

ANTISPERMATOGENIC EFFECT OF *TECOMELLA UNDULATA* ROOT EXTRACT IN MALE ALBINO RATS

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ABSTRACT : This study was framed to assess the antispermatogenic activity of *Tecomella undulata* root ethanolic extract in male albino rats. Four groups were made each having 5 animals. Group I-control. Group II-ethanolic root extract of *Tecomella undulata*- 500 mg/kg body weight orally for 60 days. Group III-Testosterone propionate- 0.01mg/day intramuscularly for 30 days. Group IV-Testosterone propionate (TP-0.01 mg/day i.m) + *Tecomella undulata* ethanolic root extract (500mg/kg body weight orally) for 30 days. After completion of experimentation overnight fasted animals were sacrificed under prolonged anesthesia. By cardiac puncture blood was collected and different serum, hematological, biochemical and histological studies were performed. Hematological and biochemical parameters showed no significant changes in all treated groups except SGOT, SGPT, triglycerides and serum total cholesterol which showed slight decrease in Gr-II and Gr-III as compared to control (Gr-I). Highly significant decrease ($P<0.001$) was observed in reproductive organs (testis, cauda epididymis, seminal vesicle, and ventral prostate) of Gr-II and Gr-III as compared to control (Gr-I). Significant decrease in sperm motility of cauda epididymis and sperm density of testis and cauda epididymis in Gr-II and Gr-III was observed as compared to control (Gr-I). Significant ($P<0.001$) decrease in germ cells, mature Leydig cells, number of spermatids and the number of spermatocytes of Gr-II and Gr-III as compared to control (Gr-I) was observed. Present study reveals that *Tecomella undulata* root ethanolic extract exerts antifertility effect on male albino rats and can be useful for the future investigation in the formulation contraception for the male without harmful effects.

Key words : Antispermatogenic, *Tecomella undulata*, contraception, testosterone, leydig cells.

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INTRODUCTION

Now-a-days the world's major burning issue is population explosion. The natural resources are limited so for the development of countries population explosion is considered as an imminent hurdle (Parvez *et al*, 2015). India's population multiplying at alarming level and has crossed 121 crores and reached 9.2 billion by 2050 (Verma and Yadav, 2021). Major concern of people in today's scenario is fertility regulation because over population cause degradation of environment, natural resources depletion, poverty, and unemployment in developing as well as developed countries (Soni *et al*, 2015). Various effective and preventive contraceptive methods are available for the control of fertility in female and male but these all are not free from side effect such as weight gain, increase the risk of cancer, hypertension, and hormonal imbalance (Shaik *et al*, 2017). Currently,

for the planning of family responsibilities should be shared by men also because as compare to female contraceptive methods male have very few methods for contraception which typically confirmed to condom, vasectomy and withdrawal methods (Gava *et al*, 2016). From ancient time plant-based products are pursued over clinically available synthetic antifertility drugs because plant-based natural products are available easily, cost effective and devoid of any adverse effects.

A Bignoniaceae family member *Tecomella undulata* also known as Desert teak or Rohida have many pharmaceutical properties such as antioxidant, analgesic, antidiabetic, anti-inflammatory, antibacterial and hepatoprotective (Genwa *et al*, 2017; Khosravi *et al*, 2019). The present investigation focused on ethanolic extract of *Tecomella undulata* roots to evaluate indicators for male contraception include testicular

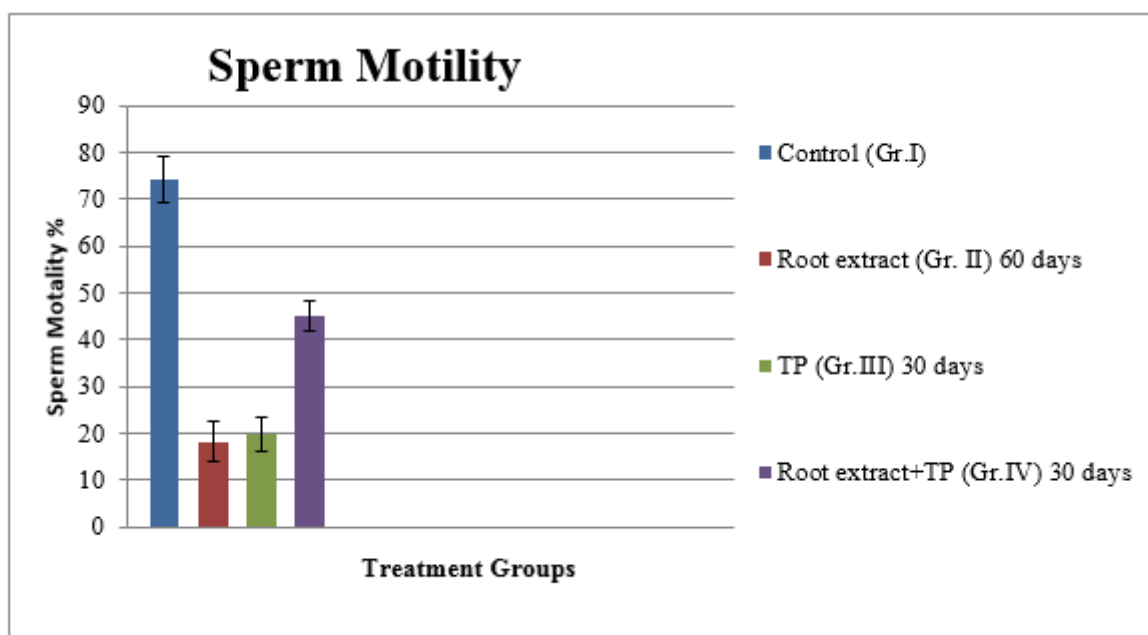


Fig. 6 : Effect of ethanolic root extract 60 days, TP 30days, Bark+TP 30 days on sperm motility of treated rats.

Similarly administration of *Aegle marmelos* extract also showed reduction in testosterone level and the weight of testis and other accessory sex organs (Chauhan and Agarwal, 2008).

Reduction in sperm count, sperm density, and sperm motility resulted decrease in fertility in male. Present study also reported that supplementation of root extract of *T. undulata* showed reduction in sperm density in testis and cauda epididymis and sperm motility in cauda epididymis. Similarly administration of aqueous extract of leaf of *Azadirachta excels* also showed significant reduction in motility in cauda epididymis, sperm density in testis and cauda epididymis (Shaher, 2009). For the transition of primary spermatocytes into secondary spermatocytes testosterone is needed. Present investigation showed that treatment with *T. undulata* root extract and TP alone reduce the level of testosterone and the number of spermatogonia, spermatozoa, primary and secondary spermatocytes were also reduce. Similarly, supplementation of alcoholic extract of *Adiantum lunulatum* (500 mg/kg) also showed reduction in testosterone level and ultimately inhibit the maturation of primary spermatocytes into secondary spermatocyte (Bhatia *et al*, 2010). Additionally treatment with *Curcuma longa* extract also showed reduction in number of spermatogonia, spermatozoa and inhibition of spermatogenesis in male albino rats (Purohit and Bhagat, 2004).

The present investigation indicated that the ethanol root extract of *Tecomella undulata* exerts antifertility effect on male albino rats. This extract does not cause

any harmful and deleterious effects vital organs. This study can be useful for the future investigation in the formulation contraception for the male and the elucidation of specific chemical entity which has antifertility activities.

REFERENCES

- Agarwal A and Allan J J (2010) Antifertility effects of herbs: Need for responsible reporting. *J. Ayurveda Integr. Med.* **1**(2), 129-131.
- Al-Shaher W S (2020) Effect of leaf extract of *Melia azedarach* L. on the Testis tissue of albino mice mus musculus. *Raf. J. Sci.* **29**(1), 1-9.
- Bhatia D K, Sharma A K, Pathania P C and Khanduri N C (2010) Antifertility effects of crude different of *Adiantum lunulatum* burm on reproductive organs of male albino rats. *Biological Forum* **2**(2), 88-93.
- Chauhan A and Agarwal M (2008) Reversible changes in the antifertility induced by *Aegle marmelos* in male albino rats. *Systems Biology in Reproductive Medicine* **54**(6), 240-246.
- Gava G, Lantadilla C, Martelli V, Fattorini A, Seracchioli R and Meriggola M C (2016) Hot issues in female and male hormonal contraception. *Minerva Ginecol.* **68**(1), 78-89.
- Genwa K L, Purohit A and Ram H (2017) Insulin mimetic and pancreas-protective effect of *Tecomella undulata* leaves extract in diabetic rats. *World J. Pharma Pharmaceut. Sci.* **6647**(2), 924-938.
- Goyal L and Purohit A (2021) Antiandrogenic efficacy of *Tecomella undulata* bark extract in male albino rats with special reference to histology and sperm dynamics. *Adv. Biores.* **12**(4), 155-161.
- Kaur R, Sharma A, Kumar R and Kharb R (2011) Rising trends towards herbal contraceptives. *Scholars Research Library* **1**(4), 5-12.
- Khosravi H, Solouki M and Ganjali S (2019) Investigating antibacterial properties of *Tecomella undulata* and *Momordica charantia* plant extract on some pathogenic bacteria. *Gene Cell and Tissue* **7**(1), 949-960.
- Krishan B G, Ringmichon C L and Chachad D (2016) Antifertility activity of *Manlikara hexandra* (ROXB.) dubard seed extract

- on male albino rats. *Int. J. Appl. Biol. Pharmaceut. Tech.* **7**(3), 71-76.
- Lynch J M, Raphel S S, Mellar L D, Spare P D and Inwood M J H (1969) *Medical Laboratory Technology and Clinical Pathology*. W.B. Savnders company, IgakuShoin Ltd., Tokyo P. 626, 647, 662.
- Meerwal P and Jain G C (2016) Antifertility effect of *Caesalpinia bonducella* (L.) fleming in male Wister rat. *Int. J. Pharmacog.* **3**(6), 265-275.
- Parveen N B, Chate V A, Katti A and Shrevathsa T S (2020) Spermatogenesis: correlation in ayurveda. *J. Ayurveda Integ. Med. Sci.* **5**(5), 402-409.
- Parvez M, Zaman R, Sayeed M A, Haque M A and Rashid M A (2015) Antifertility activity of methanol bulb extract of *Allium sativum* on swiss albino male mice and teratogenic effect on neonates of female mice. *Glob. J. Pharmacol.* **9** (3), 272-277.
- Prasad M R N, Chinoy N J and Kadam K M (1972) Changes in succinate dehydrogenase levels in the rat epididymis under normal and altered physiological conditions. *Fertil. Steril.* **23**, 186-190.
- Purohit A and Bhagat M (2004) Contraceptive efficacy of *Curcuma longa* (L) in male albino rats. *Asian J. Androl.* **6**, 71-74.
- Purohit A and Daradka H M M (1999) Antioandrogenic efficacy of *Curcuma longa* (50% EtOH extract) with special emphasis on testicular cell population dynamics. *Indian Drugs* **36**(2), 142-143.
- Purohit A and Dixit V P (1991) Antispermatogetic efficacy of neem plant materials in rats. *Neem Newsletter* **8**(2), 13-14.
- Shah W, Khan R, Shah B, Khan A, Dil S, Liu W, Wen J and Jiang X (2021) The molecular mechanism of sex hormones on sertoli cell development and profile proliferation. *Front. Endocrinol.* **12**, 1-13.
- Shaher W S (2009) Effect of *Azadirachta excelsa* (Jack) leaf extracts on the reproductive organs and fertility of male albino mice. *J. Raf. Sci.* **20**(3), 1- 9.
- Shaik A, Yalavarthi P R and Bannoth C K (2017) Role of anti-fertility medicinal plants on male and female reproduction. *J. Compl. Altern. Medical Res.* **3**(2), 1-22.
- Soni P K, Luhadia G, Sharma D K and Mali P C (2015) Antifertility activates of traditional medicinal plants in male with emphasis on their mode on their mode action: A review. *J. Glob. Biosci.* **4**(1), 1165-1179.
- Verma S and Yadav A (2021) Rising trends towards the development of oral herbal male contraceptive: An insight review. *Fut. J. Pharmaceut. Sci.* **7**(23), 1-15.
- Vyas A, Purohit A and Ram H (2019) Assessment of dose-dependent reproductive toxicity of diclofenac sodium in male rats. *Drug and Chemical Toxicology* **42**, 478-485.
- Vyas A, Ram H, Purohit A and Jatwa R (2016) Adverse effect of subchronic dose of aspirin on reproductive profile of male rats. *J. Pharmaceut.* **2016**, Article ID 6585430, 9 pages, <http://dx.doi.org/10.1155/2016/6585430>
- Wang R S, Yeh S, Tzeng C R and Chang C (2009) Androgen receptor roles in spermatogenesis and fertility: Lessons from testicular cell-specific androgen receptor Knockout Mice. *Endocrine Reviews* **30**(2), 119 –132.