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RESEARCH PAPER

Histopathological and Biochemical Change of Testicular Epididymal Tissue in Male Albino Rats Due to Textile Waste Water Treatment

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ABSTRACT
The present study has thus established the toxicity of both untreated and treated textile wastewater to the histopathological and biochemical alterations in male albino rats. Male albino rats were carried out for a period of 100 days to investigate the effects of untreated (Influent) and treated (Effluent) textile wastewaters collected from an Effluent Treatment Plant in Amani Shah Nallah Sanganer, Jaipur (Raj.) India. In comparison to control animals (potable water), in wastewater exposed animals, 50 male albino rats were divided into 5 groups of 10 each and treated as under control, 100% textile waste water, 75% textile waste water, 50% textile waste water and 25% textile waste water treated.
Key words: *Textile waste water, effluents, Testicular Epididymal Tissue, Male albino Rats*

INTRODUCTION

Textile waste water from industries contain chemicals, acids, oil, grease suspended solids and heavy metals. Heavy metals directly affect the metabolism and reproductive parts of mammals. The use of dyes is a very mature practice used to modify the colour characteristics of different substrates, such as fabric, paper, leather, among others [1,2]. Global consumption of dyes and pigments approximates 7x105 tons/year and only in the textile industry it consumes about two-thirds of all the world production [3, 4].It is reported that consumption (through food or water), of lead and Cadmium enlarges the liver, Kidney and cause adverse impact on reproductive organs, i.e. testes, cauda epididymis and prostate in male rat . Present study was carried out in sanganer town. Sanganer is famous for its dyeing and printing, waste water recycling and blue pottery industries. The untreated waste mainly from textile industries is discharged in Amani Shah Nallah. These disposal practices have contaminated the environment and caused adverse effects on the fl ora, crops and fauna in Sanganer town [5,6]. The area across Amani Shah Nallah has agriculture fields. It was observed during the survey that waste water from Amani Shah Nallah is directly utilize by the farmers for agriculture area across the Amani shah Nallah in sanganer town. Present work has been undertaken to the impact of textile waste water on histopathological change in Cauda epidydamic of Male Albino rats.

MATERIAL AND METHODS

Experiment had been carried out on mature male albino rat of wister strain. The animals were obtained from jamia Hamadard University, New Delhi and were first acclimatized to laboratory conditions for 7 to 10 days before the commencement of the experiments. During the course of this study only the healthy adult male rats were selected and utilized.

Sample collection: Sample was collected from effluent water discharged by Textile industry of Amanis shah Nalla in sanganer town, clean sterilized 1 liter bottle.

Experiment Design

The animals were observed daily for clinical signs and mortality. Body weights were recorded every week during the study period. They were fed on a balanced diet of palates of Hindustan lever limited. They were kept in plastic cages under 12 hrs. Light and 12 hrs. dark cycles and temperature at 25^0C, tap water was provide *ad libitum*. 50 male rats were divided into 5 groups of 10 each and treated as under-

Group I- Served as control.
Group II- Treated with purely textiles waste water(100% pure) for a periods of 90 days
Group III- Treated with waste water and distilled water in the ratio of 75:25 for a periods of 90 days.
Group IV- Treated waste water and distilled water in the ratio of 50:50 for a periods of 90 days.
Gropu V- Treated with waste water and distilled water in the ratio of 25:75 foa a period of 90 days.

On the 91st the animals were sacrified: Tissue, blood were directly collected from Heart for histological, and for biochemical analysis. Cauda epidydamis were fixed in Bouin's fixiative and cut into pieces. Tissue were passed

through ethanol-xylelen series and embedded in paraffin wax(m.p. 55-62^{0}C) 5 µ thick sections were cut and stained with haematoxylene and eosin. All the value of body and organ weights, biochemical estimation were averaged standard error of Mean values were calculated and students 't' test was applied for standard comparison Epstein and Poly (1970).

Tissue Biochemistry:

Fresh frozen tissues were analyzed for following parameters:

Parameter studies	**Tissue taken**	**Method used**
1. Protein	Testes, Cauda epididymis	Lowry *et al.* [7]
2. Sialic acid	Testes, Cauda epididymis	Warren [8]

RESULT AND DISCUSSION

The result of the experiment carried out on Albino Rats cauda epidydmis significant impact on physiological and Biochemical changes as follows

PHYSIOLOGICAL CHANGE

1. Organ Weight (Cauda epididymis)

A significant decrease (P<0.001) of the weight of epididymis was brought about by textile waste water treatment in all groups when compared with controls (Fig-1) and Table 1

Table 1-Organ weight (Cauda Epididymis)

Treatment	Cauda Epididymis Weight mg/100 gm body weight
Group I	404.65±17.80
Group II	221.38±2.37*
Group III	299.51±20.16*
Group IV	347.77±12.77*
Group V	357.61±15.39*

Group II,III,IV and V compared with Group I

*=P≤ 0.001

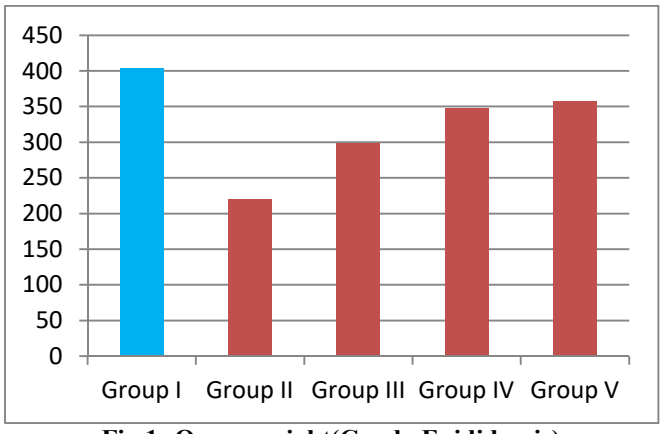

Fig 1- Organ weight(Cauda Epididymis)

2. Sperm Dynamics

The textile waste treatment to all four groups for 90 days caused significant reduction(P,0.001) in sperm concentration of cauda epididymis. A percent fall of 85.41, 75.03, 73.09 and 66.11 in 100,75,50 and 25% sample of the textile waste water treated animals respectively in comparison to control rats (Fig. 2 & table 2).

Table 2- Sperm Dynamics (Cauda Epididymis)

Treatment	Sperm Density (million/ml)
Group I	**53.46 ± 3.37**
Group II	**7.80 ± 1.26***
Group III	**13.35 ± 0.57***
Group IV	**14.39 ± 2.26***
Group V	**18.12 ± 1.51***

Group II,III,IV and V compared with Group I

*=P≤ 0.001

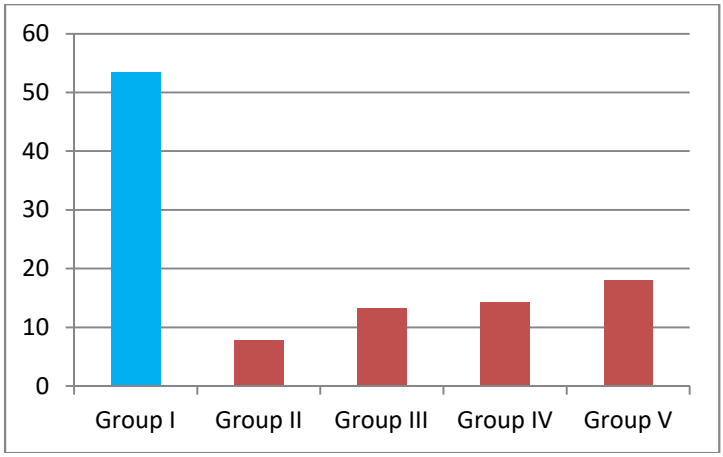

Fig 2- Sperm Dynamics (Cauda Epididymis)

Biochemical Change (cauda Epididymis)

1. **Protein:** Protein in cauda epididymis of texile waste water treated rats showed significant (P<0.001) decrease in Group II and III while Group IV and V showed non significant change when compared with control.
2. **Sialic Acid:** Sialic acid contents of cauda epidiymis was decresed significantly (group II.III and IV-P<0.001, Group V-P<0.01)after textile waste water exposure fo the periods of 90 days, at all dose levelsn (i.e. 100% pure textile waste water, 75%, 50% and 25% textile waste water treated animals) in comparison to controls.

Table3- Tissue Biochemistry

Treatment	Protein (mg/gm)	Sialic zcid(mg/gm)
Group I	189.47±5.43	5.27±0.09
Group II	140.98±2.17*	3.42±0.07*
Group III	151.30±0.47*	3.98±0.15*
Group IV	166.22±3.27*	3.64±0.13*
Group V	176.51±0,09*	4.02±0.37*

Group II,III,IV and V compared with Group I; *=P≤ 0.001

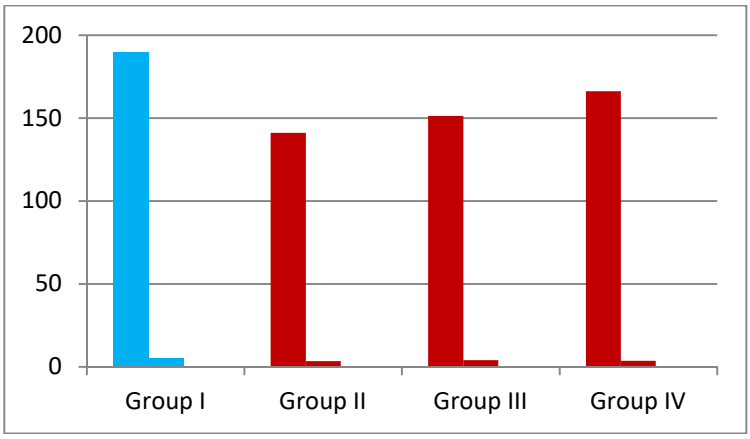

Fig 3: Biochemical Change (Cauda Epididymis)

Histological observation

Control (Plate-1)

Cauda Epididymal cell height was lower, tubules lined with pseudo epithelium consist of columnar cells. Intertubular stroma contained connective tissue and blood vessels. Lumen was filled with mature spermatozoa.

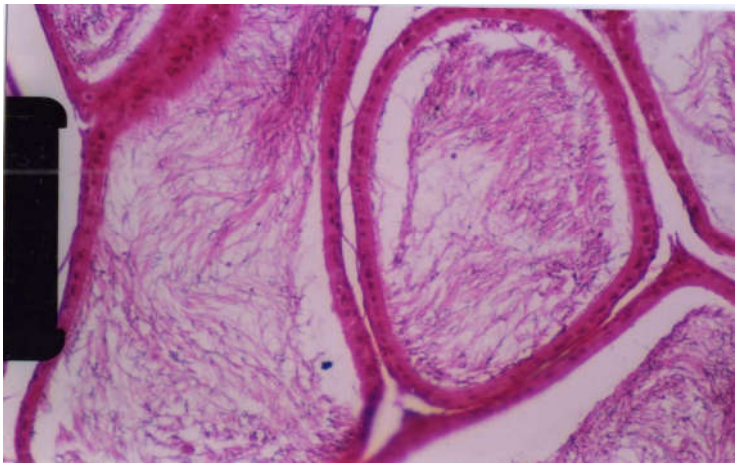

Plate 1-Section of Control or Vehicle treated Cauda epididymis of Albino Rats(20X)

100% textile waste water treated cauda epididymides (Palte-2, Fig-5)

100% textile waste water treated rats exhibited tubules with degenerated epithelium. Stereocilia were reduced. Genrally tubules were found empty. Cellular debris and few spermatozoa were present in the lumen.

Plate 2-Section of Cauda epididymis of Albino Rats treated with level(waste water :Distilled water::100:0) (20X)

75% textile waste water treated cauda epididymides (Palte-3, Fig-6)

Administration of textile waste water at 75% dose level caused thickening of epithelium. Tubular diameter was increased and lumen contained degenerated spermatozoa.

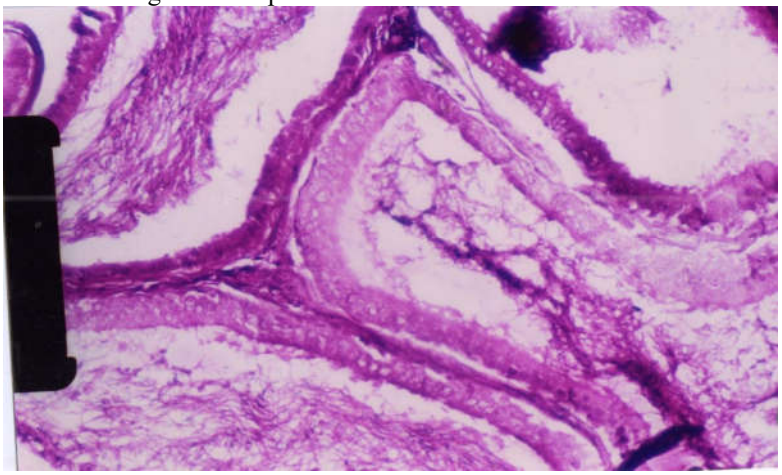

Plate 2-Section of Cauda epididymis of Albino Rats treated with level (waste water :Distilled water::75:25) (20X)

50% and 25% textile waste water treated cauda epididymides (Palte-4, Fig-7)

Cauda epididymal epithelium of 50% and 25% textile waste water treated rats were remain unaffected. Spermatozoa concentration was less than control rats.

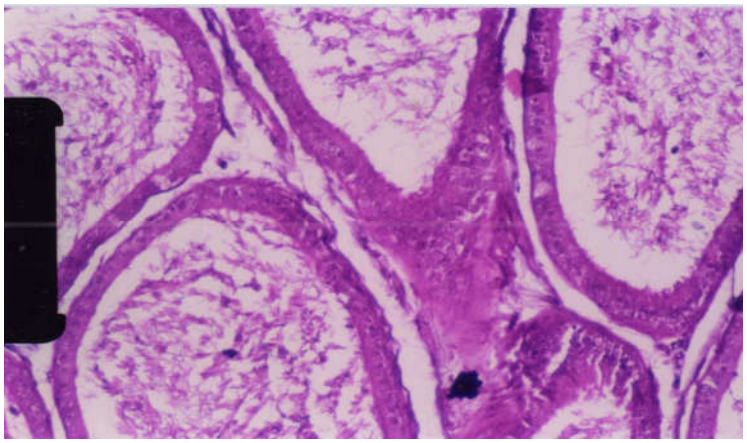

Plate 2-Section of Cauda epididymis of Albino Rats treated with level (waste water :Distilled water::50:50) (20X)

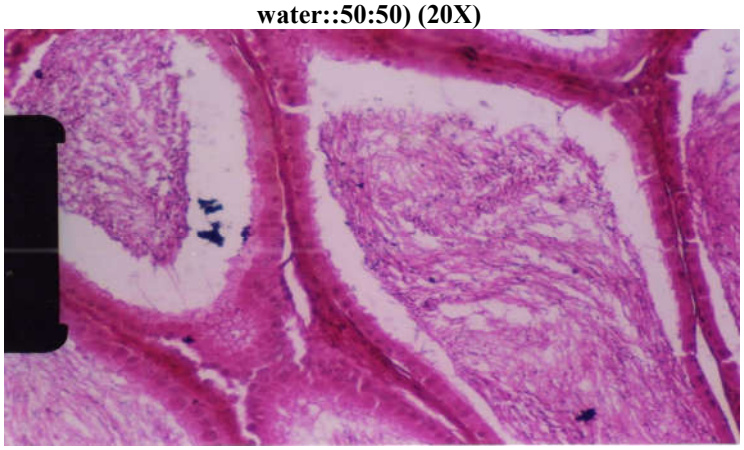

Plate 2-Section of Cauda epididymis of Albino Rats treated with level(waste water :Distilled water::25:75) (20X)

CONCLUSION

The present study has thus established that untreated textile waste wastewater was highly toxic to the test animals. Untreated textile waste water and thereafter its adverse impact on soil, surface and underground water and the entry of pollutant like heavy metals in the food chain through agriculture product in the Sanganer or other parts of Jaipur.

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