Evaluation of long-heating kinetic process of edible oils using ATR–FTIR and chemometrics tools

Abstract

Long thermal oxidative kinetic and stability of four different edible oils (colza, corn, frying, sunflower) from various brands were surveyed with the use of attenuated total reflectance–Fourier transform infrared spectroscopy (ATR–FTIR) combined with multivariate curve resolution-alternative least square (MCR-ALS). Sampling from the heated oils (at 170 °C) was performed each 3 h during a 36-h period. Changes in the ATR–FTIR spectra of the oil samples in the range of 4000–550 cm⁻¹ were followed as a function of heating time. MCR-ALS was utilized to resolve the concentration and spectral profiles of three detected kinetic components. Three variations in resolved concentration profiles were related to the thermal-deduction of triacylglycerol of unsaturated acid, appearance of hydroperoxides form of triacylglycerols and generation of secondary oxidation products. The kinetic profiles of these species were dependent on the type of oil. The proposed method can define a new way to monitor the oils’ quality. © 2017, Association of Food Scientists & Technologists (India).