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**File: ■ Grape (*Vitis vinifera*) Seed Extract
■ Metabolic Syndrome
■ Oxidative Stress**

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RE: Grape Seed Extract Consumed with Breakfast Reduces Levels of Plasma Glucose and Oxidative Stress in Patients with Metabolic Syndrome

Edirisinghe I, Randolph J, Cheema M, et al. Effect of grape seed extract on postprandial oxidative status and metabolic responses in men and women with the metabolic syndrome – randomized, cross-over, placebo-controlled study. *Functional Foods in Health and Disease*. 2012;2(12):508-521.

Oxidative stress and inflammation contribute to atherosclerosis and diabetes. A meal high in carbohydrates and fat increases markers of oxidative stress and inflammation postprandially (after eating). This effect is accentuated in patients with obesity, diabetes, or metabolic syndrome. Fruits and vegetables high in polyphenols may counteract this effect. The authors hypothesize that grape (*Vitis vinifera*) seed extract, which is high in polyphenols, would attenuate meal-induced alterations in the oxidant and inflammatory status of patients with metabolic syndrome. This hypothesis was tested in a single-center, randomized, crossover, 2-arm, placebo-controlled study conducted at the University of California, Davis.

Included patients (n = 12; mean age = 45 years) had metabolic syndrome as defined by having 3 of the following conditions: abdominal obesity, elevated serum triglycerides, low high-density lipoprotein (HDL) concentration, elevated blood pressure, and elevated blood glucose. They were non-smokers in general good health. Excluded patients had clinical evidence and/or a history of cardiovascular, respiratory, renal, gastrointestinal, metabolic, or hepatic disease/conditions; used anti-inflammatory drugs, lipid-lowering medications, or antioxidant supplements; were actively losing weight; or were addicted to drugs and/or alcohol. Patients were recruited from newspapers, posters, and direct contact in the Davis and Sacramento areas of California.

One week prior to study commencement, patients were instructed to limit their consumption of foods that contained polyphenols. They were acutely treated with 300 mg of grape seed extract (MegaNatural® Gold; Polyphenolics; Madera, California) or placebo (time = 0), 1 hour prior to eating a high-fat, high-carbohydrate breakfast (670 kcal with approximately 40% energy from fat). The grape seed extract contained 94.3 gallic acid equivalents (wt/wt) in total phenols. Blood was collected at baseline and

hourly for 5 hours postprandially. Blood was analyzed for plasma lipids, glucose, insulin, oxidized low-density lipoprotein (OxLDL), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF- α). After a 7- to 10-day washout period, the patients were crossed over to the other treatment.

Peak plasma hydrophilic and lipophilic oxygen radical absorbance capacity (ORAC) occurred 1 hour postprandially in both groups and both were significantly greater than baseline for both groups ($P < 0.05$). Postprandial ORAC values in the hydrophilic phase (but not lipophilic phase) as assessed by positive incremental area under the curve (AUC) was significantly increased with the grape seed extract compared to the placebo ($P < 0.01$). Postprandial OxLDL and glucose concentrations at 5 hours were significantly decreased in the grape seed extract group ($P < 0.01$ and $P < 0.05$, respectively) compared to placebo. The markers of inflammation (IL-6 and TNF- α) and insulin concentration were not significantly different between groups postprandially.

The authors conclude that grape seed extract enhanced the postprandial antioxidant capacity of plasma, suppressed the increases in OxLDL, and reduced postprandial glucose concentrations as compared to placebo in patients with metabolic syndrome. It is unknown whether these changes would also occur following lunch or dinner since the grape seed extract was only consumed acutely before breakfast. Therefore, the data cannot be extrapolated to determine the effect on long-term glucose/insulin control. The authors hypothesize that there was no change in the inflammatory markers because the duration of the assessment was too short. This study provides helpful preliminary research on the effect of grape seed extract on postprandial antioxidant/glucose/insulin balance in patients with metabolic syndrome.

—Heather S. Oliff, PhD

Referenced article can be found at <http://functionalfoodscenter.net/files/61131948.pdf>.

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