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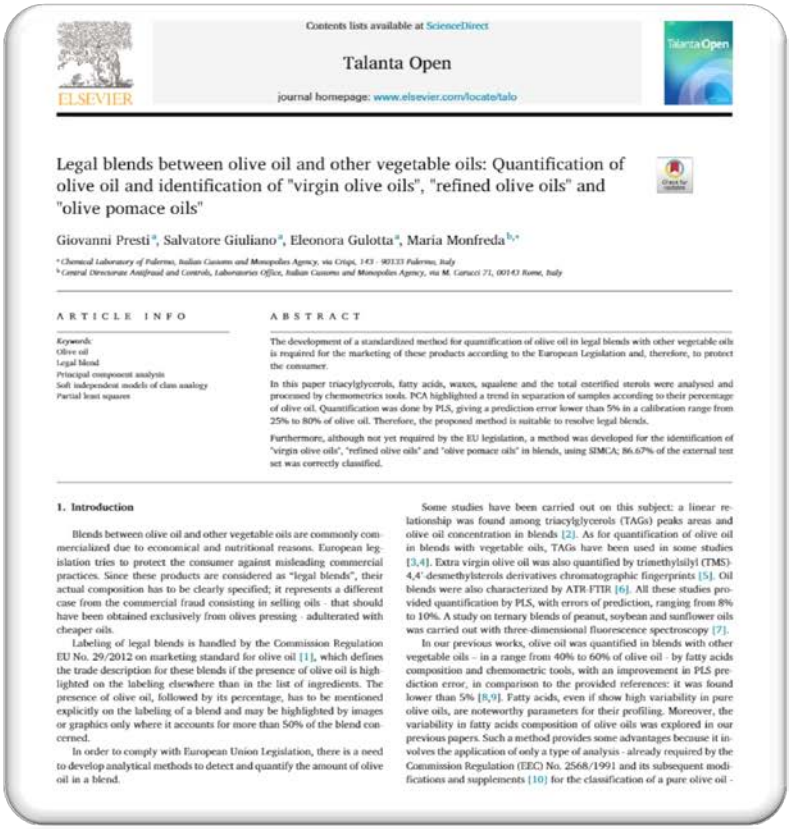
Palermo, 6 aprile 2021 – Il Laboratorio Chimico di Palermo e l'Ufficio Laboratori della Direzione Centrale Antifrode e Controlli hanno presentato un articolo scientifico dal titolo "*Legal blends between olive oil and other vegetable oils: Quantification of olive oil and identification of "virgin olive oils", "refined olive oils" and "olive pomace oils"*, pubblicato dalla prestigiosa rivista internazionale *Talanta Open*.

Il metodo analitico proposto nella pubblicazione, consente di verificare nelle miscele di oli vegetali, tramite un approccio chemiometrico con un sufficiente grado di predizione, sia la corrispondenza fra la reale composizione dei prodotti e la lista degli ingredienti riportati in etichetta, sia la tipologia di oli d'oliva impiegati nelle formulazioni in questione.

L'avvenuta pubblicazione conferma il ruolo attivo delle strutture chimiche di ADM che, nell'ambito dello sviluppo di nuove metodologie analitiche impiegate nel settore delle miscele degli oli vegetali, si manifestano sempre più con lo scopo di migliorare e di velocizzare il controllo di qualità sui prodotti, ma anche per garantire maggiore tutela al consumatore finale.



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Legal blends between olive oil and other vegetable oils: Quantification of olive oil and identification of "virgin olive oils", "refined olive oils" and "olive pomace oils"

Giovanni Presti[a], Salvatore Giuliano[a], Eleonora Gulotta[a], Maria Monfreda[b,*]

[a] Chemical Laboratory of Palermo, Italian Customs and Monopolies Agency, via Crispi, 143 - 90133 Palermo, Italy
[b] Central Directorate Antifraud and Controls, Laboratories Office, Italian Customs and Monopolies Agency, via M. Carucci 71, 00143 Rome, Italy

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ABSTRACT

The development of a standardized method for quantification of olive oil in legal blends with other vegetable oils is required for the marketing of these products according to the European Legislation and, therefore, to protect the consumer.

In this paper triacylglycerols, fatty acids, waxes, squalene and the total esterified sterols were analysed and processed by chemometrics tools. PCA highlighted a trend in separation of samples according to their percentage of olive oil. Quantification was done by PLS, giving a prediction error lower than 5% in a calibration range from 25% to 80% of olive oil. Therefore, the proposed method is suitable to resolve legal blends.

Furthermore, although not yet required by the EU legislation, a method was developed for the identification of "virgin olive oils", "refined olive oils" and "olive pomace oils" in blends, using SIMCA; 86.67% of the external test set was correctly classified.

1. Introduction

Blends between olive oil and other vegetable oils are commonly commercialized due to economical and nutritional reasons. European legislation tries to protect the consumer against misleading commercial practices. Since these products are considered as "legal blends", their actual composition has to be clearly specified; it represents a different case from the commercial fraud consisting in selling oils - that should have been obtained exclusively from olives pressing - adulterated with cheaper oils.

Labeling of legal blends is handled by the Commission Regulation EU No. 29/2012 on marketing standard for olive oil [1], which defines the trade description for these blends if the presence of olive oil is highlighted on the labeling elsewhere than in the list of ingredients. The presence of olive oil, followed by its percentage, has to be mentioned explicitly on the labeling of a blend and may be highlighted by images or graphics only where it accounts for more than 50% of the blend concerned.

In order to comply with European Union Legislation, there is a need to develop analytical methods to detect and quantify the amount of olive oil in a blend.

Some studies have been carried out on this subject: a linear relationship was found among triacylglycerols (TAGs) peaks areas and olive oil concentration in blends [2]. As for quantification of olive oil in blends with vegetable oils, TAGs have been used in some studies [3,4]. Extra virgin olive oil was also quantified by trimethylsilyl (TMS)-4,4' desmethylsterols derivatives chromatographic fingerprints [5]. Oil blends were also characterized by ATR-FTIR [6]. All these studies provided quantification by PLS, with errors of prediction, ranging from 8% to 10%. A study on ternary blends of peanut, soybean and sunflower oils was carried out with three-dimensional fluorescence spectroscopy [7].

In our previous works, olive oil was quantified in blends with other vegetable oils – in a range from 40% to 60% of olive oil - by fatty acids composition and chemometric tools, with an improvement in PLS prediction error, in comparison to the provided references: it was found lower than 5% [8,9]. Fatty acids, even if show high variability in pure olive oils, are noteworthy parameters for their profiling. Moreover, the variability in fatty acids composition of olive oils was explored in our previous papers. Such a method provides some advantages because it involves the application of only a type of analysis - already required by the Commission Regulation (EEC) No. 2568/1991 and its subsequent modifications and supplements [10] for the classification of a pure olive oil -