

Multi-residue analysis for the determination of pesticide residues in fruit and vegetables using liquid chromatography coupled with mass spectrometry

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Abstract. *This article summarizes the results of validation studies of a multi-residue method for the determination of pesticide residues in fruits and vegetables. The results of some of the monitoring control programs carried out in Romania are also presented. Liquid chromatography coupled with mass spectrometry (LC-MS / MS) was used to assess pesticide residue levels. The QUECHERS extraction method was used to extract the compounds. To validate the method, the control samples were fortified with a solution of 74 pesticides for LC-MS / MS analyzes, at 3 levels. The validation study is based on the regulations in Document DG N° SANTE / 12682/2019. The scope of validation included the following performance requirements: Limit of detection; Quantification limit; Recovery; Fidelity; Repeatability; Reproducibility; Recovery; Selectivity / Specificity; Stability / Robustness; Linearity; Matrix effect; Measuring the margin of error.*

Key words: pesticides in fruits and vegetables, chromatographic liquid analysis, mass spectrometry, food safety

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1. Introduction

In recent decades, the growing interest in this direction has stimulated research into the risks associated with the consumption of fruits and vegetables, which are an important part of human nutrition. Therefore, the fact that pesticide residues could affect final consumers, especially when these products are consumed fresh, has amplified research to investigate the distribution of pesticide mass in plant products both during growth and development and in ripening and harvesting, as well as in the post-harvest stages.

2. Experimental

My research study began with the validation of the multiresidue method of pesticides by the determination technique using liquid chromatograph coupled to a mass spectrometer.(LC-MS/MS).Validation of the LC MS / MS multi-residue method was performed for samples of lemon (product with a high acid and water content) and apples (product with a high water content), according to DG SANTE / 12682/2019, categories of which are part and other fruits and vegetables, such as oranges, grafts, mandarins, grapes,