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Green tea and grape seed extracts may control starch digestion

By Stephen DANIELLS, 09-Jul-2012

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Extracts from grape seed or green tea make inhibit the action of certain starch-digesting enzymes and offer a plant-based alternative for glycemic control, suggests new data from the Linus Pauling Institute.

Grape seed extracts were associated with significant inhibition of the enzymes alpha-amylase and alpha-glucosidase, whereas green tea was less effective at inhibiting alpha-amylase, according to findings published in the *Journal of Agricultural and Food Chemistry*.



"Because these plant extracts are well tolerated, relatively inexpensive, and readily available, they have the potential to be used in many applications for glycemic control," wrote researchers from the Linus Pauling Institute at Oregon State University, and USANA Health Sciences, Inc., in Salt Lake City.

"Although further work is required to determine if specific procyanidins are responsible for the inhibitory effects of grape seed extract on alpha- amylase activity, it is certainly possible that multiple components of the extract are needed to reach its full inhibitory potential."

The researchers noted that they are currently planning human clinical trials to demonstrate the efficacy of these extracts and EGCG from green tea to lower blood sugar increases after meals.

Glycemic control

Controlling blood sugar levels is seen as an effective, long-term therapy for people with type-2 diabetes, said the researchers, as it decreases the risk of cardiovascular and neurological complications associated with diabetes.

With the number of people are affected by diabetes in the EU 25 projected to increase to 26 million by 2030, up from about 19 million currently – or 4% of the total population – approaches to reduce the risk of diabetes are becoming increasing attractive.

The statistics are even more startling in the US, where almost 24 million people live with diabetes, equal to 8 per cent of the population. The total costs are thought to be as much as \$174 billion, with \$116 billion being direct costs from medication, according to 2005-2007 American Diabetes Association figures.

One approach to controlling blood sugar is to inhibit the action of specific

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enzymes such as alpha-amylase and alpha-glucosidase, which are responsible for carbohydrate digestion.

"The overall effect of inhibition is to reduce the flow of glucose from complex dietary carbohydrates into the bloodstream, diminishing the postprandial effect of starch consumption on blood glucose levels," explained the researchers.

However, current glucosidase inhibitors, such as acarbose and miglitol, are said to produce diarrhea and other intestinal disturbances.

Study details

A potential alternative is to use plant extracts, such as grape seed extracts and green tea extracts.

Results of the *in vitro* tests indicated that both grape seed and green tea extracts were associated with inhibition of alpha-glucosidase, but only grape seed extracts were effective in inhibiting alpha-amylase.

The data show that plant extracts containing catechin 3-gallates, in particular epigallocatechin gallate, are potent inhibitors of α -glucosidase activity and suggest that procyanidins in grape seed extract strongly inhibit α -amylase activity.

"Our data suggest the use of plant extracts, especially grape seed and green tea extracts, as viable alternatives to pharmaceutical inhibitors of the glycoside hydrolase enzymes, alpha-amylase and alpha-glucosidase," wrote the researchers.

"Whereas EGCG appears to be mainly responsible for the inhibitory effects on alpha-glucosidase activity of the plant extracts investigated here, the contribution of other catechins and catechin 3-gallates should not be discounted."

Source: *Journal of Agricultural and Food Chemistry*

Published online ahead of print, doi: 10.1021/jf301147n

"Grape Seed and Tea Extracts and Catechin 3-Gallates Are Potent Inhibitors of α -Amylase and α -Glucosidase Activity"

Authors: M. Yilmazer-Musa, A.M. Griffith, A.J. Michels, E. Schneider, B. Frei

Keywords: [grape seed extract](#), [green tea](#), [glycemic control](#)

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