

Discrimination of Olive Oils Based On Combined Information of MIR Spectra and Chromatographic Profiles

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Geographical identification of foods necessitates the statistical analysis of data formed by chemical measurements, which is multivariate in nature. Data matrix can be formed by spectrophotometric, chromatographic, or analytical measurements. Multivariate statistical analysis of the data matrix extracts the relevant information coming from different measurements and can classify the food products according to different attributes such as geographical origin, cultivar or harvest year. This sort of study was performed for extra virgin olive oils produced in different geographical regions. Geographical characterization has been carried out on three different data sets and also on the combination of these data sets including a wide range of information.

Extra virgin olive oil samples were collected from North and South regions of West Turkey (Aegean Sea coastal area). The samples were analysed by mid-infrared spectroscopy, GC, and HPLC. Colour measurements (L, a, b) were obtained with a hand-held chromometer. First, the data matrices of these chemical measurements were separately used in multivariate statistical techniques and successful separation of North and South groups were obtained by Soft Independent Modelling of Class Analogy (SIMCA) models according to their fatty acid and phenolic substance compositions. In the second part of the study, FT-IR spectra of olive oils were used in Partial Least Squares (PLS) regression analysis to predict the GC and HPLC data. The individual class models showed very clear separation and good prediction of fatty acids and phenols were obtained based on FT-IR data.

When the easiness and quick analysis is concerned, it would be very advantageous to predict the results of more laborious analyses by FT-IR analysis. Additionally, the difference between two geographical regions can be linked to the difference in two main olive varieties, Ayvalik in North and Memecik in South.