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Analysis of pesticide residues in olive oil and other vegetable oils

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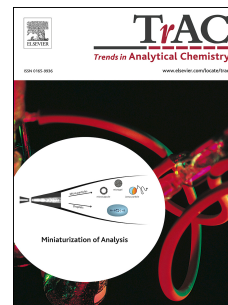
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# 1 Analysis of pesticide residues in olive oil and other vegetable oils

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## 7 Abstract

8 Pesticide residue analysis in olive oil presents difficulties due to the high amount of co-  
9 eluted compounds resulting in high matrix effect. Different extraction/clean-up methods  
10 including gel permeation chromatography, liquid/liquid extraction, solid-phase  
11 extraction and other extraction methods are applied to overcome these difficulties.  
12 Recent approaches such as the addition of the freezing-out step and the application of  
13 Enhanced Matrix Removal-Lipid sorbent (EMR-Lipid) are reported. Gas  
14 chromatography and liquid chromatography coupled to mass spectrometry are  
15 considered the gold standard technologies covering a wide scope of pesticides. This  
16 review recapitulates the methods most widely used for the determination of pesticide  
17 residues in vegetable oils. As a continuation of previous reviews, the work conducted is  
18 an update review of methods from 2006 in this field, evaluating their strengths and  
19 limitations. Main analytical parameters of the different extraction procedures and  
20 detection methods are discussed in terms of recoveries, robustness, limit of  
21 quantification, and matrix effect.

22 **Keywords:** olive oil, extraction methods, analytical methods, recoveries, LOQ, matrix  
23 effect.

## 24 1. Introduction

25 Olive trees are prone to various diseases caused by pests, fungi and weeds. Among  
26 those diseases that affect olive trees, there are those caused by fungi (eye of peacock,  
27 black mold, and verticilliose) and those caused by insects (olive fly, olive moth, psyllids,  
28 thrips, cochineal, neiroun, and leopard moth). The olive fly (*Bactrocera oleae*, Rossi) is  
29 the main disease attacking olive trees in Mediterranean countries causing reduction of

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