

Effect of Particle Size and Concentration of Pomegranate (*Punica granatum* L.) Peel Powder on Suppression of Oxidation of Edible Plant Oils

Authors : D. G. D. C. L. Munasinghe, M. S. Gunawardana, P. H. P. Prasanna, C. S. Ranadheera, T. Madhujith

Abstract : Lipid oxidation is an important process that affects the shelf life of edible oils. Oxidation produces off flavors, off odors and chemical compounds that lead to adverse health effects. Chemical mechanisms such as autooxidation, photo-oxidation and thermal oxidation are responsible for lipid oxidation. Refined, Bleached and Deodorized (RBD) coconut oil, Virgin Coconut Oil (VCO) and corn oil are widely used plant oils. Pomegranate fruit is known to possess high antioxidative efficacy. Peel of pomegranate contains high antioxidant activity than aril and pulp membrane. The study attempted to study the effect of particle size and concentration of pomegranate peel powder on suppression of oxidation of RBD coconut oil, VCO and corn oil. Pomegranate peel powder was incorporated into each oil sample as micro (< 250 µm) and nano particles (280 - 300 nm) at 100 ppm and 200 ppm concentrations. The control sample of each oil was prepared, devoid of pomegranate peel powder. The stability of oils against autooxidation was evaluated by storing oil samples at 60 °C for 28 days. The level of oxidation was assessed by peroxide value and thiobarbituric acid reactive substances on 0,1,3,5,7,14 and 28 day, respectively. VCO containing pomegranate particles of 280 - 300 nm at 200 ppm showed the highest oxidative stability followed by RBD coconut oil and corn oil. Results revealed that pomegranate peel powder with 280 - 300 nm particle size at 200 ppm concentration was the best in mitigating oxidation of RBD coconut oil, VCO and corn oil. There is a huge potential of utilizing pomegranate peel powder as an antioxidant agent in reducing oxidation of edible plant oils.

Keywords : antioxidant, autooxidation, micro particles, nano particles, pomegranate peel powder

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