

THE EFFECT OF HEATING PROCESS ON ANTIOXIDANTS COMPOUNDS (POLYPHENOLS, CHLOROPHYLLS AND CAROTENOIDS) IN OLIVE OIL SAMPLES IN ALBANIA

Jonida Canaj^{1*}

¹Department of Industrial Chemistry, Faculty of Natural Sciences, University of Tirana,
Boulevard Zogu I nn, 1000, Tirana, Albania

*e-mail: jonidacanaj@ymail.com

Abstract

This research is important to study the attribute of oxidative stability of antioxidants in different temperature and duration time of heat treatment depending on olive oil quality. The purpose of the study is to evaluate the effect of thermal processing on the antioxidant properties of olive oils due to the determination of antioxidants compounds' content (chlorophylls, polyphenols, carotenoids) and oxidative stability of olive oil during the heating process and to find the right temperature of heating without big changes.

All the samples are from olives harvesting in different regions of south Albania collected in period of years 2018-2020, (14 extra virgin olive oil and virgin olive oil samples). Selected samples of olive oil were analyzed first to control the value of chlorophylls, polyphenols, carotenoids, and after oven heating in 180 °C and 220 °C for 6 hours. Total polyphenolic compounds content is determined by spectroscopic Folin-Ciocalteu method and it is expressed in mg caffeic acid/kg, measured at 725 nm. Total chlorophylls and carotenoids in olive oil were determined by visible spectroscopy. The method used is the determination of the extinction coefficient K_{668} for total chlorophylls and K_{470} for total carotenoids.

Results showed that the antioxidants compounds' content of olive oil samples heating in 180 °C do not have significant difference in values from the control samples, but heating in 220°C is contributing to significant differences. Polyphenols have a higher oxidative stability than pigments during heating in 220 °C, especially in the samples with high quality (extra virgin olive oil). Another change is the color and taste of samples before and after the heating process Control samples have green-yellow color and after heating at 180 °C the color is totally yellow and at 220 °C the color is yellow light and the taste is as fried oil, there is no specific taste of olive oil.

The results of this study suggest using the temperature of heat treatment below 220 °C during cooking and short time of heating to have the content of antioxidants compounds in high level as in raw olive oil samples. The samples of extra virgin olive oil have an oxidative stability higher than other samples. Olive oil heating at temperature of 180 °C is less dangerous for oxidative stability of antioxidants compounds' content (chlorophylls, polyphenols, and carotenoids).

Key words: Olive oil, Carotenoids, Chlorophylls, UV-VIS Spectroscopy, Polyphenols, Oxidative stability.