

# Effect of Steroidal Extract of *Tribulus Alatus* on Semen Parameters of Albino Mice

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## Abstract

**Objective** -The use of the herb has become increasingly popular worldwide, especially in Asian countries. Herbal medicine is a major component of all indigenous people's traditional medicines. It is generally found in ayurvedic, homeopathic naturopathic traditional oriental and Native American Indian medicine. *Tribulus* is used as an enhancer. It increases testosterone level in a different way however then either DHEA or Androsteronedione. The aim of our study was effect of Steroidal extract of *Tribulus alatus* on Semen parameters.

**Methods**-24 Adult male mice were used for study of semen quality. Mice were divided into four groups; Group I (Control) Group II (1.25 mg/kg) Group III (2.50 mg/kg) and Group IV (3.5 mg/kg) respectively.

**Results**-The maximum sperm motility ( $70.0 \pm 2.35$ ), sperm concentration in million/ml ( $55.8 \pm 1.891$ ) and live percentage ( $37.3 \pm 7.58$ ) was found in Group IV.

**Conclusion** -*Tribulus* increased sperm count as well as motility level after 30 days and at the end of treatment showed significant enhancement in sperm concentration and motility. The increase in Testosterone level by *Tribulus* ultimately promotes protein synthesis. Testosterone is a positive nitrogen balancer for a rapid recuperation and recovery from muscular stress.

**Keywords:** *Tribulus*; Traditional Medicine; Sperm Motility; Sperm Concentration; Semen Quality

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## Introduction

Herbal medicine is an important component of all domestic traditional medicine and a common constituent in ayurvedic, homeopathic naturopathic traditional oriental and native American Indian medicine. *Tribulus* is a top rooted flowering plant that grows wild throughout China, India, western parts of Europe and Africa. *Tribulus* is a perennial plant, grown predominantly in India and Africa. The Greeks used *Tribulus* as a diuretic. *Tribulus* has been used in China and Vietnam for the treatment of postpartum haemorrhage, Epitasis, Gastrointestinal bleeding. It is a South African remedy for inflammation and arthritis. *Tribulus terrestris* has been used in Europe as a treatment for impotence and as stimulants to help enhance sexual desire and performance. *Tribulus terrestris* increased sperm production and testosterone level in men. Among women, *Tribulus terrestris* was

found to increase the concentration of hormones with testosterone being very slightly influenced, thus improving reproductive function, libido and ovulate.

*Tribulus* contain 3 groups of active photochemical dioscin, protodiosin and diosgenin. These substance have effect on sexual performance and may treat various sexual disorders, they regulate sexual energy level and strength by increasing the percentage of free testosterone levels for men and they affect progesterone, progesterone and oestrone. *Tribulus* was found to be rich source of calcium [1].

Diosgenin is main precursor of pharmacologically active steroids including sex hormones, corticoids and all contraceptives. The chemical compounds of TT are capable of activating multiple pathways and showing various effects[2]. There has been concern that apparent decline in sperm quality over recent decades might be related to exposure to environmental endocrine disruptors [3][4]. *Tribulus terrestris* can balance the the male reproductive system functions and can also be used in treatment of male infertility, while effecting the testis spermatocyte. Result after treatment show significant increase in sperm concentration, motility and liquefaction time [5].

### Material and Methods

The aim of this study was to evaluate the effects of steroidal extract of *Tribulus alatus* on semen parameters in healthy albino male mice. Sperm Motility, Live and Dead Spermatozoa, Spermatozoan abnormalities and Sperm Concentration were analyzed in albino mice of swiss strain.[6][7][8][9].

**Animals and Treatments** –Adult male (age 12-15 weeks) laboratory mice weighing 32-40gm were used in the present experiments. Animals were housed under standard laboratory conditions and fed with Pelleted standard mice feed, mice were randomly allocated into 4 groups. Each group was housed in separate cages and treated with steroidal extract of *Tribulus alatus* suspended in 1ml methanol and administered injecting intravenously.

#### Control –

Treated with 1ml methanol

#### Group I

Treated with steroidal extract of *Tribulus alatus* tissue culture (1,25mg/kg) and sacrificed after 20 days treatments.

#### Group II

Treated with steroidal extract of *Tribulus alatus* tissue culture (2.50mg/kg) and sacrificed after 20 days treatments.

#### Group III

Treated with steroidal extract of *Tribulus alatus* tissue culture (3.75 mg/kg) and sacrificed after 20 days treatments.

Testes, Epididymis and seminal vesicles were excised and blotted free of blood.

### Result and Discussion :

The semen of all the mice of different groups were evaluated from Sperm Motility, Sperm Concentration, Live and Dead percentage Spermatozoa and abnormalities and Mean  $\pm$ SE were

calculated for each parameters. Among all the group analyzed maximum sperm motility  $70.0 \pm 2.35$ , sperm concentration in millions/ml  $55.8 \pm 1.89$ , live percentage  $37.7 \pm 7.58$  was found in group (Table 1) which were treated with maximum dose  $3.75 \text{ mg/kg}$  of steroidal extraction of *Tribulus alatus*. Maximum abnormalities of head, Middle Piece, Tail and Total abnormalities was observed in Control  $47.3 \pm 1.86$ ,  $32.3 \pm 1.19$ ,  $38.3 \pm 0.36$  and  $33.3 \pm 3.72$  as shown in Table and Fig 1.

Correlation between various semen characteristics were group wise analyzed. Correlation coefficient between motility and live spermatozoa percentage were determined significant ( $p < 0.02$ ) and negative correlation was observed in group I and Group II. The values were found non significant in control and group III. Correlation between live spermatozoa and total abnormalities were found significant ( $p < 0.01$ ) and negative correlation was observed in group I, group II and group III.

The significant values ( $p < 0.05$ ) were found in sperm concentration and live spermatozoa and negative correlation was observed in control and group I. where as in group II and group III the values were non significant and correlation coefficient between motility and sperm concentration were found non significant in control, group I and group II and group III (Table 2). Protodioscin is the main photochemical agent of the *Tribulus* genus, which is responsible for the sertoli cells, acts on germ cell proliferation and growth of somniferous tubules. This component convert to testosterone into dihydrotestosterone, which plays important roles in male attributes [10].

*T. terrestris* fruits may be beneficial for male patients suffering from infertility [11]. *T. terrestris* roots used as traditional medicine for male infertility [12][13]. Methanolic extract of *T. terrestris* showed very good activity as testosterone producer in serum tested animals [14]. *T. terrestris* L., has been responsible for the improvement of sperm parameters [15].

### Conclusion:

*Tribulus* is used as a quality of sperm enhancer. *Tribulus* increased sperm count as well as motility level after 30 days and at the end of treatment showed significant enhancement in sperm concentration and motility. Our results indicate that the *Tribulus* work as a sperm quality enhancer and infertility treatment.

### References

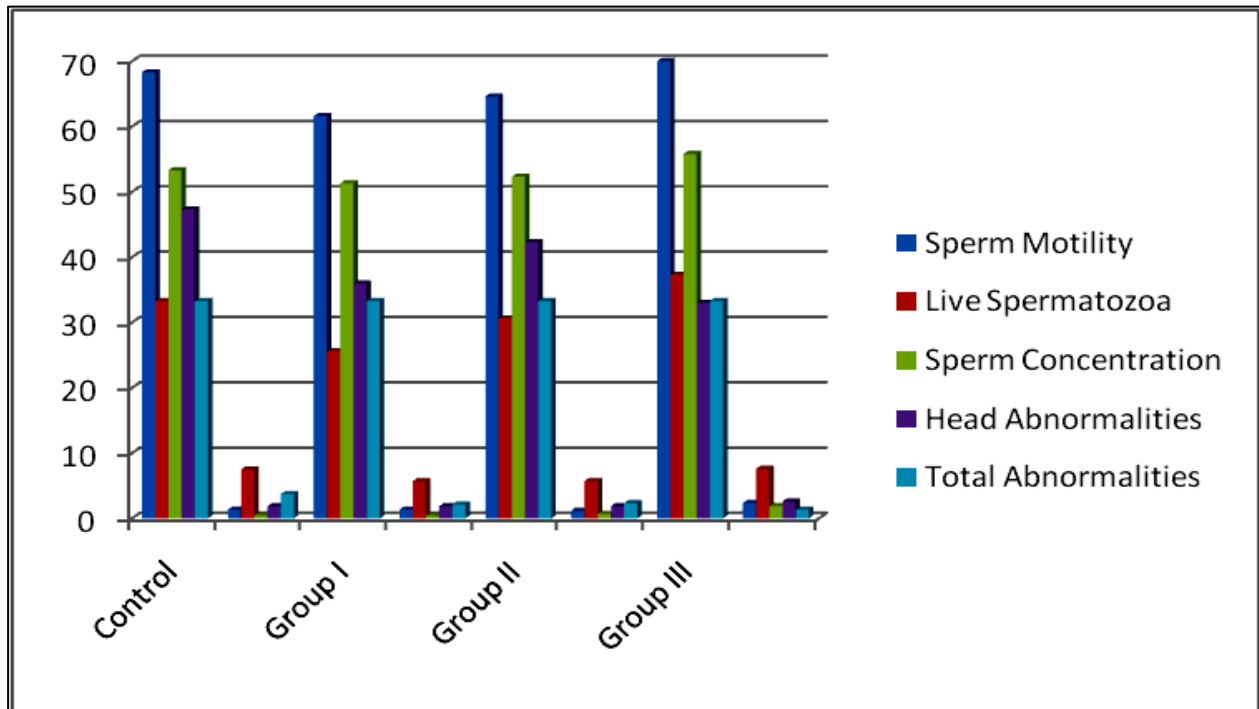
1. Duhan A, Chauhan BM, Punia D. Nutritional value of some non-conventional plant foods of India. *Plant Foods Hum Nutr.* 1992;42(3):193-200. doi:10.1007/bf02193926
2. Ștefănescu R, Tero-Vescan A, Negroiu A, Aurică E, Vari CE. A Comprehensive Review of the Phytochemical, Pharmacological, and Toxicological Properties Of *Tribulus Terrestris* L. *Biomolecules*; 2020.
3. Carlsen E, Giwerman A, Keiding N, Shakkebaek NE. *British Medical Journal*, 1992;305:609-13
4. Sharpe RM, Skakkebaek NE. Are oestrogens involved in falling sperm counts and disorders of the male reproductive tract? *Lancet.* 1993;341(8857):1392-1395. doi:10.1016/0140-6736(93)90953-e
5. Karimi J, Malekzadeh H, Hoshman S. The effect of the *tribulus terrestris* extract on spermatogenesis in the rat. *Journal of Jahroom University of Medical sciences.* 2012;9(4).
6. Khan A, Kohli A. A study on sexual behavior of male camel. *Indian veterinary Journal.* 49:1007-1012.

7. Swanson B, Boatman J. The Effect of thiouracil feeding upon the seminal characteristics of dairy bull J. J Dairy Sci. 1953.
8. Blom E.O meduzowatyeh tworach spermic buhaji I Ogierow I ich enaczenin Diagnostyeczyn (on method formation in bull and stallion sperm and their diagnostic significance Med). AnimBreed Abstr. 1948;4.
9. Salisbury GW. Physiology of Reproduction and Artificial Insemination of Cattle.W.H. Freeman; 1978
10. Salgado RM, Marques-Silva MH, Gonçalves E, Mathias AC, Aguiar JG, Wolff P. Effect of oral administration of Tribulus terrestris extract on semen quality and body fat index of infertile men. Andrologia. 2017;49(5):e12655. doi:10.1111/and.12655
11. Shalaby MA, Hammouda AAEK. Assessment of protective and anti-oxidant properties of Tribulus terrestris fruits against testicular toxicity in rats. J Intercult Ethnopharmacol. 2014;3(3):113-118. doi:10.5455/jice.20140627123443
12. Qureshi A, Naughton DP, Petroczi A. A systematic review on the herbal extract Tribulus terrestris and the roots of its putative aphrodisiac and performance enhancing effect. J Diet Suppl. 2014;11(1):64-79. doi:10.3109/19390211.2014.887602
13. Sharma P, Huq AU, Singh R. Cypermethrin induced reproductive toxicity in male Wistar rats: protective role of Tribulus terrestris. J Environ Biol. 2013;34(5):857-862.
14. Mohammed AA, Hussain Al-Amiery AA, I. Al-Mosowy HHIAM, Abbas AH. Study the biological activities of Tribulus terrestris extracts. J Biotechnol Res Cent. 2010;4(1):55-60. doi:10.24126/jobrc.2010.4.1.95
15. Sanagoo S, Sadeghzadeh Oskouei B, Gassab Abdollahi N, Salehi-Pourmehr H, Hazhir N, Farshbaf-Khalili A. Effect of Tribulus terrestris L. on sperm parameters in men with idiopathic infertility: A systematic review. Complement Ther Med. 2019;42:95-103. doi:10.1016/j.ctim.2018.09.015

**Table 1: Effect of Different concentration of steroidal extract of *Tribulus alatus* on Sperm Motility, Live Spermatozoa, Sperm Concentration and Sperm Abnormalities**

Groups-Parameters-	Control	Group I	Group II	Group III
Sperm Motility	68.3±1.36	61.6±1.36	64.6±1.19	70.0±2.35
Live Spermatozoa	33.3 ±7.50	25.6±5.70	30.6±5.70	37.3±7.58
Sperm Concentration	53.3±0.45	51.3± 0.43	52.3±0.71	55.8±1.89
Head Abnormalities	47.3 ±1.86	36.0±1.88	42.3±1.86	33.0±2.60
Total Abnormalities	33.3±3.72	33.3±2.13	33.3±2.33	33.3±1.33

**Fig 1:Effect of Different concentration of steroidal extract of *Tribulus alatus* on Sperm Motility, Live Spermatozoa, Sperm Concentration and Sperm Abnormalities**



**Table2: Correlation of different morphological parameters in albino mice semen**

Groups	Control	Group I	Group II	Group III
<b>Parameters</b>				
<b>Sperm Motility and Live Spermatozoa(%)</b>	-0.632 <sup>NS</sup>	-0.977 <sup>***</sup>	0.979 <sup>*</sup>	0.699 <sup>NS</sup>
<b>Live Spermatozoa(%) and Total Abnormalities</b>	0.219 <sup>NS</sup>	-0.144 <sup>NS</sup>	-0.997 <sup>***</sup>	-0.983 <sup>**</sup>
<b>Sperm Concentration(millions/ml) and Live Spermatozoa(%)</b>	-0.940 <sup>***</sup>	-0.945 <sup>***</sup>	0.870 <sup>NS</sup>	0.131 <sup>NS</sup>
<b>Sperm Motility and Sperm Concentration(millions/ml)</b>	0.318 <sup>NS</sup>	0.831 <sup>NS</sup>	0.504 <sup>NS</sup>	0.800 <sup>NS</sup>

Significant\* Significant\*\* Significant\*\*\* Non Significant-NS