

FENUGREEK

TOPIC: Fenugreek

SCIENTIFIC NAME: *Trigonella foenum-graecum* L. Family: Leguminosae or Fabaceae¹

COMMON NAME: Fenugreek

ALSO KNOWN AS: Alholva, Bird's Foot, Bockshornklee, Bockshornsamen, Chilbe, Fenegrec, Foenugraeci Semen, Foenugreek, Graine de fenugrec, Greek Clover, Greek Hay, Greek Hay Seed, Griechische Heusamen, Hu Lu Ba, Menthi, Methi, Trigonella, Trigonella Semen^{1,2,3}

CHEMISTRY AND PHARMACOLOGY: The medicinal parts are the ripe, dried seeds⁴. Fenugreek seed contains 45-60% carbohydrates, mainly mucilaginous fiber (galactomannans); 20-30% proteins high in lysine and tryptophan; 5-10% fixed oils (lipids); pyridine-type alkaloids, mainly trigonelline (0.2-0.36%), choline (0.5%), gentianine, and carpaine; the flavonoids apigenin, luteolin, orientin, quercetin, vitexin, and isovitexin; free amino acids, such as 4-hydroxyisoleucine (0.09%); arginine, histidine, and lysine; calcium and iron; saponins (0.6-1.7%); glycosides yielding steroidal sapogenins on hydrolysis (diosgenin, yamogenin, tigogenin, neotigogenin); cholesterol and sitosterol; vitamins A, B₁, C, and nicotinic acid; and 0.015% volatile oils (n-alkanes and sesquiterpenes)^{5,6}. The seeds also contain the saponin fenugrin B, coumarin compounds, alkaloids (trigonelline, gentianine, carpaine). A large portion of the trigonelline is degraded into nicotinic acid and pyridines, which is responsible for the flavor of the seed. The seed is also responsible for 8% of fixed, foul-smelling oil⁶.

Several C-glycoside flavones have been identified in the seeds of fenugreek. These include vitexin, vitexin glycoside, and an arabinoside of orietin (iso-orientin), minor steroidal sapogenins (smilagenin, sarsasapogenin, yuccagenin), and up to 50% of mucilaginous fiber⁶.

MECHANISM OF ACTION: Fenugreek has antidiabetic and antilipidemic effects^{1-3,5-6}. However, the exact mechanism of action is still unclear and being studied, and more work is needed. The antidiabetic effect of Fenugreek was thought to be due to formation of a colloidal-type suspension in the stomach and intestines when the mucilaginous fiber of the seeds is hydrated, therefore affecting gastrointestinal transit, slowing glucose absorption. The antilipidemic effects of Fenugreek was thought to be due to inhibition of intestinal cholesterol absorption due to saponin-cholesterol complex formation, increased loss of bile through fecal excretion due to saponin-bile complexes, thus increasing conversion of cholesterol to bile by the liver, and effects of amino acid pattern of Fenugreek on serum cholesterol^{1,2}. Fenugreek contains coumarins and other constituents that might affect platelet aggregation, but this might not be clinically significant. Fenugreek constituents also show evidence of cardiotoxic, hypoglycemic, diuretic, anti-inflammatory, anti-hypertensive, and anti-viral properties¹.

CURRENT INDICATIONS AND EFFICACY: The Commission E approved internal use of Fenugreek seed for loss of appetite and external use as a poultice for local inflammation. It is indicated for use externally as an emollient for treating furuncles, boils, inflamed indurations, and eczema, and applied as a poultice^{2,4,5}. However, the primary clinical applications of Fenugreek are in the treatment of diabetes and hyperlipidemia².

In a randomized, crossover metabolic study (n=10), 100 grams of defatted Fenugreek seed powder, divided into two equal doses, was given for 10 days to Type I diabetes patients resulted in a significant decrease in fasting blood sugar from 15.1 ± 2.4 to 10.9 ± 2.75 mmol/L ($p < 0.01$) and improved the glucose tolerance test. 24-hour urinary glucose excretion was reduced by 54%. However, fenugreek administration did not significantly affect the serum insulin levels. Total serum cholesterol (from approximately 4.9 to 3.5 mmol/L), LDL and VLDL cholesterol (from approximately 3.2 to 2.3 mmol/L) and triglycerides (from approximately 1.8 to 1.3 mmol/L) were also significantly reduced. The authors suggest that dietary intake of Fenugreek seed powder is useful in the management of diabetes. However, all subjects were put on a fixed dose of continuous Lente insulin therapy throughout the study. Insulin dose ranges between 25-40 units/day⁷.

In a clinical study, 21 patients with Type II diabetes consumed 15 grams of ground Fenugreek mixed in a meal consisted of 55% carbohydrate, 15% protein, and 30% fat. The results demonstrate a significant decrease in postprandial glucose levels (from approximately 105 to 80 mg/dL) and overall glucose levels at 120 minutes following a mean tolerance test with Fenugreek. The authors suggest that Fenugreek may have a potential benefit in the management of Type II diabetes. However, all subjects were also receiving daily therapy of oral antidiabetic agents with glyburide and/or metformin⁸.

CONTRAINDICATIONS: Hypersensitivity or history of allergic reaction to Fenugreek or any of its components, pregnancy, or lactation^{2,3,5}.

ADVERSE REACTIONS: Diarrhea, flatulence, maple syrup urine, hypoglycemia with large doses, decrease in blood urea to low normal after 12 weeks of ingestion of Fenugreek seed powder. Fenugreek can cause allergic reactions including nasal congestion, hoarseness, persistent coughing, wheezing, facial angioedema, and shock. Repeated external applications of Fenugreek may lead to undesirable skin reactions^{1,2,4,5}.

ALLERGIES: Allergy to Leguminosae including soybeans, peanuts, and green peas might also be allergic to Fenugreek¹.

DOSAGE FORMS^{1-6,9}: Fenugreek is supplied as seed, powdered seed, or capsule. Because the seeds of Fenugreek are somewhat bitter, Fenugreek is best taken in capsule form. Orally used for lowering blood glucose in diabetes, loss of appetite, dyspepsia, gastritis, constipation, atherosclerosis, high serum cholesterol and triglycerides, and for promoting lactation. Topically used as a poultice for local inflammation, boils, wounds, and eczema. Fenugreek is also used as a spice in food.

RECOMMENDED DOSES AND DURATION: When taken orally for hyperglycemia and hyperlipidemia dose ranges from 5 grams powdered Fenugreek seed to 100 grams daily twice daily with 25 grams being the most common daily dose². In capsule form, the typical dosage is 5 grams to 30 grams 3 times a day with meals, taken indefinitely¹⁰. When used topically for inflammation, the typical dosage is 50 grams powdered seed mixed with 0.25 L water, applied as needed². Fenugreek may also be administered as a tea product, typically one cup of tea several times a day. The tea is prepared by steeping 500 mg seed in 150 mL of cold water for three hours and the straining^{1,4}. Data for duration of use is not available, except for capsule form that is taken indefinitely¹⁰.

To prepare a poultice (semi-solid paste), powder: 50 grams powdered seed mixed with 1 liter water, applied as needed^{4,5}.

DRUG INTERACTIONS^{1-3,10}: Concomitant use of anticoagulant/antiplatelet drugs might increase the risk of bruising and bleeding because Fenugreek constituents contain coumarins that have antiplatelet effects. Some drugs with anticoagulant or antiplatelet effects include aspirin, clopidogrel, non-steroidal anti-inflammatory drugs (NSAIDs) such as diclofenac, ibuprofen, naproxen, and others. Also, dalteparin, enoxaparin, and heparin might increase the risk of bleeding. Concomitant use of Fenugreek and anti-diabetic agents including acarbose, glipizide, glyburide, insulin, metformin, pioglitazone, rosiglitazone, and others may cause hypoglycemic episodes. Fenugreek can also interfere with corticosteroid drug activity, hormone therapy, monoamine oxidase inhibitors, warfarin, and insulin, which may be due to high content of mucilaginous fiber in Fenugreek and high viscosity in the gut.

DRUG-DISEASE INTERACTIONS: Fenugreek may alter blood sugar control in persons with diabetes, thus blood glucose levels should be closely monitored with concomitant use of diabetic medications and Fenugreek¹⁻³.

OTHER SAFETY ISSUES: Stop taking Fenugreek immediately if the following side effects occur because it may indicate symptoms of allergic reactions. These symptoms include breathing problems, chest or throat tightness, chest pain, skin hives, rash, or itchy or swollen skin². Avoid using Fenugreek during pregnancy or lactation, or those with severe liver or kidney impairment because of inadequate data suggesting use^{1-3,5}. Avoid repeated topical application, chronic use, and excessive ingestion of Fenugreek to prevent undesirable reactions or toxicities^{2,6} and because long-term data are not available.

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