



## **AN OVERVIEW OF MEDICINAL SIGNIFICANCE OF FENUGREEK SEEDS**

*(Trigonella foenum-graecum)*



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### **ABSTRACT**

*The objectives of this article are to provide a brief overview of the medicinal significance of fenugreek seeds (*Trigonella foenum-graecum*). Fenugreek is an annual plant in the family Fabaceae, with leaves consisting of three small obovate to oblong leaflets. It is cultivated worldwide as a semiarid crop. Its seeds and leaves are common ingredients in dishes from the Indian subcontinent, and have been used as a culinary ingredient since ancient times. It is known for its medicinal qualities such as antidiabetic,*

*anticarcinogenic, hypocholesterolemic, antioxidant and immunological activities. Beside its medicinal value, it is also used as a part of various food product developments as food stabilizer, adhesive, and emulsifying agent.*

### **KEYWORDS**

*Fenugreek, Anti- diabetic, Anti-carcinogenic, Hypocholesterolemic, *Trigonella foenum-graecum**

## RESEARCH PAPER

### Introduction:

Fenugreek is an annual herb with triangular yellow flowers and seed containing pods that grows in countries of the Mediterranean, Middle East, India, China and more recently, Canada. Fenugreek seed or its extracts are found in food products such as frozen dairy products, gelatin puddings, candy and gravy sauces and in alcoholic and nonalcoholic beverages. An extract of fenugreek also is used as a flavoring ingredient in imitation maple syrup. Fenugreek has a history of use in traditional medicine in India and China. Its uses include as a treatment of weakness and leg edema, as a lactation and appetite stimulant, and as a remedy for indigestion, baldness, and fever. Some have used it topically for myalgia, wound treatment, and cellulitis. Seeds of fenugreek spice have medicinal properties such as hypocholesterolemic, lactation aid, antibacterial, gastric stimulant, for anorexia, antidiabetic agent, galactagogue, hepatoprotective effect and anticancer. These beneficial physiological effects including the antidiabetic and hypocholesterolemic effects of fenugreek are mainly attributable to the intrinsic dietary fiber constituent which have promising nutraceutical value (Srinivasan, 2006). It is well known for its fiber, gum, other chemical constituents and volatile contents. Dietary fiber of fenugreek seed is about 25% which changes the texture of food. These days it is used as food stabilizer, adhesive and emulsifying agent due to its high fiber, protein and gum content. The protein of fenugreek is found to be more soluble at alkaline pH (Meghwal and Goswami, 2012). As like fenugreek, *Costus igneus* contains various phytochemicals like flavonoids, alkaloids, terpenoids and it was traditionally used in India to control diabetes (Pardhe D.D., 2021).

### Photochemistry:

Fenugreek contains a number of chemical constituents including steroidal sapogenins. Diosgenin component has been found in the oily embryo of fenugreek. There are two furastanol glycosides, F-ring opened precursors of diosgenin that have been reported in fenugreek also as hederagin glycosides. Alkaloids such as trigocoumarin, nicotinic acid, trimethyl coumarin and trigonelline are present in stem. The mucilage is a standing out constituent of the seeds (Khare, 2004). There is about 28% mucilage; a volatile oil; 2 alkaloids such as trigonelline and Choline, 5% of a stronger-smelling, bitter fixed oil, 22% proteins and a yellow coloring substance are present in stem (Grieve, 1984). The mineral and vitamins present in leaves include calcium, zinc iron, phosphorous, riboflavin, carotene, thiamine, niacin and vitamin C (Rao, 2003). Yadav and Sehgal (1997) found that fresh leaves of fenugreek contain ascorbic acid of about 220.97 mg per 100 g of leaves and b-carotene is present about 19 mg/100 g. Fenugreek seed has a central hard and yellow embryo which is surrounded by a corneous and comparatively large layer of white and semi-transparent endosperm (Betty, 2008). The major bioactive compounds in fenugreek seeds are believed to be polyphenol compounds, such as rhaponticin and isovitexin (He et al., 2015). Srinivasan (2006) reported that Fenugreek leaves contain vitamin C (52 mg per 100 g),  $\beta$ -carotene (2.3 mg per 100 g), thiamine (40  $\mu$ g per 100 g), riboflavin (310  $\mu$ g per 100 g), nicotinic acid (800  $\mu$ g per 100 g) and folic acid (0  $\mu$ m per 100 g), whereas the ones for seed were 43 mg, 96  $\mu$ g, 340  $\mu$ g, 290  $\mu$ g, 1.1 mg and 84  $\mu$ g, respectively.

### **Medicinal Significance of fenugreek seeds:**

The most important functional and medicinal values of fenugreek are attributed to its chemical composition (20-25% proteins, 45-50% dietary fiber, 20-25% mucilaginous soluble fiber, 6-8% fixed fatty acids and essential oils, and 2-5% steroidal saponins. Moreover, some minor components such as alkaloids (trigonelline, choline, gentianine, carpaine, etc), free unnatural amino acids (4-hydroxyisoleucine), and individual spirostanols and furstanols like diosgenin, gitogenin and yamogenin have also been identified and determined as the main component for its various biological effects (Trivedi *et al.*, 2007).

### **Diabetes management:**

There are a significant number of works that have been carried out to show the efficacy of fiber, especially the soluble part of the fenugreek dietary fiber on blood and serum glucose management and insulin production. It was reported that adding 100 g fenugreek powder containing 50 percent dietary fiber for a period of 10 days decreased 25 percent blood glucose level among the type II diabetes patients (Hammerness *et al.*, 2003). Moreover, it has been reported that soluble fiber of fenugreek postpones digestion and absorption of carbohydrate resulting improvement of glucose homeostasis (Hannan *et al.*, 2003). Fenugreek derived galactomannans, due to its unique structure of galactose to mannose 1:1 ratio, have shown to have the maximum efficacy in lowering the plasma cholesterol level (Brummer *et al.*, 2003). Furthermore, soluble fiber fractions reduce only the dangerous low-density lipoproteins and triglycerides intake, whereas keeping the good high-density cholesterol intact (Boban *et al.*, 2006).

### **Effect on constipation and irregularity:**

Fenugreek fiber could be useful for treating constipation and hinder the development of diverticulosis and diverticulitis; it helps to keep constant and steady stool time (Johanson J.F., 2007).

### **Effect on body weight and obesity:**

It was observed that the food rich in dietary fiber and protein could increase secretion of the anorexigenic and insulinotropic hormone, glucagon-like peptide-1 (GLP-1) to improve glucose tolerance and reduce weight gain (Reimer *et al.*, 2008).

### **Anticarcinogenic effect and antioxidant activity:**

Cancer is a very serious and complicated disease created by out of control and irregular growth of cell, whose prevalence is remarkably increasing. The anticarcinogenic activity of fenugreek has been reported in several studies. Incorporation of fenugreek seed in the diet modulates the activities of  $\beta$ -glucuronidase and mucinase and inhibit coloncarcinogenesis. Activity of  $\beta$ -glucuronidase significantly decreased the free carcinogens which were not affective on colonocytes. Mucinase helped in hydrolysing the protective mucin and this was correlated with the presence of fibre, flavanoids and saponins (Devasena *et al.*, 2003). Dixit *et al.* 2005 have shown that the aqueous fraction of fenugreek exhibit higher antioxidant activity compared with other fractions. Fenugreek has been used to relieve colds,

bronchial complaints, influenza, asthma, catarrh, constipation, sinusitis, pleurisy, pneumonia, sore throat, laryngitis, hay fever tuberculosis and emphysema (Anon., 2013). Breasts are modified sweat glands and fenugreek has been found to stimulate sweat production as it contains hormone precursor to increase milk formation. Some scientists reported that fenugreek can increase a nursing mother's milk supply within 24–72 h after first taking the herb (Snehlata and Payal, 2012).

### **Conclusion:**

The medicinal value of fenugreek is mentioned in ayurveda as well as latin and greek pharmacopoeia. Fenugreek is rich in fiber, protein and due to its valuable bioactive components has promising therapeutic and application. Antidiabetic, antioxidant, anticarcinogenic, hypoglycemic and hypocholesterolemic activity are the major medicinal properties of the fenugreek found in various research studies. The more research is expected to find out medicinal significance of fenugreek in future. Based on these several healthful benefits, fenugreek can be recommended and be a part of our daily diet and incorporated into foods in order to produce functional foods.

### **REFERENCES**

- Anonymous, 2013. Herbs are special. Fenugreek. Available from:  
<http://www.herbsarespecial.com.au/free-sprout-information/fenugreek.html>.
- Betty, R.I., 2008. The many healing virtues of fenugreek. *Spice India* 1,17–19.
- Boban PT, Nambisan B, Sudhakaran PR. Hypolipidaemic effect of chemically different mucilages in rats: a comparative study. *Brit J Nutr.* 2006; 96(06):1021-9.
- Brummer Y, Cui W, Wang Q. Extraction, purification and physicochemical characterization of fenugreek gum. *Food Hydrocolloid.* 2003; 17(3):229-36.
- Devasena T, Menon VP. Fenugreek affects the activity of  $\beta$ -glucuronidase and mucinase in the colon. *Phytother Res.* 2003; 17(9):1088-91.
- Dixit P, Ghaskadbi S, Mohan H, Devasagayam T. Antioxidant properties of germinated fenugreek seeds. *Phytother Res.* 2005; 19(11):977-83.
- Grieve, 1984. *A Modern Herbal*. Savvas PublishingHannan J, Ali L, Rokeya B, Khaleque J, Akhter M, Flatt P, et al. Soluble dietary fibre fraction of *Trigonella foenum-graecum* (fenugreek) seed improves glucose homeostasis in animal models of type 1 and type 2 diabetes by delaying carbohydrate digestion and absorption, and enhancing insulin action. *Brit J Nutr.*2007;97(03):514-21.

- Hammerness P, Basch E, Ulbricht C, Barrette E-P, Foppa I, Basch S, et al. St. John's wort: a systematic review of adverse effects and drug interactions for the consultation psychiatrist. *Psychosomatics*. 2003;44(4):271-82.
- He, Y., Ding, C., Wang, X., Wang, H., Suo, Y., 2015. Using response surface methodology to optimize countercurrent chromatographic separation of polyphenol compounds from fenugreek (*Trigonella foenum-graecum* L.). *Seeds. J. Liq. Chromatogr, R. T.* 38 (1), 29–35.
- Johanson JF. Review of the treatment options for chronic constipation. *Med gen med*. 2007;9(2):25.
- Khare, C.P., 2004. *Indian herbal Remedies: Rational Western Therapy, Ayurvedic and other Traditional Usages, Botany*. Springer Verlag, Berlin Heidelberg New York.
- Meghwal, M., Goswami, T.K., 2012. A review on the functional properties, nutritional content, medicinal utilization and potential application of fenugreek. *J. Food Process Technol.* 3. <http://dx.doi.org/10.4172/2157-7110.1000181>.
- Pardhe D,D.,2021. An overview of medicinal uses of insulin plant (*Costus igneus*), *IJRSET*, Vol.10, Issue 05, 4540-4541.
- Rao, A.V., 2003. *Herbal Cure for Common Diseases*. Fusion Books, New Delhi.
- Reimer RA, Russell JC. Glucose tolerance, lipids, and GLP-1 secretion in JCR: LA-cp rats fed a high protein fiber diet. *Obesity*. 2008;16(1):40-6.
- Snehlata, H.S., Payal, D.R., 2012. Fenugreek (*Trigonella foenumgraecum* L.): an overview. *Int. J. Curr. Pharm. Rev. Res.* 2 (4), 169–187.
- Srinivasan, K., 2006. Fenugreek (*Trigonella foenum-graecum*): A review of health beneficial physiological effects. *Food Rev. Int.* 22 (2), 203–224.
- Trivedi PD, Pundarikakshudu K, Rathnam S, Shah KS. A validated quantitative thin-layer chromatographic method for estimation of diosgenin in various plant samples, extract, and market formulation. *J Aoac Int.* 2007; 90(2): 358-63.
- Yadav, S., Sehgal, S., 1997. Effect of home processing and storage on ascorbic acid and  $\beta$ -carotene content of bathua (*Chenopodium album*) and fenugreek (*Trigonella foenum graecum*) leaves. *Plant Food Hum. Nutr.* 50, 239–247.