

# 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 developed 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<sup>1</sup> 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<sup>2</sup>

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. Malyalam: *Kattureninjala*
12. Arabic: *Hasake-Kabir*
13. Pharsi: *Kharekhasa-ke-Kalan, Khaske Kalan*
14. English : **Large Caltrops**

### TAXONOMICAL CLASSIFICATION<sup>3</sup>

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: *Pedaliium*
10. Species: *murex*

#### Synonyms<sup>4</sup>

1. *Pedaliium microcarpum* Decne.
2. *Pedaliium muricatum* Salisb.
3. *Rogeria microcarpa* Klotzsch

#### HABIT<sup>3</sup>

*Pedaliium 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<sup>5</sup>

*Pedaliium murex* Linn. It is distributed in India, Sri Lanka and Tropical Africa.

#### Phytochemical Constituents of *Pedaliium murex* Linn<sup>3</sup>.

**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

*Pedaliium murex* commonly known as **Bara Gokhru** , **Gokhru**, **Large Caltrops** and is traditionally used to treat several male reproductive disorders such as impotency and gonorrhoea. *Pedaliium murex* Linn. has also been used as aphrodisiac in traditional Indian medicine to treat impotency and male sexual dysfunction<sup>6</sup>. Several experimental studies have been carried out in order to explore different pharmacological activities of *Pedaliium murex* Linn:

#### Aphrodisiac Activity of *Pedaliium Murex*

In order to evaluate aphrodisiac activity of *Pedaliium 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. *Pedaliium 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<sup>7</sup>.

Sharma *et al* (2012) also provided evidence that ***Pedaliium 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<sup>8</sup>

### 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<sup>9</sup>.

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**<sup>10</sup>.

### 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)<sup>11</sup>.

### Other Activities

*Pedalium murex* fruit extracts has also been reported to possess nephroprotective (Shelke, *et al.* 2009)<sup>12</sup>, antiulcerogenic (Banji *et al* 2010)<sup>13</sup>, and. Fruits of *Pedalium murex* also exhibited **diuretic activity in animal models** (Sharma *et al*, 2012)<sup>9</sup>. The leaves has been found to possess antimicrobial activity (Soosairaj *et al*, 2008)<sup>14</sup>.

Sundaram, *et al* (1999) reported about **Prostane**, herbal formulation containing *Pedalium murex*, to possess **dose-dependently inhibition of 5 $\alpha$ -reductase activity** and **exhibited alpha-adrenergic antagonistic activity**<sup>15</sup>.

### 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**<sup>6</sup>. *Pedalium murex* extract produced **no toxic symptoms or mortality up to a dose level of 2000 mg/kg body weight orally in rats**<sup>11</sup>.

**Parts used**<sup>16</sup>: Panchanga (whole plant) and Phala (fruit)

**Dosage**<sup>2</sup>: *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 motility 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 *Vajikarana* (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.

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