World Academy of Science, Engineering and Technology
International Journal of Nutrition and Food Engineering
Vol:10, No:09, 2016

Comparative Efficacy of Pomegranate Juice, Peel and Seed Extract in the Stabilization of Corn Oil under Accelerated Conditions

Authors : Zoi Konsoula

Abstract : Antioxidant-rich extracts were prepared from pomegranate peels, seeds and juice using methanol and ethanol and their antioxidant activity was evaluated by the 1,1-diphenyl-2-picrylhydrazine (DPPH) radical scavenging and Ferric Reducing Antioxidant Power (FRAP) method. Both analytical methods indicated a higher antioxidant activity in extracts prepared from peels, which was comparable to that of butylated hydroxytoluene (BHT). Furthermore, the antioxidant activity was correlated to the phenolic and flavonoid content of the various extracts. The antioxidant effectiveness of the extracts was also assessed using corn oil as the oxidation substrate. More specifically, preheated corn oil samples stabilized with extracts at a concentration of 250 ppm, 500 ppm or 1,000 ppm were subjected to accelerated aging (100 oC, 10 days) and the extent of oxidative alteration was followed by the measurement of the peroxide, conjugated dienes and trienes, as well as p-aniside value. BHT at its legal limit (200 ppm) served as standard besides the control sample. Results from the different parameters were in agreement with each other suggesting that pomegranate extracts can stabilize corn oil effectively under accelerated conditions, at all concentrations tested. However, the magnitude of oil stabilization depended strongly on the amount of extract added and this was positively correlated with their phenolic content. Pomegranate peel extracts, which exhibited the highest not only phenolic and flavonoid content but also antioxidant activity, were more potent in inhibiting oxidative deterioration. Both methanolic and ethanolic peel extracts at a concentration of 500 ppm exerted a stabilizing effect comparable to that of BHT, while at a concentration of 1000 ppm they exhibited higher stabilization efficiency in comparison to BHT. Finally, heating oil samples resulted in a time dependent decrease in their antioxidant capacity. Samples containing peel extracts appeared to retain their antioxidant capacity for a longer period, indicating that these extracts contained active compounds that offered superior antioxidant protection to corn oil.

Keywords : antioxidant activity, corn oil, oxidative deterioration, pomegranate
Conference Title : ICHNFS 2016 : International Conference on Human Nutrition and Food Sciences
Conference Location : Rome, Italy
Conference Dates : September 15-16, 2016