

Antioxidant capacity of hesperidin from citrus peel using electron spin resonance and cytotoxic activity against human carcinoma cell lines.

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Abstract

CONTEXT:Hesperidin is a flavonoid that has various pharmacological activities including anti-inflammatory, antimicrobial and antiviral activities. **OBJECTIVE:** The aim of the study is the isolation of hesperidin from the peel of *Citrus sinensis* L. (Rutaceae), and the evaluation of its antioxidant capacity and cytotoxicity against different human carcinoma cell lines. **MATERIALS AND METHODS:** In the present work, hesperidin is identified and confirmed using chromatographic and spectral analysis. To correlate between hesperidin concentration and antioxidant capacity of peel extracts, extraction was carried out using 1% HCl-MeOH, MeOH, alkaline solution, the concentration of hesperidin determined qualitatively and quantitatively using high performance thin layer chromatography (HPTLC), high performance liquid chromatography (HPLC) analysis, in vitro antioxidant capacity of hesperidin and the extracts against free radical diphenylpicrylhydrazyl (DPPH•) performed using an electron spin resonance spectrophotometer (ESR). Cytotoxic assay against larynx, cervix, breast and liver carcinoma cell lines was performed. **RESULTS:** Hesperidin was found to be moderately active as an antioxidant agent; its capacity reached 36%. In addition, the results revealed that hesperidin exhibited pronounced anticancer activity against the selected cell lines. IC_{50} were 1.67, 3.33, 4.17, 4.58 $\mu\text{g/mL}$, respectively. **DISCUSSION AND CONCLUSION:** Orange peels are considered to be a cheap source for hesperidin which may be used in the pharmaceutical industry as a natural chemopreventive agent. Hesperidin and orange peel extract could possess antioxidant properties with a wide range of therapeutic applications.

Keywords: Computational fluid dynamics; fluent; fast fluidization; steam reforming; hydrogen production; circulating fluidized bed reactor; two-phase flow

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