

Abstract

Assessment of Natural Hydroxycinnamic Acid Derivatives for Their Potential as Antimicrobial and Antioxidant Agents [†]

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Abstract: Nutraceuticals are a category of treatments which have gained more attention from people in recent times. Dietary polyphenols, as nutraceutical products, constitute two groups. Hydroxycinnamic acids are one of those two groups. These acids are found naturally in various products we consume on a day-to-day basis. Coffee is one of the most common sources of hydroxycinnamic acids. Cinnamon is a spice that is consumed in different forms in various food products. The study presented investigates their capacity as antioxidant agents and anti-microbial agents through in-vitro and in silico approaches. For this, commonly found infectious organisms namely, *E. coli*, *S. aureus*, *K. pneumoniae*, and *S. pyogenes* were cultured. The minimum inhibitory concentrations for methanolic coffee extract as well as methanolic cinnamon extract were estimated to be ~0.4 µg/mL and ~5 µg/mL. The cytotoxicity effects of these extracts were studied on cell line MCF-7 (human breast cancer cell line). IC₅₀ values for MCF-7 were calculated at 64.04 µg/mL for coffee extract, 81.12 µg/mL for cinnamon extract, and 51.14 µg/mL for standard caffeic acid. Molecular docking analysis revealed the efficiency of different hydroxycinnamic acids on protein receptors, namely PPAR, IL-6, TNF- alpha, and VEGF. These results were supported by the tests performed on blood cultures and human tissue samples obtained from the clinical partner. The present study endeavors to set a preliminary platform for understanding the efficiency and efficacy of hydroxycinnamic acid derivatives in commonly used food sources.

Keywords: hydroxycinnamic acid; antioxidant; anti-microbial; coffee; cinnamon



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