



## Fenugreek: The Versatile Herb with Medicinal Wonder

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Fenugreek, scientifically known as *Trigonella foenum-graecum* ( $2n=16$ ), belongs to the family Fabaceae, is an annual and self-pollinated seed spice known for its medicinal, pharmaceutical, and nutraceutical properties originating from the Mediterranean region, recognized for its unique trifoliate leaves and small, oblong seeds. It boasts a rich historical heritage, stretching back to ancient civilizations, and carries cultural and culinary significance worldwide. Its seeds, which possess a mildly bitter yet subtly sweet flavor profile, are widely employed as a spice in Indian, Middle Eastern, and Mediterranean culinary traditions. Similarly, its leaves, referred to as "methi" in Indian cuisine, enhance the taste of numerous dishes.

Fenugreek is extensively used as fresh leaves as green leafy vegetable, chopped leaves as flavoring agent, sprouts as salad, micro greens as salad, pot herbs as decoration and most importantly the seeds are used as spices and condiments to improve the flavor and nutritive value of food. Due to its mucilaginous, demulcent, diuretic, carminative, astringent, emollient and aphrodisiac properties of seeds, its powders and extracts are also used in the preparation of several ayurvedic medicines. Besides young green tender plants and leaves are also used as nutritionally rich vegetables. Fenugreek which forms the actual spice is a rich source of vitamin A, vitamin C, and vitamin B2. The seeds of fenugreek contain *Diosgenin* which is used in the preparation of oral contraceptive pills. Beyond its culinary applications, fenugreek has a traditional role in Ayurvedic and traditional medicine, believed to offer various health advantages such as aiding digestion and regulating blood sugar levels.

Natural remedies, derived from plants, herbs, and traditional practices, often have a long history of use and may provide effective alternatives or adjuncts to pharmaceutical drugs with fewer side effects. This article aims to underscore the importance of fenugreek as a versatile and valuable natural remedy. It emphasizes how fenugreek's rich cultural heritage, along with its modern scientific exploration, contributes to a comprehensive understanding of its potential to improve digestion, regulate blood sugar levels, and support overall health.

### Nutritional importance and medicinal value of Fenugreek

The herb's seeds and leaves are reservoirs of bioactive compounds such as alkaloids, flavonoids, saponins, and polyphenols. One of its foremost uses lies in glycemic control, as fenugreek exhibits hypoglycemic effects by modulating glucose metabolism, enhancing insulin sensitivity, and reducing postprandial hyperglycemia. This property makes it a promising adjunctive therapy for individuals with diabetes. Furthermore, fenugreek is recognized for its galactagogue potential, promoting milk production in lactating mothers, possibly attributable to its phytoestrogen content. Beyond metabolic health, fenugreek is valued for its anti-inflammatory properties, with applications in managing conditions like arthritis and inflammatory bowel disease. Its fiber content aids in digestion, potentially mitigating gastrointestinal discomfort. The herb's steroidal saponins may contribute to

cardiovascular health by reducing cholesterol levels and inhibiting atherogenesis. Additionally, fenugreek's multifaceted benefits extend to skincare, with its extracts exhibiting antioxidant and anti-inflammatory properties, and haircare, where it may help combat hair loss.

The table below mentions the important nutritive component of fenugreek and its uses for a healthy life. Fenugreek seeds are characterized by varied mineral content, and some minerals, such as phosphorus and sulfur, are found in significant concentrations. Mineral elements play a host of important roles in the human body. Potassium is a component of cellular and bodily fluids that regulate the heart rate and blood pressure by countering the effects of sodium. Magnesium is important for energy production and transport; it is involved in glycolysis and oxidative phosphorylation and is required for maintaining normal heart rhythm. This element participates in muscular activity and is required by more than 300 enzymes to catalyze various functions in the body, including protein synthesis, muscle, and nerve function. Fenugreek seeds contain the neuroprotective alkaloid trigonelline, which can be effectively used in the prevention and treatment of neurodegenerative diseases. Fenugreek seeds also have anti-inflammatory, antipyretic, and analgesic properties. Active ingredients with hypoglycemic effects include coumarin, trigonelline, and nicotinic acid. It is demonstrated that fenugreek extracts effectively prevent and inhibit the progression of breast cancer. Flavonoids could also significantly contribute to fenugreek's anticarcinogenic properties. Fenugreek constitutes valuable raw material for the pharmaceutical industry that has long searched for effective cures for cancer. Fenugreek extracts have estrogenic properties, which makes them suitable for use in the treatment of impotence and the alleviation of menopausal syndromes.

Fenugreek Component	Nutritional/Health Impacts
Galactomannan (soluble fiber)	Help lower blood sugar levels and improve insulin sensitivity.
Steroids (e.g., diosgenin)	Used in the synthesis of steroidal drugs, potentially for hormone replacement therapy.
Alkaloids (e.g., trigonelline)	May have various pharmacological effects, including anti-diabetic and neuroprotective properties.
Omega-3 Fatty Acids	Supports heart and brain health, and reduces inflammation.
Essential Amino Acids	Required for protein synthesis and overall health.
Choline	Important for brain development, nerve function, and liver health.
Essential Oils (e.g., triglycerides, sterols)	Anti-inflammatory and antioxidant properties
Lecithin	Supports cell membrane health and liver function.
Galactose	A sugar that can provide a source of energy for the body
Saponins	Cholesterol-lowering and immune-boosting properties.
Flavonoids	Antioxidant compounds that help protect cells from oxidative damage.
Polysaccharides	Immune-enhancing properties.
Luteolin	A flavonoid with potential anti-inflammatory and antioxidant effects.
Coumarins	May have anti-coagulant (blood-thinning) properties.
Steroids (e.g., diosgenin)	Used in the synthesis of steroidal drugs, potentially for hormone replacement therapy.
Alkaloids (e.g., trigonelline)	May have various pharmacological effects, including anti-diabetic and neuroprotective properties

## Conclusion

Fenugreek represents a distinctive spice crop that has garnered renewed attention in the realm of traditional medicine. Its seeds and leaves serve as abundant reservoirs of essential nutrients, encompassing proteins, lipids, fatty acids, and minerals, thereby satisfying the body's nutritional requirements and conferring a multitude of health advantages. This environmentally sustainable plant exhibits significant potential across various sectors, including food production, animal feed, pharmaceuticals, and cosmetics, owing to its nutrient-rich and nutraceutical composition. The insights presented within this review paper hold promise for consumers seeking to enhance their health by integrating biogenic elements and beneficial fatty acids into their dietary regimens. With its rich nutritional profile and diverse medicinal attributes, fenugreek holds a promising role in promoting overall well-being and warrants further exploration in both traditional and modern healthcare practices. The article aims to promote awareness of fenugreek's relevance in contemporary healthcare and nutrition, encouraging individuals to consider its inclusion in their daily lives for potential health benefits.

## References

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