ejpmr, 2021,8(4), 756-760

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

PHYTOPHARMACOLOGY ACTIVITY AND MEDICINAL PROPERTIES OF GOKHARU: A REVIEW

Kanchan B. Ghatge*, Sheetal K. Kamble, Supriya P. Bujare and Sachin S. Mali

Y. D. Mane Institute of Pharmacy, Kagal 416 216, Maharashtra, India.

***Corresponding Author: Kanchan B. Ghatge**

Y. D. Mane Institute of Pharmacy, Kagal 416 216, Maharashtra, India.

Article Received on 21/02/2021 **Article Revised on 11/03/2021** **Article Accepted on 01/04/2021**

ABSTRACT

Tribulus terrestris a Far East herb known as gokshura in Ayurveda & called as Puncture of Vine. The most traditional medicinal plant in India. It has been used for sexual & kidney dysfunction. Each part of plant has some medicinal properties & thus it is widely used in Ayurvedic system of medicine. Gokharu also used as colic pain, hypertension & disease of the genito-urinary disorders. Tribulus terrestris (family Zygophyllaceae), regularly known as Gokshur or Gokharu or cut plant. Long time in both the Indian and Chinese frameworks of medication for treatment of different sorts of sicknesses. Its different parts contain an assortment of substance constituents, which are restoratively significant, for example, flavonoids, flavonol glycosides, steroidal saponins, and alkaloids. It has diuretic, love potion, antiurolithic, antidiabetic, ingestion upgrading, hypolipidemic, cardiotonic, focal sensory system, hepatoprotective, anti-inflammatory, pain relieving, antispasmodic, anticancer, antibacterial, anthelmintic, larvicidal, and anticariogenic exercises. Throughout the previous few decades or thereabouts, broad research work has been done to demonstrate its natural exercises and the pharmacology of its concentrates. The point of this survey is to make an information base for additional examinations of the found phytochemical and pharmacological properties of this plant to advance exploration. This will help in affirmation of its customary use alongside its value-added utility, in the end prompting higher incomes from the plant.

KEYWORD: Saponin, Tribulus terrestris, Cardiotonic,Analgesic etc.

INTRODUCTION

Natural Plants are extracted for medicinal properties & use as the biological activities from human Diseases. A huge number of large species around 3500 are under surveillance for tracking medicinal values against human disease.

Tribulus Terrestis called as Gokharu and called as Puncture of Vine. These plants are annual flowering yellow colouring plant belonging to the family *Zygophyllaceae.* These plants found in hot places & grow in various countries that are India, Pakistan, France, and China & Africa. *Tribulus Terrestis* common weed plant with spines & found in sandy oil & wasteland. In ayurvedic medicine, *Tribulus Terrestis* explored as Gokhshura in Sanskrit language In India.

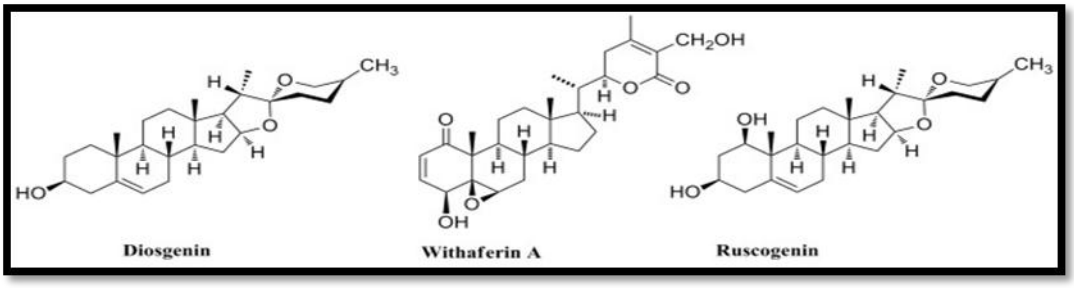
Indian (language)	Other name *Tribulus Terrestis*
English	Caltrops Root
Gujrati	Nana Gokharu
Hindi	Gokahru
Kannada	Sannaneggilu, Neggilamullu
Panjabi	Bhakra
Tamil	Nerinjil
Marathi	Sarate, Gokharu

It is used as folk medicine such as tonic, Aphrodisiac, Painkiller, Astringent to kill parasitic worms from stomach, Antihypertensive, Diuretic, Nephroprotective, Nephrolithiatic. In South Europe plant parts such as roots, stem & leaves are used for the formulation of tonic. In China used *Tribulus Terrestis* used for the treatment of cutaneous pruritus & Oedema. It is used as formulation of creams with antibacterial & anti-Inflammatory activity.

The extract of *Tribulus Terrestis* have characteristics a diuretic, analgesic, antidiabetic, Anthelmintic, antitumor, Astringents, antidiabetic, Cardio tonic & antibacterial.

Kingdom	Plantea
Division	Planerogams
Subdivision	Angiospermae
Class	Dicotyledonae
Subclass	Polypetalae
Series	Disciflorae
Order	Giraniales
Family	Zygophyllaceae
Genus	Tribulus
Species	Terrestis Linn

Chemical Structure



MORPHOLOGY

Synonym	**Caltrops Fruit**
Biological Source	●In Ayurveda two types of Gokhru are used, that is, Bada and Chota Gokhru. The smaller or Chhota Gokhru is the dried ripe seeds of *Tribulus terrestris* Linn.
Family	Zygophyllaceae
Geographical Source	●The Plant is an annual, Prostate herb growing throughout India up to 3,500 m in Kashmir. Tribulus terrestris is a silky herb reproduced by seed and occurs in dry places. It can grow erected and draws support for light and minerals
Characteristics	●The fruits & Flowers are yellowish in colour & Spherical shape & 1.2 cm Diameter containing five woodies, Densely hairy & spiny coccus. ● The roots are brown in Branched slender, fibrous cylinder tap Roots system making them resistance to drought condition. ●Seed are encapsulated & Oily in hard stony cells. Seed are produced two types of verities bitter & sweet.

Microscopy	●Fruit's show small epidermal cell of coccus. Unicellular trichrome found on surface & having layers of parenchymatous cells forms mesocarp. & Then mesocarp three to four compact layers of small cells are present which conatins rosset of calcium oxalate crystals.
Chemical Constituents	●The major constituents of *Tribulus terrestris* steroidal Saponin. It includes terestrosins A B C D & E desgalactotigonin. F Gitonin, desglucolanatigonin,Gitonin. ●The hydrolysed extract consists of sapogenins such as diosgenin,chorogenin,hecogenin,neotigogenin.certains other steriodal such as terestroside F, tribulosin, trillin, gracillin, dioscin have also been isolated from the aerial parts of the herb.It also common phytosterols , such as, β-sitosterol, stigmasterol and cinnamic amide derivative, terestiamide.

Traditional Uses

TT is utilized in people medicines as a tonic, Spanish fly, palliative, astringent, stomachic, antihypertensive, diuretic, lithotriptic, and urinary disinfectant. The dried product of the spice is exceptionally successful in a large portion of the genitourinary parcel problems. It is a fundamental constituent of Gokshuradi Guggul, a powerful Ayurvedic medicine used to help appropriate working of the genitourinary plot and to eliminate the urinary stones. TT has been utilized for quite a long time in Ayurveda to treat ineptitude, venereal illnesses, and sexual weakness. In Bulgaria, the plant is utilized as a society medicine for treating feebleness. Not with standing every one of these applications, the Ayurvedic Pharmacopeia of India attributes cardiotonic properties to the root and organic product. In customary Chinese medicine, the organic products were utilized for treatment of eye inconvenience, edema, stomach distension, discharge, sullen leukorrhea, and sexual brokenness. TT is depicted as a profoundly important medication in the Shern-Nong Pharmacopeia (the most established known pharmacological work in China) in reestablishing the discouraged liver, for treatment of totality in the chest, mastitis, fart, intense conjunctivitis, cerebral pain, and vitiligo. In Unani medicine, TT is utilized as diuretic, gentle purgative, and general tonic.

Sr. No.	Parts of Plant	Uses of Plant Parts
1	**Leaves**	*Tribulus terrestris* leaves are used in pharmaceutical industry for preparation of herbal tonic.Its play important role in digestive problems.
2	**Fruits**	Fruits are used for cough, sperma torrhoea, scabies, anaemia opthalmia and haemostatic. The fruit infusion is exclusively used for kidney disease.
3	**Stem**	The stem are used as astringent and in treatment of gonorrhoea.
4	**Ash**	Ash of whole plants used as rheumatoid arthritis.
5	**Roots**	Roots are reported to be aperients, demulcent, and used in the preparation of tonic (Mohd etal)
Tribulus terrestris is very useful for broad range in asthma, cough, Heart disease, striating urinary stones,Anthelmentic, Anti-inflammatory & also used as diuretic & Enema.		

Phytoconstituents

Sr. No	Phytochemical class	Parts of plant	Chemical constituent's
1	Alkaloid	Seed herb	Harmine, Harman
2	Saponin	Fruits, root, flower, Plant, whole plant	Terrestrosin A-E, Diosgenin, Ruscogenin, Protodioscin
3	Flavonoid	Fruits & Leaves	kaempferol
4	Acids	Leaves	Vanillic acid

Preparation of the extracts

1. Fluid concentrates: The air dried fine powdered plant organic products, leaves and roots (100 g) were imbued in refined water until complete depletion. The concentrate was then separated utilizing What Man No. 1 channel paper and the filtrate was vanished in vacuum and dried utilizing either a turning evaporator at 60 °C or a freeze drier (Kandil et al., 1994). The last dried examples were put away in marked sterile containers and kept at −20 °C.

2. Ethanol separates: Ethanol removes were refined by set up conventions (le Grand et al., 1988). Each dried plant test was ground and removed in a percolator with 95% ethanol. Around 10 ml of ethanol for every gram of plant test was utilized. The ethanol separate was dried under a diminished weight at 40 °C. The dried concentrate was put away in sterile containers until additional utilization.

3. Chloroform separates: Powdered examples (100 g) from each plant part were removed with chloroform utilizing a soxhlet extractor for consistently 10 h or until the pre-owned dissolvable turned unadulterated and dry.

Pharmacological Activity

A) Anticancer activity

Anticancer movement: The watery concentrate of T. terrestris has inalienable chemo preventive potential. A Swiss pale skinned person male mouse was initiated to papilloma beginning by utilizing engineered cancer-causing and a portion of 800 mg/kg watery concentrate was discovered adequate to lessen tumour development. The concentrate from a root show higher chemo preventive potential as contrasted and organic product extricates when utilized in a similar focus in papilloma beginning in mice (Kumar et al. 2006). It is accounted for that fluid concentrate block multiplication of HepG2 cells and actuates apoptosis in this way helping against liver malignant growth cells. It was demonstrated that watery concentrate has radio protectant capacity and serves to secure against radiation harm. Significant constituents Saponin have cytotoxic action on human fibroblasts. As Saponin fixation builds the consolidation of [3H] thymidine in DNA diminishes, which shows a decrease in multiplication rate.

B) Diuretic Activity

The diuretic properties of TT are because of huge amounts of nitrates and basic oil present in its leafy foods. The diuretic movement can likewise be ascribed to the presence of potassium salts in high focus. Ali et al. tried the fluid concentrate of TT arranged from its leafy foods in rodent diuretic model and pieces of segregated Guinea pig ileum were utilized for the contractility test. The watery concentrate of TT, in oral portion of 5 g/kg, inspired a positive diuresis, which was somewhat more than that of furosemide. Sodium and chloride focuses in the pee were expanded. The expanded constitution of the smooth muscles, which was created by TT remove, along with its diuretic action helped in the drive of stones along the urinary tract. Saurabh et al. assessed the various concentrates of TT organic products, viz. fluid, methanolic, Kwatha high strength, Kwatha low strength, and Ghana powder, for diuretic movement in rodents. Kwatha high strength demonstrated diuretic impact equivalent to that of the reference standard furosemide and furthermore showed extra favourable position of potassium saving effect. The diuretic activity of TT makes it valuable as an enemy of hypertensive specialist.

C) Anti-inflammatory activity

Calming action The ethanolic concentrate of TT restrained the outflow of cyclooxygenase 2 (COX 2) and inducible nitric oxide synthase (iNOS) in lipopolysaccharide invigorated RAW264.7 cells. It additionally stifled the statement of proinflammatory cytokines, for example, tumour putrefaction factor alpha (TNF α) and interleukin (IL) 4 in macrophage cell line. Consequently, the ethanolic concentrate of TT hinders the declaration of go between identified with irritation and articulation of incendiary cytokines, which beneficially affects various inflammatory conditions. The methanolic concentrate of TT indicated a portion subordinate hindrance of rodent paw volume in carrageenan incited aggravation in rats.

D) Analgesic activity

Pain relieving action Pain relieving exercises of TT were concentrated in male mice utilizing formalin and tail flick test. The examination showed that the methanolic concentrate of TT at a portion of 100 mg/kg delivered pain relieving impact. This pain relieving impact of the TT concentrate might be intervened halfway or potentially incidentally. Impact of the concentrate was lower than morphine and higher than acetylsalicylic corrosive (anti-inflammatory medicine) in the two tests. Pre-treatment of creatures with narcotic receptor rival, naloxone, didn't change the pain relieving impact of the concentrate in the two tests; consequently, the inclusion of narcotic receptors in the pain relieving impact of TT is prohibited. Nonetheless, different components answerable for the pain relieving impact of TT stay to be explored. The aftereffects of ulcerogenic considers demonstrate that the gastric ulcerogenecity of TT is lower than indomethacin in the rodent's stomach.

E) Central nervous system

Swiss Pale skinned person mice exhibited energizer and anxiolytic action on organization of 260 mg/kg portion of Rasayana Ghana tablet involving three strong grounded rejuvenator spices, viz. Tinospora cordifolia (stem), Emblica officialise (organic product), and TT (foods grown from the ground), present in equivalent amounts in the tablet. It was proposed that harmine, a β carboline alkaloid present in TT, is one of the primary dynamic constituents that adds to the previously mentioned exercises. Harmine is an inhibitor of monoamine oxidase which assists with expanding level of dopamine in the mind.

F) Hepatoprotective activity

The TT extract(250mg/kg) indicated a noteworthy hepatoprotective action against acetaminophen incited hepatotoxicity in Oreochromis mossambicus fish. The raised biochemical boundaries and diminished degree of decreased glutathione catalysts were standardized by treatment with TT extricate (250 mg/kg) for acetaminophen prompted poisonousness in freshwater fish.

G) Antidiabetic activity

Saponin from TT has hypoglycaemic properties.TT essentially decreased the degree of serum glucose, serum fatty oil, and serum cholesterol, while serum superoxide dismutase (Grass) action was discovered to be expanded in alloxan prompted diabetic mice. The decoction of TT demonstrated Chhatre, et al.: Survey on tribulus terrestris 48 Pharmacognosy Audits | January-June 2014 | Vol 8 | Issue 15 restraint of gluconeogenesis in mice.[33,34] TT ethanolic separate at 2 g/kg body weight created defensive impact in streptozotocin instigated diabetic rodents by hindering oxidative pressure. Ethanolic concentrate of TT displayed 70% hindrance of α

glucosidase at 500 µg/ml utilizing maltose as the substrate and 100% restraint of aldose reductase at a portion of 30 µg/ml utilizing dl glyceraldehyde as the substrate.[35] A critical abatement in the postprandial blood glucose level of rodents was found after organization of saponin from TT. TT delivered widening of coronary vein and improved the coronary course. It is hence suggested in Ayurveda for the treatment of angina pectoris and other cardiovascular complexities of diabetes. Subsequently, TT could be advantageous in the treatment of diabetes by bringing down blood glucose, lipid levels, and by its cancer prevention agent system.

REFERENCES

1. Trease GE, Evans WC. A taxonomic approach to the study of medicinal plants and animal derived drugs. Trease and Evans Pharmacognosy. 15th ed. Singapore: Harcourt Brace and Company Asia Pvt. Ltd., 2002: 27.
2. Duke J, Duke PK, Cellier JL. 2nd edn. Duke Handbook of medicinal herbs. United States: CRC Press, 2002; 595.
3. Nadkarni KM. Indian Materia Medica. Mumbai: Popular Prakashan, 1927; 1230‑1.
4. The wealth of India. Raw materials. Vol. 9. Publications and Information Directorate. New Delhi: CSIR, 1972; 472. Trease GE, Evans WC. A taxonomic approach to the study of medicinal plants and animal derived drugs. Trease and Evans Pharmacognosy. 15th ed. Singapore: Harcourt Brace and Company Asia Pvt. Ltd., 2002; 27.
5. Duke J, Duke PK, Cellier JL. 2nd edn. Duke Handbook of medicinal herbs. United States: CRC Press, 2002; 595.
6. Nadkarni KM. Indian Materia Medica. Mumbai: Popular Prakashan, 1927; 1230-1.
7. The wealth of India. Raw materials. Vol. 9. Publications and Information Directorate. New Delhi: CSIR, 1972; 472.
8. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 13th edn. Pune: Nirali Prakashan Publisher, 2007; 370-6.
9. Usman H, Abdulrahman F, Ladan A. Phytochemical and antimicrobial evaluation of Tribulus terrestris L. growing in Nigeria. Res J Biol Sci., 2007; 2: 244-7.
10. Kostova I, Dinchev D. Saponins in Tribulus terrestris - chemistry and bioactivity. Phytochem Rev., 2005; 4: 111-37.
11. Xu YJ, Xu TH, Zhou HO, Li B, Xie SX, Si YS, et al. Two new furostanol saponins from Tribulus terrestris. J Asian Nat Prod Res., 2010; 12: 349-54.
12. Wu TS, Shi LS, Kuo SC, Alkaloids and other constituents from Tribulus terrestris. Phytochemistry, 1999; 50: 1411-5.
13. Bhutani SP, Chibber S, Seshadri TR. Flavonoids of the fruits and leaves of T. terrestris. Phytochemistry, 1969; 8: 299.
14. Raja M, Venkataram AR. Pharmacognostical studies on *Tribulus terrestris* and *Tribulus alatus*. Der Pharmacia Sinica, 2011; 2: 136–9.
15. Mitra N, Mehdi DM, Reza ZM. *Tribulus terrestris* L. Flavonoid Compounds. Int J Mod Bot., 2012; 2: 35–9.
16. Wu TS, Shi LS, Kuo SC. Alkaloids and other constituents from *Tribulus terrestris*. Phytochemistry, 1999; 50: 1411–5.
17. Bremner J, Sengpracha W, Southwell I, Bourke C, Skelton B, White A. The Alkaloids of *Tribulus terrestris*: A revised structure for the Alkaloid Tribulusterine. Perspect Nat Prod Chem, 2005; 3: 11–7.