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Histopathological Studies on the Effect of *Aloe Vera* Extract on Seminal Vesicle of Wistar Rats, *Rattus norvegicus*

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ABSTRACT
Aloe vera is a cactus-like perennial plant of family Liliaceae. *Aloe vera* has antibacterial and anti-inflammatory properties. It has been used as a source of functional foods and as an ingredient in other food products. The present study investigates the effect of *Aloe vera* extract on seminal vesicle in adult male Wistar rats. In this experimental study, 3 months old 12 adult male Wistar rats were used that weighed an average of 178-210 grams. They were randomly assigned to 2 groups (each group having 6 rats), group I is control and group II is experimental. Group II were administered 25mg/Kg body weight *Aloe vera* extract orallyfor 30 days and control group received saline solution daily for the same duration. After the completion of treatment rats were sacrificed using chloroform seminal vesicle was dissected out, weighed and processed for histological study. Treatment did not bring any significant change in the body weight, whereas the weight of seminal vesicle decreased significantly. Histological study of seminal vesicles showed degenerative changes, flattening of secretory mucosal folds, height of muscular layer is reduced, lumen contains less secretion as compare to control. The conclusion from this study revealed that *Aloe vera* has a potentially deleterious effect on the seminal vesicle and have antifertility effect.
Key words: *Aloe vera,* seminal vesicle, histology, degenerative changes, antifertility agent

INTRODUCTION

The plant *Aloe vera* has a history dating back to biblical time which, belongs to the family liliaceae is a cactus-like perennial plant (Surjushe *et al.* 2008). The genus *Aloe* contains over 400 different species with *Aloe barbadensis* Miller, is considered to be the most biologically active (Ritchie 2001; Rajasekaran *et al.* 2005; Bozzi *et al.* 2007; Moghaddasi and Verma 2011). The plant is rich in many natural health promoting substances. The raw pulp of *Aloe vera* contains approximately 98.5% water, while the mucilage or gel consists of about 99.5% water (Eshun and He 2004). The remaining 0.5 – 1% solid material consist of a range of compounds including water-soluble and fat-soluble vitamins, minerals, enzymes, mono and polysaccharides, sugar, lignin, phenolic compounds and organic acids (Foster and Tyler's 1999; Boudreau and Beland 2006; Lanjhiyana *et al.* 2011). The whole gel extract of *Aloe vera* has been reported to have various pharmacologic properties, specifically to promote wound, burn, and frost-bite healing, in addition to having antiinflammatory, antifungal, hypoglycemic, and gastroprotective properties. Of those claims, *Aloe vera*'s antiinflammatory and wound healing effects have been the most extensively studied. Besides these effects, *Aloe vera* gel (AVG) is considered to have adverse effects on some organs (Choi and Chung 2003; Can *et al.* 2004; Rabe *et al.* 2005). There are a few studies related to effects of AVG on the reproductive system. Telefo *et al.* 1998; Telefo *et al.* 2002; Telefo *et al.* 2004, demonstrated the effect of AVG on the reproductive system in rats. In these studies, besides the effect of AVG on ovarian and uterine weight, an attempt was made to determine ovarian steroidogenesis, estradiol and progesterone levels.

A little information is available about the effects of *Aloe vera* on accessory sex gland of rats. Hence, the present study is aimed to find out the effects of *Aloe vera* on seminal vesicle weight response and histopathology.

MATERIALS AND METHODS

Animal model

The present study was carried on healthy and sexually mature adult male albino rats (*Rattus norvegicus*) of Wistar Strain of an average body weight 178-210 gm. The animals were housed in a hygienic, well-ventilated room with natural light and dark cycles (12 h dark, 12 h light). They were individually housed in clean polypropylene cages (12" × 10" × 8") with sawdust bed and covered with stainless steel wire lids.

Preparation of *Aloe vera* extract

***Aloe vera* extract** was prepared from the fresh leaves, the leaves were washed with clean water and cut transversely into small pieces with the help of sterilized knife and then the thick epidermis was removed. The solid gel in the center of leaf was homogenized. The crude extract was prepared freshly each time and used for the treatment.

Experimental design

The rats were randomly divided into two groups. One group served as a control while the other group received *Aloe vera* extract of 25 mg/kg body weight daily for 30 days and control group received saline solution daily for same duration.

The experimental protocol was approved by the Institutional Animal Ethics Committee (Registration number 478/01/a CPCSEA) of RTM Nagpur University, Nagpur, prior to commencement of study.

Body and organ weights

The weight of each animal was recorded before and after treatment. After treatment rats were sacrificed using chloroform seminal vesicle was dissected out and weighed.

Seminal vesicle histology

Seminal vesicle of rats of all experimental groups were fixed in Bouin's fixative for at least 24 hrs, dehydrated in graded ethanol, cleared in xylene and embedded in paraffin wax, sections cut at 5 µm on rotary microtome stained with hematoxylin and eosin (HE) for histological study under light microscope.

Statistical analysis

The data obtained from the above experiments were subjected to statistical analysis. All the values were expressed in terms of mean ± SEM. The data were analyzed statistically by using Student's "t" test.

RESULTS

Effect of Aloe vera on body weight and weight of seminal vesicle

No significant change was observed in body weight but significant decrease was observed in weight of seminal vesicle after administration of *Aloe vera* at dose levels of 25 mg/kg body weight daily for 30 days in comparison to control (Table 1).

Table 1: Effect of *Aloe vera* extract on body weight and weight of seminal vesicle

Parameter	**Body weight(gm)**		**Seminal vesicle weight (mg/ 100gm body weight)**
	Initial	Final	
Group I (control)	186.85 ± 2.62	189.31 ± 2.83	449.63 ± 14.55
Group II (25mg/kg body weight)	190.04 ± 3.31	189.34 ± 3.12	410.65 ± 7.36

Values are mean ± SEM (n=6); P value< 0.05 is significant

Histopathology of seminal vesicle

Seminal vesicle of control Wistar rat consist of outer thick muscle layer, below the muscle layer secretory epithelial folds are present which extend into lumen, lumen is filled with secretion. Administration of *Aloe vera* extract (25mg/kg body weight) daily for 30 days showed adverse effect on histology of seminal vesicle, degenerative changes observed flattening of secretory epithelial fold and thinning of muscle layer as compared to control. And secretion was also decreased in lumen of seminal vesicle of treated animals as compared to control.

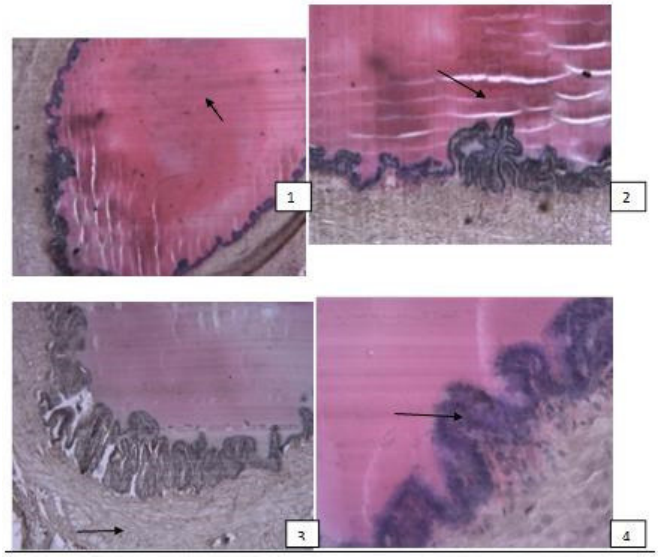

Figure .1- T.S. Seminal vesicle of Control Wistar rat showing lumen secretion (stain with HE, x4)
Figure .2- T.S. Seminal vesicle of Control Wistar ratshowing secretory epithelial folds (stain with HE, x10)
Figure .3 - T.S. Seminal vesicle of Control Wistar ratshowing thick muscle layer (stain with HE, x10)
Figure .4- T.S. Seminal vesicle of Control Wistar ratshowing secretory folds (stain with HE, x40)

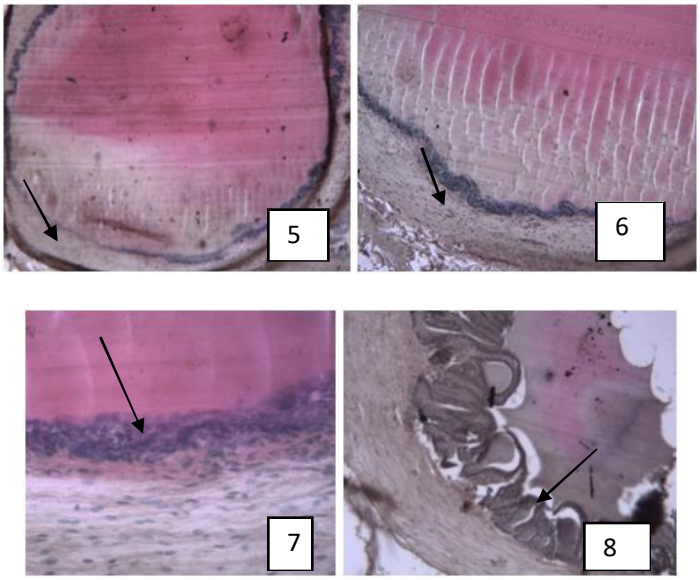

Figure 5- T.S. Seminal vesicle of Wistar rat treated with 25 mg/kg body weight daily for 30 days showing reduced lumen secretion (stain with HE, x4)
Figure 6- T.S. Seminal vesicle of treated Wistar ratshowing thinning of muscle layer (stain with HE, x10)
Figure 7 - T.S. Seminal vesicle of treated Wistar ratshowing flattening of secretory epithelial folds (stain with HE, x40)
Figure 8- T.S. Seminal vesicle of treated Wistar ratshowing less secretion in lumen (stain with HE, x10)

DISCUSSION

The present data showed that the oral administration of *Aloe vera* to male rat at the dose of 25mg/Kg body weight for 30 days. The body weight slightly change in treated group and the results are in agreement with (Farook *et al.*1991, Gupta *et al.* 2007).

In present studystatistically significant reduction in the weight of seminal vesicle was also observed. Reduction in weight of seminal vesicle in *Aloe vera* treated rat clearly indicates that *Aloe vera* caused structural and functional changes in seminal vesicle. This result agrees with the findings of Farook *et al.* (1991) who reported that administration of Anethole show significant decrease in weight of seminal vesicle. Seminal vesicle, being mainly secretory organ has more secretory cells than muscle cells which contribute for the organ weights (Neubauer and Mawhiney 1978) and any adverse effect on the secretory cells is reflected in the reduction of organ weight.

Histopathology of seminal vesicle of *Aloe vera* extract treated rat exhibits degenerative changes, flattening of secretory mucosal folds, height of muscular layer was reduced and lumen contains less secretion as compare to control. The pattern of histological changes observed in this study is consistent with the effect of methanol seed extract of Strychnos potatorum (Gupta *et al.* 2007), *Citrullus colocynthis* (Sharma *et al.* 2014), *Calotropis procera* (Akinloye et al. 2002) on male reproductive organs of Wistar rat.

In present study, administration of *Aloe vera* extract (25mg/kg body weight) suggests significant alteration in weight reduction and degenerative changes in histology of seminal vesicle. Therefore, it can be concluded that *Aloe vera* has potentially deleterious effect on the seminal vesicle**.** Seminal vesicle play very important role in fertility of male hence it is suppresses after long term administration of *Aloe vera.*

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