Investigation of Ion Mobility coupled with mass spectrometry (IM-MS) for the screening of pesticide residues in food

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Author 1 accepts, if selected, to give an oral presentation: ~~YES~~ - NO

Pesticide residue analysis requires methods that can determine hundreds of compounds at low levels in complex food matrices. This challenge has given rise to multi residue methods, the only efficient analytical approach. This type of analytical method entails a “generic” extraction followed by a soft or no purification step to avoid any analytes looses. With over a 1000 active compounds with different physico-chemical properties, gas and liquid chromatography are used as complementary separative techniques.

In the past decade, the determination has been performed on tandem mass analyzers, a powerful tool to overcome co-eluting compounds with excellent sensitivity. Nevertheless, these instruments can guarantee these results per acquisition cycles for more or less 150 compounds. This represents a serious limitation when the number of pesticides to be sought for monitoring and MRL enforcement is growing each year. As multiple injections for the same sample is not viable for the laboratories, we need to have alternatives options. We propose the investigation of ion mobility (IM) coupled with mass spectrometry as a new tool for pesticide residue analysis in food.

Ion mobility spectrometry experiments were performed on a Synapt HDMS G2 spectrometer (Waters, Manchester, UK) which is similar to the Q-TOF instrument, except that the hexapole collision cell is replaced by an ion mobility cell. This technique allows separating an ion packet of a given mass-to-charge ratio by the mean of an electric field applied to the ion mobility cell containing a neutral gas at a controlled pressure (e.g. N_2, 2.5 mbar). Therefore, for each ion, you have additional information: the time required for an ion to travel through the mobility cell.

In this presentation, will be discussed the advantages and drawbacks of this new approach for the identification of 190 pesticides in different food matrices (the choice of compounds was based on the official national and Community monitoring programmes target list). IM was evaluated as an additional separation as well as retention time (liquid chromatography) and m/z (mass spectrometry).