

New insights into the antioxidant activity of hydroxycinnamic and hydroxybenzoic systems: Spectroscopic, electrochemistry, and cellular studies

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© 2014 Informa UK, Ltd. A series hydroxycinnamic and gallic acids and their derivatives were studied with the aim of evaluating their in vitro antioxidant properties both in homogeneous and in cellular systems. It was concluded from the oxygen radical absorbance capacity-fluorescein (ORAC-FL), 1,1-diphenyl-2-picrylhydrazyl (DPPH), and cyclic voltammetry data that some compounds exhibit remarkable antioxidant properties. In general, in homogeneous media (DPPH assay), galloyl-based cinnamic and benzoic systems (compounds 7-11) were the most active, exhibiting the lowest oxidation potentials in both dimethyl sulfoxide (DMSO) and phosphate buffer. Yet, p-coumaric acid and its derivatives (compounds 1-3) disclosed the highest scavenging activity toward peroxy radicals (ORAC-FL assay). Interesting structure-property- activity relationships between ORAC-FL, or DPPH radical, and redox potentials have been attained, showing that the latter parameter can be a valuable antioxidant measure. It wa