

Cinnamon Extracts Boost Insulin Sensitivity

Agricultural Research Service scientists are seeking a patent on compounds extracted from cinnamon that make cells much more sensitive to insulin in test tube studies.

Nearly 6 percent of the U.S. population—15.7 million people—have diabetes, and one-third of them don't even know it. The large majority of diabetes cases are type 2—the kind that usually begins in midlife. It is characterized by the failure of body cells to recognize and respond to insulin as well as they once did. This leads to elevated blood sugar because insulin's job is to prompt cells to take in glucose.

Another 13.4 million people have elevated fasting blood sugar levels below the threshold indicating diabetes but are at high risk for developing the disease. Lack of exercise, being overweight, and genetic predisposition are often cited as contributing factors involved in the high incidence of diabetes in western countries.

Worldwide, this silent killer claims more than 100 million lives annually. It is the seventh leading cause of death in the United States. And for many people, drugs or other forms of treatment are unavailable.

The search for a natural way to keep blood sugar levels normal began more than a decade ago when ARS chemist Richard A. Anderson and co-workers at the Beltsville (Maryland) Human Nutrition Research Center assayed plants and spices used in folk medicine. They found that a few spices—especially cinnamon—made fat cells much more responsive to insulin, the hormone that regulates sugar metabolism and thus controls the level of glucose in the blood.

With help from Walter F. Schmidt in ARS's Nuclear Magnetic Resonance Laboratory at Beltsville, the researchers identified the compounds in cinnamon responsible for its activity. The patent application names Anderson, his co-workers C. Leigh Broadhurst and

Marilyn M. Polansky, and Schmidt as the inventors.

Cinnamon is among the world's most frequently consumed spices and is relatively inexpensive. Anderson and colleagues found that its most active compound—methylhydroxy chalcone polymer (MHCP)—increased glucose metabolism roughly 20-fold in a test tube assay of fat cells.

The researchers tested 50 some plant extracts and found that none of them came close to MHCP's level of affecting glucose metabolism—a process in which cells convert glucose to energy. If in future research MHCP proves to do the same in people, it might provide a natural remedy against diabetes.

What's more, MHCP prevented the formation of damaging oxygen radicals in a blood platelet assay.

"That could be an important side benefit," notes Anderson. "Other studies have shown that antioxidant supplements can reduce or slow the progression of various complications of diabetes."

MHCP is the first chalcone, a type of polyphenol or flavonoid, reported in cinnamon. MHCP and other active compounds are water soluble and are not found in the spice oils sold as food additives.

Anderson pointed out that the water extract reduced blood pressure in hypertensive rats even before it increased insulin sensitivity. And compounds in a water extract are less likely to be toxic in large doses than those in an oil extract, he says.—By **Judy McBride**, ARS.

This research is part of Human Nutrition, an ARS National Program (#107) described on the World Wide Web at <http://www.nps.ars.usda.gov/programs/appvs.htm>.

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Chemists Richard Anderson and Marilyn Polansky use high-performance liquid chromatography to identify compounds from cinnamon that improve the action of insulin.