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EVALUATION OF APHRODISIAC ACTIVITY OF CORIANDRUM SATIVUM (Linn) IN MALE ALBINO RATS

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ABSTRACT

Sexual dysfunction effectively is a major problem facing the reproductive process. In ayurvedic medicine *Coriandrum Sativum* (Linn) is a fruit-used as aphrodisiac, In case of stress modulated sexual behavior in male rats, high and medium dose of *Coriandrum Sativum* (Linn.) extract significantly decreased the body weight difference between day 1 and day28 and increased the weight of testes, vasdeferens, seminal vesicles, epididymis and produced no change in weight of adrenal glands *Coriandrum Sativum* (Linn.) extract showed significant increase in sperm count and % of sperm motility when compared to stressed rats. In case of histopathology of testis, treatment of *Coriandrum Sativum* (Linn.) extract in the rats overcomes the single layer of spermatogenesis, congested blood vessels and absence of spermatozoa due to stress and also improves predominance of spermatocytes and increase in number of sertoli cells.

KEYWORDS

Coriandrum Sativum (Linn.), Aphrodisiac activity and Stress modulated sexual behavior.

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INTRODUCTION

Male sexual dysfunction (MSD) could be caused by various factors. These include: psychological disorders (performance anxiety, strained relationship, depression, stress, guilt and fear of sexual failure), androgen deficiencies (testosterone deficiency, hyperprolactinemia), chronic medical conditions (diabetes, hypertension), vascular insufficiency (atherosclerosis, venous leakage), penile disease (peyronie's, priapism, phinosis, smooth muscle dysfunction), pelvic surgery (to correct arterial or inflow disorder), neurological disorders (parkinson's

disease, stroke, cerebral trauma, Alzheimer's disease, spinal cord or nerve injury), drugs (anti-hypertensives, central agents, psychiatric medications, antiulcer, antidepressants and anti-androgens), life style (chronic alcohol abuse, cigarette smoking), aging and systemic diseases¹.

Erectile dysfunction (ED) is a highly prevalent medical condition that affects 52% men between 40 and 70 years of age to some degree. Although ED is not inevitable consequence of aging, its prevalence and severity increase with age. As the world population continues to increase to live longer, it is predicted that 322 million men worldwide will suffer from this disorder by the year 2025².

Hence, there is an increasing demand for the alternative therapies, particularly herbal therapies that are believed to be effective, safe and economical. *Coriandrum Sativum* (Linn) is a fruit used as carminative, antibilious, digestive, appetizer, constipating, diuretic, antipyretic, stimulant, aphrodisiac, refrigerant, tonic, expectorant, dyspepsia³.

However, there is no authentic scientific data reported regarding aphrodisiac activity of *Coriandrum Sativum* (Linn) fruits. In this context, in the present study an attempt is proposed to evaluate the effect of *Coriandrum Sativum* (Linn) fruit extract on aphrodisiac activity and stress modulated sexual behavior in male rats.

MATERIAL AND METHODS

Collection of plant material

Ripe fruits of *Coriandrum Sativum* (Linn.) were collected in the month of July 2015 from the agricultural fields of Chirala. The collected plant material was shade dried to retain its vital phytoconstituents and then subjected to size reduction for further extraction process.

Preparation of hydro alcoholic extract⁴

The powder of *Coriandrum Sativum* (Linn.) ripe fruits were charged in to the thimble of a Soxhlet apparatus and extracted using 70% ethanol and 30% water for 18 hrs. Appearance of colourless solvent in the siphon tube was the indication of exhaustive extraction and based on that, further extraction was terminated. The

extract was then transferred into the previously weighed empty beaker and evaporated to a thick paste on the water bath, maintained at 50°C to get alcoholic extract (Table No.1). The extract was finally air dried thoroughly to remove all traces of the solvent and the percentage yield was calculated. The perfectly dried extract was then stored in an air tight container till used.

Effect on Stress modulated sexual behavior in male rats⁵⁻⁸

Male Albino rats weighing between (150-200 g) were divided into following seven groups of six rats each, in which three groups were for hydro alcoholic extract of *Coriandrum Sativum* (Linn.) in a dose of 100, 200 and 400mg/kg respectively as low, medium and high doses.

Group 1: Normal control (receives distilled water 3ml/kg) (without stress) p.o.

Group 2: stress control (receives distilled water 3ml/kg) p.o.

Group 3: Standard drug (sildenafil citrate 0.7mg/kg) p.o.

Group 4: Standard drug (testosterone 15mg/kg) p.o.

Group 5: High dose of hydro alcoholic extract of *Coriandrum Sativum* (Linn.) p.o.

Group 6: Medium dose of hydro alcoholic extract of *Coriandrum Sativum* (Linn.) p.o.

Group 7: Low dose of hydro alcoholic extract of *Coriandrum Sativum* (Linn.) p.o.

All the treatments were given for 28 consecutive days before immobilization stress.

Induction of Immobilization stress

The animals were subjected to IMB stress by Plexiglas cylinder (5 cm diameter and 16 cm large) for 6 h a day during light period started from 10 am each day for 28 consecutive days. Water and food were withdrawn during stress period.

Sperm count⁹

Spermatozoa were collected by flushing the vas deferens and epididymis in 2.0ml of normal saline. Draw the semen in the WBC pipette up to 0.5 mark. Draw in 4% sodium bicarbonate in 1% phenol solution up to the mark 11, making a dilution of 1 in 20.

Count the sperm under high power in the four WBC squares.

Calculation

Number of sperms in 1 cu.mm of sample = $N \times 10/4 \times 20$

Number of sperms in 1 ml (i.e.1 cu.cm) of sample: = $N \times 50 \times 1000$ (as 1 cu.cm=1000cu.mm) = $N \times 50,000$

Where N is the total sperm count observed in outer four square of WBC chamber.

Sperm motility

Place a drop of semen on the cover slip and invert it on a rim of plasticine on the cavity slide. Examine under high power objective and find out the percentage of immobile to mobile sperms (Table No.2 and 3).

Histology of testis

Two-left testis of each group was excised and rinsed in 0.9% saline blotted dry of saline and excess blood. They will be fixed in 12 % formalin for 24 hr. The tissues, after fixation, were washed in water to remove excess fixative. Washed tissues were dehydrated through a graded series of ethyl alcohol, cleared with xylene and embedded in paraffin wax. Sections were cut at 3 μ m with microtone blade, and mounted on clean glass slide. The sections were routinely stained with haemotoxyllin and eosin. The stained slides were

observed (400 X) in research microscope and photographed (Figure No.1-7).

DISCUSSION

These results suggest that, *Coriandar Sativum* (Linn.) possesses clinically applicable aphrodisiac activity, and also support to the claims for its traditional usage as sexual function enhancing medicine. Further, the study also indicates that *Coriandar Sativum* (Linn.) is useful in overcoming stress condition as it improved the weight of accessory sexual organs, improved the sperm count and sperm motility which was supported by histopathology of testis. Preliminary phytochemical studies indicate the presence of carbohydrates, amino acids, alkaloids, glycosides, flavonoids, phytosterols, and volatile oils in the extract. Hence, the sexual function improving effect of *Coriandar Sativum* (Linn.) might be due to presence of such compounds. Moreover, *Coriandar Sativum* (Linn.), merits further studies for detailed sexual improving activities, especially at higher doses in normal as well in stress conditions. In addition, further research is also needed for the identification of its active constituent responsible for sexual function activities and the mechanism by which it augments sexual function.

Results

Table No.1: Nature and Percentage yield of the extract

S.No	Name of the Extract	Nature	Colour	% Yield (%w/w) in g.
1	Hydro alcoholic extract	Sticky	Yellowish	25.17

Table No.2: Effect of sildenafil, testosterone and *Coriander Sativum* extract on Sperm Count (Total x 10⁵) in stress modulated rats:

S.No	Treatment	Sperm Count (Total x 10 ⁵)						Mean \pm SEM
		1	2	3	4	5	6	
1	Normal Control	100.0	125.0	118.0	122.5	120.0	112.5	118.0 \pm 2.363
2	Stress Control	197.5	112.5	104.0	92.5	105.0	109.0	103.4 \pm 3.004
3	Sildenafil (0.7 mg/kg)	207.6	214.5	232.5	263.0	258.5	232.0	234.6 \pm 9.169**
4	Testosterone (15 mg/kg)	274.0	256.5	269.5	267.0	247.5	259.5	262.3 \pm 3.964**
5	C.S.H (400 mg/kg)	268.5	268.0	243.5	273.5	259.5	220.0	255.5 \pm 8.306**
6	C.S.M (200 mg/kg)	155.0	162.5	161.5	167.5	190.5	173.5	168.4 \pm 5.090**
7	C.S.L (100 mg/kg)	132.5	142.5	145.0	136.0	140.5	144.0	144.0 \pm 1.998**

Values are Mean \pm SEM (n=6) one way ANOVA followed by Dunnett's 't' test.

Where ** represents very significant at $p < 0.01$ when compared to stress control group. C.S.H (400 mg/kg), C.S.M (200 mg/kg) and C.S.L (100 mg/kg) are the high, medium and low doses of *Coriander Sativum* (Linn.).

Table No.3: Effect of sildenafil, testosterone and *Coriander Sativum* extract on Sperm Motility (%) in stress modulated rats

S.No	Treatment	Sperm Motility (%)						Mean±SEM
		1	2	3	4	5	6	
1	Normal Control	45	50	52	40	47	46	46.6±1.706
2	Stress Control	46	43	49	51	50	45	47.3±1.282
3	Sildenafil (0.7 mg/kg)	82	77	80	79	74	88	80.0±1.949**
4	Testosterone (15 mg/kg)	75	85	78	82	76	70	77.6±2.171**
5	C.S.H (400 mg/kg)	75	83	72	68	74	76	74.6±2.028**
6	C.S.M (200 mg/kg)	65	67	63	72	68	61	66.0±1.592**
7	C.S.L (100 mg/kg)	60	59	56	63	67	55	60.0±1.826**

Values are Mean ± SEM (n=6) one way ANOVA followed by Dunnett's 't' test.

Where ** represents very significant at p< 0.01 when compared to stress control group.

C.S.H (400 mg/kg), C.S.M (200 mg/kg) and C.S.L (100 mg/kg) are the high, medium and low Doses of coriander sativum (Linn.)

Histopathology results of rat testis

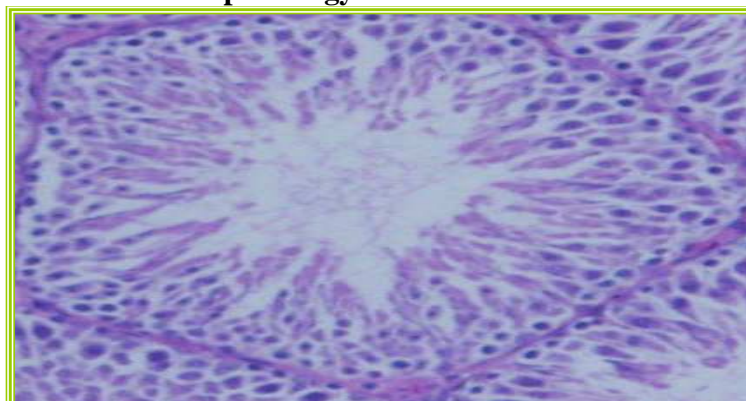


Figure No.1: Histopathology of testis of normal control rats

Normal histology of testis was seen, seminiferous tubules were closely packed, normal arrangement of the basement membrane below this presence numerous spermatogenic cells and spermatozoa also found, the lumen was occupied by the tail sperms.

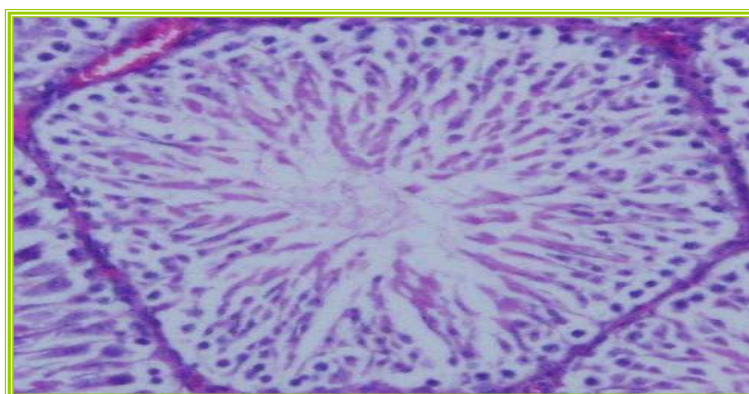


Figure No.2: Histopathology of testis of stress control rats

Thickening of basement membrane, single layer of spermatogenic cells found and congested blood vessels were present with no spermatozoa were absent.

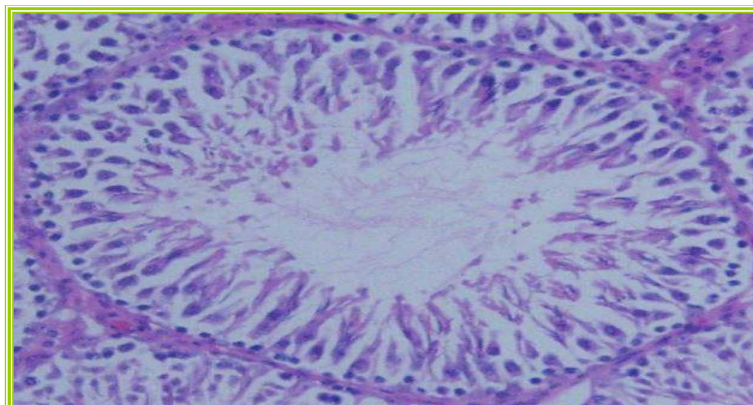


Figure No.3: Histopathology of testis of sildenafil citrate (0.7mg/kg) treated stressed rats

Normal maintenance of basement membrane, prominent spermatogenesis and presence of spermatozoa at the center of each cell.

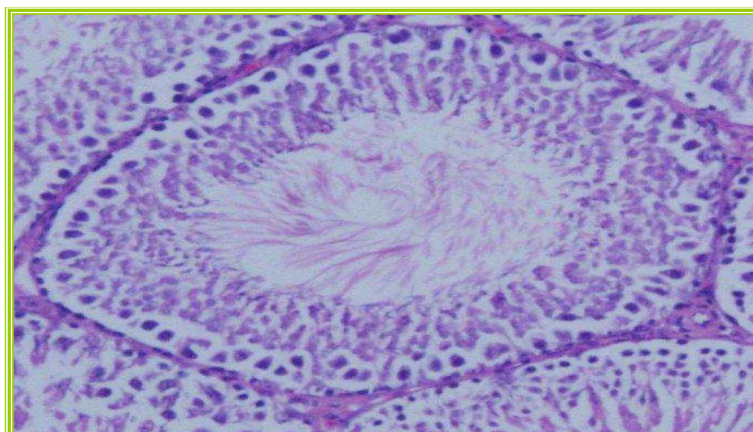


Figure No.4: Histopathology of testis of testosterone (15 mg/kg) treated stressed rats

Maintenance of basement membrane, less number of sperm cells, delayed maturation and prominent primary spermatocytes.

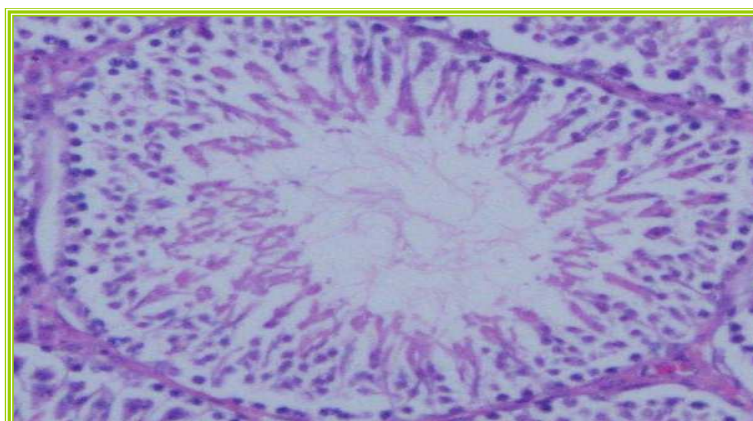


Figure No.5: Histopathology of testis of high dose of *Coriander Sativum* extract (400 mg/kg) treated stressed rats

Thickening of base ment membrane, predominance of spermatocytes, increase in no.of sertoli cells and maturation arrest in few seminiferous tubule cells.

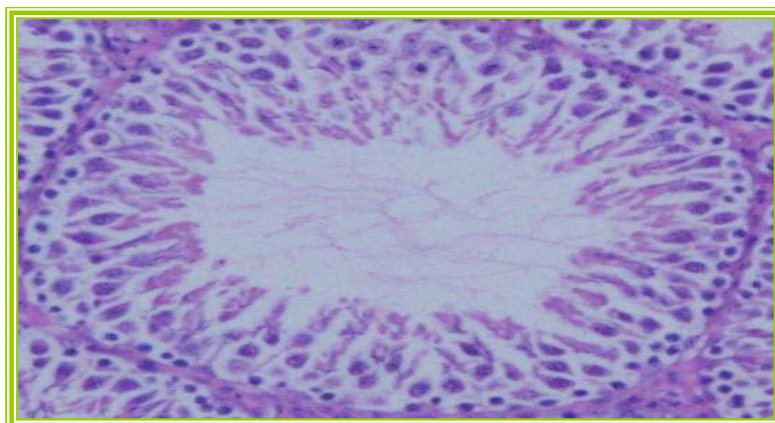


Figure No.6: Histopathology of testis of medium dose of *Coriander Sativum* extract (200 mg/kg) treated stressed rats

Thickening of basement membrane, predominance of spermatocytes and increased number of sertoli cells.

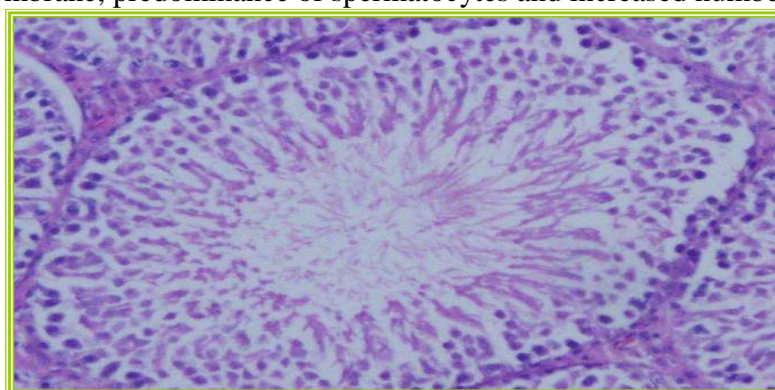


Figure No.7: Histopathology of testis of low dose of *Coriander Sativum* extract (100 mg/kg) treated stressed rats

Thickening of basement membrane, maturation arrest and Increased number of sertoli cells.

CONCLUSION

The present study was carried out to find out, effect of *Coriandar sativum* (Linn.) ripe fruit extract on sexual behaviour in normal and stressed rats.

From the results obtained, we conclude that the *Coriandar sativum*(Linn.) ripe fruit extract at higher doses produces significant and sustained increase in the sexual activity of normal male rats and also helpful in overcoming IMB stress induced sexual dysfunction. This activity may be due to the presence of different phytoconstituents viz, glycosides and flavanoids in the extract. However, further studies are required to isolate and identify the active constituent responsible for the activity and also to focus on the mechanism of its aphrodisiac activity.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBLIOGRAPHY

1. Yakubu M T, Akanji M A and Oladijji A T. Male sexual dysfunction and methods used in assessing medicinal plants with aphrodisiac potentials, *Phcog Rev*, 1(1), 2007, 49-56.
2. Soni M, Patidar K, Sharma D, Soni P, Sharma D K. Oral therapy for erectile dysfunction, *Asian J pharmaceuticals*, 3(3), 2009,174-177.

3. <http://en.wikipedia.org/wiki/Coriandar> access on 20th July' 15.
4. Kokate C K. "Practical Pharmacognosy", Vallabh Prakashan, New Delhi, 4th edition, 1994, 110-111.
5. University of Plymouth Dept. of psychology, Salmon study materials on-line, PSY128 Lecture Support Material, Hormones and SexualBehavior.www.indopedia.org/environment access on 20th Jan' 10.
6. Inoko M, Kiharay Y, Morii I, Fujiwara H, dasayana S. Transition from compensatory hypertrophy to dilated failing heart ventricles in Dahi-salt sensitive rats, *Am J Physiol*, 267(36), 1994, 471-482.
7. Jain A K. Manual practical physiology for MBBS, Semen analysis sperm count and motility, Arya publications, Sirmour, 1st edition, 2003, 176-77.
8. Bauer JD, Ackerman PG, Toro G. Clinical Laboratory Methods. St. Louis Missouri, USA: Mosby Co, 1974.

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