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

Indika Edirisinghe¹, Jody Randolph², Mandeep Cheema², Ravi Tadapaneni¹, Eunyoung Park¹, Britt Burton-Freeman¹,², Tissa Kappagoda³

¹Center for Nutrition Research, Institute for Food Safety and Health, Illinois Institute of Technology, Bedford Park, IL 60501, USA; ²Department of Nutrition, University of California Davis, Davis, CA 95616, USA; ³Department of Internal Medicine, University of California Davis, Davis, CA 95616, USA

*Corresponding author: Tissa Kappagoda, PhD, MD, TB 172, Division of Cardiovascular Medicine University of California, Davis, Davis, CA 95616, USA

Submission date: October 17, 2012, Acceptance date: December 18, 2012; Publication date: December 23, 2012

ABSTRACT

Objective: This investigation was undertaken to determine whether a grape seed extract (GSE) that is rich in mono-, oligo- and poly-meric polyphenols would modify postprandial oxidative stress and inflammation in individuals with the metabolic syndrome (MetS).

Background: MetS is known to be associated with impaired glucose tolerance and poor glycemic control. Consumption of a meal high in readily available carbohydrates and fat causes postprandial increases in glycemia and lipidemia and markers of oxidative stress, inflammation and insulin resistance.

Materials/methods: After an overnight fast, twelve subjects with MetS (5 men and 7 women) consumed a breakfast meal high in fat and carbohydrate in a cross-over design. A GSE (300 mg) or placebo capsule was administrated 1 hr before the meal (-1 hr). Changes in plasma insulin, glucose, oxidative stress and inflammatory markers were measured hourly for 6 hr.

Results: Plasma hydrophilic oxygen radical absorbance capacity (ORAC) measured as the positive incremental area under the curve (-1 to 5 hr) was significantly increased when the meal was preceded by GSE compared with placebo (P<0.05). Meal-induced increases in oxidized LDL were attenuated with GSE (P<0.05). Plasma glucose concentrations (area under the curve
from -1 to 5 hr) were also significantly lower when the meal was preceded by GSE (P<0.05) while the insulin concentrations remained unchanged (P>0.05). No changes in inflammatory markers were evident.

**Conclusion:** These data suggest that GSE enhances postprandial plasma antioxidant status and reduces the glycemic response to a meal, high in fat and carbohydrate in subjects with the MetS.

**Key words:** Polyphenols, Oxidative stress, Inflammation, ORAC, Oxidized LDL