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**FILE: ■Cinnamon (*Cinnamomum* spp.)
■Type 2 Diabetes
■Glucose**

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RE: An Ancient Spice, Cinnamon, Improves Glucose and Lipid Levels

Khan A, Safdar M, Khan MMA, Khattak KN, Anderson RA. Cinnamon improves glucose and lipids of people with type 2 diabetes. *Diabetes Care* 2003;26:3215–3218.

Persons with type 2 diabetes have an incidence of cardiovascular disease that is two- to four-fold that of persons without this disease. The role of diet in the prevention and treatment of diabetes and cardiovascular disease is clear; however, the specific dietary components involved are not. This article discusses the effects of cinnamon consumption on blood glucose and lipid concentration.

It has been postulated that spices may benefit patients with type 2 diabetes. Cinnamon (*Cinnamomum* spp.), cloves (*Syzygium aromaticum*), bay (*Laurus nobilis*) leaves, and turmeric (*Curcuma longa*) have proven insulin-enhancing activity. Balsam pear (more commonly known as bitter melon, *Momordica charantia*), ginseng (*Panax* spp.), onion (*Allium cepa*), and garlic (*Allium sativum*) have been shown to have hypoglycemic effects. Aqueous extracts of cinnamon have been shown to increase glucose uptake, glycogen synthesis, and phosphorylation of the insulin receptor and to likely help in triggering the insulin cascade system. Given that insulin also plays an important role in lipid metabolism, the authors postulated that cinnamon consumption may improve blood glucose and lipid concentrations. Therefore, this study was designed to determine whether there is a dose response of cinnamon on clinical variables associated with cardiovascular disease and diabetes in persons with type 2 diabetes.

Sixty patients under 40 years of age with type 2 diabetes ($n = 30$ men and 30 women) were randomly assigned to one of six groups. From days 1–40, groups 1, 2, and 3 ingested 1 g (2 capsules), 3 g (6 capsules), or 6 g (12 capsules) cinnamon (*C. cassia*) daily (1 g of cinnamon is equal to roughly one half teaspoon), respectively; groups 4, 5, and 6 consumed a corresponding number of placebo capsules. Days 41–60 constituted a washout period, where no cinnamon or placebo was consumed. Fasting blood samples were collected on days 0

(baseline), 20, 40, and 60 for the measurement of serum glucose, triglyceride, total cholesterol, low-density-lipoprotein (LDL) cholesterol, and high-density-lipoprotein (HDL) cholesterol concentrations.

No significant changes were observed in the placebo groups after 20 or 40 days of the study. After 20 days of treatment, glucose and triglyceride concentrations were significantly lower only in the 6-g cinnamon group. Total cholesterol concentrations were significantly lower with all three doses of cinnamon. LDL cholesterol concentrations were significantly lower only in the 1-g and 6-g cinnamon groups, and HDL cholesterol concentrations were significantly lower only in the 3-g cinnamon group. After 40 days of treatment, significantly lower ($P < 0.05$) concentrations of glucose (18–29%), triglycerides (23–30%), and total cholesterol (12–26%) were observed with all three doses of cinnamon; LDL cholesterol concentrations were significantly lower only in the 3-g (10%) and 6-g (24%) cinnamon groups, and HDL cholesterol concentrations did not change significantly. The decreased concentrations of glucose and lipids were maintained even after the 20-day washout period.

The results of this study indicate that a wide range of cinnamon intakes may be beneficial in reducing the risk factors associated with diabetes and cardiovascular disease in patients with type 2 diabetes. Since the effects were similar at all three levels tested, there is a possibility that even less than one gram of cinnamon may be effective. The authors suggest that cinnamon may also be beneficial to the non-diabetic population for preventing and controlling elevated glucose and blood lipid concentrations. The maintenance of lower serum glucose and lipid concentrations even when the subjects were not consuming cinnamon denotes the sustained effects of this spice and is evidence that cinnamon need not be consumed daily to achieve the effects observed. It is important that the mechanisms responsible for these effects on glucose and lipids be determined.

—*Brenda Milot, ELS*

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