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STUDY OF MALE REPRODUCTIVE TOXICITY IMPACTS OF SILK DYE WASTE ON SWISS ALBINO MICE *MUS MUSCULUS*

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ABSTRACT

The object of this study to identify the toxicity impact of silk dye waste on reproductive systems in male swiss albino mice. The results was shown the effect of oral administration of silk dye waste (2ml/day each animal) on weight of the testis, vas deferens, seminal vesicle and epididymis of swiss albino male mice. Three sets of animals i.e. Group I (Control), Group II (fed with 50% silk dye) and Group III (fed with 100% silk dye) have been taken for experiment. The result was demonstrated when treated with silk dye waste showed some alteration including testis weight, weight of epididymis, vas deferens, seminal vesicle when compared it control group male mice after 30, 60 and 90 days incubation period.

KEYWORDS: Silk dye waste, Testis Weight, Epididymis, Seminal vesicle, Vas deferens, Swiss albino male mice, toxicity assessment.

INTRODUCTION

Testis is the major organ for male sexual development and fertility. Sperm are produced in the testis. The testes have two interrelated functions as production of gametes (gametogenesis) and steroid (steroidogenesis). Sperm are released into the interior of the tubules they are carried by ciliary action to the epididymis. Testis and epididymis together constitute testicle. Epididymis connects with the vas deferens. Vas deferens is a muscular tube, which terminal portion enlarges to form an ejaculatory duct. Where end of seminal vesicle, before the ejaculatory duct it connects to the urethra. The seminal vesicles secrete semen which is expelled along with sperm.

The human are exposed to various type of environmental contaminants at different stage of their life span, widely held of them are harmful. Silk dye waste is one of the major sources of hazardous pollutants. Industrialization is a godsend of independent India but that is allied with hazardous effluents and discharges polluting the environment. Silk industry as textile provides an important economic stand to the artisans but the dye waste or spent wash arising from the manufacturing unit cause great menace ,if released in the open. Silk dye waste effluents are more toxic to environment than the domestic sewage. Bhagalpur (25°17'N latitude and 86°83'E longitude) is endowed with age old silk fabric and yarn production units. Here, the manufacturers use mostly synthetic dye such as azo dyes as colorant for their products. Azo dye forms the largest and most important Silk industry provides an important economic group of synthetic dyes (Mathur et al., 2005). Meyer in 1981 reported that the chemical structure of azo benzene and azo napthol derivatives.

This study was therefore designed to investigation the toxicity effect of silk dye waste on reproductive system specially testis weight, testis diameter, epididymis weight, seminal vesicle and vas deferens weight in Swiss albino male mice *Mus musculus*.

MATERIAL AND METHODS

Animals: Experiment was performed on 6 to 8 weeks old healthy laboratory inbreed mice *Mus musculus* weighing about 25-30 grams. The animals were obtained from University Department of Zoology, Bhagalpur. Mice were reared and maintained at the animal house of University Dept. of Zoology, T.M. Bhagalpur University, and Bhagalpur under standard conditions and fed with nutritional diet and water.

Collection of silk dye waste: Silk dye waste effluents were collected directly from discharge point of silk dye industries of Nathnagar, Bhagalpur at regular interval.

Experimental Design: The mice were divided into 3 groups of 10 animals each. Gr-I (control mice), Gr-II (mice treated with 50% silk dye waste) and Gr-III (mice treated with 100% silk dye waste).

Dosage: The control group (Gr-I) was given normal food and water. Silk dye waste was administered orally 2ml/day (Chaurasia et al, 2005) group II and III for 30, 60 and 90days duration.

Biological assays: Observation of different part of Testis with weight.

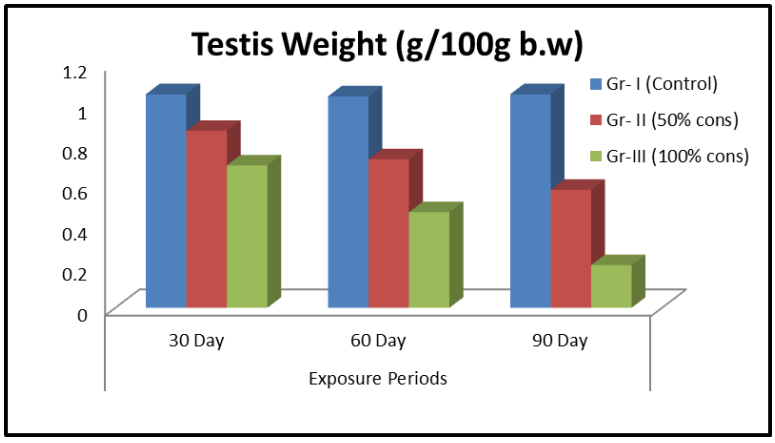
Statistical analysis: Data were analyzed using a t- Test, Correlation and one way ANOVA followed with a post hoc test (least square division test) using the SPSS for comparison between different treatments. Results were presented as mean ± S.E and differences were considered as significant when $p<0.05$ and $p<0.10$.

RESULTS

The results show that the silk dye waste when orally administrated to Group- II and III mice, significantly reduced the testis weight, testis diameter, epididymis weight, seminal vesicle weight and vas deferens weight ($p<0.05,0.01$) when compared with mice of Group-I (control). This study suggested that the toxicity impact on reproductive system of swiss albino male mice shown after the treated with silk dye waste in different incubation period as well as weight of different part of testis when compared with control group of mice.

Table 1: Showing the toxicity impact of silk dye waste on mice testis weight (g/ 100g b.w).

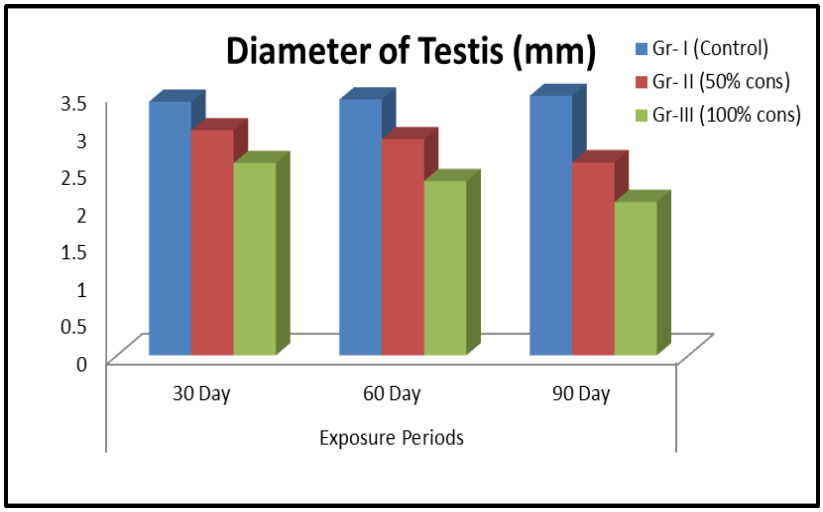
Experimental Groups	Exposure Periods		
	30 Day	60 Day	90 Day
Gr- I (Control)	1.05±1.67	1.04±0.92	1.05±0.05
Gr- II (50% cons)	0.87±2.89	0.73±0.69	0.58±0.02
Gr-III (100% cons)	0.7±0.86	0.47±2.43	0.21±1.25



Graph 1: Weight of Testis (g/ 100g b.w).

Table 2: Showing the toxicity impact of silk dye waste on mice testis diameter (mm).

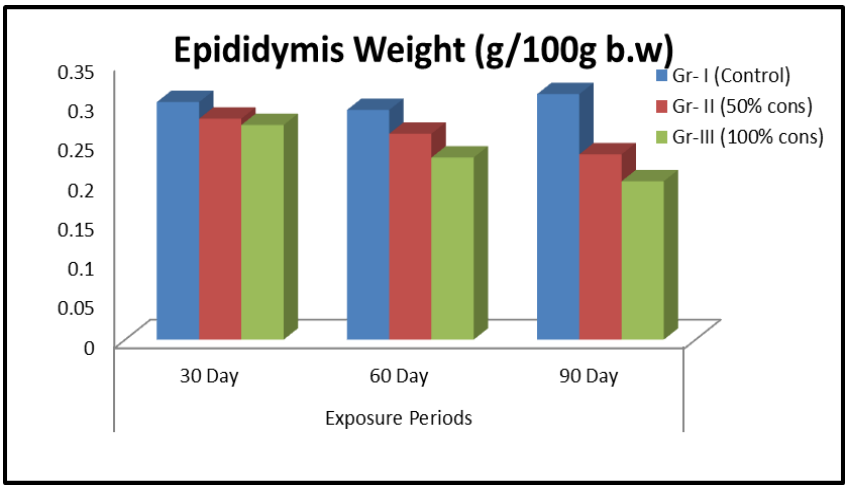
Experimental Groups	Exposure Periods		
	30 Day	60 Day	90 Day
Gr- I (Control)	3.39 ± 0.17	3.42±0.62	3.47±0.09
Gr- II (50% cons)	0.87±1.63	0.73±0.03	0.58±0.01
Gr-III (100% cons)	0.7±2.31	0.47±0.07	0.21±2.49



Graph 2: Diameter of Testis (mm).

Table 3: Showing the toxicity impact of silk dye waste on mice Epididymis weight (g/ 100g b.w).

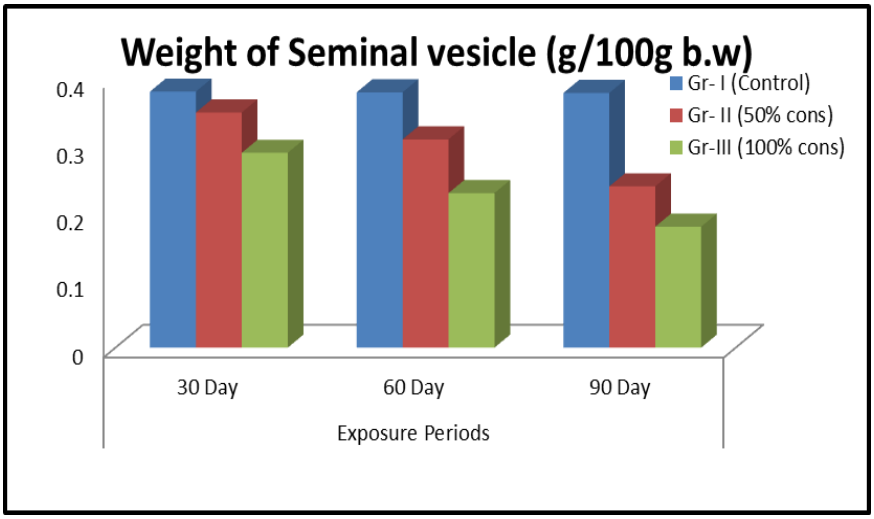
Experimental Groups	Exposure Periods		
	30 Day	60 Day	90 Day
Gr- I (Control)	0.30 ±0.06	0.269±0.01	0.31±0.05
Gr- II (50% cons)	0.279 ±0.72	0.26±1.90	0.234±0.98
Gr-III (100% cons)	0.271 ±0.89	0.23±0.54	0.20±0.04



Graph 3: Weight of Epididymis (g/ 100g b.w).

Table 4: Showing the toxicity impact of silk dye waste on mice weight of Seminal Vesicle (g/ 100g b.w).

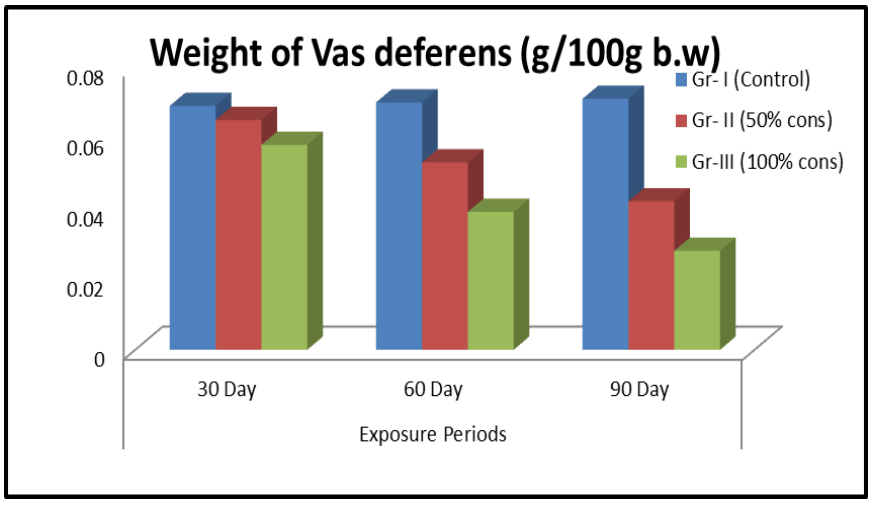
Experimental Groups	Exposure Periods		
	30 Day	60 Day	90 Day
Gr- I (Control)	0.381±0.05	0.380±0.01	0.379±0.02
Gr- II (50% cons)	0.35±0.56	0.31±0.03	0.24±0.05
Gr-III (100% cons)	0.29±1.27	0.23±2.37	0.18±0.09



Graph 4: Weight of Seminal vesicle (g/ 100g b.w).

Table 5: Showing the toxicity impact of silk dye waste on mice weight of Vas deferens (g/100g b.w).

Experimental Groups	Exposure Periods		
	30 Day	60 Day	90 Day
Gr- I (Control)	0.069±1.05	0.07±0.04	0.071±1.09
Gr- II (50% cons)	0.065±0.87	0.053±0.13	0.042±0.58
Gr-III (100% cons)	0.058±0.07	0.039±0.47	0.028±0.21



Graph 5: Weight of Vas deferens (g/ 100g b.w).

DISCUSSION

The experimental study was performed to prove that the toxic effect of silk dye waste could reduce the weight of testis, epididymis, seminal vesicle, vas deferens and diameter of testis of Gr- II and III swiss albino male mice when compared to Gr- I (Control group) male mice. Some experimental studied pvove that the reduction of body and testicular weight of albino

rate by effect of arsenic (Irum et al, 2018). The body weight and testis weight are considerably reduced (Fang et al, 2009). It was same change observed in the present experiment when treated with silk dye waste in differen incubation period. Tremellen in 2008, gave heavy metal as a Pb, mercury, arsenic are found the reduntion in weight and spermatogenesis in testis of albino rats. Susheela & Das (1988) reported the significant changes observed in the epithelial cells lining the ductuli efferent's of the caput epididymidis and vas deferens in the testis of fluoride treated animals. Bedford (1975); Orgebin-Crist et al, (1975); Prasad & Rajalakshmi (1976); Courot (1981); Eddy (1988) reported similar ultrastructure change including spermatogenic cells, vas deference damage in the testis of rats treated with benzoates, nickel and sulphured. Silk dye effluent induced change in ultra-structure of testis on Swiss albino male mice *Mus musculus (Serina in 2023).* Silk dye effluent induced change in ultrastructure of liver, on swiss albino mice *mus musculus* (Serina, K in 2022). Toxicity impact of Silk dye waste induced change shown in the kidney (Khatun in 2017), effect in liver, lungs and testis (Khatun et al, 2017 and 2023). Reddy et al in 1998 identified that the testicular changes due to graded doses of nicotine in albino mice.

CONCLUSION

This study concluded that the silk dye waste is highly toxic to human being as well as all an animals. Silk dye waste induced toxicity might be responsible for regression of testis and reduces the weight part of testis of swiss albino male mice. Clearly, the present experimental study proves the toxicity effect on swiss albino male mice in different reproductive part of testis.

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