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**Determining the proper concentration of rosemary extract as a replacement to synthetic antioxidants during frying**

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Determining the proper concentration of rosemary extract as a replacement to synthetic antioxidants during frying Abstract Rosemary is a plant distributed all over the world with more antioxidant capacity than some synthetic antioxidants. Therefore, this study was performed to investigate the effectiveness of this extract based on the concentration (ppm) compared to the common synthetic antioxidant butylated hydroxytoluene (BHT) on retarding lipid oxidation of high oleic sunflower oil subjected to frying at  $180 \pm 2$  °C for 15 batches of frying (each batch five minutes) till reaching total polar compounds of 24 to 27 %. In the first step, after ultrasound-assisted extraction of the rosemary plant, the antioxidant capacity was evaluated through scavenging of 1,1-diphenyl-2-picryl-hydrazil radical (DPPH), total antioxidant activity (FRAP), and total phenolic content. It was found that rosemary extract had high polyphenol contents and therefore high antioxidant capacity and high radical scavenging activity. In the next step, the proper concentration usage of this antioxidant was studied according to different works of literature ranging from 100 to 1000 ppm. As the changes in oxidative stability of oil were not significant after concentrations of 400 ppm, this amount seemed to be the proper concentration based on the progress of lipid oxidation during frying assessed in terms of free fatty acids content (FFA), peroxide value (PV), p-anisidine value (p-AV) and TOTOX value. Keywords: high oleic sunflower oil; rosemary extract; oxidative stability, BHT