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Effect of wild blueberry *(Vaccinium angustifolium)* consumption on markers of oxidative stress and endothelial function in subjects with risk factors for cardiovascular disease

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Background: Wild blueberries (WB) (*Vaccinium angustifolium*) are rich sources of polyphenols such as anthocyanins (ACNs) capable of counteracting oxidative stress, influencing vasomotor tone and modulating gene expression associated with disease processes such as cardiovascular disease (CVD).
Objective: The objective of the study was to investigate the effect of consumption of a WB product on lipid profiles, markers of oxidative stress (endogenous and oxidatively-induced DNA damage in mononuclear cells), soluble vascular adhesion molecule 1 (s-VCAM-1) and nitric oxide concentration and endothelium mediated changes in peripheral arterial tone in subjects with at least one risk factor for CVD.
Methods: Twenty male volunteers were recruited and randomized in a cross-over design. Subjects received a WB drink (25 g of lyophilised WB powder corresponding to 148 g of raw fruits) providing 375 mg of ACNs or a placebo drink (without ACNs) for 6 weeks each. A six week wash-out period was scheduled. At the beginning and at the end of each treatment, blood samples were collected. Serum lipid and cholesterol profiles were measured by validated laboratory methods. The resistance to H_2O_2-induced DNA damage and endogenously oxidized DNA bases (formamidopyrimidine DNA glycosilase (FPG) sensitive sites) were evaluated in blood mononuclear cells by the comet assay. Peripheral arterial function was assessed by using finger plethysmography (Endo-PAT2000) while plasma nitric oxide and s-VCAM-1 analysis was performed by commercial kits. All variables were examined by a two way ANOVA for repeated measures.
Results and Conclusion: Six weeks of WB drink significantly reduced the levels of H_2O_2-induced DNA damage (from 45.8 ± 7.9% to 37.2 ± 9.1%, $p \leq 0.01$) and the levels of endogenously oxidized DNA bases (from 12.5 ± 5.6% vs 9.6 ± 3.5%, $p \leq 0.01$), while no effect was found after PL drink. No significant difference was observed in the total group for the peripheral arterial tone even though more than half of the subjects had an improvement, following the intervention with the WB drink. No statistically significant difference was also observed for lipid profile, nitric oxide and s-VCAM-1 concentrations. Considering the high inter-individual variation observed in endothelial function response, further studies may be necessary to demonstrate an effect.

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