IMPACT OF SILKDYE WASTE ON HISTOPATHOLOGY OF TESTIS OF SWISS ALBINO MICE

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Abstract : Azo dye an aryl amide is used frequently as silk dyes in silkdyeing industry of Bhagalpur. The untreated wastes has shown chronic toxicity effect on Testis of albino mice when untreated dye wastes (50% and 75% concentrations)were administered to mice for different durations (15 days,30days,45days and 60 days) at a dose 1ml/mice/day. The aim of present investigation was to find out the impact of dye wastes on reproductive organ (Testis) of male albino mice. Degenerations in spermatogonial cells, loss of spermatocytes,disruption in wall of seminiferrous tubules were shown.

Key words: Azo dyes, Albino mice, Testis, Chronic toxicity.

Introduction

In silk dyeing industry situated at Bhagalpur city azo dyes are used as most popularly. Discharge of untreated silkdye wastes in the waterbodies which ultimately meet into the river Ganga cause health hazards to human as well as aquatic animals and plants. Azo dyes are carcinogenicity in nature (Chung 2000). Genotoxic effect of silkdye wastes were reported (Chaurasia et al 2005); (Rangaswamy and Shanthamurty 1980), distillery effluent (Chaurasia 1992). Textile wastewater affects toxic on reproductive system of male albino rats (Suryavathi et al, 2012) and mice (Sarkar and Ghosh 2012).No work had been reported on impact of silkdye wastes on histology of Testis of mice except sperm profile (Chaurasia, 2009).So, the present investigation was an attempt to find out its impact on histology of Testis of male albino mice .The results may be crucial milestone for silkdyeing industries.

Materials and Method:

The wastes were collected from final disposal point of Cottage Industries, Champanagar, Dist. Bhagalpur.

Experimental animal:

Experiments were performed with three months old healthy albino mice weighing 25±5g obtained from CDRI, Lucknow and maintained in the animal house of University Department of Zoology, Bhagalpur, Bihar. All the animals were kept as accepted principles for laboratory animal use and care as per the guidelines of CPCSEA. The mice were acclimatized one week before the experiment.

Experimental dose and design:

For studying the toxicity impact mice were divided into 3 groups each group having 10 mice. The group I (control group) received 1ml distilled water each mice. The treated groups (II&III) were received 1ml different concentrations (50% and 75%) of dyeing waste. Treatment was continued for 30 and 45 days for histological study of testis. After completion of treatment the animals were sacrificed.

Manual processing of tissues:

The mice of both control and treated groups were sacrificed under chloroform anesthesia and Testis were taken out and fixed in Bouin's fixative for 24 hours for histopathological study. The slides were subsequently stained by a haematoxylin and eosin.

Result and Discussion:

Group I (Control) : A normal arrangement of cellular components of germ cells and sertoli cells were shown in the control animals. The Testis of control animals had shown normal seminiferous tubule, leydig cells and spermatogenesis. The outline of seminiferous tubules were smooth and sertoli cells were also in good condition and (Fig. 1.1 & 1.2)

Experimental Group II : Compared to the control groups, the epithelium of the seminiferous tubule of treated mice were disrupted with broad spaces. Presence of vacuoles between the cellular components showing frequently associated with degenerating germ cells. Testis after the treatment exhibited degeneration of the spermatogenic cells accompanied with absence of spermatozoa (Fig. 2.1). Testis after 50% concentration to 30 days treatment with silk dye waste showed disarrangement of spermatogenic cells and reduction in some seminiferous tubules, dilatation and congestion of blood vessels (Fig. 2.1). Leydig cells between seminiferous tubules were diminished after 45 and 60 days treatment with 50% concentration (Fig. 2.3 & Fig. 2.4.)

Experimental Group III : Mice treated with 75% concentration for 30 days degeneration were occurred in the spermatogonia (Fig. 1.1). The seminiferous tubules were necrosed. Lumen becomes empty in some seminiferous tubule (Fig 3.3) and fibrosis were occurred in the lumen of seminiferous tubule. The ghost like cells were also found in seminiferous tubule (Fig 3.4). Spermatogenesis processes were disturbed with the increased waste concentration.

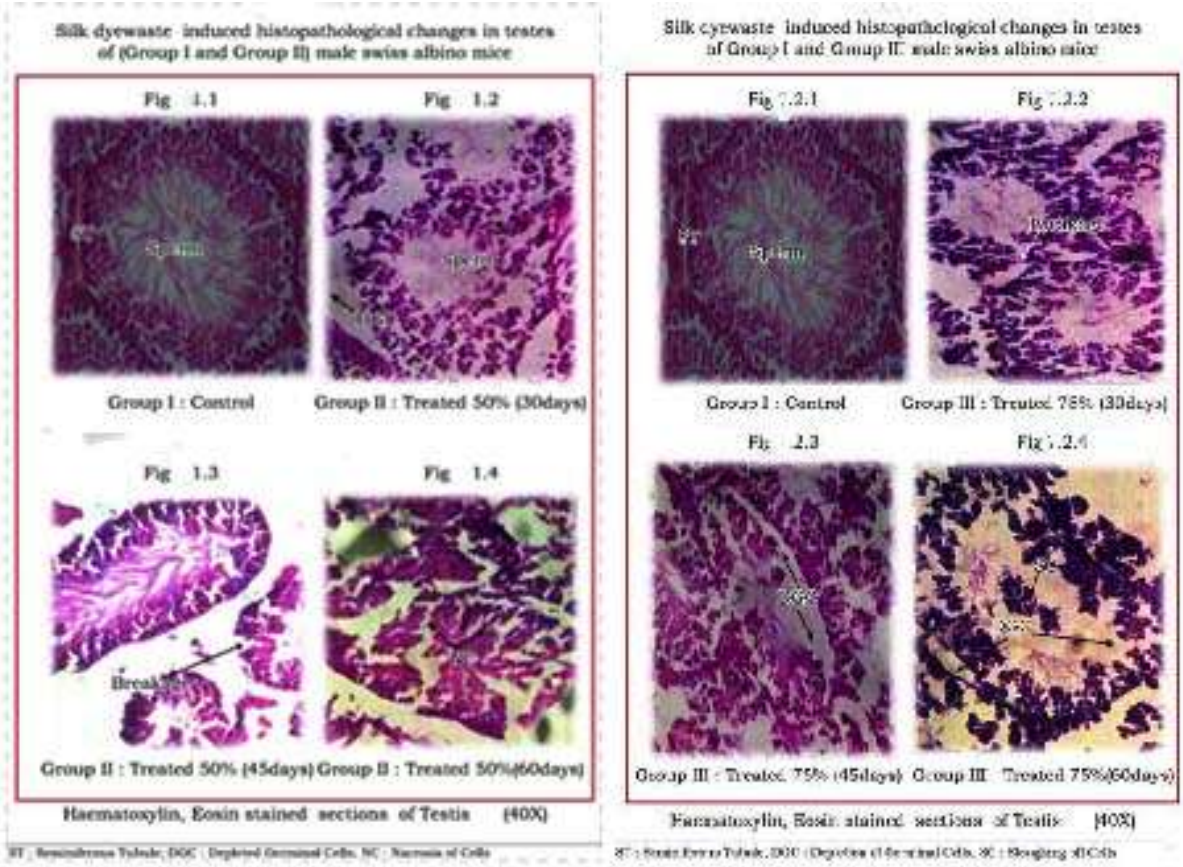
Discussion:

Main findings in silkdye wastes treated mice were degeneration of occurred in the seminiferous tubules as well as spermatogonia (Fig. 1 and 2). Leydig cells between seminiferous tubules were diminished. The seminiferous tubules were necrosed and pycnotic spermatocytes were found. These observations confirm and extend previous reports on gonadotoxic effects of textile dye wastewater in swiss albino rat (Sharma S., 2007).

Testicular lactic dehydrogenase isoenzyme activity (LDH-X), a pachytene spermatocyte marker of testicular toxicity, was significantly decreased to 71.8% and 68.6% of the control value after daily administration of silk dye wastes (30 days, 45 days and 60 days) in doses of 1ml/mice /day respectively.

Effect of Indigo carmine were reported as arrest of spermatogenesis at early stages in mice might be due to its direct effect on the sertoli cells which control spermiation.

Khanna and Das, (1991) observed testicular damage in gametogenic elements in guinea pig, rats and mice. Erythrosine has shown its toxic effect on spermatogenic process of mice when given 68-1360mg/kg. A potential toxic effect on spermatogenesis in mice may affect its testicular function and reproductive performance (Abdel Aziz et al., 1997). Toxic effects of pulp and paper mill effluents on male reproductive organs reported by Rana T et al (2004). Mathur et al., (2005) reported serious toxic effect on the sperm morphology, sperm count and testicular weight. Marked histopathological changes in testis of albino rats following oral administration of carbaryl in dose of 100 and 200 mg/kg body weight in 0.2 ml of groundnut oil orally, 6 days/week for 60 days reported by Rani et al., (2009). Metanil Yellow has shown degeneration in seminiferous tubule as well as spermatogonia when given 3.0g/kg body weight (Sarkar R., 2013). Nandi et al reported (1999) apoptosis intestis of rats after administration of ethane 1,2-dimethylsulfonate.



Conclusion:

The present study thus indicated that contamination of silk dye waste showed reproductive toxicity and histopathological alteration in Testis of male mice. The histopathological changes effects indicates that the waste contain toxic substances which may constitute a risk to not only the environment but also the human population if discharged without any judicious pre treatment.

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