

Fast Authentication of Edible Oils by DSC and TAM Calorimetry

M. Angiuli, C. Ferrari, L. Lepori, E. Matteoli^{C,S}, M.C. Righetti, G. Salvetti and E. Tombari
Istituto Processi Chimico-Fisici, Pisa, Italy
matteoli@ipcf.cnr.it

During the last year the authors [1] performed preliminary measurements for testing the possibilities of calorimetry for the authentication of edible oils, being convinced that thermodynamics and kinetics of both crystallization and melting of a complex liquid, as vegetable oils are, show features representative of molecular interactions. Experiments have been carried out either with an isothermal heat-flow calorimeter (TAM, Thermometrics, Sweden) and with a Perkin-Elmer DSC7 apparatus. These features can be used to build a correlation among the oil composition, that is its nature and organoleptic properties, and the thermograms (enthalpy variation or apparent heat capacity of melting and freezing, against temperature).

The results here reported give a clear evidence that DSC and TAM calorimetric techniques represent a powerful mean for edible oil authentication, being possible: i) to disclose the addition of seed oil to “extra-virgin” olive oil (EVOO), refined hazelnut oil and high oleic sun flower oil as well, which are difficult to detect also with sophisticated and expensive and time consuming techniques; ii) to put in evidence the presence of refined olive oil, the low cost oil seldom added to commercial EVOOs; iii) to obtain a “first glance” genuineness test for EVOO with protected designation of origin; iv) to have a “fingerprinting” of a oil sample to be utilized for “conformity test” in the commercial practice.

[1] M. Angiuli, C. Ferrari, L. Lepori, E. Matteoli, G. Salvetti and E. Tombari, *J. Therm. Anal. and Calorim.*, in the press.