

Protective Effects of Caffeic Acid Esters Against H₂O₂ Induced Cell Damages

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SUMMARY

Oxidative cell damages of caffeic acid have been ascribed to H₂O₂ formed in its autoxidation process. In the presence of transition metal ion such as Fe³⁺, Cu²⁺, and Mn²⁺, caffeic acid enhanced hydroxyl radical ($\cdot$ OH) formation and caused oxidative damages such as chromosomal aberration, mutagenicity, and single strand breaks of cellular and isolated DNA.

We found that caffeic acid esters showed protective effects against H₂O₂-induced cell damages in the absence of these metal ions. Cytotoxicity and DNA single strand breaks caused by H₂O₂ were assessed by a colony formation assay and a DNA precipitation assay, respectively. In both assay, caffeic acid ethyl ester showed protective effects. Also in model systems in the presence of cytochrome *c* instead of free Fe³⁺, caffeic acid and its esters inhibited H₂O₂-induced DNA single strand breaks and H₂O₂-induced lipid peroxidation. These results suggest that caffeic acid could act as antioxidant *in vivo*, where these transition metal ions are scarcely found as their free forms.