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Extractable Phenolic Content and Antioxidant Capacity of Lemon Peel from Different Cultivars

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Abstract

The citrus industry generates a significant amount of waste containing high amounts of valuable bioactive phenolic compounds. The potential health promoting effects of phenolic extracts from citrus fruits reported include anti-inflammatory, anti-hypercholesterolemic, antihypertensive antibiotic, anti-diabetic, antiulcer, antioxidant and anti-allergenic. Lemon peels, which constitutes nearly about 50 to 60% of the total fruit mass, contain phenolic compounds such as phenolic acids, flavanones, flavones and flavonols. The recovery of these bioactive substances by extraction will help to increase the added value of its waste. In this study, lemon peel waste from four different lemon cultivars including Enterdonat, Lamas, Kara limon and Kütdiken which are the most commonly used ones in juice industry were evaluated for their potential of phenolic content (Singleton et al., 1999), total flavonoid content (Dewanto et al., 2002) and antioxidant activity (Miller and Rice-Evans, 1997; Apak et al., 2004). Phenolics were extracted from peel powder by using 50% aqueous ethanol or only water with a sample:solvent ratio of 1:10 and 1:20 (g/ml). The highest extraction efficiency was obtained with 50% aqueous ethanol and the sample:solvent ratio of 1:20 (g/ml). Total phenolic content of lemon peels differed between 12.06 ± 0.22 and 23.63 ± 0.11 mg GAE/g dry matter and total flavonoid content varied between 10.02 ± 0.99 and 30.10 ± 0.33 mg rutin/g dry matter. Kara limon cultivar had the highest total phenolic and flavonoid content, followed by Lamas, Enterdonat and Kütdiken, respectively. Antioxidant activity of lemon peels was found in the range of 30.54 ± 0.19 - 60.64 ± 2.78 mg TE/g dry matter and 38.20 ± 1.09 - 72.63 ± 0.73 mg TE/g dry matter by ABTS and CUPRAC methods, respectively. Kara limon cultivar had the highest antioxidant activity followed by Lamas, Enterdonat and Kütdiken.

Keywords: Lemon waste, extraction, total phenolics, total flavonoids, antioxidant activity

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