

Study of Oxidative Stability of Cold-Pressed and Refined Rapeseed Oils Using Infrared Spectroscopy

Krzysztof Wójcicki and Ewa Sikorska

Faculty of Commodity Sciences, Poznań University of Economics, Poznań, Poland

The present work investigates the use of infrared spectroscopic techniques for monitoring autooxidation of cold-pressed and refined rapeseed oils.

Rapeseed oil is traditionally consumed in Eastern Europe, being a viable alternative to the olive oil in a healthy diet. It has content of monounsaturated fatty acids similar to that of olive oil, containing, however, higher amounts of omega-3 fatty acid, which is believed to protect from cardiovascular disease. Rapeseed oil can be consumed in refined or unrefined cold-pressed form. The popularity of the latter has increased in recent years due to the tendency of consumer to avoid deeply processed foods. However, as opposed to refined oil, minor constituents with either prooxidative or antioxidative activity are preserved in cold-pressed oil, affecting its oxidative stability.

The objective of the present study was to evaluate the oxidative stability of selected commercially available cold-pressed and refined rapeseed oils, based on their infrared spectral properties. The oil samples were subjected to autooxidation at 60° C during 15 days in the dark. The changes in peroxide value and absorption at 232 and 270 nm (K232 and K270) were used to evaluate oxidation progress in oils. Spectral changes in near and mid infrared regions (NIR, MIR) were evaluated using the Principal Component Analysis. The regression analysis using the Partial Least Squares method was applied to examine the correlation between the chemical parameters and the respective spectra. We found that infrared spectroscopy may be a valuable tool in evaluation of differences in oxidative stability of refined and cold pressed oils.

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Correspondence to: ewa.sikorska@ue.poznan.pl

krzysztof.wojcicki@ue.poznan.pl