

Walnuts, walnut oil, improve reaction to stress

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This image shows walnuts growing on walnut tree. Credit: California Walnut Commission

A diet rich in walnuts and walnut oil may prepare the body to deal better with stress, according to a team of Penn State researchers who looked at how these foods, which contain polyunsaturated fats, influence blood pressure at rest and under stress.

Previous studies have shown that [omega-3 fatty acids](#) -- like the alpha linolenic acid found in walnuts and flax seeds -- can reduce low density

lipoproteins (LDL) -- [bad cholesterol](#). These foods may also reduce c-reactive protein and other markers of inflammation.

"People who show an exaggerated biological response to stress are at higher risk of heart disease," said Sheila G. West, associate professor of biobehavioral health. "We wanted to find out if omega 3-fatty acids from plant sources would blunt cardiovascular responses to stress."

The researchers studied 22 healthy adults with elevated [LDL cholesterol](#). All meals and snacks were provided during three diet periods of six weeks each.

The researchers found that including walnuts and walnut oil in the diet lowered both resting [blood pressure](#) and blood pressure responses to stress in the laboratory. Participants gave a speech or immersed their foot in cold water as a stressor. Adding flax seed oil to the walnut diet did not further lower blood pressure. They report their findings in the current issue of the *Journal of the American College of Nutrition*.

"This is the first study to show that walnuts and walnut oil reduce blood pressure during stress," said West. "This is important because we can't avoid all of the stressors in our daily lives. This study shows that a dietary change could help our bodies better respond to stress."

A subset of the participants also underwent a vascular ultrasound in order to measure artery dilation. Results showed that adding flax oil to the walnut diet significantly improved this test of vascular health. The flax plus walnuts diet also lowered c-reactive protein, indicating an anti-inflammatory effect. According to West, that could also reduce risk of cardiovascular disease.



This is a closeup of a walnut in its shell. Credit: Heather Annette Miller; Penn State

The researchers used a randomized, crossover study design. Tests were conducted at the end of each six-week diet, and every participant consumed each of the three diets in random order, with a one-week break between. Diets included an "average" American diet - a diet without nuts that reflects what the typical person in the U.S. consumes each day. The second diet included 1.3 ounces of walnuts and a tablespoon of walnut oil substituted for some of the fat and protein in the average American diet. The third diet included walnuts, walnut oil and 1.5 tablespoons of flaxseed oil. The three diets were matched for calories and were specifically designed for each participant so that no weight loss or gain occurred. The walnuts, walnut oil, and flax oil were either mixed into the food in such offerings as muffins or salad dressing or eaten as a snack. About 18 walnut halves or 9 walnuts make up the average serving used by the researchers.

After each diet, the participants underwent two stress tests. In the first test, they received a topic; and they were given two minutes to prepare a three-minute speech, which they presented while being videotaped. The second stressor was a standard physical test of stress consisting of submerging one foot in ice-cold water. Throughout these tests, the

researchers took blood pressure readings from the participants.



The average portion of walnuts added to the diet was 1.3 ounces which is 9 whole walnuts or 18 walnut halves. The average portion of walnut oil was one teaspoon. Amounts of walnut products varied by individual. Credit: Heather Annette Miller; Penn State

Results showed that average diastolic blood pressure -- the "bottom number" or the pressure in the arteries when the heart is resting -- was significantly reduced during the diets containing walnuts and walnut oil.

Walnuts are a rich source of fiber, antioxidants, and unsaturated fatty acids, particularly alpha linolenic acid, an omega-3 fatty acid, and these compounds could be responsible for the beneficial effects on blood pressure. Flax oil is a more concentrated source of omega-3 fatty acids than walnut oil, but this study did not test whether flax oil alone could blunt cardiovascular responses to stress.

"These results are in agreement with several recent studies showing that walnuts can reduce cholesterol and blood pressure," noted West. "This work suggests that blood pressure is also reduced when a person is exposed to stress in their daily life."

Provided by Pennsylvania State University

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