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FILE: ■ Fenugreek (*Trigonella foenum-graecum*)

■ Diabetes

■ Hyperlipidemia

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RE: Common Therapeutic Use of Fenugreek

Basch E, Ulbricht C, Kuo G, Szapary P, Smith M. Therapeutic applications of fenugreek. *Alternative Medicine Review* 2003;8:20–27.

Fenugreek (*Trigonella foenum-graecum*) is an annual plant that grows to an average height of two feet. Its leaves and seeds have been used for centuries to prepare extracts and powders for medicinal use. In ancient Rome, fenugreek was thought to be used to aid labor and delivery. It was used as incense and in the embalming of mummies in ancient Egypt. In traditional Chinese medicine, fenugreek seeds are used to treat weakness and edema of the legs. In India, fenugreek is used as a lactation stimulant. Many other medicinal uses of the plant (e.g., the treatment of baldness and indigestion) have been reported. The preliminary results of human and animal studies suggest that oral fenugreek seeds have hypoglycemic and antihyperlipidemic properties.

The testa and endosperm of the defatted seeds are thought to be the source of the hypoglycemic effects of fenugreek, which have been attributed to various mechanisms. Sauvaire et al. showed that the amino acid 4-hydroxyisoleucine in fenugreek seeds increased the glucose-induced release of insulin in the pancreatic islet cells of humans and rats. Several studies have evaluated the effects of fenugreek in patients with type 1 and 2 diabetes.

In a randomized, controlled, double-blind trial, Gupta et al. evaluated the effects of fenugreek seeds on glycemic control in 25 patients with type 2 diabetes. The patients received either a 1-g hydrochloric extract of fenugreek seeds or usual care. After two months, blood glucose concentrations decreased in both groups (from 148.3 to 119.9 mg/dL in the fenugreek group and from 137.5 to 113.0 mg/dL in the usual-care group); the difference between groups was not significant. A randomized, controlled, crossover trial of fenugreek seeds was conducted in ten patients with type 2 diabetes. The patients consumed meals either with or without 25 g powdered fenugreek seeds in two equal doses for 15 days.

Glucose-tolerance-test scores improved significantly in the fenugreek-treated patients, as did serum glucose clearance rates (136.4 ± 6.36 mg/mL/min in the fenugreek group and 153 ± 11.92 mg/mL/min in the control group). In ten patients with type 1 diabetes, Sharma et al. conducted a randomized, controlled, crossover study. The subjects consumed meals either with or without 100 g fenugreek seed powder at lunch and dinner for ten days. Glucose-tolerance-test scores improved significantly in the fenugreek group, as did fasting serum glucose concentrations (from 15.1 ± 2.4 to 10.9 ± 2.75 mmol/L; $P < 0.01$). The results suggest that "fenugreek may aid with insulin secretion;" however, more studies in patients with type 1 diabetes are needed.

The lipid-lowering effects of fenugreek may be due to its sapogenin and estrogen constituents. Sharma et al. studied the effects of defatted fenugreek powder (100 g/day orally) in asymptomatic, hyperlipidemic adults. After three weeks, the subjects' triglyceride and low-density-lipoprotein-cholesterol (LDL-C) concentrations were lower than those at baseline; small decreases in high-density-lipoprotein-cholesterol (HDL-C) concentrations were also observed. In another study by Sharma et al., total cholesterol concentrations decreased in five patients with diabetes who ingested 25 g fenugreek seed powder daily. Sowmya and Rajyalakshmi also observed significant decreases in total cholesterol and LDL-C concentrations in 20 hypercholesterolemic adults who consumed 12.5–18.0 g powdered, germinated fenugreek seeds for one month; however, no significant changes in HDL-C, very-low-density-lipoprotein-cholesterol, or triglyceride concentrations were found. Most of the available studies of the effects of fenugreek on lipid concentrations did not have "proper controls, randomization, or blinding." Therefore, "further double-blind research is warranted."

Although fenugreek is generally considered to be safe and well tolerated, side effects from its use have been reported and include diarrhea, dizziness, and flatulence. Fenugreek should not be consumed by persons allergic to chickpeas or by pregnant women. Because hypoglycemia is an expected effect of fenugreek, glucose concentrations should be monitored during its use. A toxicologic evaluation of 60 diabetic patients who consumed powdered fenugreek seeds (25 g/day) for 24 weeks indicated no clinical hepatic or renal toxicity and no hematologic abnormalities.

Patients with metabolic syndrome or diabetes have an increased risk of cardiovascular morbidity and mortality. Thus, dietary supplements that can modulate glucose homeostasis and improve lipid parameters would be beneficial for these patients. The sparse data generated thus far will "hopefully lead to the development of well-designed, adequately powered, randomized, clinical trials evaluating the effect of fenugreek seed powder on measures of insulin resistance, insulin secretion, and cholesterol metabolism."

—Brenda A. Milot, ELS

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