

# Antioxidants in Green Tea increased effectiveness with Lemon Juice high in Vitamin C

Submitted by [Mark Barone](#) on November 14, 2007 - 2:21pm.



Purdue associate professor Mario Ferruzzi - photo Tom Campbell

Vitamin C which is found in citrus juices help to improve the antioxidants found in green tea. Often you can put a little lemon juice with the green tea for flavor, but it may offer health benefits as well according to researcher, Mario Ferruzzi who is the assistant professor of food science at Purdue University and the study's lead author. The study was published in the current issue of *Molecular Nutrition and Food Research*.

The researchers report that the extra vitamin C taken with green tea increases the amount of catechins absorbed in the body. Catechins are the naturally occurring antioxidants found in green tea beverage.

Catechins are believed to be the compound that reduces a person's risk of cancer, heart attack, and stroke. Ferruzzi said that the catechins become unstable in a non-acidic environment which removes a large amount of catechins from being absorbed into the body.

Ferruzzi researched how different juices, creamers, or other additives that people add to green tea would react with the catechins. To test this he put them through a model simulating gastric and small-intestinal digestion. He compared fresh-brewed green tea with ready-to-drink green tea products as well. The catechin levels when testing the green tea with citrus juice showed a five-fold increased recovery rate. Ascorbic acid added to ready-to-drink tea products showed a sixfold recovery of catechin levels. Vitamin C added to ready-to-drink tea products showed a 13-fold increase of recovery of the catechin levels.

Lemon juice with green tea caused 80 percent of the catechins levels to remain. After lemon juice, orange was the next effective, then lime, and finally grapefruit juices. Ferruzzi suggests that the vitamin C and the citrus juices interact with the catechins which help to prevent degradation during digestion.

Ferruzzi said that if you want to get the most antioxidant benefit from green tea to add some

citrus juice after you brew the beverage or if you purchase ready-to-drink green tea pick the brand that adds ascorbic acid. Ferruzzi also said that some brands of ready-to-drink green do not have enough tea extract in the drink. Optimally a ready-to-drink green tea product should contain 100-200 mg of catechins to offer antioxidant benefits.

Black tea is made from fermenting green tea, and has lower levels of catechins. Ferruzzi theorizes that citrus products added to black tea could also help preserve catechin levels.

Future research will need to be conducted on live animals and humans to determine if vitamin C actually will increase catechin absorption in the body. While this initial study offers some insight more research needs to be conducted to prove the health benefits of vitamin C with catechin levels.