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TRIBULUS TERRESTRIS: A PHARMACOLOGICAL REVIEW

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ABSTRACT

Most of the plants are used as medicine. These plants have different constituents to cure diseases. *Tribulus.terrestris* is belongs to the family zygophyllaceae. The part of plant which is used as medicine is leaves fruits and sometime whole plant. *T.terrestris* have flavonoids, alkaloids, saponins, and flavonol glycosides. Plant also contain flower which is used as medicine. *T.terrestris* is actually shady plant and grew across the road and also in different crops. In this review article the pharmacological activities of *T.terrestris* is highlighted like antibacterial, in vivo antiviral, antioxidant, antihyperglycaemic activity, hepatoprotective, antimicrobial activity, antifungul activity, vascular protective effect, analgesic activity, anti ischemic cardioprotection, antihypertensive activity, and antihyperlipidemic activity. *T.terrestris* gives effective results against these pharmacological activities.

Keywords: *T.terrestris*, pharmacological, Saponins and Flavonoids.

INTRODUCTION

In ancient times different plants were used as medicine all over the world. At thattime there was no knowledge about, what type of active chemical was present in which part of plants which act as a medicine to cure disease. Later on numerous work was done by different researchers to describe the active chemical of plants so that it was quite easy to use different part of plants as a medicine. *Tribulus terrestris* is a plant that is produced annually and 5000 year ago used as medicine. It is commonly called bindii, bhakhdi, caltrop according to the region in which they grow. It belongs to family caltrop (Zygophyllaceae) .The growing conditions for *Tribulus terrestris* warm temperature and dry climate. *T.terrestris* is grown in southern Africa ,Eurasia, Australia and North America. *T.terrestris* actually leafy plant and also known as puncture vine and it is road side or waste area plant that can not grow in shade. *T.terrestris* is use as Antihypertensive, Vasodilator, Antibacterial , Antidiabetic, Stimulatory effect on sperm quantity and quality in men, Hepatoprotective and Antioxidant (flavonoids and polyphenol). Part of plant which is used as medicine is fruit, leaf or root. Flower color is yellow and radially symmetrical contain five petals which are not fused. Fruit of *T.terrestris* is dry and 4_6 mm long that covered with spines.

PHARMACOLOGY

T.terrestris medicinally has great importance. Complete plant , fruit ,and roots are used as medicine. The chemical constituents that are present in *T.terrestris* are saponins, glycosides, flavonoids, alkaloids, and tannins. *T.terrestris* used as antidiabetic, absorption enhancing, diuretic, cardiotonic, central nervous system, hepatoprotective, anti-inflammatory, analgesic, anticancer, antibacterial, aphrodisiac, and anticariogenic activity.

Fig. 1 (a): T.terrestris plant

Fig. 1 (b): T.terrestris fruit

ANTIOXIDANT ACTIVITY

Tribulus terrestris posses antioxidant effect. Hala M .Hammoda and co workers reported that from the aerial part of plant two oligosaccharides (1,2) and stereoisomers of di-p-coumaroyl acid were isolated and the quinic derivatives of di-p-coumaroyl quinic acid posses antioxidant activity. Antioxidant activity also called DPPH radical scavenging activity[1].

ANTI-INFLAMMATORY

T.terrestris gives anti-inflammatory effect. Mingchun Liu and coworkers evaluated that from leaves of *T.terrestris* flavonoids are extracted in the yield of 0.27% which gives anti-inflammatory effect. The enzymes which are responsible for causing inflammation suppressed by the extracted compound from leaves of *T.terrestris*. Hyun Hwa lee reported that the Tribulusmide D is a compound isolated from *T.terrestris* which gives anti-inflammatory activity[2].

ANTIBACTERIAL ACTIVITY

Antibacterial activity of *T.terrestris* was acessed by Ahmed A.Hussain, Abbas A.Mohammad .They claimed that the extract from plant give considerable antibacterial activity against gram (+) and gram (-) bacteria[3].

IN-VIVO ANTIVIRAL POTENTIAL

Mohammad Danish Mehmood and coworkers reported that the extract obtained from *T.terrestris* shows effective results against anti Newcastle disease. Extract which obtained from plant were tannins, alkaloids, carotenoid, saponin. The dose rate reported is 80ul/ml before the declaration of disease[4].

MOTILITY AND VIABILITY OF SPERM

Mitra Bakhtiari and coworkers reported that the extract of *T.terrestris* has effect on the motility of human soerm due to its antioxidant and free radical scavenging properties. So the study reveals that *T.terrestris* used as therapeutic alternative of modalities for motility dysfunction in males[5].

ANTIOXIDANT DEFENSE IN REPRODUCTIVE TRACT OF FEMALE

Mahaboob Basha P and coworkers reported that the fruit extract of *T.terrestris* which issaponins, flavonoids and antioxidant have therapeutic use for the management of diabetes. TTF at a dose of 200mg/kgbw strongly enhance the endogenous antioxidant defense system. So TTF effected for diabetic female reproductive tract[6].

HYPERGLYCAEMIC ACTIVITY

Amina El-Shaibany and coworkers reported that the methanolic extract from aerial parts of plant have Antihyperglycaemic effect in glucose loaded normal rabits[7].

HEPATOPROTECTIVE ACTIVITY

Nafeaa.A.A and coworkers reported that the ethanolic extract and different fraction of aerial parts of plant show anti hepatoprotective effect[8].

ANTI MICROBIAL ACTIVITY

P.velusamy and coworkers reported that the dried extract from fruit of *T.terrestris* was mixed with silver nitrate and synthesized silver nanoparticles these silver nanoparticles have antimicrobial effect with some drug resistant bacteria[9].

ANTIFUNGUL ACTIVITY

Hai-sheng CHEN, Yuan-ying JIANG and coworkers reported that the eight steroid saponins obtained from *T.terrestris* and TTS-12 , TTS-15 show strong antifungul activity against fluconazole-resistant fungi[10].

VASCULAR PROTECTIVE EFFECT

YANG- chuan-Hua and coworkers evaluated that aqueous *T.terrestris* extract have antihypertensive and endothelial protective

activity by regulating ErK2, FAK, and NF-kBp 65[11].

ALLEVIATION OF MUSCLE DAMAGE AND PROMOTE ANAEROBIC PERFORMANCE

Xiaohui Wang and coworkers evaluated that the extract from *T.terrestris* reduce the muscle damage and enhance mechanisms of anaerobic performance in trained male boxers. Results shows that *T.terrestris* extract in the form of capsules at the dose rate of 1250mg reduce muscle damage by the decrease of plasma IGFBP-3[12].

ANALGESIC ACTIVITY

Mingchun Liu and coworkers reported that the flavonoids extraction from *T.terrestris* leaves have strong analgesic activity. The %age of flavonoids extract was 0.27% with 25.87% ethanolic solution[13].

ANTI-ISCHEMIC CARDIOPROTECTION

Raghu K.G and coworkers evaluated the *T.terrestris* fruits methanolic extract for the protection of cardiac ischemia both in vivo and in vitro model. Result shows that the *T.terrestris* have strong effect against cardiac ischemia through anti apoptotic potential[14].

ANTIHYPERLIPIDEMIC ACTIVITY

Shazia khan and coworkers evaluated the fruits extract of *T.terrestris* in the form of liquid. Results shows that the dose rate of 580mg/kg body weight shows considerable reduction in LDL, VLDL, TC and TG. The experiment is done on cholesterol induced hyperlipidaemia in rats[15].

ANTIHYOERTENSIVE ACTIVITY

Oludotun A.Phillips and coworkers evaluated the aqueous extract of *T.terrestris* for hypertensive effect in rats. The result shows that mrthanolic and aqueous extract of *T.terrestris* have strong Antihypertensive activity in spontaneously hypertensive rats[16].

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