



Journal

Food Additives & Contaminants: Part A >

Volume 33, 2016 - Issue 7

188 1

Views | CrossRef citations | Altmetric

0

Original Articles

Use of ATR-FTIR spectroscopy coupled with chemometrics for the authentication of avocado oil in ternary mixtures with sunflower and soybean oils

Paola Jiménez-Sotelo, Maylet Hernández-Martínez, Guillermo Osorio-Revilla, Ofelia Gabriela Meza-Márquez, Felipe García-Ochoa & Tzayhrí Gallardo-Velázquez

Pages 1105-1115 | Received 28 Mar 2016, Accepted 13 Jun 2016, Accepted author version posted online: 17 Jun 2016, Published online: 14 Jul 2016

 Download citation <https://doi.org/10.1080/19440049.2016.1203073>

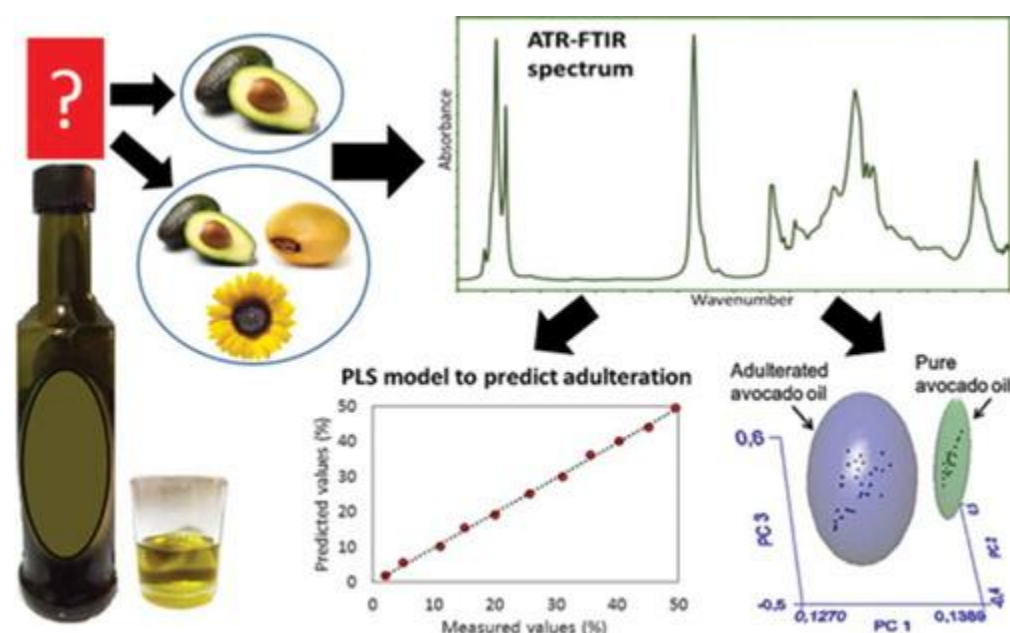
Seleccionar idioma | ▼

Translator disclaimer



ABSTRACT

Avocado oil is a high-value and nutraceutical oil whose authentication is very important since the addition of low-cost oils could lower its beneficial properties. Mid-FTIR spectroscopy combined with chemometrics was used to detect and quantify adulteration of avocado oil with sunflower and soybean oils in a ternary mixture. Thirty-seven laboratory-prepared adulterated samples and 20 pure avocado oil samples were evaluated. The adulterated oil amount ranged from 2% to 50% (w/w) in avocado oil. A soft independent modelling class analogy (SIMCA) model was developed to discriminate between pure and adulterated samples. The model showed recognition and rejection rate of 100% and proper classification in external validation. A partial least square (PLS) algorithm was used to estimate the percentage of adulteration. The PLS model showed values of $R^2 > 0.9961$, standard errors of calibration (SEC) in the range of 0.3963–0.7881, standard errors of prediction (SEP estimated) between 0.6483 and 0.9707, and good prediction performances in external validation. The results showed that mid-FTIR spectroscopy could be an accurate and reliable technique for qualitative and quantitative analysis of avocado oil in ternary mixtures.



KEYWORDS: Avocado oil, ternary mixture, adulteration, mid-FTIR, SIMCA, chemometrics

Additional information

Funding

Financial support from the Secretaría de Estudios de Posgrado e Investigación del Instituto Politécnico Nacional de México (SIP-IPN) and the Consejo Nacional de Ciencia y Tecnología (CONACyT) is greatly appreciated.

Login options

- [Log in](#)
- [Shibboleth](#)
- [OpenAthens](#)

Restore content access

- [Restore content access for purchases made as guest](#)

Purchase *

[Save for later](#)

Online



Article Purchase [24 hours access for USD 50.00](#)

* Local tax will be added as applicable

People also read

Article

FTIR spectroscopy combined with chemometrics for analysis of lard adulteration in some vegetable oils
Espectroscopia FTIR combinada con quimiometría para el análisis de adulteración con grasa de cerdo de aceites vegetales ➤

A. Rohman et al.

CyTA - Journal of Food
 Volume 9, 2011 - Issue 2

Published online: 18 May 2011

Review

The use of infrared spectroscopy in combination with chemometrics for quality control and authentication of edible fats and oils: A review ➤

Abdul Rohman

Applied Spectroscopy Reviews
 Volume 52, 2017 - Issue 7

Published online: 23 Dec 2016

Article

FTIR Spectroscopy Combined with Chemometric for Analysis of Sesame Oil

Review

Infrared spectroscopy for quantitative analysis and oil parameters of olive oil and virgin coconut oil: A

Adulterated with Corn Oil >

Nurrulhidayah A. Fadzillah et al.

International Journal of Food Properties
Volume 17, 2014 - Issue 6**Published online:** 25 Aug 2013**review** >

Abdul Rohman

International Journal of Food Properties
Volume 20, 2017 - Issue 7**Published online:** 14 Nov 2016

Article

Application of MIR-FTIR spectroscopy and chemometrics to the rapid prediction of fish fillet quality >

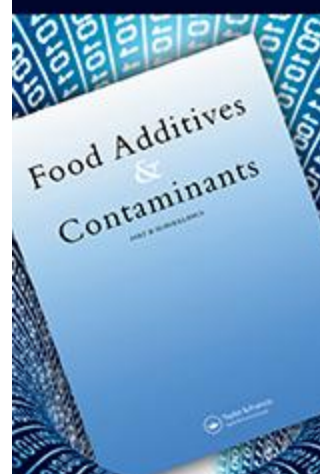
M. Hernández-Martínez et al.

CyTA - Journal of Food
Volume 12, 2014 - Issue 4**Published online:** 1 Oct 2014

Article

Fourier Transform Infrared Spectroscopy Combined with Multivariate Calibrations for the Authentication of Avocado Oil >

Abdul Rohman et al.

International Journal of Food Properties
Volume 19, 2016 - Issue 3**Published online:** 3 Jun 2015**Sample Our**
Food Science & Technology
journals**Delve
into the
Database****All the
Food Additives
& Contaminants
surveillance data
you need** **Taylor & Francis**
Taylor & Francis Group**Food Science
& Technology**
Connecting you to global
food science & technology
research
EXPLORE NOW!



Information for

- [Authors](#)
- [Editors](#)
- [Librarians](#)
- [Societies](#)

Help and info

- [Help](#)
- [FAQs](#)
- [Newsroom](#)
- [Contact us](#)
- [Commercial services](#)

Open access

- [Overview](#)
- [Open journals](#)
- [Open Select](#)
- [Cogent OA](#)

Connect with Taylor & Francis



Copyright © 2018 Informa UK Limited [Privacy policy & cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 3099067
5 Howick Place | London | SW1P 1WG