Research in Pharmaceutical Sciences, 2012;7(5)
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Antioxidant activities and total phenolic contents of four Apiacean fruits

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Background and Aims: It is well known that naturally occuring substances in higher plants have antioxidant activities. Recently, there has been increased interest in free radicals in biological systems and their roles as causative agents in a variety of chronic disorders. Accordingly, attention is being focused on the protective biochemical functions of naturally occuring antioxidants in the cells of the organisms contaning them. This work was designed to evaluate total phenolic content (TPC) and antioxidant activities of the essential oils obtained from four Apiacean fruits (including Bunium persicum , Cuminum cyminum , Pimpinella anisum and Trachyspermum copticum) .All of these plants are used in food industry and Iranian's traditional medicine.

Methods: The in-vitro antioxidant activities were spectrophotometrically evaluated by three different quantitative methods (namely DPPH•, ABTS•+ and linoleic acid/β-carotene bleaching assays). The antioxidant activity of each essential oil was expressed as an IC50 value (µL/mL) and calculated from the Log concentration-response curve. The TPC of each essential oil [as µg gallic acid equivalent/ml of essential oil) was determined by Folin-Ciocalteu method and calculated from the standard curve of gallic acid. The results were statistically compared by one-way ANOVA to see the significance.

Results and Conclusions: All the tested essential oils exhibited concentration-dependent antioxidant and free radical scavenging activities. T. copticum showed the highest free radical scavenging activities in both DPPH• [IC50 = 3.04 µL/mL ($P < 0.001$)] and ABTS•+ [IC50 = 0.083 µL/mL ($P < 0.001$)] assays. On the other hand, T. copticum [IC50 = 0.25 µL/mL] and B. persicum [IC50 = 0.24 µL/mL] were the most active species in the β-carotene bleaching inhibition test. T.copticum showed the highest TPC [(179793±808.5µg/ml]. A high correlation was found between the both antioxidant activities and the TPCs of the essential oils [r2=0.9817 (for DPPH• assay) and r2 = 0.9998 (for ABTS•+ assay)].

Keywords: Antioxidant; Apiaceae; Essential oil; Total phenolic content