Antioxidant Activity of Cinnamic Acid Derivatives in Oxidative Damage Induced by Hydrogen Peroxide in Cell Culture: A Comparative Study

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Several studies have demonstrated that the use of diets based on fruits and vegetables rich in polyphenols contributes for the reduction of oxidative stress which is usually associated with several pathological conditions as cardiovascular diseases, cancer, and diabetes. The objective of this work was to evaluate and compare the in vitro antioxidant and cytoprotective activities of cinnamic acid, caffeic acid and methyl caffeate in oxidative damage induced by hydrogen peroxide in cell culture. The results in vitro showed that only the methyl caffeate (100 µg/mL) (IP = 56.1 ± 1.2) and caffeic acid (100 µg/mL) (IP = 37.3 ± 1.2) were effective in scavenging DPPH radical. All cinnamic acid derivates were effective in inhibiting nitrite formation, especially the caffeic acid (500 µg/mL) (IP = 43.6 ± 3.1). In addition, cinnamic acid derivates were also effective in inhibiting TBARS formation, mainly the cinnamic acid (500 µg/mL) (IP = 50.9 ± 1.3). In cell culture, the caffeic acid (500 µg/mL) and methyl caffeate (100 µg/mL) did not significantly reduce the viability of IMR-90 cells. Finally, only methyl caffeate was efficient (100 µg/mL) in protecting IMR-90 cells against oxidative damages induced by hydrogen peroxide.

Keywords: Antioxidant activity; Caffeic acid; Methyl caffeate; Cinnamic acid.
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