

Toxic Effect of Textile wastewater from Sanganer on Liver of Male Albino Rat

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ABSTRACT

The present study has thus established the toxicity of both untreated and treated textile wastewater to the histopathological changes in liver 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 wastewater, 75% textile waste water, 50% textile waste water and 25% textile waste water treated liver.

Keywords: Textile waste water, effluents, Liver, Male Albino Rats

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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 [3, 4]. 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 [5, 6]. It is reported that consumption (through food or water), of lead and Cadmium enlarges the liver, Kidney and cause an adverse impact on reproductive organs, i.e. testes, cauda epididymis and prostate in the male rat [1]. The 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 flora, crops and fauna in Sanganer town [1, 2]. The area across Amani Shah Nallah have agriculture fields. It was observed during the survey that waste water from Amani Shah Nallah is directly utilized 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 the liver of Male Albino Rats.

MATERIAL AND METHODS

The 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°C, tap water provided 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 periods of 90 days

Group III- Treated with waste water and distilled water in the ratio of 75:25 for periods of 90 days.

Group IV- Treated waste water and distilled water in the ratio of 50:50 for periods of 90 days.

Group V- Treated with waste water and distilled water in the ratio of 25:75 for a period of 90 days.

On the 91st the animals were sacrificed: Tissue, blood was directly collected from Heart for histological, and for biochemical analysis. The liver was fixed in Bouin's fixative and cut into pieces. Tissue was passed through ethanol-xylene series and embedded in paraffin wax(m.p. 55-62°C) 5 μ thick sections were cut and stained with haematoxyline 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.

RESULT AND DISCUSSION

The result of the experiment carried out on Albino Rats Liver significant impact on Histopathological changes as follows-

Histopathological changes in Liver

Control: Control or Vehicle treated rat Liver showed all the histological architecture as central veins, intertubular veins branches of the hepatic artery. Hepatic sinusoid interlobular connective tissue was also seen. All the histological structure is seen normal.

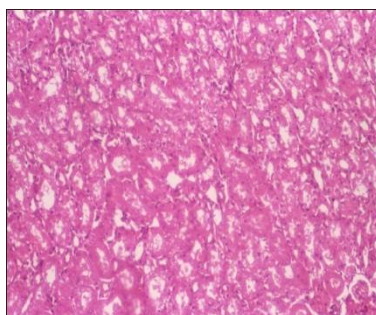


Fig.1 Section of Control vehicle treated Liver of Albino Rat (40X)

The damage appears to be higher degree at all dose level. Cells tend to be necrotic with pycnotic nuclei. A mild degree of vacuolation was also observed which gets severe. A drastic damage of hepatocyte was visible. The cells were extremely oedematous. The blood vessels show extreme hyperemia. Most cells have chromatolytic nuclei and sinusoidal space are markedly enlarged.

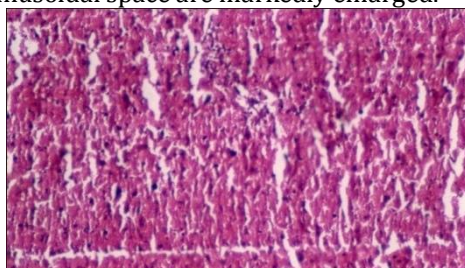


Fig.2. Section of Liver of Albino Rat treated with level (Waste water: Distilled water::100:0) (40X)

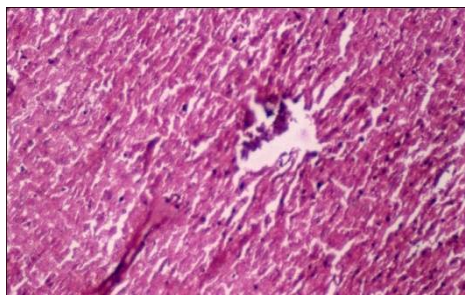


Fig.3. Section of Liver of Albino Rat treated with level (Waste water: Distilled water::75:25) (40X)

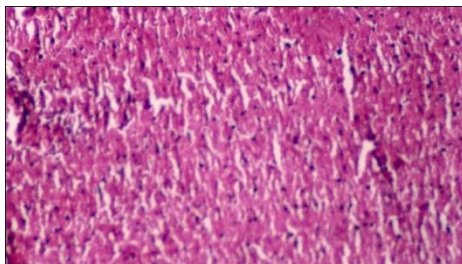


Fig.4. Section of Liver of Albino Rat treated with level (Wastewater: Distilled water::50:50) (40X)

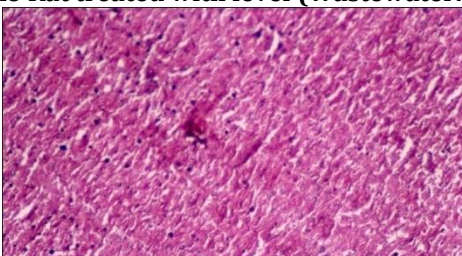


Fig.5. Section of Liver of Albino Rat treated with level (Wastewater: Distilled water::25:75) (40X)

The histopathological changes, the results of the present study revealed that wastewater caused in hepatic cells and, dilatation with congestion of blood vessels and interstitial hemorrhage, which can be explained by Michalowicz and Duda [7]. The noxious influence of phenols and their derivatives, causes acute toxicity and histopathological changes [8, 9].

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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