

Popcorn: the snack with even higher antioxidant levels than fruits and vegetables

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Popcorn's reputation as a snack food that's actually good for health popped up a few notches today as scientists reported that it contains more of the healthful antioxidant substances called "polyphenols" than fruits and vegetables. They spoke at the 243rd National Meeting & Exposition of the American Chemical Society (ACS), the world's largest scientific society, being held here this week.

Joe Vinson, Ph.D., a pioneer in analyzing healthful components in chocolate, nuts and other common foods, explained that the polyphenols are more concentrated in [popcorn](#), which averages only about 4 percent water, while polyphenols are diluted in the 90 percent water that makes up many fruits and vegetables.

In another surprising finding, the researchers discovered that the hulls of the popcorn — the part that everyone hates for its tendency to get caught in the teeth — actually has the highest concentration of polyphenols and fiber.

"Those hulls deserve more respect," said Vinson, who is with the University of Scranton in Pennsylvania. "They are nutritional gold nuggets."

The overall findings led Vinson to declare, "Popcorn may be the perfect [snack food](#). It's the only snack that is 100 percent unprocessed whole grain. All other grains are processed and diluted with other ingredients, and although cereals are called "whole grain," this simply means that

over 51 percent of the weight of the product is whole grain. One serving of popcorn will provide more than 70 percent of the daily intake of whole grain. The average person only gets about half a serving of whole grains a day, and popcorn could fill that gap in a very pleasant way."

Vinson cautioned, however, that the way people prepare and serve popcorn can quickly put a dent in its healthful image. Cook it in a potful of oil, slather on butter or the fake butter used in many movie theaters, pour on the salt; eat it as "kettle corn" cooked in oil and sugar — and popcorn can become a nutritional nightmare loaded with fat and calories.

"Air-popped popcorn has the lowest number of calories, of course," Vinson said. "Microwave popcorn has twice as many calories as air-popped, and if you pop your own with oil, this has twice as many calories as air-popped popcorn. About 43 percent of microwave popcorn is fat, compared to 28 percent if you pop the corn in oil yourself."

Likewise, Vinson pointed out that popcorn cannot replace fresh fruits and vegetables in a healthy diet. [Fruits and vegetables](#) contain vitamins and other nutrients that are critical for good health, but are missing from popcorn.

Vinson explained that the same concentration principle applies to dried fruit versus regular fruit, giving dried fruit a polyphenol edge. Previous studies found low concentrations of free polyphenols in popcorn, but Vinson's team did the first study to calculate total polyphenols in popcorn. The amounts of these [antioxidants](#) were much higher than previously believed, he said. The levels of polyphenols rivaled those in nuts and were up to 15 times greater than whole-grain tortilla chips.

The new study found that the amount of polyphenols found in popcorn was up to 300 mg a serving compared to 114 mg for a serving of sweet corn and 160 mg for all fruits per serving. In addition, one serving of

popcorn would provide 13 percent of an average intake of polyphenols a day per person in the U.S. Fruits provide 255 mg per day of [polyphenols](#) and vegetables provide 218 mg per day to the average U.S. diet.

Michael G. Coco, an undergraduate chemistry student at the University of Scranton who participated in the study, said he benefited in several ways.

"From working on this project with Dr. Vinson, I've gained experience and many insights in doing scientific research," said Coco. "Besides the obvious things like learning how to use instrumentation and perform analyses, I've also learned that research is extremely satisfying, especially when you discover or think of something no one else has thought of."

Provided by American Chemical Society

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