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RE: Ten Herbs Used for Glycemic Control in Type 2 Diabetes

Karel R. Ten herbs for glycemic control in type 2 diabetes. *J Am Herbalists Guild.* 2009;8(2):53-63.

Diabetes mellitus affects nearly 24 million people in the United States. According to the National Diabetes Information Clearinghouse, 90-95% of diabetics have type 2 diabetes. Managing type 2 diabetes requires the maintenance of glycemic control, treatment of comorbidities, and prevention of vascular complications. This article focuses on the use of 10 particular herbs for glycemic control.

Conventional medications, including insulin, may allow persons with type 2 diabetes to live relatively normal lives, says the author. If there is no permanent pancreatic beta-cell dysfunction, however, type 2 diabetes may be reversed with appropriate dietary and lifestyle modifications and the adjunctive use of medicinal herbs and supplements. Dietary changes should include an increased intake of high-quality protein and high-fiber carbohydrates and a decreased intake of refined carbohydrates and saturated fats. Many herbs help enhance insulin sensitivity and glycemic control. In addition to those herbs focused specifically on glycemic control, herbs including vascular tonics, antioxidants, adaptogens, and circulatory stimulants may help decrease some of the complications.

Ivy gourd (*Coccinia grandis* syn. *C. indica*), a traditional Ayurvedic herb, is widely and safely used in India as a traditional treatment for diabetes. Clinical trials are cited that support its efficacy and therapeutic benefits. Its mechanisms of action are poorly understood, says the author, but appear to involve insulin-mimetic properties.

Evidence suggests that Asian ginseng (*Panax ginseng*) improves glucose transport, facilitating the movement of glucose across apical membranes into cells, and potentiates the effects of endogenous or administered insulin via insulin-sparing activity. Among the studies cited by the author is a trial on Asian ginseng's safety and efficacy in a cohort of healthy individuals with controlled type 2 diabetes; adjunctive Asian ginseng improved plasma glucose and plasma insulin levels but there was no reduction in hemoglobin A1c. Other cited research supports ginseng's use as an adjunctive antiglycemic.

American ginseng (*P. quinquefolius*) has been shown to decrease fasting blood glucose and hemoglobin A1c in clinical trials cited by the author. In vitro research suggests that American ginseng acts to increase insulin production and decrease its breakdown via pancreatic beta cells by preventing beta cell apoptosis.[1,2] Both Asian ginseng and American ginseng contain ginsenosides, which appear to increase insulin sensitivity by acting as ligands for peroxisome proliferator-activated receptors.[3] The safety profile of American ginseng is highly favorable, says the author, and traditional use suggests that it may provide a less stimulating alternative to Asian ginseng for herbal therapy.

Results of clinical trials of cinnamon (*Cinnamomum cassia*) for glycemic control are mixed. The author cites several clinical trials that have reported cinnamon's antiglycemic effects and states that the precise mechanism by which it exerts those effects is "imprecisely understood." The herb is well tolerated and safe.

A number of animal trials have found that garlic (*Allium sativum*) administration resulted in dramatic decreases in blood glucose levels, while other trials indicated no antiglycemic activity; similar conflicting results have been reported in clinical trials, says the author. Those conflicting results may involve differences in dosage, type of garlic preparation, and experimental design. One cited human study resulted in significant reductions in serum glucose and triglycerides, with the diabetic cohort receiving 300 mg per day of a time-release garlic powder. If garlic is an effective clinical antiglycemic, it may exert its effects in part by stimulating beta-cell insulin secretion, thereby resulting in peripheral insulin-like activity.[4] Dyspepsia may occur with higher doses, and consumption of more than 5 grams per day of fresh garlic is contraindicated with the use of warfarin because of possible potentiation of anticoagulant action.

Indian plantain (psyllium seed; *Plantago ovata*) has been shown in both animal models and human trials to significantly lower postprandial blood glucose and insulin levels in type 2 diabetes.[5,6] The author reports that its efficacy as an antiglycemic agent has been proven at doses of 10 to 15 grams daily taken either three times a day before meals or twice a day before breakfast and dinner. According to the author, psyllium increases viscosity of intestinal contents and increases gastric motility. "The antiglycemic effects are the result of both mechanisms' decreased absorption and increased gastric emptying attendant upon greater bowel motility," writes the author. Psyllium must be consumed with adequate water to prevent choking or intestinal obstruction. Allergies to psyllium are rare.

Fenugreek (*Trigonella foenum-graecum*) has proven to be an effective antiglycemic agent alone and in combination with other Indian medicinal plants. It is generally well tolerated although some people may experience flatulence and diarrhea. It is contraindicated for people allergic to chickpeas, people with celiac disease and upper digestive tract irritation, and those suffering from fat malabsorption or deficiencies of fat-soluble vitamins.

Gymnema (*Gymnema sylvestre*) has been used traditionally to reduce sugar cravings. According to the author, clinical trials are "extremely encouraging, with robust improvements in glycemic control following its use." Gymnema appears to increase the production of endogenous insulin by pancreatic beta cells and may stimulate regeneration of remaining beta cells in individuals who have suffered beta cell loss.[7,8] Although the data on the herb are intriguing, a few scientists have conducted most of the research, so it is too early to state conclusively that the herb is capable of regenerating pancreatic tissue in a clinically relevant manner.[7] Its primary safety issue is possible induction of hypoglycemia when combined with insulin or oral diabetic agents.

Bitter melon (*Momordica charantia*) has exhibited antiglycemic activity in both animal and clinical trials, says the author. Various compounds of the herb appear to be responsible for its antiglycemic activity, including the steroidal glycosides momordin and charantin. The primary safety concern is that its antiglycemic activity may be additive with conventional antiglycemic medications and may precipitate hypoglycemia.

The author cites published controlled clinical trials on holy basil (tulsi; *Ocimum tenuiflorum* syn. *O. sanctum*) that reported significant declines in both fasting and postprandial glucose, with no adverse events. He also cites animal and in vitro research supporting a therapeutic role for holy basil in diabetes generally and for glycemic control in particular. The author discusses several mechanisms that may be responsible for holy basil's pharmacological activity. The herb has a long history of safe use; however, as with other herbs discussed in this article, it may interact with conventional antiglycemic medications.

"All of the ten herbs described have a long history of use and an exemplary safety record," says the author. "The clinical herbalist can, with the few caveats mentioned, feel confident when employing these medicines as part of a program of glycemic control."

—*Shari Henson*

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