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Özün Görel Manav, Şule Dinç-Zor, Güzin Alpdoğan



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**Optimization of a Modified QuEChERS Method by means of Experimental Design for
Multiresidue Determination of Pesticides in Milk and Dairy Products by GC-MS**

Özün Görel Manav^a, Şule Dinç-Zor^b, Güzin Alpdoğan^{b*}

^aTÜBİTAK Marmara Research Centre, Gebze/Kocaeli, Turkey

^bYildiz Technical University, Chemistry Department, Davutpasa Campus,
34220, İstanbul, Turkey

ABSTRACT

The aim of this study is to determine optimum extraction and clean up conditions for different pesticide residues in milk and dairy products by using GC-MS. A Box-Behnken design with 3-level 4-variable followed by Plackett-Burman screening design was employed in order to optimize significant variables of the modified QuEChERS method. After the determination of optimal experimental conditions, the proposed method was validated according to SANCO guideline. The method presented recoveries between 72.5% and 120.0% for 25 pesticides, which is satisfactory when one considers the performance criteria detailed in this guideline. The repeatability and within-laboratory reproducibility ranged from 0.95 to 14.62% and from 1.45 to 17.94%, respectively. Also, the method allowed the determination at low detection limits within short analysis time (<17.5 min). Consequently, application of the developed method to milk and dairy products samples revealed that this method is suitable for routine multi-residue pesticides analysis in terms of high accuracy, precision and efficient.

Keywords: Multi-residue pesticides determination, QuEChERS, experimental design, GC-MS, milk, dairy products.

1. Introduction

Pesticide residues are organic contaminants which are able to damage to endocrine, nervous and immune system as well as causing to cancer, by accumulating in the fatty tissue in human body. They can easily reach the food chain and concentrate in human and animal tissues. For food quality assurance, maximum residue limits (MRLs) of pesticides have been established by European Community for food and animal products (EC No 396/2005) [1].

*Corresponding author at: Yildiz Technical University, Chemistry Department, Davutpasa Campus, 34220, İstanbul, Turkey

E-mail address: galpdogan@yahoo.com (G. Alpdoğan)

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