

Oxidative Stability of Corn Oil Supplemented with Natural Antioxidants from Cypriot *Salvia fruticosa* Extracts

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Abstract : Vegetable oils, which are rich in polyunsaturated fatty acids, are susceptible to oxidative deterioration. The lipid oxidation of oils results in the production of rancid odors and unpleasant flavors as well as the reduction of their nutritional quality and safety. Traditionally, synthetic antioxidants are employed for their retardation or prevention of oxidative deterioration of oils. However, these compounds are suspected to pose health hazards. Consequently, recently there has been a growing interest in the use of natural antioxidants of plant origin for improving the oxidative stability of vegetable oils. The genus *Salvia* (sage) is well known for its antioxidant activity. In the Cypriot flora *Salvia fruticosa* is the most distributed indigenous *Salvia* species. In the present study, extracts were prepared from *S. fruticosa* aerial parts using various solvents and their antioxidant activity was evaluated by the 1,1-diphenyl-2-picrylhydrazine (DPPH) radical scavenging and Ferric Reducing Antioxidant Power (FRAP) method. Moreover, the antioxidant efficacy of all extracts was assessed using corn oil as the oxidation substrate, which was subjected to accelerated aging (60 °C, 30 days). The progress of lipid oxidation was monitored by the determination of the peroxide, p-aniside, conjugated dienes and trienes value according to the official AOCS methods. Synthetic antioxidants (butylated hydroxytoluene-BHT and butylated hydroxyanisole-BHA) were employed at their legal limit (200 ppm) as reference. Finally, the total phenolic (TPC) and flavonoid content (TFC) of the prepared extracts was measured by the Folin-Ciocalteu and aluminum-flavonoid complex method, respectively. The results of the present study revealed that although all sage extracts prepared from *S. fruticosa* exhibited antioxidant activity, the highest antioxidant capacity was recorded in the methanolic extract, followed by the non-toxic, food grade ethanol. Furthermore, a positive correlation between the antioxidant potency and the TPC of extracts was observed in all cases. Interestingly, sage extracts prevented lipid oxidation in corn oil at all concentrations tested, however, the magnitude of stabilization was dose dependent. More specifically, results from the different oxidation parameters were in agreement with each other and indicated that the protection offered by the various extracts depended on their TPC. Among the extracts, the methanolic extract was more potent in inhibiting oxidative deterioration. Finally, both methanolic and ethanolic sage extracts at a concentration of 1000 ppm exerted a stabilizing effect comparable to that of the reference synthetic antioxidants. Based on the results of the present study, sage extracts could be used for minimizing or preventing lipid oxidation in oils and, thus, prolonging their shelf-life. In particular, given that the use of dietary alcohol, such as ethanol, is preferable than methanol in food applications, the ethanolic extract prepared from *S. fruticosa* could be used as an alternative natural antioxidant.

Keywords : antioxidant activity, corn oil, oxidative deterioration, sage

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