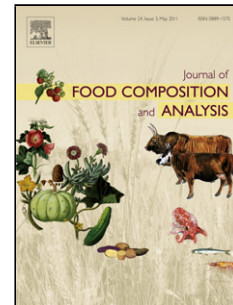


## Accepted Manuscript

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PII: S0889-1575(18)30873-1  
DOI: <https://doi.org/10.1016/j.jfca.2018.09.010>  
Reference: YJFCA 3139

To appear in:

Received date: 7-10-2017  
Revised date: 14-5-2018  
Accepted date: 13-9-2018

Please cite this article as: Aroca-Santos R, Lastra-Mejías M, Cancilla JC, Torrecilla JS, Linear and non-linear quantification of extra virgin olive oil, soybean oil, and sweet almond oil in blends to assess their commercial labels, *Journal of Food Composition and Analysis* (2018), <https://doi.org/10.1016/j.jfca.2018.09.010>

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## **Linear and non-linear quantification of extra virgin olive oil, soybean oil, and sweet almond oil in blends to assess their commercial labels**

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### **Highlights:**

- Technique to rapidly verify the composition of ternary blends of oils.
- Spectroscopic study of mixtures of monovarietal olive oil and contaminants.
- Quality control based on the concentration of contaminants in extra virgin olive oil.
- Useful for producers to validate the labels of extra virgin olive oil bottles.

### **Abstract**

In this work, a method to quantify binary and ternary mixtures composed of extra virgin olive oil (protected designation of origin “Siruana”), soybean oil, and sweet almond oil is presented. The analytical approach is based on visible spectroscopy coupled with algorithmic tools of diverse natures (partial least squares and artificial neural networks (ANNs)). In general terms, the combination of absorption spectroscopy and ANNs result in better models than the linear ones tested. Specifically, when using ANN models, the estimation error of the concentration of every component in ternary blends leads to a 28% better accuracy than linear models. Due to the mean absolute

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