BIOAVAILABILITY OF EPICATECHIN AFTER CONSUMPTION OF GRAPE SEED EXTRACT IN HUMANS

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INTRODUCTION

Dietary patterns that are rich in plant foods have been associated with a decreased risk for specific disease processes and certain chronic diseases. In addition to essential macronutrients and micronutrients, the flavonoids in a variety of plant foods may have health enhancing properties. Grape seed extract (GSE) is a common dietary supplement that is known to be rich in the flavan-3-ol, commonly known as epicatechin. However, the bioavailability and the biological effects of the grape seed extract flavonoids are poorly understood. To begin to address these issues, we developed a method based on liquid chromatography-mass spectrometry (LC-MS) detection to determine physiological levels of epicatechin (EC).

Specifically, we evaluated the appearance of epicatechin after supplementation of 1g GSE taken orally in tablet form. A four hour course of plasma epicatechin was obtained as measured by LC-MS. Furthermore, to correlate circulating epicatechin and antioxidant protection, we went on to determine plasma antioxidant reserve, a measure of resistance to plasma oxidative stress.1

MATERIALS AND METHODS

Sixteen patients with confirmed coronary artery disease completed this study. Exclusion criteria included pregnancy, other active major illness, and treatment with another investigational drug. Sixteen patients with confirmed coronary artery disease completed this study. Exclusion criteria included pregnancy, other active major illness, and treatment with another investigational drug.

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RESULTS

No measurable amount of epicatechin was detected in the samples obtained prior to GSE supplementation (limit of detection was 1 ng/mL). Within the first hour post-supplementation, plasma EC levels began to rise to a concentration of 130 ng/mL. Plasma epicatechin concentration had a maximum of 172 ng/mL by 2 h after ingestion (P < 0.001). However, there is no discernable difference between the 1, 2 and 3 h samples and thus should be reviewed carefully before determining an absolute maximum (P < 0.15). EC began to decrease by the 4 h and plasma samples, but had not yet returned to baseline concentration (Figure 1).

Within one hour, an increase in plasma antioxidant reserve was seen (P < 0.065). At 2 and 3 h there were significant 21% and 27% increases in PAR over the baseline mean (P < 0.04 and 0.02, respectively) (Figure 2).

DISCUSSION

Our results demonstrate that epicatechin can be measured via LC-MS in plasma following supplementation of grape seed extract. Furthermore, the data also support the concept that supplementation of grape seed extract can increase total plasma antioxidant capacity as seen using the PAR assay. Consistent with the antioxidant properties of GSE, there were more isoprostanes formed in the baseline sample than in any of the samples taken after ingesting grape seed extract showing that the ingested antioxidants, in fact, can improve the resistance of plasma to oxidation.

REFERENCES