Review on Pharmacognostical Presentation of Tribulus terrestris

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Abstract: Across temperate, tropical, and desert climates worldwide, Tribulus terrestris L., an annual dicot species in the Zygophyllaceae family, is a common herb found in disturbed habitats and agricultural areas. An invasive species called T. terrestris has the potential to kill plant biodiversity, harm livestock, reduce the value of hay and wool, and discourage recreational users. The species has a tendency to spread like weeds, which could become an issue. At least 37 countries and 21 crops such as cotton, maize, vineyards, orchards, etc. have been affected by this weed. It is able to grow in various types of soil and adjust to a broad spectrum of environmental circumstances. T. terrestris can be managed by the application of herbicides, mechanical control (hand pulling, hoeing, mulching), and other techniques.

Keywords: Agriculture, Medical importance, IGF-I, Control, Herbicides, Tribulus terrestris


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Introduction

Tribulus terrestris L. is a herbaceous, monocarpic, annual broadleaf weed belonging to family Zygophyllaceae (Donalson and Rafferty, 2003). It can be found all across the world, from latitudes 35°S to 47°N (Holm et al., 1991). Tribulus terrestris L. is found to be growing in subtropical areas around the world. It is commonly known as Gokhru, widely distributed throughout India. The fruits of T. terrestris L. have been used in traditional Chinese medicine for the treatment of eye trouble, edema, abdominal distention, emission, morbid leucorrhrea, sexual dysfunction and veiling. Roots and fruits are useful in rheumatism, piles, renal and vesical calculi, menorrhagia, impotency, premature ejaculation, general weakness etc. It is a very potent diuretic and tonic drug (Selvam, 2008). Puncture vine (Tribulus terrestris L.) is medicinal plant which is used to stimulate masculine sexual desire (Ukani et al., 1997). This review highlights the existing information on the origins, ingredients, qualities, and effect of Tribulus terrestris on female...
Mechanisms of Action:

Extract of Tribulus terrestris (TT) enhance the physical performance and muscle gain which arise due to the increase in plasma level of IGF-I and its receptor (Wu et al., 2017). Tribulus terrestris has ability to alleviate muscle damage and to enhance anaerobic performance. It was associated with a decrease in plasma insulin-like growth factor binding protein-3 (IGFBP-3), but not in its target – IGF-I (Ma et al., 2017). These reports indicate, that the Puncture vine enhance the physical performance by two ways – by reducting IGFBP-3, which inactivates the IGF-I and by increasing regulation of IGF-I receptors. The anti-inflammatory action of puncture vine can be mediated by prostaglandin. For example, addition of Tribulus terrestris to mouse macrophages inhibited their cyclooxygenase 2 (COX-2), an enzyme promoting prostaglandin E2, which is in turn involved in promotion of inflammation. It suggests that prostaglandin E can be a mediator of anti-inflammatory action of Tribulus terrestris (Hong et al., 2002). Tribulus terrestris derivatives alkaloids can destroy cancer cells (Jurkat E6-1) via up-regulation of this transcription factor (Bassaiyye et al., 2017).

Chemical Constituents:

There are almost 1.5 times as many main flavonoids as there are main saponins. This suggested that further research, development, and application of the flavonoid components in TT are necessary (Wu et al., 1999). The chemistry and bioactivity of saponins in TT were investigated and discovered the presence of tigogenin, neotigogenin, gitogenin, hecogenin, neohecogenin, diosgenin, chlorogenin, ruscogenin, and sarsasapogenin kinds of furostanol and spirostanol saponins (Kostova and Dinchev, 2015). In addition, four tigogenin and diosgenin type sulfated saponins were identified. Protodioscin and protogracillin are among the furostanol glycosides that are prevalent, with protodioscin being the most dominant saponin and spirostanol glycosides being present in smaller amounts (Xu et al., 2010). The whole plant of TT was extracted in methanol, and the results of a gas chromatography-mass spectrometry analysis showed that the major constituent was -Amyrin, and there were seven other minor constituents present as well: 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-benzene. Additionally, sterols such stigmasterols and -sitosterols were discovered to be present (Abirami and Rajendran, 2011).

Nutritional Supplement:

T. terrestris did not consistently affect testosterone levels in controlled studies. It has not been proven to be safe, and may negatively interact with prescription medications. Despite the fact that its extract has been used as a dietary supplement since the 1980s in the belief that it increases testosterone levels to aid body building or sexual enhancement in men, no advanced studies on T. terrestris extract have been done, and there are no reports that it possesses anabolic steroid effects for usage as a supplement for growing muscle or increasing sex (Pokrywka et al., 2014).

Pharmacological activity:

Analgesic Effect:

Methanolic fruit extract has been reported to have analgesic properties. In comparison to Indomethacin, the extract was also found to have less stomach ulcerogenic activity (Heidari et al., 2007).

Urolithiatic Activity:

Ethanolic extract of the fruits of Tribulus terrestris displayed significant dose dependent protection against uroliths induced by glass bead implantation in albino rats (Anand et al., 1994).

Effect on Hypertension:

Decreased systolic blood pressure was reported with the treatment of lyophilized aqueous extract
of Tribulus fruits (Shainifi et al., 2003). Gokshura ghan (solid aqueous extract) is reported to be used in mild to temperate hypertension (Murthy et al., 2000). Methanolic extract of Tribulus terrestris showed anti-hyperlipidemic (hypolipidemic effect) (Tantawy and Hassanin, 2007). Saponins of Tribulus terrestris were found to significantly lower serum total cholesterol, low density lipoprotein cholesterol and liver total cholesterol, triglycerides in diet-induced hyperlipidemia in mice (Shudi et al., 2003).

**Traditional Uses:**

Tribulus terrestris is utilised as a diuretic, lithotriptic, tonic, aphrodisiac, palliative, astrigent, stomaclic, antihypertensive, and aphrodisiac. The majority of genitourinary tract diseases can be effectively treated with the herb’s dried fruit. It is an essential component of Gokshuradi Guggul, a potent Ayurvedic remedy used to eliminate urinary stones and maintain the genitourinary tract's healthy operation. Impotence, venereal illnesses, and sexual debility have all been treated with TT for millennia in Ayurveda. The herb is employed as a folk remedy for impotence in Bulgaria. The Ayurvedic Pharmacopoeia of India cites the root and fruit’s cardiotonic characteristics in addition to all these uses. The fruits were used in traditional Chinese medicine to treat eye problems, edoema, stomach distension, emission, sexual dysfunction and morbid leukorrhea. The Shern-Nong Pharmacopoeia, the first known pharmacological treatise in China, describes TT as a highly valuable medication for repairing the depressed liver and treating fullness in the chest, mastitis, flatulence, acute conjunctivitis, headaches, and vitiligo. TT is a diuretic, mild laxative, and general tonic in unani medicine (Khare, 2007).

**References**


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