

The inhibition effect of tannins on lipid peroxidation of rat heart mitochondria

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Abstract

We induced lipid peroxidation in rat heart mitochondria with ferrous sulphate (FeSO₄) and compared the inhibitory effect of various tannins on the peroxidation. Oxygen consumption and malondialdehyde (MDA) formation were used to quantitate the amount of lipid peroxidation, and the free radical scavenger activity of tannins was measured with a diphenyl-p-picryl hydrazyl (DPPH) method. Of 25 tannins and related compounds tested, catechin benzylthioether and procyanidin B-2 benzylthioether were the most potent in inhibiting lipid peroxidation, with inhibitory effects stronger than that of trolox, a water soluble analogue of vitamin E. The concentrations (IC₅₀) required for catechin benzylthioether and procyanidin B-2 benzylthioether to inhibit oxygen consumption to 50% of control values were 0.85 and 2.0 μM, respectively, while their IC₅₀ values from the inhibition of MDA formation were 0.9 and 1.70 μM, respectively. The IC₅₀ values for catechin and procyanidin B-2 to inhibit oxygen consumption were 34.0 and 11.0 μM. Both compounds were less potent than their benzylthioether derivatives. However, the ability of catechin and procyanidin B-2 to scavenge DPPH were similar to that of their benzylthioether derivatives. We conclude that conjugation with a benzylthioether group enhances the inhibitory effect of tannins on lipid peroxidation, and that the mechanism is not an increase in its scavenger activity