BRIHATA GOKSHUR (Pedalium murex Linn.): A POTENT DRUG FOR MALE REPRODUCTIVE SYSTEM

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ABSTRACT
Male reproductive system comes under the urogenital system. In current scenario due to the several factors like altered food practices and ill sexual practices, affects male reproductive system giving rise to various disorders i.e. erectile dysfunctions, premature ejaculation, loss of libido, nocturnal seminal emission, low sperm count, less or no motility of sperm and painful micturition etc. commonly. In such conditions we need a drug with good effect and less or no side effects. The aim of current review is to provide the proclaiming effects of Pedalium murex Linn. for the treatment of male reproductive disorders by the review of ayurvedic texts and research articles, so that it could be develop a potent drug for maintaining the health of male reproductive system.

Keywords: Urogenital, erectile dysfunctions, herbal drug, ayurvedic pharmacology etc.

INTRODUCTION
Male reproductive system comes under urogenital system. In urogenital disorders nephritis, nephrotic syndrome, calculus, diseases of male genital organs, disorders of breast, inflammatory disease of female pelvic organs and other disorders of female genital tract etc are described. In current scenario due to the several factors like altered food practices and ill sexual practices, affects male reproductive system giving rise to various disorders i.e. erectile dysfunctions, premature ejaculation, loss of libido, nocturnal seminal emission, low sperm count, less or no motility of sperm and painful micturition etc. commonly. In such conditions we need a drug with good effect and less or no side effects. For this purpose various researches has been done on several herbal drugs. In this series a review of ayurvedic texts and research articles was done on Pedalium murex Linn. to evaluate its effects regarding the treatment of male reproductive disorders. Pedalium murex Linn is sometimes confused with Tribulus terrestris Linn. (Family- Zygophyllaceae ), a popular testosterone booster, but they are quite different morphologically as well as in the terms of chemical constituents.

MATERIAL AND METHODS
Vernacular names/Synonyms
1. Latin name: Pedalium murex Linn.
2. Sanskrit: Brihata Gokshur
3. Hindi: Bara Gokhru, Fareed buti, Dakshini Gokshur
4. Bengali: Bad Gokhru
5. Marathi: Mothe Gokharu
6. Gujarati: Oobha Gokhru, Mhyota Gokhru, Kadawa Gokhru
7. Oriya: Gokara
8. Panjabi: Gokru Kalan
9. Telugu: Pedda Palleru
10. Kannada: Aneneranchi
11. Malayalam: Kattureninjala
12. Arabic: Hasake-Kabir
13. Pharsi: Kharekhasa-ke-Kalan, Khaske Kalan
14. English : Large Caltrops

TAXONOMICAL CLASSIFICATION
1. Kingdom: Plantae – Plants
2. Subkingdom: Tracheobionta – Vascular plants
3. Superdivision: Spermatophyta – Seed plants
4. Division: Magnoliophyta – Flowering plants
5. Class: Magnoliopsida – Dicotyledons
6. Subclass: Asteridae
7. Order: Lamiales
8. Family: Pedaliaceae – Sesame family
9. Genus: Pedalium
10. Species: murex

Synonyms
1. Pedalium microcarpum Decne.
2. Pedalium muricatum Salisb.
3. Regeria microcarpa Klotzsch

HABIT
Pedalium murex Linn. is annual, fleshy, succulent diffuse, much branched herb, growing up to 38 cm in height. Its roots are white in appearance and emit musk like sweet aroma. The leaves of plant are fleshy, simple, opposite, alternate, ovate-oblong, 3.2-5.3 cm x 1-2.7 cm. The inflorescence is axillary and terminal. Calyx is deeply 5 lobed. Corolla is yellow in colour, tubular and round lobes. Stamens are four. Fruits are bluntly four angled with stout, sharp, conical horizontal spines from the angles. The leaves and stems when agitated in cold water turn into tasteless, colourless thick mucilage. This mucilage is of medicinal importance.

HABITAT
Pedalium murex Linn. It is distributed in India, Sri Lanka and Tropical Africa.

Phytochemical Constituents of Pedalium murex Linn
Leaves contain several alkaloids, Dinatoin glycoside, diosmetin glucuronides flavonoids, steroids, saponins, resins, protein.

Roots of the plant contain Reducing sugars, saponins, phenolic compounds, alkaloids, triterpenoids, xanthoproteins and flavonoids.

Stem contains tannins, phytosterols, Saponins, carbohydrates and herman.

Flowers contain quercetin-7-glucoside, quercetin and dinatin.

Fruits contain alkaloids 3.5%-5%, stable oil, carbohydrates, aromatic oil, resins, glycosides, saponins, and triterpenoids. Nonacosane, tritriacontane, triacontanoic acid, sitosterol-beta-D-glucoside, rubusic acid, luteolin are the major constituents of seeds.

PHARMACOLOGICAL ACTIONS
Pedalium murex commonly known as Bara Gokhru, Gokhru, Large Caltrops and is traditionally used to treat several male reproductive disorders such as impotency and gonorrhoea. Pedalium murex Linn. has also been used as aphrodisiac in traditional Indian medicine to treat impotency and male sexual dysfunction. Several experimental studies have been carried out in order to explore different pharmacological activities of Pedalium murex Linn:

Aphrodisiac Activity of Pedalium Murex
In order to evaluate aphrodisiac activity of Pedalium murex root extract Balamurugan et al (2010) carried a study. He reported it to promote sperm count, motility, and testosterone in animals with testicular injury. Pedalium murex extract (200 and 400 mg/kg) exhibited an increase in sperm motility, pregnancy percentage, body weight, mating and mounting behaviour. An increment in the levels of testosterone and luminal spermatozoa have also been found in treated animals compared to control group. Sharma et al (2012) also provided evidence that Pedalium murex fruit extract possesses aphrodisiac property. They fed rodents with the extract for 28 day with 50, 100 and 150 mg/kg of body weight per day. There was a significant increase in the penile erection index, mount latency, intromission latency and serum testosterone level (p<0.05) throughout the period of study. Interestingly, researchers reported that observed beneficial effects (including increased serum testosterone levels) extended up to two weeks past withdrawal of the treatment. In their in vitro part of the study, significantly elevated nitric oxide was also noted.
Antioxidant and Hepatoprotective Activity
Patel et al. (2011) aimed to evaluate a potential new source of antioxidant from Pedalium murex fruits. The fruit of Pedalium murex has shown to have extensive antioxidant properties. The results also showed that ethyl acetate solvent fractions exhibit higher antioxidant activities as compared with the other fraction. Decreased activity of antioxidant enzymes, such as superoxide dismutase, catalase, glutathione peroxidase and glutathione reductase in carbon tetrachloride intoxicated rats signifies its antioxidant activity and hepatoprotective activity.

Anti Hyperlipidemic Activity
As per Balasubramanian et al (2008), administration of Pedalium murex fruit extract at the dose level of 200 and 400 mg/kg to rats with diet induced hypercholesterolemia revealed a significantly decreased total cholesterol, triglycerides, low density lipoprotein (LDL-cholesterol), very low density lipoprotein (VLDL-cholesterol) and increase in high density lipoprotein (HDL-cholesterol).

Other Activities
Pedalium murex fruit extracts has also been reported to possess nephroprotective (Shelke, et al.2009), antiulcerogenic (Banji et al 2010), and. Fruits of Pedalium murex also exhibited diuretic activity in animal models (Sharma et al, 2012). The leaves has been found to possess antimicrobial activity (Soosairaj et al, 2008).


Toxicity Study
The acute toxicity studies of the Pedalium murex plant were reported to be safe in the doses up to 260 mg/kg in mice. Pedalium murex extract produced no toxic symptoms or mortality up to a dose level of 2000 mg/kg body weight orally in rats

Parts used: Panchanga (whole plant) and Phala (fruit)
Dosage: Patra churna (leaf powder) – 10gm, Phala churna (fruit powder) – 2-4gm and Phala Phanta (Infusions of fruits) – 20-30gm of fruit

DISCUSSION
Nowadays male reproductive disorders i.e. erectile dysfunctions, premature ejaculation, loss of libido, nocturnal seminal emission, low sperm count, less or no motality of sperm and painful micturition etc. are getting very common problem of males. In this condition we need a drug with good effect and having good safety profile. For that purpose a review of ayurvedic texts and research articles concerned with effect of Pedalium murex Linn. regarding treatment of male reproductive disorders, was framed so that it could help to develop a potent drug for male reproductive disorders.

CONCLUSION
On the review of Ayurvedic texts such as Bhava Prakash Nighantu and Adarsha Nighantu there is description of use of Pedalium murex Linn. as a Vajikerana (aphrodisiacs) drug, consequently In the experimental studies Pedalium murex Linn. shows a good aphrodisiac activity & increases the levels of testosterone. These studies lend support for the traditional use of Pedalium murex as a sexual stimulating agent as well as boosting the reproductive organs. This can offer a significant potential for further research.

REFERENCES
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