KenKyu

Kenkyu Journal of Pharmacy Practice & Health Care 4:1-3 (2018)

Mini Review

Evaluation of Trigonella Foenum Graecum L. (Fenugreek) Seeds Efficiency in Enhancing Male Reproductive Health

Heba N. Gad El-Hak*, Ranwa A. Elrayess

Department of Zoology, Faculty of Science, Suez Canal university, Ismailia, Egypt

Received May 02, 2018; **Accepted** May 10, 2018; **Published** May 14,2018

***Corresponding Author:** Heba N. Gad El-Hak, Department of Zoology, Faculty of Science, Suez Canal university, Ismailia, Egypt, Email: heba_nageh@hotmail.com

Abstract

Over the years, researches on Fenugreek evidenced that it had enormous beneficial effects on general health. This mini review focused on the research question of: "Is Fenugreek seeds cause increase of fertility or cause infertility problems? Although there is a growing body of literature relating to the effect of Fenugreek seeds on fertility and increase the reproductive performance, in the other hand, a contradictory literature on the negative effect of Fenugreek seeds on male reproductive health. In 2002, Fenugreek seeds have been used for the 1st time to treat male infertility. However, in 2006, the first study that talks about the anti-fertility of fenugreek was published. In this work we review the current evidence on the association between Fenugreek seeds and male reproductive health positive and negative effects.

Keywords: Trigonella foenum-graecum; Fenugreek; male reproductive health; infertility.

Introduction

The marker for exposure to potential reproductive toxicants and a diag-nostic tool for male infertility which is the poorest semen quality semen parameters (sperm morphology, concentration, motility and total number of sperm [1], sperm DNA integrity and fragmentation [2].

Trigonella foenum-graecum Linn (Family: Fabaceae), also known as fenugreek, is an aromatic annual plant, 30–60 cm tall [3]. Fenugreek grows widely in Egypt, India, China, France, Spain, Morocco, Argentina, Iran and Turkey [4,5] .Its seeds contains the diosgenin [6] which is an important precursor for the synthesis of a number of sex hormones, including testosterone and estrogens [7]. It also contain three minor steroidal saponins (similagenin, savsalpogenin and yuccagen-in), choline, trimethylamine (a sex hormone in frogs), vitamins (A, B2, B6, B12, D), lysine and l-tryptophan rich proteins, mucilaginous fibre, coumarin, fenugreekine, nicotinic acid, sapogenins, phytic acid, scopletin and trigonelline [8] , calcium, iron, β-carotene and other vitamins and essential oils [9] . Fenugreek seeds used as a flavoring agent and spicy added to foods [10] (. Traditionally, fenugreek seeds is given to lactating females as a stimulant for milk production [11] and decrease Systemic symptoms of dysmenorrhea [12] .

No studies confirmed if fenugreek seeds caused fertility or anti-fertility to female. Some studies on fenugreek seeds has shown it as anti-implantation and antifertility effects and may has abortifacient activity in rats [13] While, [14] found histologically in female mice fenugreek seeds stopped folliculogenesis trend and destroyed ovary tissue [15] observed a teratogenic effect of fenugreek seeds in the female rabbits by significant decrease in number of newborn fetuses and increased plasma progesterone concentrations at 10 and 20 days of gestation without any change on prebreeding estrogen concentrations even the enhancement of fenugreek the ovulation before the abnormal fetuses development. These teratogenic effects may be due to the fact that of fenugreek seeds containing an estrogenic activity that bothers the uterine endometrial lining and interferes with the development of fetuses[16-19]showed that feneugreak may affect the mice central nervous system resulted from the sensorimotor impairment in neonates and adult mice found. On the other hand,[20] results revealed that fenugreek has no effect on female rat fertility by not altering the estrous cycle and the absent of abortifacient activity. In this work we review the current evidence on the association between Fenugreek seeds and male reproductive health positive and negative effects.

Fenugreek improves male fertility

There are many studies disscued the protective role of fenugreek against testes toxicity resulted from its constituent that have antioxidant and an-ti-inflammatory effect [21-27] as well as having a protective role against testes toxicity induced resulted from diabetes [28] found that Trigonella foenum graecum seeds increased the physiological aspects of libido in healthy adult males, but not affect the testosterone and prolactin level and explained that increase in the libido behavior due the present of sa-ponin which control the body physiological condition (blood sugar and the lipid profile laboratory test) [29,30] found crud Fenugreek seeds Oil had positive significant effect on the spermatogenesis of eighty patients, aging from 20-30 years, complaining of infertility due to oilgospermia for 4-8 years and had been exclusion of any medical disease or surgical problems. Moreover [31] conducted a study in 120 men (age: 43-70 years; 600 mg day fenugreek extract/ 12 weeks) and found that fenu-greek extract significantly increased free and total testosterone levels and sexual Function. Similarly [32] showed that extract from Fenugreek seed showed an enhanced fertility and improved sperm profile in most male Volunteers through raising testosterone level.

Fenugreek Anti-fertility effects

There are many studies in the antifertility and antiandrogenic activities of fenugreek to male sex [33] found significantly declined cholesterol level, sperm count, caudal spermatozoa motility, testes

weights and androgen dependent parameters (protein, sialic acid and fructose) whenmale albino rats were fed with fenugreek seed extract (100 mg/day/rat) orally to rats for 60 days and their result of antifertility and antiandro-genic activities depend on the decrease of cholesterol which is the main precursor of the sex hormone [34] found that feeding diets contain-ing 30% fenugreek seeds to male white New Zealand rabbits reduced testis weight, with damage to the seminiferous tubules and interstitial testis tissue sections followed by decrease of the androgen hormone and sperm concentrations. [35] found that 90 days treatment fenu-greek with 153, 305 and 610 mg/kg/day by oral gavage to male mice caused significant changes in the sperm percent motility and count, increase in spermatozoa morphology and chromosomal aberrations. Moreover [36] suggested that fenugreek tends to decrease male mice fertility by reducing the concentration of testosterone and sperms and inhibiting sperms mass and individual motility.

Fenugreek contains phytoestrogen compounds [37] and rich in steroidal saponins [38] that has an oestrogenic activity bind to the oestrogen receptors and induce the expression of oestrogen responsive genes. The in-fertility effect of Fenugreek may be due to the phytoestrogen compound activity. Long-term exposure or high dose exposure to phytoestrogens affected male reproductive function by decreasing sperm count [39] and increasing developing germ cells apoptosis [40].

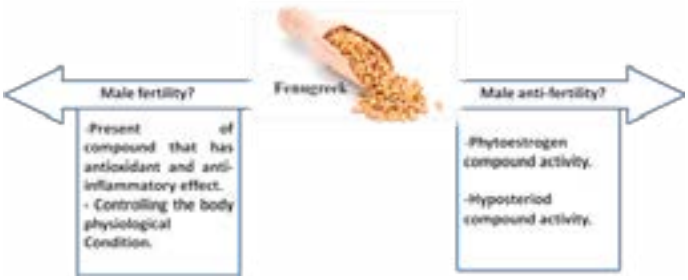

Figure 1: From the result, the summary of the fenugreek mechanism to male fertility and antifertility represented in diagram

Conclusion

Fenugreek seeds are rich with different benefits and medical compounds that has antioxidant and anti-inflammatory activity. Antifertility of fenugreek may be resulted from its richness of phytoestrogen compounds. Fenugreek seeds not recommended to be used to increase the male fertility, and if will be used in other studies (antioxidant, antiflammatory, anticancer activity) should be used in low doses for a short time as using low doses of phytoestrogen neither affects the semen quality nor the reproductive function. Further studies are needed to answer the question: Can fenugreek be an endocrine distributor like other phytoestrogen compound? And to study and confirm the exact fenugreek mechanism of actions to improve fertility or induce infertility as it is poorly studied.

References

1. Ong C.N, Shen H.M, Chia S.E (2002) Biomarkers for male reproductive health hazards are they available? Toxicology letters 134:17-30.
2. Sakr S.A, El-shenawy S.M, Al-Shabka A.M (2012) Aqueous fenugreek seed extract ameliorates adriamycin-induced cytotoxicity and testicular alterations in albino rats. Reproductive Sciences 19:70-80.
3. Snehlata H.S,Payal D.R (2012) Fenugreek (Trigonella foenum-graecum L): an overview. Int J Curr Pharm Rev Res 2:169-187.
4. Bahmani.M, Shirzad.H, Mirhosseini.M, Mesripour.A, Rafieian Kopaei.M (2016) A review on ethnobotanical and therapeutic uses of fenugreek (Trigonella foenum-graceum L). Journal of evidence-based complementary & alternative medicine 21:53-62.
5. Yadav U.C, Baquer N.Z (2014) Pharmacological effects of Trigonella foenum-graecum L. in health and disease. Pharmaceutical biology 52:243-254.
6. Taylor W.G, Zulyniak H.J, Richards K.W, Acharya S.N, Bittman.S et al. (2002) Variation in diosgenin levels among 10 accessions of fenugreek seeds produced in western Canada. Journal of agricultural and food chemistry 50:5994-5997.
7. Wankhede.S, Mohan.V, Thakurdesai.P (2016) Beneficial effects of fenugreek glycoside supplementation in male subjects during resistance training: A randomized controlled pilot study. Journal of Sport and Health Science 5:176-182.
8. Billaud.C, Adrian.J D (2001) Le fenugrec: Composition, valeur nutritionnelle et physiologique.
9. Yadav S.K, Sehgal S (1997) Effect of home processing and storage on ascorbic acid and β-carotene content of bathua (Chenopodium album) and fenugreek (Trigonella foenum graecum) leaves. Plant foods for human nutrition 50:239-247.
10. Srinivasan.K (2006) Fenugreek (Trigonella foenum-graecum): A review of health beneficial physiological effects. Food reviews international 22:203-224.
11. Tiran.D (2003) The use of fenugreek for breast feeding women. Complementary Therapies in Nursing and Midwifery 9:155-156.
12. Younesy.S, Amiraliakbari.S, Esmaeili.S, Alavimajd.H, Nouraei.S (2014) Effects of fenugreek seed on the severity and systemic symptoms of dysmenorrhea. Journal of reproduction & infertility 15:41.
13. Al-Hamoo Department of Zoology M.Al-Bayatti (1995) Effect of Trigonella foenum graecum, Nerium oleander and Ricinus communis on reproduction in mice. Iraqi J Sci 36: 436.
14. Deshpande P.O, Mohan.V, Pore M.P, Gumaste.S, Thakurdesai.P.A (2017) Prenatal developmental toxicity study of glycosides-based standardized fenugreek seed extract in rats. Pharmacognosy magazine 13:135.
15. Ibrahim.M, El-Tawill.G (2010) Possible Outcome of Fenugreek Seeds Powder Administration on the Fertility of Female and Male Albino Rat. Journal of Radiation Research and Applied Sciences 3:357-372.
16. Khalki.L,M'hamed,S.B.Sokar,Z.Bennis,M.Vinay et al. (2013) Prenatal exposure to fenugreek impairs sensorimotor development and the operation of spinal cord networks in Mice. PloS one 8: e80013.
17. Aswar.U, Mohan.V, Bodhankar.S (2009) Effect of trigonelline on fertility in female rats. International Journal of Green Pharmacy (IJGP) 3.
18. Arafa, M.H Mohammad, N.S Atteia, H.H (2014) Fenugreek seed powder mitigates cadmium-induced testicular damage and hepatotoxicity in male rats. Experimental and toxicologic pathology 66:293-300.
19. Hamza.A, Elwy.H, Badawi.A (2016) Fenugreek seed extract attenuates cisplatinβinduced testicular damage in Wistar rats. Andrologia 48:211-221.
20. Hussein.A.M, Mustafa.H.N, Badawoud.M.H (2015) Ameliorative potentials of a combination of fenugreek and alpha-tocopherol on cadmium induced testicular toxicity: an ultrastructural study. Folia morphologica 74:325-334.
21. Mohammadi.F, Nikzad.H, Taherian.A, Amini Mahabadi.J, Salehi.M (2013) Effects of herbal medicine on male infertility. Anatomical Sciences Journal 10:3-16.
22. Sakr S.A, El-shenawy S.M, Al-Shabka A.M (2012) Aqueous fenugreek seed extract ameliorates adriamycin-induced cytotoxicity and testicular alterations in albino rats. Reproductive Sciences 19:70-80.
23. Sakr S.A, Mahran H.A , Abo-El-Yazid S.M (2012) Effect of fenugreek seeds extract on cyclophosphamide induced histomorphometrical, ultrastructural and biochemical changes in testes of albino mice. Toxicology and industrial health 28:276-288.
24. Steels.E, Rao.A, Vitetta.L (2011) Physiological Aspects of Male Libido Enhanced by Standardized Trigonella foenumβgraecum Extract and Mineral Formulation. Phytotherapy Research 25:1294-1300.
25. Sharma.J, Bhinda .A (2005) Antifertility activity of steroidal extract of Trigonella foenum-graecum (seeds) in female rats. Asian Journal of Experimental Science 19:115-120.

26. Al-khalisy, M.H (2015) Treatment of Men Infertility using Low doses of Fenugreek Oil Extract. Group 29.
27. Rao.A, Steels.E, Inder W.J, Abraham S, Vitetta L (2016) Testofen, a specialised Trigonella foenum-graecum seed extract reduces age-related symptoms of androgen decrease, increases testosterone levels and improves sexual function in healthy aging males in a double-blind randomised clinical study. The Aging Male 19:134-142.
28. Maheshwari.A, Verma.N, Swaroop.A, Bagchi.M, Preuss H.G, et al. (2017) Efficacy of FurosapTM, a novel Trigonella foenum-graecum seed extract, in enhancing testosterone level and improving sperm profile in male volunteers. International journal of medical sciences 14:58.
29. Kamal.R, Yadav.R, Sharma.J (1993) Efficacy of the steroidal fraction of fenugreek seed extract on fertility of male albino rats. Phytotherapy research 7:34-138.
30. Kassem.A, Al-Aghbari.A, Molham.A.H, Al-Mamary.M (2006) Evaluation of the potential antifertility effect of fenugreek seeds in male and female rabbits. Contraception 73:301-306.
31. Al-Yahya, A.A (2013) Reproductive, cytological and biochemical toxicity of fenugreek in male Swiss albino mice. African Journal of Pharmacy and Pharmacology 7: 2072-2080.
32. Mohammed.H.A, Kamil.D.Q, Ahmed S.A (2015) Effect of fenugreek (Trigonella foenum-graecum) seed aqueous extract on testes tissue of anabolic steroid treated adult mice. World Journal of Agricultural Research 4:35-39.
33. Sharma.R, Raghuram.T, Rao N.S (1990) Effect of fenugreek seeds on blood glucose and serum lipids in type I diabetes. European Journal of Clinical Nutrition 44:301-306.
34. Sreeja .S, Anju.V (2010) In vitro estrogenic activities of fenugreek Trigonella foenum graecum seeds.
35. Cederroth.C.R, Zimmermann.C, Beny, J.-L.Schaad, O. Combepine et al (2010) Potential detrimental effects of a phytoestrogen-rich diet on male fertility in mice. Molecular and cellular endocrinology 321:152-160.
36. Assinder.S , Davis.R, Fenwick.M, Glover.A (2007) Adult-only exposure of male rats to a diet of high phytoestrogen content increases apoptosis of meiotic and post-meiotic germ cells. Reproduction 133;11-19.
37. 37. Sharma.R, Raghuram.T, Rao N.S (1990) Effect of fenugreek seeds on blood glucose and serum lipids in type I diabetes. European Journal of Clinical Nutrition 44:301-306.
38. 38. Sreeja .S, Anju.V (2010) In vitro estrogenic activities of fenugreek Trigonella foenum graecum seeds.
39. 39. Cederroth.C.R, Zimmermann.C, Beny, J.-L.Schaad, O.Combepine et al (2010) Potential detrimental effects of a phytoestrogen-rich diet on male fertility in mice. Molecular and cellular endocrinology 321:152-160.
40. 40. Assinder.S , Davis.R, Fenwick.M, Glover.A (2007) Adult-only exposure of male rats to a diet of high phytoestrogen content increases apoptosis of meiotic and post-meiotic germ cells. Reproduction 133:11-19.