



238 | 5 | 0  
Views | CrossRef citations to date | Altmetric

Original Articles

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

Cristina Ripollés, José M. Marín, Juan V. Sancho, Francisco J. López & Félix Hernández

Pages 1380-1391 | Received 25 May 2010, Accepted 27 Aug 2010, Published online: 21 Oct 2011

Cite this article <https://doi.org/10.1080/03067319.2010.520131>

Sample our  
Bioscience  
Journals  
>> [Sign in here](#) to start your access  
to the latest two volumes for 14 days

Full Article

Figures & data

References

Citations

Metrics

Reprints & Permissions

Read this article

Share

## 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 extraction and pre-concentration from water samples and its chromatographic retention are difficult. Several approaches for sample pretreatment have been tested including direct injection into the chromatographic system, on-line solid phase extraction (SPE) and off-line SPE, with the best results being obtained after off-line SPE, using Oasis MAX cartridges (mixed-mode strong anion-exchange). After testing several ion-pairing reagents, tetrabutylammonium acetate (TBA) was selected. This was

added to the samples before LC/MS/MS analysis to facilitate ethephon chromatographic retention. The acquisition of several specific MS/MS transitions together with the evaluation of their relative intensity ratios allowed the reliable confirmation of the analyte in samples. The optimised approach was tested in low-salinity water spiked at 0.1 µg L<sup>-1</sup> level with satisfactory recovery, and a limit of detection of 0.02 µg L<sup>-1</sup>. 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

## Acknowledgements

This work has been developed under financial support of the Ministry of Education and Science, Spain (CTM2006-06417). The authors acknowledge the financial support of Generalitat Valenciana, as research group of excellence PROMETEO/2009/054. C. Ripollés is very grateful to the Ministry of Education and Science for her pre-doctoral grant.

## Related research ⓘ

People also read

Recommended articles

Cited by  
5

## Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

## Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

## Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

## Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

## Keep up to date

Register to receive personalised research and resources by email



Sign me up



Copyright © 2025 Informa UK Limited [Privacy policy](#) [Cookies](#) [Terms & conditions](#)

[Accessibility](#)

 Taylor and Francis Group

Registered in England & Wales No. 01072954  
5 Howick Place | London | SW1P 1WG