

NEW METHOD FOR THE CONFIRMATION OF PESTICIDES IN FOOD COMMODITIES USING GC-Q-ORBITRAP.

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Nowadays, the most common techniques for the analysis of pesticide residues in food samples are liquid chromatography (LC) and gas chromatography (GC), both coupled to triple quadrupole mass spectrometers (QqQ-MS). In the Laboratori de l'Agència de Salut Pública de Barcelona (LASPB), more than 240 pesticides are daily analyzed in a wide range of food commodities using these techniques.

It is well-known that QqQ instruments are extensively used and have currently become workhorses in routine analysis. While sensitivity is essential to analyze low concentration levels, selectivity is also of paramount importance to assure reliable results and to avoid false positive/negative results. Although QqQ provides excellent sensitivity, some difficulties may arise concerning confirmation criteria as established in Decision 2002/657/EC or SANTE/11945/2015, due to interferences and complex matrices.

In this sense, high resolution mass spectrometry (HRMS) offers an outstanding performance, and is an attractive approach for the confirmatory analysis of pesticides in food samples. HRMS hybrid instruments, such as quadrupole-Orbitrap, start to be introduced as analyzing systems in food safety control laboratories. This instrumentation is a very valuable tool for highly demanding analysis, but also, as a second stage, to confirm doubtful results obtained with low resolution MS/MS.

The aim of the work was to develop a method based on GC-HRMS to confirm the presence of pesticides in food commodities. The capabilities and limitations of the recently presented GC-Q-Orbitrap have been studied. For that reason, the mass spectra of 150 pesticides have been characterized and validated in order to develop this new method. Different matrixes have been tested with the aim to establish a confirmation detection limit of 1 ppb for most of the pesticides, no matter the matrix analyzed. Different acquisition modes and instrumental parameters have been studied, to finally establish an internal standard procedure to confirm the doubtful presence of pesticides previously analyzed by GC-MS/MS.