ANTIHYPERLIPIDEMIC POTENTIAL OF FRUITS OF *TRIBULUS TERRESTRIS* LINN.

Shazia Khan*[1], H. Kabir[1], M. Asif[1], F. Jalees[2], Kamran J. Naquvi[2]

1. Faculty of medicine, Jamia Hamdard, New Delhi.
2. Faculty of Pharmacy, Jamia Hamdard, New Delhi, India.

Corresponding author*: shaziakhan.md@gmail.com

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ABSTRACT

The aqueous extract of fruits of *Tribulus terrestris* was tested for its effect on cholesterol induced hyperlipidaemia in rats. The study with aqueous extract at dose of 580 mg/kg body weight showed significant reduction in various biochemical parameters (LDL, VLDL, TC, TG &AI) and increase in HDL level than aqueous extract at dose of 300 mg/kg body weight.

KEY WORDS: *Tribulus terrestris*, Khar-e-Khasak, Cholesterol, Triglycerides, Zygophyllaceae.

INTRODUCTION

Tribulus terrestris Linn. (Family: Zygophyllaceae) is an annual or perennial plant growing throughout India and other warm countries such as Ceylon. In India, it grows up to an attitude of 5400 m. It is a travelling plant common in sandy oil [1,2]. Some Unani physicians described it as “Akhrasul-Ujooj” which means molar tooth of old lady because of its resemblance [3]. The reported pharmacogolical activities are antioxidant[4,5], antihypertensive[6], antimolluscicidal[7], aphrodisiac[8-11], anti-diabetic[12], anthelmintic[13], anticancer[14], antifungal[15], Antiurolithiatic[16,17], CNS stimulant[18]. In the present investigations, the aqueous extract of fruits of *Tribulus terrestris* was subjected to screening for the anti-hyperlipidaemic activity in cholesterol induced hyperlipidemia in albino rats to substantiate the claim in ethanopharmacology.

MATERIAL AND METHODS

Plant material

The fruits of the *T.terrestris* were collected from Khari bawli, Delhi and authenticated by Dr. H. B. Singh, NISCAIR (National Institute of Science Communication and Information Resource), Dr. K. S. Krishnan road, Pusa Gate, New Delhi. Voucheer specimen (NISCAIR/RHMD/Consult/2008-9/1177/209,dated 26th Feb, 2009) of the test drug has been retained and deposited for future references in the department of Ilmul Advia, F/O Medicine (U), Jamia Hamdard, New Delhi.

Preparation of Extract

About 500 g fruits were properly cleaned, dried under shade, powdered to 60 mesh size, extracted with water using a Soxhlet extractor and concentrated under reduced pressure. Field of extract was found to be 6.91 % W/W. Result of preliminary phytochemical screening indicated the presence of saponins, diosgenin,

alkaloids, phenolics, flavonoids, glycosides, tannins, proteins, sterols.

Experimental Animals

Wistar strain albino rats (170-270 gm) of either sex maintained under standard laboratory conditions (temp. 23±2°, relative humidity 55±10% and 12 hrs light & dark cycles). The animals were fed standard diet pellets and water *ad libium*. The animal experiment protocol was approved by the Central Animal House Faculty of Jamia Hamdard, New Delhi-62 (Reg. No. 173/CPCSEA).

Hypolipidaemic Activity [4,19]

The rats were divided in 4 groups of 6 each in cholesterol induced hyperlipidaemic model (CIH). In CIH, animals of fruits group (Control group) were administered with vehicle (distilled H_2O, 10 ml/kg body weight orally). Cholesterol (15ml/kg body weight) suspended in ground nut oil was given to the animals of second group for 30 days, cholesterol along with aqueous extract of *T.terretris* at dose of 580 mg/kg bw, once orally was given to third group and fourth group was given the same treatment as third but at dose of 300 mg/kg bw. At the end of the stipulated period, animals were kept for overnight fasting. They were thereafter anaesthetised with ether and blood samples were collected from all animals by puncturing the retro-orbital plexus and allowed to coagulate at 37°C for 30 minutes. The serum separated by centrifugation at 2500 rpm for 40 min and was analysed for various biochemical parameters for such as TG, TC, HDL, LDL, VLDL, AI. The animal experiments were conducted as per protocol approved by institutional animal ethics committee for the purpose of control and supervision of experimental anima (CPCSEA).

Statistical Analysis

Results of estimation of biochemical and functional parameters have been reported as mean± standard error (S.E.M). The variation in a set of data has been estimated by performing one way analysis of various (ANOVA). Individual comparisons of group mean values were done using student t- test.

RESULTS & DISCUSSION

In the present studies, rats treated with cholesterol, developed significant increase in lipid levels ($p<0.01$) as observed from the elevated serum level of lipid biochemistry (Table-I). A pronounced elevation in the concentration of TC, TG was observed in cholesterol induced hyperlipidaemia. The level of HDL was also markedly decreased in intoxicated rats.

Treatment with the aqueous extract of fruits of *T.terrestris* decreased the cholesterol induced alterations in TC, TG, LDL, VLDL & AI and increased the HDL level in blood. It was found that aqueous. extract at dose of 580 mg/kg bw offers better protection than the extract at dose of 300 mg/kg bw against cholesterol induced hyperlipidaemia as evidenced by remarkable reduction in TC, TG, LDL, VLDL & AI and increase in the HDL levels in the blood (Table-I). The results of the study indicated that under the present experiment conditions, aqueous extract of fruits of *T.terrestris* have significant hypolipidaemic effects against cholesterol induced hyperlipidaemia in rats.

CONCLUSION

Hypolipidaemia activity may be due to presence of phenolic compounds from *T.terrestris* fruits which increases muscle

LPL (plasma lipoprotein lipase) and decreases that of adipose tissue indicating that plasma TG utilization is preferentially directed towards energy production by the muscle instead of energy storage by the adipose tissue. Increase in plasma HDL cholesterol which plays a key role in cholesterol removal from peripheral tissue to the liver for final clearance [19]. Also, *T. terrestris* has shown antioxidant activity because of presence of hydroxyl radical and 1, 1-diphenyl-2-picrylhydrazyl (DPPH) stable free radical screening activity which inhibits lipid peroxidation[4].

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Table 1 Effects of aqueous extract of fruit of *T. terrestris* on rat's lipid biochemical parameters in cholesterol induced hyperlipidaemia at dose of 580 and 300 mg/kg bw

Parameters	**Control** (10 ml/kg bw)	**Toxicant** (15 ml/kg in groundnut oil)	**Concurrent** (580 mg/kg)	**Concurrent** (300 mg/kg)
Cholesterol	117.41 ± 4.48	177.89±7.70*	135.49± 3.12**	152.82±5.21**
Triglyceride	71.58±2.17	176.84±6.32*	112.51±10.44**	137.78±5.08**
LDL	58.92±4.26	121.43±6.20*	78.61±4.63**	104.78±4.91**
HDL	44.56±1.85	21.09±1.53*	34.38±1.39**	20.54±1.21ns
VLDL	14.3±0.43	35.36±1.26*	22.50±2.08**	27.55±1.01**
AI	15.65±0.46	41.24±1.56*	24.82±1.94**	32.69±0.97**

Results are expressed as mean ± S.E.M of six animals, values are statistically significant at *p<0.05 group I *vs* group II; **p<0.05 gp II *vs* gp III or gp IV by ANOVA followed by student t- tests.