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RESEARCH ARTICLE

Male Antifertility Activity of Hydro-Alcoholic Stem and Leaf Extracts of *Ecballium Elaterium* on Male Wistar Rats

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ABSTRACT

Objective: The objective was to investigate the male antifertility effect of hydro-alcoholic stem and leaf extracts of *Ecballium elaterium* on male Wistar rats. **Methods:** The animals were divided into five groups of five animals each. The first group (I) served as control and received normal saline remaining Groups (II, III, IV & V) were treated with plant extracts (HALEE & HASEE) at a dose of 200 & 400 mg/kg p.o. respectively for a period of 21 days. **Results:** Dose dependent significant decrease in the weight of testes & epididymis was observed. Also a dose related reduction in sperm count and motility was observed. **Conclusion:** In conclusion HASEE & HALEE extract of *Ecballium elaterium* has produced dose dependent antifertility effect o male rats.

Keywords: Male antifertility, *Ecballium elaterium*, testes, epididymis.

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1. Introduction

Control of over population is a major problem of the present society. Higher use of contraceptive methods is a direct indicator of health, population, development and women's empowerment. It also serves as a proxy measure to access the reproductive health services that are essential

for meeting many of the millennium development goals, especially for those concerned with child mortality, maternal health, HIV/AIDS, and gender equality [1]. In many developing countries, traditional medicines are widely utilized in the treatment of various ailments on an

empirical basis. A variety of plants have been used for the treatment of ulcer, hypertension, diabetes and male reproductive function.

Traditional medicine accounts for about 80% of the health needs of the rural populace in most regions, of which are of high medicinal value in many countries [2]. *Ecballium elaterium* (E. elaterium), the squirting cucumber or spitting cucumber, is from the Cucurbitaceae family. It is a decumbent, perennial herb restricted to the Mediterranean Basin and cultivated in central Europe and England. This plant has hairy vine, palmately lobed, bristly leaves. The fruit is ovoid, fleshy, approximately 4 cm in length. The unripe fruit is of a pale green color, and covered with numerous, uniseriate glandular hairs, which eject dark seeds and juice after maturity in response to light pressure. It is common throughout the Mediterranean area as a medicinal plant [3-6].

Ecballium elaterium has claimed to possess hepatoprotective property. The plant contains many biologically active compounds, including phenolic compounds, flavonoids "phytomelin" and triterpenoid [7]. Despite the use of the plant in traditional, so far no scientific evaluation was carried out on this plant. Therefore, this research work was carried out to provide scientific evidence for its anti fertility potentials.

2. Materials and Methods

Collection of plant material:

The Fresh stems and leaves of *E. elaterium* were collected from the Thalakona forest, Tirupathi, A.P.

Preparation of extracts:

The leaves and stems of *Ecballium elaterium* were separately blended in to fine powder with a blender and used for the preparation of hydro-alcoholic extract. The extracts were prepared by using soxhlet extractor for 18-20 h. The extracts obtained, were concentrated and dried under reduced pressure at controlled temperature (40-50 C).

Experimental animals:

Sexually matured, healthy, colony-bred male rats of Wistar strain, weighing 150-200g were used for the experiments. The animals were purchased from a rat breeder (Ragavendra Enterprises, Bengaluru, Karnataka). The rats were housed in polypropylene cages measuring 12"x10"x8" under well-ventilated animal house conditions (ambient temperature: 28-31°C, photoperiod: 12 hours natural light and 12 hours dark; relative humidity: 50-55%). The rats were given balanced diet and drinking water.

Experimental Design

Animals were divided into five treatment groups containing five in each.

Group I (Control):

Received vehicle only (1% CMC suspension 10ml/kg) and served as control.

Group II (HASEE-I):

Received hydro-alcoholic stem extract of *Ecballium elaterium* of dose 200mg/kg body weight.

Group III (HASEE-II):

Received hydro-alcoholic stem extract of *Ecballium elaterium* of dose 400mg/kg body weight.

Group IV (HALEE-I): Received hydro-alcoholic leaf extract of *Ecballium elaterium* of dose 200mg/kg body weight.

Group V (HALEE-II): Received hydro-alcoholic leaf extract of *Ecballium elaterium* of dose 400mg/kg body weight.

A suspension of extract was prepared in distilled water before administration. The required dose was administered orally with a syringe fitted with a feeding needle.

Parameters monitored

Body and organ weights

The animals were weighed before and after the treatment schedule to note the initial and final body weights. The testes, epididymides were dissected out, freed from tissues and blood and weighed.

Sperm count and motility

One hundred milligram of each cauda epidymal tissue was minced in 1 ml of physiological saline. For sperm motility, one drop of evenly mixed sample suspension was applied to a glass slide and provided with cover slip. The percentage sperm motility was determined by counting both mobile and immobile spermatozoa per unit area.

Statistical analysis

All the data was expressed as mean \pm SEM. Statistical significance between two and above groups were tested by using one way ANOVA method followed by Tukey test using Prism graph pad.

3. Results and Discussion

Body and organ weights

All the animals in 4 groups had shown marked increase in their body weights with respect to their initial weights. The final body weights of both group II & III (HASEE 200 & 400 mg/kg) and group IV & V (HALEE 200 & 400 mg/kg) has significantly increased when compared to the final weight of group I (Control group) animals. On the other hand a great decrease in the weights of testes & epididymides were observed in all treatment groups when compared to group I animals (Table 1).

Sperm motility and count

In group II, III, IV & V a significant decrease in percent epididymal sperm motility was observed when compared with group I animals. The sperm count was also decreased significantly in all treatment groups (Table 2).

Discussion

In the present study findings showed that the HASEE & HALEE extract of *Ecballium elaterium* could significantly alter the male fertility potentials. The data observed and obtained from the present has shown that the *Ecballium elaterium* Stem & leaf extract suppresses epididymal and testicular sperm count [8]. The significant increase in body weights on treated animals indicates that the extract may have toxic effect on the rats. The significant in the absolute weight of testes and epididymis could be therefore due to increase androgen synthesis as evidence serum testosterone level [9]. Yet another possibility of lower sperm concentration by the extract may be due to oxidative stress. However, it is also observed that the serum testosterone

level correlates with sperm count and motility. In fact the motility and fertility ability are markers of a healthy sperm;

any sort of negative impact on motility can leads to serious affect on fertility ability [10].

Table 1: Body and organ weights after 21 days of treatment with HASEE & HALEE Extract of *Ecballium elaterium* on male rats.

S. No	Treatment groups	Body weights in gm		Testes	Epididymis
		Initial	Final		
1	Group I	188.23 ± 7.5	215.92 ± 11.0	99.3 ± 1.45	46.1 ± 1.23
2	Group II	187.53 ± 13.2	216.61 ± 10.4	79.6 ± 2.12	37.2 ± 0.45
3	Group III	191.28 ± 9.5	228.18 ± 11.4	72.3 ± 1.25	34.4 ± 0.64
4	Group IV	199.62 ± 5.5	218.04 ± 10.8	71.3 ± 1.05	31.6 ± 1.50
5	Group V	201.59 ± 6.3	213.32 ± 09.4	62.3 ± 2.45	30.4 ± 0.04

Data are expressed as mean ± SEM., mg/100 g of body weight, P<0.01 compared with corresponding initial body weight.

Table 2: Sperm morphology after 21 days of treatment with HASEE & HALEE Extract of *Ecballium elaterium* on male rats.

S. No	Treatment groups	Sperm motility count (%) Cauda epididymis	Sperm count (million/mm ³)	
			Testes	Cauda epididymis
1	Group I	68.2 ± 2.2	4.3 ± 0.3	46.0 ± 2.3
2	Group II	34.4 ± 7.2	2.8 ± 0.8	35.6 ± 4.3
3	Group III	32.5 ± 4.6	2.0 ± 0.4	18.1 ± 1.4
4	Group IV	31.3 ± 4.8	2.1 ± 0.6	25.1 ± 3.6
5	Group V	29.4 ± 7.8	1.9 ± 0.3	15.1 ± 2.3

Data are expressed as mean ± SEM; n =5, P < 0.01 Compared with group I.

4. Conclusion

In conclusion, the HASEE & HALEE extract of *Ecballium elaterium* has produced dose dependent effect on male fertility and reproduction. The effect may have a decreased influence on LH release which may be responsible to incline testosterone release. Further an extensive evaluation of complete reversible fertility should be done on this particular important plant.

Conflict of Interest: We declare no conflict of interest.

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