



ISSN : 0973-7057

Efficacy of *Citrus limonum* seeds on reproductive parameters of male albino rat

Haque Sana** & Shamshun Nehar^b

^aUniversity Department of Zoology, Ranchi University Ranchi, Jharkhand, India

^bPrincipal Ranchi Women's College, Ranchi, Jharkhand, India

Received : 15th November, 2022 ; Revised : 20th December, 2022

Abstract- Healing with medicinal plants is as old as mankind itself. Now days, plant products catch the attention of many scientists as a primary source of naturally occurring fertility regulating agents because of their little and no side effects. Compounds found in plants could prevent fertilization without the side effects of hormone-based contraceptives. The present study was carried out to evaluate the effect of *Citrus limonum* seed on body weight as well as reproductive organ weight for 60 days. A considerable decrease in weight has been observed at ($p < 0.001$). Along with this the sperm motility and sperm viability were also drastically reduced.

Key words: *Citrus limonum*, reproductive parameters, pharmacological treatments

INTRODUCTION

Fertility control is a significant issue of global and national public health concern. This increasing human population throughout the world particularly in developing and underdeveloped countries has inevitable effects on the life supporting resources on the earth.¹ Various studies have confirmed both men and women's desire for novel male contraceptives.² Majority of men believe that both partners share an equal responsibility of family planning.³ Barriers to development include concerns regarding side effects and spermatogenic rebound with hormonal methods.² Herbal medicines have become a popular form of health care. Even though several differences exist between herbal and conventional pharmacological treatments, herbal medicine can be tested for efficacy using conventional trial methodology. Several specific herbal extracts have been

demonstrated to be efficacious for specific conditions.⁴ Some *Citrus* species have been reported to have antifertility effect.⁵ *Citrus limonum* seeds have shown significant antifertility activity in female albino mice. The seeds have shown phytoestrogenic activities and the alcoholic extract reveals the most promising antifertility effect in female albino mice.⁶ *Citrus limonum* commonly known as lemon, belongs to the *citrus-Linn* (Ruteaceae) family.⁷ Therefore in this investigation ethanolic extract of *Citrus limonum* seed was studied to find out its potential antifertility effect on male albino rats.

MATERIALS & METHOD

Citrus limonum seeds were obtained from Birsa agriculture college and was authenticated in the Department of Botany, Ranchi University, Ranchi. Ethanolic extract was prepared in soxhlet in (400) mL of ethanol (95%) solvent for (24-48) hr. then evaporated at 45°C by rotary evaporator to form a paste, and further transferred into

*Corresponding author :

Phone : 8235487540

E-mail : sanaafroz8@gmail.com

sterile bottles and refrigerated at 4°C until used. Adult albino mice of Wistar strain weighing between 150–200 gms housed in clean environment under 12-hour light and 12-hour dark cycle, having free access to food pellet and water *ad-libitum*, were used after approval of the protocol by the Institutional Animal Ethical Committee. 30 male albino rats were divided into three groups (n=10). Each group was kept in a separate cage. Group I served as control. Group II and group III were treated with lemon seed extract at a dose level of 250 mg and 500mg/kg b.w. respectively for 60 days.

Determination of body weight and reproductive organ weight:

After 24 hours of last treatment, weight of the animals was recorded and then sacrificed. After scarification, testes, epididymis, seminal vesicle and ventral prostate were dissected out, trimmed off of extraneous tissues and weighed accurately on balance. The organs weights were expressed in term of mg/100g body weight.

Statistical analysis:

Data were expressed as mean ± S.D. Significance difference between means was determined by student t-test and one way (ANOVA). P <0.05 was considered as significant.

RESULTS & DISCUSSION:

The effect of oral administration of *Citrus limonum* seed extract on body weight and reproductive organ weight indices is represented in table 1. The extract significantly reduced (p<0.001) body weight as well as reproductive organs weight. At the same time sperm motility and viability was significantly altered upon its administration as depicted in table 2. Previous studies have revealed that lemon seeds are rich in pectin, a fibre that minimizes fat absorption into the body.⁸ Fibre supplementation potentially reduces energy intake and contributes to weight loss.⁹ The testes perform two highly organized and intricate events, called spermatogenesis and steroidogenesis, which are vital for the perpetuation of life.¹⁰ Our study for the very first time revealed that *C. limonum* seed reduced the weight of the testis. This indicates that there have been disturbances in the germinal component which has led to its weight depletion. In our study the weight of epididymis was reduced, which explains that level of sperm production has declined in the testis which in turn leads to the reduction in epididymal weight.

Table 1: Effect of *Citrus limonum* seed extract on body weight and reproductive organ weight of adult male albino rats.

Parameters	Group I		Group II		Group III	
Body weight	162.53 ± 1.75		160.65± 1.24		156.02 ± 1.11	
Testes	L	R	L	R	L	R
	370.10±1.82	371.98±1.26	366.88±0.56	367.98±1.12	362.47±0.86	361.98±1.68
Epididymis	73.00±2.57	74.41± 1.23	70.94±0.78	70.92± 1.01	67.55±0.97	68.26±1.13
Seminal vesicle	208.16±1.19		205.81± 0.49		202.61± 0.84	
Prostate	51.42±3.01		50.15 ± 2.97		49.45 ± 2.35	

Table 2: Effect of *Citrus limonum* seed extract on sperm viability and sperm motility of adult male albino rats.

Parameters	Group I	Group II	Group III
Sperm motility %	74.91 ± 2.37	53.89 ± 1.56	47.64 ± 1.08
Sperm viability %	72.93± 1.14	50.34± 1.97	44.81± 1.92

REFERENCES

- Umadevi M, Sampathkumar PK, Debjit, Bhowmik and Duraivel S. 2013. Medicinal plants with antifertility activity. *Journal of Medicinal Plants Studies*. 1(1): 26-33
- Abbe C. R., Page S. T., Thirumalai A. 2020. Male contraception. *Yale J Biol Med*. 93(4): 603-613

3. **Grady W. R., Tanfer K., Billy J. O., Lincoln-Hanson J. 1996.** Men's perceptions of their roles and responsibilities regarding sex, contraception and childbearing. *Fam plann perspect.* **28(5):** 221-6.
4. **Firenzouli F., Gori L., Crupi A., Neri D. 2004.** Flavonoids: risks or therapeutic opportunities. *Recenti prog med.* **95:** 345-51
5. **Kulkarni M. A., Kothekar M. A. and Mateenuddin M. 2005.** Study of antifertility effect of lemon seeds (*Citrus limonum*) in female albino mice. *Indian Journal of Physiology and Pharmacology.* **49(3):** 305-312.
6. **Patil S. J. and Patil S. B. 2010.** Pre-clinical toxicity studies of orally administered petroleum ether extract of *Citrus medica* seeds on the reproductive organs of female mice. *International Journal for Contemporary Research. Review.* **1:** 1-6.
7. **Wealth of India Raw materials Council of Scientific and Industrial Research. 1950.** New Delhi. Vol. II. p. 77-82.
8. **Are lemon seeds edible. 2021.** 7 Health benefits.
9. **Vicky A. Soleh, Deboah A. Kerr and Simonwood. 2017.** Effect of fibre supplementation on body weight and composition, frequency of eating and dietary choice in overweight individuals. *Nutrients.* **9(4):** 409
10. **Hess R. A., Renato de Franca L. 2008.** Spermatogenesis and cycle of the seminiferous epithelium. *Adv Exp Med Biol.* **636:** 1-15.
