利用不同檢測方法來辨別摻假橄欖油

吳曜廷 (5140)

2018/12/05

大綱

一、前言

二、透過質譜法來測定特級初榨橄欖油中大豆油的添加量

三、以穩定碳同位素分析法檢測玉米油摻加於橄欖油及大豆油

四、使用手持式傅立葉轉換紅外線光譜儀和化學計量工具來鑑定摻假橄欖油

五、結論

摘要

橄欖油的生產成本昂貴且耗時,因具有高商業價值,為食品摻偽最常見的目標之一。隨著儀器分析技術漸趨成熟，摻假檢驗強調以簡單、快速、高精確性及少量溶劑消耗之方式，來達到快篩檢測，因此本篇報告旨在探討不同偵測方法對於辨別摻偽橄欖油之可行性。使用質譜法監測特級初榨橄欖油混合大豆油，可以利用質譜儀分析僅存在大豆油中之天然脂質標記物 olein linoleo 10-heptadecenoic (OLMo，m/z 886.68) 來區別，此法能夠檢測出至最低含量 1% (v / v)。以穩定碳同位素分析不同產地之橄欖油、玉米油和大豆油，結果表明玉米油之 $\delta^{13}C$ (‰) 明顯高於另外兩者。隨著玉米油摻加量提高，橄欖油和大豆油的 $\delta^{13}C$ 值也逐漸增加，其最低偵測含量分別為 5% 和 25% (v / v)。而手持式傅立葉轉換紅外線光譜儀搭配化學計量方法能讓摻有不同植物油之橄欖油最低檢出率為 5~10%。綜合以上三篇研究結果顯示，不同分析方法皆能辨別摻假橄欖油，使得食品企業能利用檢驗技術作為常規分析和管理品質。

參考文獻

Boskou, D. (2006). *Olive Oil: Chemistry and Technology*. New York: AOCS Publishing.

Cimato, A. (1990). La calidad del aceite de oliva virgen y los factores agronómicos. *Olivae, (31): 20-31, 1990.*

da Silveira, R., Vagula, J. M., Figueiredo, I. D., Claus, T., Galuch, M. B., Santos, O. O., & Visentainer, J. V. (2017). Rapid methodology via mass spectrometry to quantify addition of soybean oil in extra virgin olive oil: A comparison with traditional methods adopted by food industry to identify fraud. *Food Research International, 102,* 43-50.

Dubois, V., Breton, S., Linder, M., Fanni, J., & Parmentier, M. (2007). Fatty acid profiles of 80 vegetable oils with regard to their nutritional potential. *European Journal of Lipid Science and Technology, 109*(7), 710-732.

Guillén, M. D., & Cabo, N. (1997). Characterization of edible oils and lard by fourier transform infrared spectroscopy. Relationships between composition and frequency of concrete bands in the fingerprint region. *Journal of the American Oil Chemists' Society, 74*(10), 1281-1286.

Hassen, I., Casabianca, H., & Hosni, K. (2015). Biological activities of the natural antioxidant oleuropein: Exceeding the expectation – A mini-review. *Journal of Functional Foods, 18*, 926-940.

Huang, J. Y., Norgbey, E., Nkrumah, P. N., Opoku, P. A., & Apreku, T. O. (2017). Detection of corn oil in adulterated olive and soybean oil by carbon stable isotope analysis. *Journal Fur Verbraucherschutz Und Lebensmittelsicherheit-Journal of Consumer Protection and Food Safety, 12*(3), 201-208.

Jabeur, H., Zribi, A., & Bouaziz, M. (2016). Extra-virgin olive oil and cheap vegetable oils: Distinction and detection of adulteration as determined by GC and chemometrics. *Food Analytical Methods, 9*(3), 712-723.

Kalivas, J. H., Georgiou, C. A., Moira, M., Tsafaras, I., Petrakis, E. A., & Mousdis, G. A. (2014). Food adulteration analysis without laboratory prepared or determined reference food adulterant values. *Food Chemistry, 148*, 289-293.

Kelly, S., Parker, I., Sharman, M., Dennis, J., & Goodall, I. (1997). Assessing the authenticity of single seed vegetable oils using fatty acid stable carbon isotope ratios (13C12C). *Food Chemistry, 59*(2), 181-186.

Moore, J. C., Spink, J., & Lipp, M. (2012). Development and application of a database of food ingredient fraud and economically motivated adulteration from 1980 to 2010. *Journal of Food Science, 77*(4), R118-R126.

Olive Oil Source (2017). https://www.oliveoilsource.com, Accessed date: 16 May 2017.

Osorio, M. T., Haughey, S. A., Elliott, C. T., & Koidis, A. (2014). Evaluation of methodologies to determine vegetable oil species present in oil mixtures: Proposition of an approach to meet the EU legislation demands for correct vegetable oils labelling. *Food Research International, 60*, 66-75.

Pan, M., Sun, S. Q., Zhou, Q., & Chen, J. B. (2018). A simple and portable screening method for adulterated olive oils using the hand-held FTIR spectrometer and chemometrics tools. *Journal of Food Science, 83*(6), 1605-1612.

Primrose, S., Woolfe, M., & Rollinson, S. (2010). Food forensics: Methods for determining the authenticity of foodstuffs. *Trends in Food Science & Technology, 21*(12), 582-590.