

Cinnamon Improves Glucose and Lipid Levels in Type 2 Diabetes

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Persons with type 2 diabetes have an incidence of cardiovascular disease that is two to four times higher than 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, beneficial dietary components involved are not. This article discusses the effects of consumption of the common spice cinnamon on blood glucose and lipid concentrations.

Dr. Richard Anderson of the U.S. Department of Agriculture's Nutrients Requirements and Functions Laboratory, Beltsville Human Nutrition Research Center in Beltsville, Maryland, has devoted some of his research program to testing the effects of common spices on insulin production and glucose metabolism. Previous research—much of it by Anderson and colleagues—has shown that numerous common spices may benefit patients suffering from type 2 diabetes. Cinnamon (*Cinnamomum* spp. J. Presl, Lauraceae), clove (*Syzygium aromaticum* [L.] Merr. & L. M. Perry, Myrtaceae), bay (*Laurus nobilis* L., Lauraceae) leaves, and turmeric (*Curcuma longa* L., Zingiberaceae) have proven insulin-enhancing activity. Bitter melon (*Momordica charantia* L., Cucurbitaceae), ginseng (*Panax* spp., Araliaceae), onion (*Allium cepa* L., Liliaceae), and garlic (*Allium sativum* L., Liliaceae) have been shown to have hypoglycemic effects.

Aqueous extracts of cinnamon have been shown to increase in vitro glucose uptake, glycogen synthesis, and phosphorylation (adding phosphate to an organic compound) of the insulin receptor. It is thought that these extracts may help trigger 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 (non-insulin dependent) diabetes mellitus.

In this trial, 60 patients of mean age 52 ± 6.9 years with type 2 diabetes ($n = 30$ men and 30 women) were randomly assigned to one of 6 groups. From days 1–40, groups 1, 2, and 3 ingested a daily dose of 1 g (2 capsules), 3 g (6 capsules), or 6 g (12 capsules) of cinnamon (*C. cassia*), respectively. (One g of cinnamon is equal to roughly one-half teaspoon.). Groups 4, 5, and 6 consumed a corresponding number of placebo capsules. Days 41–60 constituted a washout period, during which time 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 than

baseline values in only the 6-g cinnamon group. Total cholesterol concentrations were significantly reduced in all three treatment groups. LDL cholesterol concentrations were significantly reduced in the 1-g and 6-g cinnamon groups, while HDL cholesterol concentrations were significantly reduced in only the 3-g cinnamon group. After 40 days of treatment, significantly lower ($P < 0.05$) concentrations of glucose (decreases of 18–29%), triglycerides (decreases of 23–30%), and total cholesterol (decreases of 12–26%) were observed with all three doses of cinnamon. LDL cholesterol concentrations were significantly lower in the 3-g and 6-g cinnamon groups by 10% and 24%, respectively. 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 range of cinnamon intakes may be beneficial in reducing the risk factors associated with diabetes and cardiovascular diseases in patients with type 2 diabetes. Since the effects were similar at all three levels tested, there is a possibility that even a dose of less than 1 gram may be effective. The authors suggest that cinnamon may also benefit the non-diabetic population by preventing and controlling elevated glucose and blood lipid concentrations. The continued maintenance of lower serum glucose and lipid concentrations after subjects had ceased cinnamon consumption suggests a sustained effect by this spice and provides 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 by future research.

—Brenda Milot, ELS