GOKSHURA (TRIBULUS TERRESTRIS LINN.) A REVIEW

Prakash Sanjay
Lecturer, Department of Dravyaguna, Govt. Ayurvedic College & Hospital, Varanasi-221002, U.P. (India)

ABSTRACT:
Gokshura (Tribulus terrestris Linn.) Family: Zygophyllaceae is a procumbent herb commonly known as Small Caltrops, occurs naturally throughout India, specially warm regions. As this is having Guru, Snigdha Guna, Madhura Rasa, Madhura Vipaka, Shita Virya. By the virtue of above property this is Vatapitashamaka. Gokshura contains a number of bioactive chemicals, including saponins, flavonoids, glycosides, alkaloids, and tannins. The fruits of Laghu Goksura (Tribulus terrestris Linn.) are useful as alterative, aphrodisiac, anthelmintic, anti-arthritic, cooling, tonic, demulcent, expectorant and conceiveptive (root of white flower-variety). It is useful as calculus affections, kidney diseases, painful micturition and urinary discharges. The present review is therefore, an effort to give a detailed focus on its botanical details, phytochemistry, pharmacodynamics, therapeutic importance and its pharmacological studies.

Keywords: Gokshura, Tribulus terrestris, diuretic, ashmari, phytochemistry, pharmacology.

INTRODUCTION: Gokshura (Tribulus terrestris Linn.) Family: Zygophyllaceae is a procumbent herb commonly known as Small Caltrops, occurs naturally throughout India, specially warm regions. The fruits of Laghu Gokshura are useful as alterative, aphrodisiac, anthelmintic, anti-arthritic, cooling, tonic, demulcent, expectorant and conceiveptive (root of white flower-variety). It is useful as calculus affections, kidney diseases, painful micturition and urinary discharges.

Figure 1 T. terrestris. (A) Whole plant with flowering twig. (B) Fruit.

History: On comprehensive review of Ayurvedic classics it was found that Gokshura is described in Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Sharangadhar Samhita, Harita Samhita, Nighantus and Chikitsagranaathas. In Charaka Samhita, it is described as Shvadanshtra ghrita used in ashmari (C.Ci.26.74). In Sushruta Samhita, it is described in mutrakrichchhra (S.U.59.19). In Ashtanga Hridaya, it is described as Rasayana (A.H.U.39.56). In Harita Samhita, it is described as ashmarihara (H.S.3.31-13). In Kaideva Nighantu, it is described as Hridaroga, krichchhashmari, shvasakasarujahara. In Bhavaprakasha Nighantu, its properties are described as vrishya, ashmarihara,
Pramehashvasakasarsha, hridroga. In Raj Nighantu, gokshuradvaya is described in krichchhhrashmari. It is also mentioned in Chikitsa Granthas like Chakradatta, it is described as sunthigokshura kwatha in amavata (CD.25.9.). Bhavamishra, in his section Bhavaprakash, madhyamakhanda mentions indication of trikantakabeejachurna in ashmari. Same used in Vrindamadhva (VM.34.28). Shvadanshraphalachurna is used in shosharoga(Rajamartanda.12.3).

Botanical classification

Tribulus terrestris Linn. belongs to the family Zygophyllaceae.

Kingdom: Planate
Unranked: Angiosperms
Unranked: Eudicots
Order: Zygophyllales
Family: Zygophyllaceae
Genus: Tribulus
Species: terrestris

Part used: Fruits, roots, whole plant.

Doses of fruit powder 3-6gm., Decoction 50-100 ml. Specific formulations are Goksuradi curna, Goksuradyavaleha, Goksuradi guggulu, Goksuradi Kvatha, Dasamularista, Trikantakadya (Sadhita) Ksira, Trikantakadi Kvatha, Svadanstra taila, Goksuradi modakam, Svadanstra ghtam, Abhayarista, Svadanstradi pamakam, Svadanstradi Kasayam, Trikantakabija curnam, Brhat Varunadi Kvatha.

Vernacular Names

Sanskrit names : Gokshura, Kshuraka, Kantaphala, Gokantaka, Trikantaka, Bhakshakanta, Bhukshura, Shvadanshtra, Svdakantaka, Palankasha- Fruits are armed with spines which injure the feet of grazing cattle.

Ikshugandhika- With aroma of sugarcane.

Sthalashringataka, Vanashrigataka- Fruits resembling water-chestnut.

Shadanga- It possesses the sixth part, spines, apart from usual five parts.

Chanadruma- The plant has leaves like those of Bengal gram plant.

Hindi, Bengali, Marathi, Punjabi : Gokhru, Huthchikar
Mar. : Sarate
Guj. : Beta gokhru, Mhama Gokhru
Tamil : Nerunje
Telugu : Palleru
Pers. : Kharakhasak
Arab. : Hasak
Eng. : Small Caltrops, Gokhru

Description

A. Tribulus terrestris Linn.: Gokshura-ksudra goksura

A procumbent herb; stems and branches pilose; young parts silky-villous. Leaves opposite, abruptly pinnate, one of each pair usually smaller than the other; sometimes wanting; stipules lanceolate, hairy; leaflets 3-6 pairs, 6-12 mm. long, oblong, mucronate, sericeos-villous with appressed hairs beneath and more or less so on the upper surfaces, base rounded oblique; petioles very short pilose.

Flowers axillary or leaf-opposed, solitary; pedicels 1.2-2 cm. long, slender, hairy. Sepals 6 mm., lanceolate, acute, hairy. Petals 1 cm., long, oblong-oovbate; claw short, hairy. Ovary bristly; style short;stout; stigmatic lobes longer than the diameter of the style.

Fruit globose, consisting of (usually) 5 hairy or nearly glabrous, often muruculate, woody cocci, each with 2 pairs of hard sharp spines, one pairs longer than the other. Seeds several in each coccus, with transverse partitions between them.

Flowering and Fruiting Time is rainy to autumn seasons and onwards.

It is found throughout India, especially warm regions.

B. Pedalium murex Linn.: Brhad goksura.
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Family: Pedaliaccae

Description: A much-branched herb, 15-38 cm. high; stems and branches often slightly rough with scaly glands.

Leaves opposite, pale glaucous-green, somewhat fleshy, 2.5-5 by 2-3.8 cm. broadly ovate-oblong, truncate or obtuse, coarsely crenate-serrate or sublobate, glabrous above, the lower side usually covered with minute scales, base acute; petioles 6-20 mm. long.

Flowers axillary, solitary; pedicels 4 mm. long. Calyx small, scarcely 3 mm. long; minutely scaly outside, divided rather more than half way down; lobes 5, linear-triangular, acute. Corolla 2.5 cm. long, about 2 cm. across the mouth, bright yellow; tube 2 cm; long, slender; lobes broad, rounded. Filaments glandular-hairy at the base.

Fruit 1.3-2 cm., long, narrowed at the base, pyramidal-ovoid above the spines, bluntly 4-angled, with stout sharp conical horizontal spines from the angles.

Flowering and Fruiting Time: rains to autumn seasons and onwards.

It is found in tropical regions in India; Konkan, Gujarat, Madhya pradesh, Uttar Pradesh, Deccan Peninsula and other areas in country.

Pharmacodynamics

Rasa: Madhura
Guna: Guru, Snigdha
Virya: Shita
Vipaka: Madhura
Doshakarma: Vatapittashamaka

Chemical composition

The preliminary phytochemical study of TT revealed the presence of saponins, flavonoids, glycosides, alkaloids, and tannins.[6] Tian Shung et al. isolated and characterized three new compounds, terrestribisamide, 25R-spirost-4-en-3, 12-dione, and tribulusterine, together with 10 known compounds, N-p-coumaroyltyramine, terrestriamide, hecogenin, aurantiamide acetate, xanthosine, fatty acid ester, ferulic acid, vanillin, p-hydroxybenzoic acid, and β-sitosterol, from the dried fruits of TT.[16] The alkaloids present are harmane and norharmane. The β-carboline alkaloid, tribulusterine, is present in minor quantities in fruits.[17]

Gas chromatography-mass spectrometry analysis of methanolic extract of the whole plant of TT revealed the presence of α-Amyrin as the major constituent and seven minor constituents, which are 3,7,11,15-tetramethyl-2-hexadecen-1-ol, n-hexadecadienoic acid, hexadecadienoic acid ethyl ester, phytol, 9,12-octadecadienoic acid, 9,12,15-octadecatrienoic acid, and 1,2-benzenedicarboxylic acid disoctyl ester. Sterols such as β-sitosterols and stigmasterols were also found to be present.[18]

Therapeutic uses

The medicinal properties of Brhad Goksura (Pedalium murex Linn.) are almost the same as those of Laghu Goksura (Tribulus terrestris Linn.)

The fresh leaves and stems, briskly agitated in cold water, speedily convert it into a thick mucilage, nearly of the consistence of the white of a raw egg, inodorous and tasteless.

An infusion of fresh leaves and stems is used as an esteemed remedy for treating gonorrhoea and dysuria.

The juice of the fruits is useful as an emmenagogue. It is employed in puerperal diseases, and to promote the local discharge. The leaves are used as a curry in spleenic enlargements. The decoction of the roots is used as an antibilious remedy.
It is very useful drug in kidney and urinary troubles specially calculus and dysuria and their allied complications. The fruits are antispasmodic, aphrodisiac and emmenagogue; their decoction is used for the diseases for which the mucilaginous infusion of the leaves is suggested. The juice of the fruits is given in puerperal diseases, and for promoting lochial discharge. A pint of an infusion of the seeds is given daily in spermatorrhoea, impotence and incontinence of urine.

**Pharmacological Properties**

**Diuretic activity:** Saurabh et al. evaluated the different extracts of TT fruits, viz. aqueous, methanolic, *Kwatha*-high strength, *Kwatha* -low strength, and *Ghana* powder, for diuretic activity in rats. [21] The diuretic action of TT makes it useful as an anti-hypertensive agent.

**Aphrodisiac activity**

Adaikan et al. reported that the TT extract exhibited a pro-erectile effect on rabbit corpus cavernosum smooth muscle *ex vivo* after oral treatment at doses of 2.5, 5, and 10 mg/kg body weight for 8 weeks. [22]

**Antiurolithic activity**

An ethanolic extract of TT fruits was tested in urolithiasis induced by glass bead implantation in albino rats by Anand et al. [27]

**Immunomodulatory activity**

An alcoholic extract of the whole plant of TT exhibited a significant dose-dependent increase in humoral antibody titre and delayed type hypersensitivity response, indicating increased specific immune response. [31]

**Antidiabetic activity**

Saponin from TT possesses hypoglycemic properties. [32]

**Hypolipidemic activity**

The aqueous extract of the fruits of TT was evaluated for their hypolipidemic activity in Wistar albino rats. [37]

**Activity in cardiac disorders**

TT showed significant effect in the treatment of various cardiac diseases including coronary disease, myocardial infarction, cerebral arteriosclerosis, and the sequelae of cerebral thrombosis. [40]

**Central nervous system (CNS) activity**

Swiss Albino mice demonstrated antidepressant and anxiolytic activity. [43]

**Hepatoprotective activity**

The TT extract (250 mg/kg) showed a remarkable hepatoprotective activity against acetaminophen-induced hepatotoxicity in *Orechromis mossambicus* fish. [44]

**Antiinflammatory activity**

The methanolic extract of TT showed a dose-dependent inhibition of rat paw volume in carrageenan-induced inflammation in rats. [46]

**Analgesic activities**

Analgesic activities of TT were studied in male mice using formalin and tail flick test. [47]

**Antispasmodic activity**

The lyophilized saponin mixture of the plant exhibited a significant decrease in peristaltic movements of rabbit jejunum preparation in a dose-dependent manner. [48]

**CONCLUSION:** On comprehensive review of Ayurvedic classics it was found that *Gokshura* is described in *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, *Sharangadhara Samhita*, *Harita Samhita*, *Nighantu* and *Chikitsagrantas*. Some synonyms of *gokshura* like...
Gokshura, Kshuraka, Kantaphala, Gokantaka, Trikantaka, Bhakshakanta, Bhukshara, Shvadanshtra, Svaduakantaka, Palankasha described in various Nighantu. Gokshura (Tribulus terrestris Linn) Family: Zygophyllaceae is a procumbent herb commonly known as Small Caltrops, occurs naturally throughout India, especially warm regions. As this is having Guru, Snigdha Guna, Madhura Rasa, Madhura Vipaka, Shita Virya. By the virtue of above property this is Vatapittashamaka. The fruits are considered demulcent and diuretic, antispasmodic and aphrodisiac. The juice is used in aphthae as a local application. The decoction is useful in irritation of the urinary organs; it is given as a remedy for sperma-torhoea, incontinence of urine and impotency.

REFERENCES:


**Corresponding Author:**
Dr. Sanjay Prakash. Lecturer, Department of Dravyaguna, Govt. Ayurvedic College & Hospital, Varanasi-221002. U.P. (India).
Email: dr.sanjayprakash007@gmail.com

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