

Comparison between Synchronous Fluorescence and Near Infrared Spectroscopy in Classification of Vegetable Oils

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Instrumental methods are now an important complement to the study of physical characteristics and basic composition of foods, being essential for ensuring high reliability of classification of foods and beverages.

We discuss the potential usage of Synchronous Fluorescence and Near Infrared (NIR) spectroscopy for classification of vegetable oils based on their botanical origin and manufacturing technologies.

We recorded transmission spectra in the near-infrared range, and fluorescence spectra of sunflower, rapeseed, grape seed, corn, and rice oils. The interest in this group of products is increasing due to their beneficial organoleptic and nutritional properties, and the consumer tendency to choose healthier and less processed foods.

The spectra were analyzed using multivariate methods. Principal Component Analysis (PCA) was used to check the feasibility of calibration models for the above edible oils. The respective results were used to calculate PCA models for each of the species of vegetable oils separately. Soft Independent Modeling of Class Analogy (SIMCA) algorithm was used for classification at the final stage of data processing.

Our results demonstrate that spectroscopic methods combined with chemometric analysis can be successfully used in classification of edible oils, providing several economic and environmental benefits as compared to conventional wet-chemistry approaches. We find the two spectroscopic techniques presently analyzed equally effective in discovering the botanical origin and manufacturing technologies of vegetable oils.

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