

ANTIFERTILITY EFFECTS OF AQUEOUS LEAF EXTRACT OF *OCIMUM SANCTUM* LINN. (TULSI) ON SEMINAL PROFILE OF MICE

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ABSTRACT

Treatment of aqueous leaf extract of *Ocimum sanctum* causes significant decrease in sperm counts during 10 ($p < 0.05$), 20 ($p < 0.001$) and 30 ($p < 0.001$) days treatment than the control. Motility of spermatozoa also decline significantly in treated group after 10 ($p < 0.05$), 20 ($p < 0.001$) and 30 ($p < 0.001$) days treatment than the control. Besides these pH of seminal plasma show significant decline in treated group of mice during 10 ($p < 0.001$), 20 ($p < 0.001$) and 30 ($p < 0.001$) days treatment than the control. However mortality of spermatozoa increases significantly in treated group of mice during 10 ($p < 0.001$), 20 ($p < 0.001$) and 30 ($p < 0.001$) days treatment than the control. Thus significant decrease in sperm counts, mortality, seminal pH as well as increase in mortality of spermatozoa alters the seminal quality which leads to infertility among treated group of mice.

INTRODUCTION

Tulsi (*Ocimum sanctum* L.; Family-Lamiaceae) is a religious aromatic and annual herb with diverse medicinal property. The entire plant shows medicinal properties, although mostly the leaf and seeds are used to cure various diseases (Gupta *et al.*, 2002). The leaf extract has been reported to possess antimicrobial (Mondal *et al.*, 2007), wound healing (Shetty *et al.*, 2008), anticancer (Pandey, 2009), cardioprotective (Suanarunsawat *et al.*, 2010), and immunomodulatory (Mondal *et al.*, 2011) properties. Leaves of *Ocimum sanctum* has antizygotic, anti-implantational and abortifacient activity in women and in the experimental animals (Chopra *et al.*, 1958, Nadkarni and Nadkarni, 1954; Batta and Santhakumari, 1971). *Ocimum sanctum* leaves show anti-fertility property in male mouse (Kasinathan *et al.*, 1972) as it possesses anti-spermatogenic (Seth *et al.*, 1981; Prakash and Gupta, 2005) as well as anti-androgenic property (Pratibha *et al.*, 2005). Benzene, extract of *Ocimum sanctum* in albino rats also decreases the total sperm counts and sperm motility (Ahmed *et al.*, 2002a) which leads to infertility among them.

The present study has been undertaken to observe the effect of *Ocimum sanctum* on seminal profile of mice.

MATERIALS AND METHODS

The young fresh leaves of *Ocimum sanctum* were collected from the minigarden of University Department of Zoology, T.M. Bhagalpur University, Bhagalpur. Leaves were washed 2-3 times in the tap-water. 10 grams of leaves were then grounded with 10mL of distilled water with sterilized pestle

and mortar. The homogenized mixture was filtered twice through a cotton cloth and centrifuged at 5,000 rpm for 10 minutes. Supernatants were collected and diluted with 30mL of distilled water to obtain a concentration of 250mg/day/kg body wt. of mice.

Adult swiss albino male mice weighing between 25-30g. were divided into four groups each consisting of six mice. One group of six mice was considered as control group while other were considered as experimental. These four groups of mice were maintained at uniform animal husbandry condition (12h photoperiod, $25 \pm 2^\circ\text{C}$ temperature). Control group of mice was fed with 0.1mL distilled water and experimental groups were fed with 0.1mL aqueous leaf extract of *Ocimum sanctum* for 10, 20 and 30 days.

At the end of feeding period, all the mice were sacrificed by cervical dislocation and both the cauda epididymis were taken into watch glass containing 2mL of normal saline. Both the cauda epididymis of each mice were teased and seminal content were sieved by metallic filter. Sperm counts were done by using methods described by Eliasson (1975), motility of spermatozoa was observed after the method of Tijee and Oentoeng (1968) and the pH of seminal plasma was measured with the help of pH paper.

RESULTS

The treatment of *Ocimum sanctum* leaf extract causes significant decline ($p < 0.001$) in sperm counts of mice after 10 to 30 days treatment in the treated group than the control group of mice (Table 1). In the treated group of mice, motility of spermatozoa reduced significantly ($p < 0.001$) during 10 to

Table 1: Effect of *Ocimum sanctum* L. on seminal profile of mice

Groups	Sperm counts (x10 ⁴ sperm/mL)	Motility (in Percent)	Seminal pH	Mortality (in percent)
Control (6)	209 ± 1.570	95.16 ± 0.477	7.3 ± 0.0577**	4.83 ± 0.4773
10 days (6)	197 ± 2.19*	91.66 ± 0.715*	6.4 ± 0.0308**	8.33 ± 0.7070**
20 days (6)	176 ± 1.86**	78.6 ± 1.476**	6.3 ± 0.05**	21.33 ± 1.475**
30 days (6)	156.3 ± 1.764**	69 ± 1.06**	5.3 ± 0.081**	31 ± 1.064**

Data presented as mean ± SEM; *, **, *** shows significance of 0.05 and 0.001 level with the value in control. Number within parenthesis denotes number of samples

30 days treatment in the treated group than the control (Table 1). Similarly pH of seminal plasma also decreased significantly ($p < 0.001$) in the treated group of mice than the control. However, mortality of spermatozoa increases significantly ($p < 0.001$) in treated group of mice than the control (Table 1).

DISCUSSION

Leaf extract of *Ocimum sanctum* treatment causes significant decline in sperm counts and motility of spermatozoa in the treated mice than the control. This observation corroborates the study of Khanna *et al.*, 1986. Such reduction in sperm counts and motility of spermatozoa may be due to decline in testosterone level as sperm counts and their motility are androgen dependent (Seth *et al.*, 1981). This suggests that *Ocimum sanctum* causes decrease in sperm counts and their motility by modulating testosterone level in treated group of mice.

Results of present study reveals that the pH of seminal plasma also decreased significantly among treated group of mice than the control, which is due to treatment of *Ocimum sanctum* leaf extract. Such decline in seminal pH may affect motility of the spermatozoa (Kasinathan *et al.*, 1972; Leigh and Fayemi, 2008). This shows that decline in seminal pH may affect fertility in treated group of mice. The increased percentage of mortality of spermatozoa in seminal fluid of treated mice may be due to androgen deficiency, as *Ocimum* shows anti-androgenic property (Ahmed *et al.*, 2002b).

From the above observations it can be concluded that the aqueous leaf extract of *Ocimum sanctum* decreases the sperm counts, motility, seminal pH and increases the mortality of spermatozoa which results into infertility among treated groups of mice by alternating the seminal quality. This suggests that *ocimum sanctum* shows antifertility effects in treated group of male mice.

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