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Analytical study on ethephon residue determination in water by ion-pairing liquid chromatography/tandem mass spectrometry

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Abstract

A detailed analytical study on ethephon residue determination in water, making use of ion-pairing liquid chromatography coupled to electrospray tandem mass spectrometry (LC/MS/MS), has been carried out. Ethephon is a plant growth regulator, highly polar, which is typically present in aqueous solution in anionic form due to its acid character.

Both its retention and its extraction efficiency have been tested using off-line SPE, including several ion-pairing reagents. The results showed that the addition of the ion-pairing reagent to the mobile phase was necessary for the chromatographic separation of the analyte. The evaluation of their relative intensity ratios allowed the reliable confirmation of the

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analyte in samples. The optimised approach was tested in low-salinity water spiked at 0.1 $\mu\text{g L}^{-1}$ level with satisfactory recovery, and a limit of detection of 0.02 $\mu\text{g L}^{-1}$. To this purpose, the water sample was partially de-ionised in an initial stage, in order to remove major ions that would have interfered in analyses. The application of this methodology to more saline/complex water samples, as surface or wastewater, was problematic and a thorough optimisation of the de-ionisation conditions would be required.

Keywords: ethephon ion-pairing liquid chromatography tandem mass spectrometry tetrabutylammonium, water analysis

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