

Health benefits of broccoli require the whole food, not supplements

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New studies have found that the health benefits of broccoli depend on consumption of the whole food, rather than supplements. (Photo courtesy U.S. Department of Agriculture)

New research has found that if you want some of the many health benefits associated with eating broccoli or other cruciferous vegetables, you need to eat the real thing – a key phytochemical in these vegetables is poorly absorbed and of far less value if taken as a supplement.

The study, published by scientists in the Linus Pauling Institute at Oregon State University, is one of the first of its type to determine whether some of the healthy compounds found in cruciferous [vegetables](#) can be just as easily obtained through supplements.

The answer is no.

And not only do you need to eat the whole foods, you have to go easy on cooking them.

"The issue of whether important nutrients can be obtained through whole foods or with supplements is never simple," said Emily Ho, an OSU associate professor in the OSU School of Biological and Population Health Sciences, and principal investigator with the Linus Pauling Institute.

"Some vitamins and nutrients, like the folic acid often recommended for pregnant women, are actually better-absorbed as a supplement than through food," Ho said. "Adequate levels of nutrients like vitamin D are often difficult to obtain in most diets. But the particular compounds that we believe give [broccoli](#) and related vegetables their health value need to come from the complete food."

The reason, researchers concluded, is that a necessary enzyme called myrosinase is missing from most of the supplement forms of glucosinolates, a valuable phytochemical in cruciferous vegetables. Without this enzyme found in the whole food, the study found that the body actually absorbs five times less of one important compound and eight times less of another.

Intensive cooking does pretty much the same thing, Ho said. If broccoli is cooked until it's soft and mushy, its health value plummets. However, it can still be lightly cooked for two or three minutes, or steamed until it's still a little crunchy, and retain adequate levels of the necessary enzyme.

The new study was published in the *Journal of Agricultural and Food Chemistry*. It was supported by the National Institutes of Health.

Broccoli has been of particular interest to scientists because it contains

the highest levels of certain glucosinolates, a class of phytochemicals that many believe may reduce the risk of prostate, breast, lung and colorectal cancer. When eaten as a raw or lightly-cooked food, enzymes in the broccoli help to break down the glucosinolates into two valuable compounds of intensive research interest – sulforaphane and erucin.

Studies have indicated that sulforaphane, in particular, may help to detoxify carcinogens, and also activate tumor suppressor genes so they can perform their proper function.

Most supplements designed to provide these glucosinolates have the enzyme inactivated, so the sulforaphane is not released as efficiently. There are a few supplements available with active myrosinase, and whose function more closely resembles that of the whole food, but they are still being tested and not widely available, Ho said.

Small amounts of the myrosinase enzyme needed to break down glucosinolates are found in the human gut, but the new research showed they accomplish that task far less effectively than does whole [food](#) consumption.

Although broccoli has the highest levels of glucosinolates, they are also found in cauliflower, cabbage, kale and other cruciferous vegetables. The same cooking recommendations would apply to those foods to best retain their [health benefits](#), Ho said.

Many people take a variety of vitamins, minerals and phytochemicals as supplements, and many of them are efficacious in that form, researchers say. Higher and optimal levels of popular supplements such as vitamins C, E, and fish oil, for instance, can be difficult to obtain through diet alone. Some researchers believe that millions of people around the world have deficient levels of vitamin D, because they don't get enough in their diet or through sun exposure.

But for now, if people want the real health benefits of broccoli, there's a simple guideline.

Eat your vegetables.

Provided by Oregon State University

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