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Fourier Transform Infrared Spectroscopy (FTIR) coupled with multivariate calibration and discriminant analysis for authentication of extra virgin olive oil from rambutan seed fat   (Article)   (Open Access)

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Abstract

The adulteration practice in pharmaceutical industries, especially in fats and oils used as a vehicle in some pharmaceutical products must be identified to assure its quality. In this study, Fourier Transform Infrared Spectroscopy (FTIR) in combination with chemometrics techniques of multivariate calibration and discriminant analysis (DA) were used for the authentication of extra virgin olive oil (EVOO) from rambutan seed fat (RSF). EVOO, RSF, and the mixture of EVOO-RSF were scanned using FTIR spectrophotometer at mid-infrared region (4000-650 cm^{-1}). The results showed that normal FTIR spectra at wavenumbers region of 1446.8-1409.7 cm^{-1} and 2368.6-1769.9 cm^{-1} combined with principle component regression (PCR) offered the best quantitative model for prediction of RSF levels in EVOO. The coefficient of determination (R^2) values obtained for the relationship between actual values of RSF and predicted values were of 0.9955 and 0.9915 in calibration and prediction models, respectively. The errors in calibration and prediction models were relatively low, accounting of 2.17% and 3.68%, respectively. The classification model between unadulterated or pure EVOO and adulterated EVOO with RSF was successfully carried out using DA at wavenumbers of 3100-1000 cm^{-1} without any samples mistakenly classified into the wrong group. FTIR spectroscopy in combination with chemometrics offered effective tools for authentication of EVOO against the adulteration practice. © 2019 The Authors.

SciVal Topic Prominence ⓘ

Topic: Oils and fats | Oils | Oil adulteration

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Author keywords

(Authentication)   (Discriminant analysis)   (Olive oil)   (PCR)   (Rambutan seed fat)

Indexed keywords

EMTREE drug terms: (arachidic acid)   (erucic acid)   (extra virgin olive oil)   (linoleic acid)   (oleic acid)   (palmitic acid)   (palmitoleic acid)   (stearic acid)

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Khudzaifi, M. , Retno, S.S. , Rohman, A.

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Chemicals and CAS Registry Numbers:

arachidic acid, 506-30-9; erucic acid, 112-86-7; linoleic acid, 1509-85-9, 2197-37-7, 60-33-3, 822-17-3; oleic acid, 112-80-1, 115-06-0; palmitic acid, 57-10-3; palmitoleic acid, 373-49-9; stearic acid, 57-11-4, 646-29-7

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