

# Lipids in eggs enhance bioavailability of carotenoids in vegetables

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Research led by Wayne Campbell, a Purdue University professor of nutrition science, found that adding eggs to a salad mixed with a variety of raw vegetables is an effective method to improve nutrient absorption. The research is published in the *American Journal of Clinical Nutrition*. Credit: Purdue University photo/John Underwood

Adding eggs to a salad with a variety of raw vegetables is an effective method to improve the absorption of carotenoids, which are fat-soluble nutrients that help reduce inflammation and oxidative stress, according to research from Purdue University.

"Eating a salad with a variety of colorful vegetables provides several unique types of carotenoids, including beta-carotene, lutein, zeaxanthin and lycopene," said Wayne Campbell, a professor of nutrition science. "The lipid contained in whole [eggs](#) enhances the absorption of all these carotenoids."

This research is published online in the *American Journal of Clinical Nutrition* and is funded by the American Egg Board-Egg Nutrition Center, National Institutes of Health and Purdue Ingestive Behavior Research Center.

"Most people do not eat enough vegetables in their diets, and at the same time, people are consuming [salad dressings](#) that have less fat or are fat-free," said Jung Eun Kim, a postdoctoral researcher in Purdue's Department of Nutrition Science. "Our research findings support that people obtained more of the health-promoting carotenoids from raw vegetables when cooked whole eggs were also consumed. Eggs, a nutrient-rich food containing [essential amino acids](#), unsaturated fatty acids and B vitamins, may be used to increase the nutritive value of vegetables, which are under consumed by the majority of people living in the United States."

In the study, 16 participants consumed a raw mixed-vegetable salad with no eggs, a salad with one and a half eggs, and a salad with three eggs at different times. All salads were served with three grams of canola oil. The second salad had 75 grams of scrambled whole eggs and the third 150 grams of scrambled whole eggs. The absorption of carotenoids was 3.8-fold higher when the salad included three eggs compared to no eggs.

The study used scrambled eggs to make sure the participants consumed both the yolk and egg whites.

"While other egg forms were not tested, we believe the results would be comparable as long as the egg yolk is consumed," said Campbell, whose research also has looked at salads with different amounts of soybean oil, canola oil and butter. "The lipids in salad dressings also increase the absorption of [carotenoids](#) but it is easy to overuse salad dressings and consume excess calories. Many salad dressings contain about 140-160 calories per serving, about two tablespoons. One large whole egg is about 70 calories and provides 6 grams of protein. People are at a greater risk of putting too many calories on a salad because they don't always know proper portion sizes for salad dressings, but you do know the portion size of an egg."

The study also included Susannah L. Gordon, a graduate student in the Department of Nutrition Science, and Mario G. Ferruzzi, a professor of food science and [nutrition science](#).

**More information:** "Effects of Egg Consumption on Carotenoid Absorption from Co-consumed, Raw Vegetables." *Am J Clin Nutr* ajcn111062; First published online May 27, 2015. [DOI: 10.3945/ajcn.115.111062](#)

Provided by Purdue University

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