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Effect of Heating on Fatty Acid Composition of Edible Oils and Fat

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Abstract

Frying of food is one of the most popular methods for food preparation. Oil is during the frying process subjected to aggressive conditions such as high temperature, and the presence of oxygen and water. These conditions cause thermal-oxidative degradation changes in the oil according to the stability of the oil. These changes influence a fatty acid composition of the oil. In this study has been examined the influence of constant heating of oil on its fatty acid composition. Seven types of oil and one type of fat were heated up at 190°C in a commercial fryer. The heating process steadily continued for 24 hours and after every 4th-hour samples were collected. Fatty acid profiles were analysed after their transesterification according to the method of E.W. Hammon (2003) to methyl esters by gas chromatography coupled with mass spectrometry. The changes in the relative representation of fatty acids were monitored and analysed. The results were statistically analysed and graphically presented. Significant decreasing in the representation of unsaturated fatty acids due to the decomposition of double bonds was found. This decomposition occurs significantly after the eighth hour of heating. The most significant changes were in the content of linoleic acid and oleic acid. Their content after the heating period was decreased in all tested samples. The most significant increase occurred in stearic acid content. The results show that in all tested oils and the fat were the most affected the polyunsaturated fatty acids and that the oils become more saturated because of heating.

Keywords: Edible oil, fatty acids, transesterification