-2456-2165

Impact of Toxic Sediment on Histopathology of Liver and Kidney of Channa Punctatus

Dr. Kalpana Verma Naraynkar

Abstract:- In this study we procured toxic sediment from Amlakhadi water channel in Bhuj where paper, dye and textile industries were dumping their toxic wastes. We took Channa punctatus to test the toxicity of the sediment in the lab to find the NOEC for their liver and kidney.

I. AIM OF THE EXPERIMENT

To find the NOEC for liver and kidney of Channa punctatus.

II. INTRODUCTION

Hepatocytes are the most commoncells in fish liver. Hepatocyte removes nutrients and xenobiotics from blood that circulates through the sinusoids and separate the tubules of hepatocytes. Kidney is filter organ which removes toxic wastes from blood, thus purify it.

III. METHOD

The organs like gills were taken out from the fish *Channa punctatus* at three different concentrations on 0, 5th, 10th, 20th and 30th days, in triplicate, to observe gross anatomical changes, such as, hemorrhages, congestion, dropsy, necrosis, depigmentation and textural changes. These tissues were fixed in 10% formalin for 48 hours. They were then dehydrated in 90% alcohol for an hour and three times in absolute alcohol for 45 minutes separately. The samples were then cleaned two times in xylene for 30 minutes and embedded in paraffin thrice each time for 45 minutes. The samples were then blocked, allowed to cool, cut on a rotary microtome at 7 µm and mounted sections were dewaxed in xylene and dehydrated serially in alcohol and then stained sections were washed in tap water, dipped in 2% acid alcohol and washed in tap water, followed by Scotts for water substitute. The sections were dehydrated through 50%, 70%, 90% alcohol for 2 minutes each. Then stained in eosin for 4 minutes and dipped in absolute alcohol for one minute each. Finally, stained section were cleaned in xylene for 5 minute each and mounted on a slide with DPX. Prepared section were examined and photographed under a light microscope.

IV. RESULT

Lever shows sites of inflammation, heparocyte necrosis, enlarged vacuoles and fibrosis. in the highest concentration i.e 1.2 gm/l for *Channa punctatus*. There was no alteration at all in medium concentrations, i.e. 0.8 gm/l for *Channa punctatus* and ower concentration i.e 0.5 gm/l for *Channa punctatus.*

Nutrient & Organic Load	
Organic carbon (%)	2.72
Organic matter (%)	4.7
Total Nitrogen (mg/100 gm)	245
Total Phosphorus (mg/100 gm)	49.5
Heavy Metal Concentration (in mg / 100 gm)	
Cadmium	6.0
Chromium	7.18
Copper	58.27
Lead	6.19
Iron	2763.5
Manganese	47.4
Zinc	109.75

Table 1:- Nutrient, Organic Load and Heavy Metal Concentrations in Composite Sediments from Amlakhadi water Channel

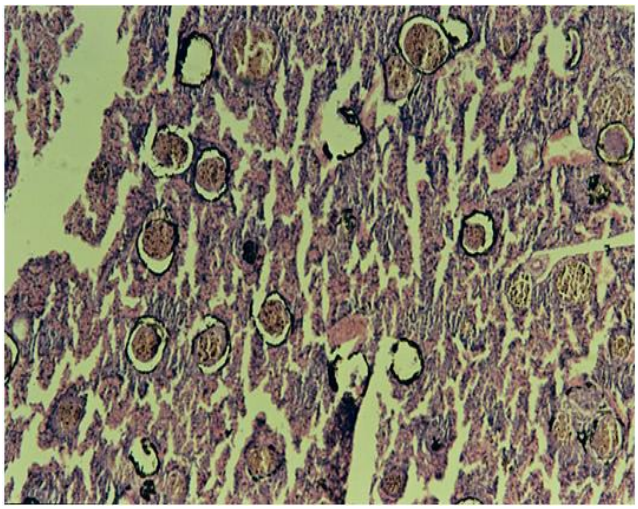

Fig 1:- 5 Day Channa 1.2 gm/l. Note kidney tissue showing numerous myxosporidian cysts in the interstitium.

ISSN No:-2456-2165

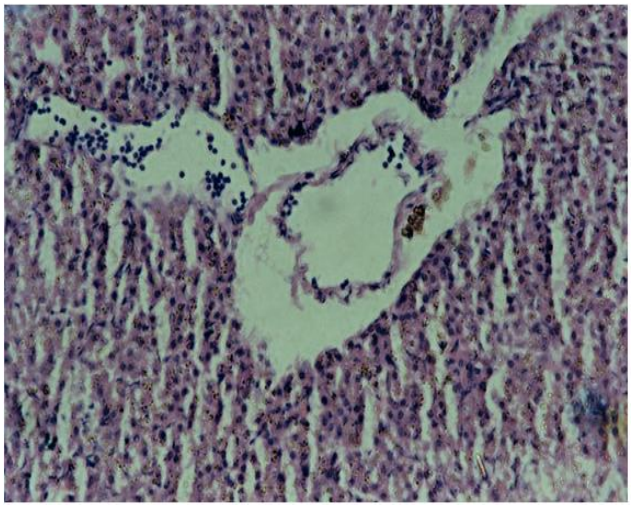

Fig 2:- 10 Day Channa 1.2 gm/l. Liver tissue with a distended central view. Note few infiltrating cells around the blood vessel

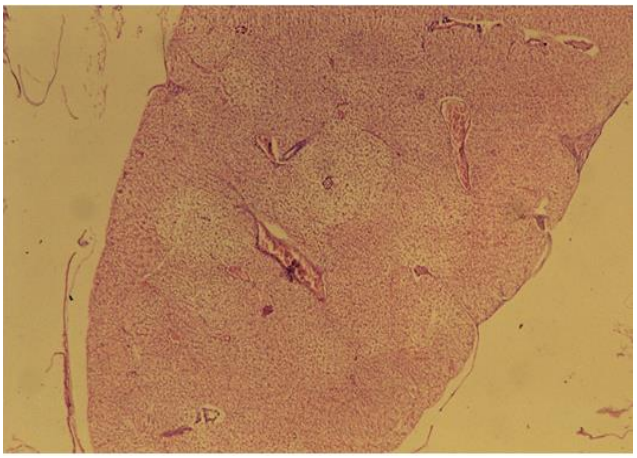

Fig 3:- 30 Day Channa 1.2 gm/l. Liver tissue showing marked paleness and fatty necrosis .

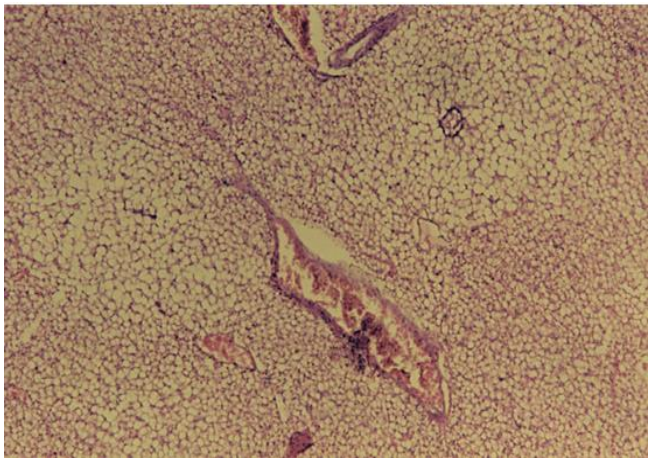

Fig 4:- 30 Day Channa 1.2 gm/l.Higher magnification . Note marked fat infiltration within hepatocytes with complete architectural obliteration

.

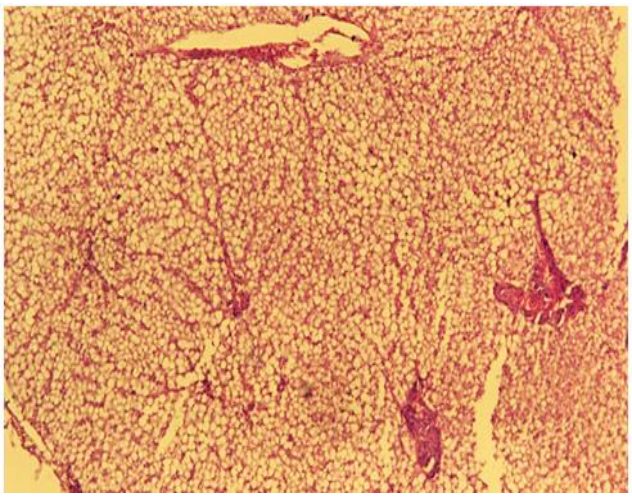

Fig 5:- 20 Day Channa 0.8 gm/l. Pale liver tissue showing extensive vacuolation

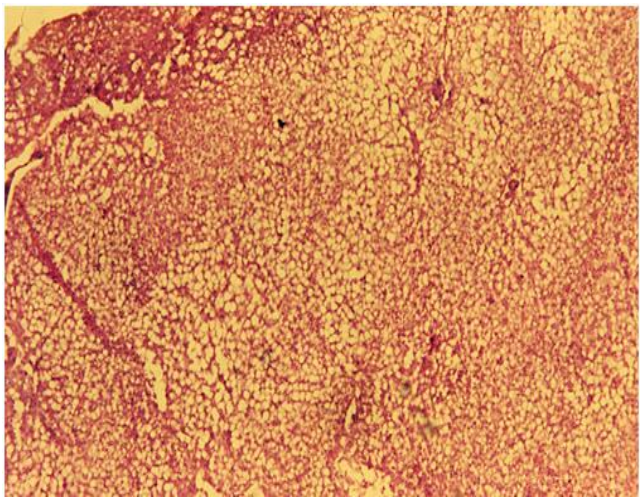

Fig 6:- 30 Day Channa 0.8 gm/l. Note marked distortion of the architecture of liver tissue due to severe vacuolation

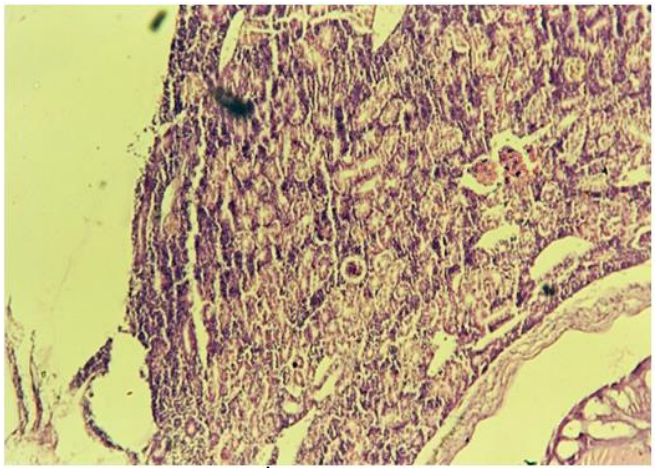

Fig 7:- 30 Day Channa 0.8 gm/l. Kidney tissue with widely scattered haemopoietic cells in the interstitium

ISSN No:-2456-2165

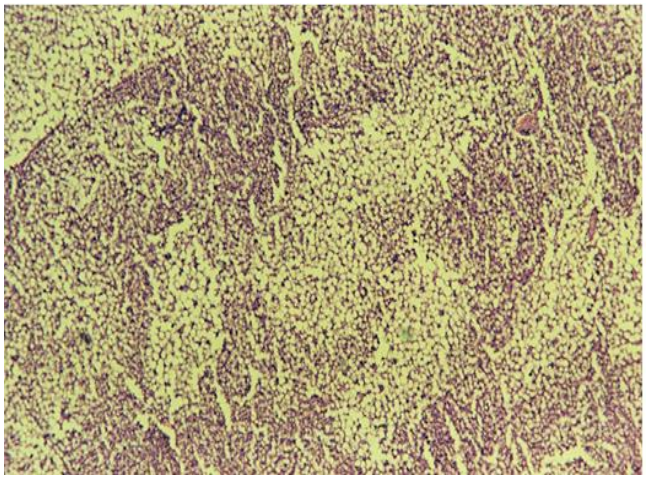
Fig 8:- 30 Day Channa 0.8 gm/l. Fatty liver showing multiple fat laden cells

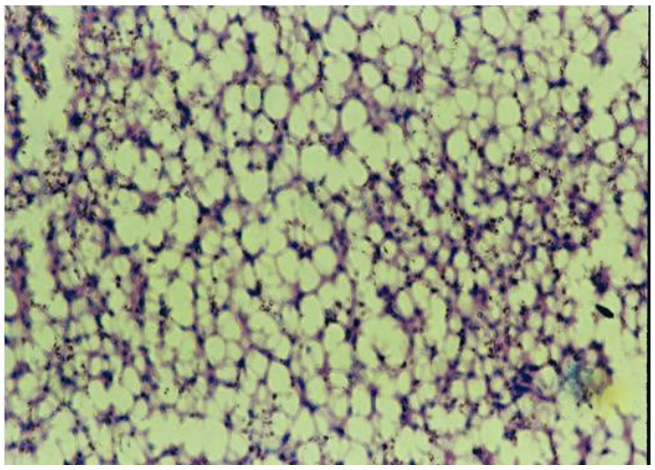
Fig 9:- 30 Day Channa 0.8 gm/l. Note the liver cells with large vacuolated appearance . The nuclei of the cells are pushed towards one end

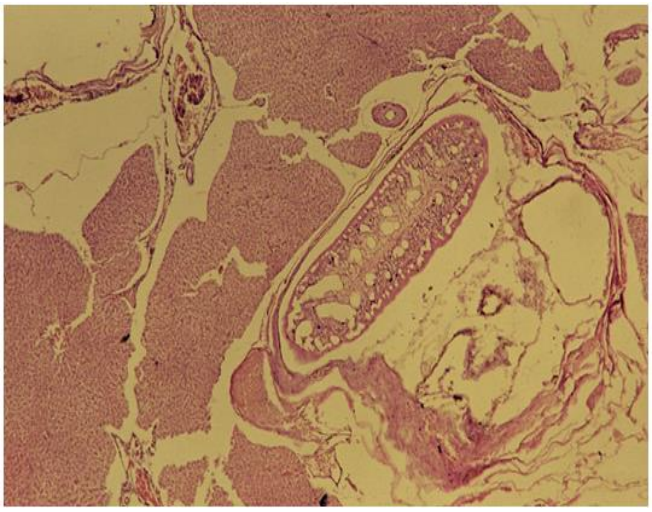
Fig 10:- 30 Day 0.5 gm/I Channa and Channa control . Liver tissue with portion of empty stomach and intestine

V. DISCUSSION & CONCLUSION

Liver and kidney of fish Channa exhibited severe architectural disturbances in highest (1.2 gm/l) concentration of toxic sediment while there was no alteration observed in medium and lower concentrations of toxic sediment i.e. 0.8 gm/l &0.5 gm/l respectively.

REFERENCES

[1]. Clayden, E.C. (1962) Practical section cutting and staining. The Chpel River Press Ltd. 1-190.
[2]. Hibiya, T. (1982). An Atlas of Fish Histology, Kodansha Ltd. Tokyo, Japan.
[3]. Mayers, T.R. & Hendricks, J. D. (1984) Histopathology**, In:** Fundamentals of Aquatic Toxicology (Rand, G.M. and Petrocelli, S.R. eds), Hemishere Publishing Corporation. 172-175.
[4]. Medonald, D G. (1983b) The effects of H ion upon the gills of fresh water fish. Can. J. Zool**., 61:**:691-703.