

**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**

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**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 administered 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 glyceemic response to a meal, high in fat and carbohydrate in subjects with the MetS.

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