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Researchers study how pistachios may improve heart health

Going green may be heart healthy if the green you choose is pistachio nuts, according to researchers at Penn State who conducted the first study to investigate the way pistachios lower cholesterol.

"We investigated mechanisms of action to explain the cholesterol-lowering effects of the pistachio diets," says Sarah K. Gebauer, recent Penn State Ph.D. recipient, currently a post-doctoral research associate, USDA Beltsville Human Nutrition Research Center.

The researchers conducted a randomized, crossover design, controlled feeding experiment to test the effects of pistachios added to a heart healthy moderate-fat diet on cardiovascular disease risk factors. Controlled feeding experiments provide all the food eaten by study subjects for the duration of the study segment.

The participants began the study by eating a typical American diet consisting of 35 percent total fat and 11 percent saturated fat for two weeks. They then tested three diets for four weeks each with about a two-week break between each diet. All three diets were variations on the Step I Diet, a cholesterol-lowering diet in general use. The diets included, as a control, a Step I Diet with no pistachios and about 25 percent total fat and 8 percent saturated fat. The pistachio enhanced diets were Step I Diets with 10 and 20 percent of the energy supplied by pistachio nuts, respectively. The 10 percent pistachio diet had 30 percent total fat and 8 percent saturated fat and the 20 percent pistachio diet had 34 percent total fat and 8 percent saturated fat.

The participants ate half their pistachios as a snack and the rest incorporated into meals.

The researchers report in the most recent issue of the *American Journal of Clinical Nutrition* that "Inclusion of pistachios in a healthy diet beneficially affects cardiovascular disease risk factors in a dose-dependent manner, which may reflect effects on Stearoyl CoA Desaturase (SCD). "

The researchers used the ratio of two fatty acids, 16:1 and 16:0 in plasma as a marker for SCD, an enzyme that is involved in the body's synthesis of fatty acids.

"SCD is an important enzyme involved in cholesterol metabolism," says Gebauer.

They found the ratio of 16:1/16:0 was significantly lower, suggesting a decrease in SCD activity, after eating the 20 percent energy pistachio diet compared to the control diet which had no pistachios. Also, the change in the 16:1/16:0 ratio was correlated with the change in cholesterol, suggesting that SCD activity may contribute to the lipid-lowering effects of pistachios. That, accompanied by the dose-dependent effects of the pistachios, begins to unravel the way in which pistachios improve cardiovascular health.

Compared to the control diet, the 20 percent pistachio diet lowered LDL cholesterol -- bad cholesterol -- about 12 percent and the 10 percent energy pistachio diet lowered LDL cholesterol by 9 percent that suggests a 9 to 12 percent decrease in coronary heart disease risk. The relationships of total cholesterol to HDL cholesterol and LDL cholesterol to HDL cholesterol may be more powerful predictors of cardiovascular risk. The effects of the 10 and 20 percent energy diets showed a dose dependent effect on these ratios.

However, the researchers note that the reduction in LDL cholesterol observed was seven times greater than would be expected from only the fatty acid profile of pistachios. They suggest that the lipid lowering effects not only reflect the fatty acid profile of the diet, but also are the result of other bioactive substances in pistachios, perhaps phytosterols and fiber.

"Our study has shown that pistachios, eaten with a heart healthy diet, may decrease a person's CVD risk profile, says Penny Kris-Etherton, distinguished professor of nutrition and primary investigator of the study."

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Researchers conducting the study included Gebauer; Kris-Etherton; Sheila G. West, associate professor of biobehavioral health; and Deborah Bagshaw, clinical coordinator, Penn State; Colin D. Kay, former Penn State post doctoral associate now at the University of East Anglia, UK; and P. Alaupovic, Oklahoma Medical Research Foundation, Oklahoma City.

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