

## **Polyphenols in almond skins after blanching modulate plasma biomarkers of oxidative stress in healthy humans.**

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### **Abstract:**

Almond skins are a waste byproduct of blanched almond production. Polyphenols extracted from almond skins possess antioxidant activities in vitro and in vivo. Thus, we examined the pharmacokinetic profile of almond skin polyphenols (ASP) and their effect on measures of oxidative stress. In a randomized crossover trial, seven adults consumed two acute ASP doses (225 mg (low, L) or 450 mg (high, H) total phenols) in skim milk or milk alone. Plasma flavonoids, glutathione peroxidase (GPx), glutathione (GSH), oxidized GSH (GSSG), and resistance of low-density lipoprotein (LDL) to oxidation were measured over 10 h. The H dose increased catechin and naringenin in plasma, with maximum concentrations of 44.3 and 19.3 ng/mL, respectively. The GSH/GSSG ratio at 3 h after the H doses was 212% of the baseline value, as compared to 82% after milk ( $p = 0.003$ ). Both ASP doses upregulated GPx activity by 26–35% from the baseline at 15, 30, 45, and 120 min after consumption. The in vitro addition of  $\alpha$ -tocopherol extended the lag time of LDL oxidation at 3 h after L and H consumption by 144.7% and 165.2% of that at 0 h compared to no change after milk ( $p \leq 0.05$ ). In conclusion, ASP are bioavailable and modulate GSH status, GPx activity, and the resistance of LDL to oxidation.

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