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Quantifying acetaldehyde in cider using a Mn(III)-substituted polyoxotungstate coated acoustic wave sensor

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HIGHLIGHTS:

- Methodology for acetaldehyde determination in cider using a new acoustic wave sensor.
- New sensor coated with TBA-polyoxotungstate is immune to water vapour degradation
- Long lifetime of the sensor (at least eight weeks without sensitivity degradation).
- SPME/FIA- sensor is less expensive than GC-FID and analysis time is similar.
- [acetaldehyde] in ciders not statistically different with SPME/FIA- sensor or GC-FID.

Abstract

A new method for the quantification of acetaldehyde in a water matrix, namely commercial ciders, was developed using solid phase micro-extraction (SPME) followed by detection with a coated acoustic wave sensor. The sensitive coating was a polyoxometalate salt specially synthesised for this application, a compound tailored to be insoluble in water. Although the sample gaseous flow reaching the sensor needed to be dried, as the sensor itself responds to water, there was no sensitivity deterioration after contacting with water vapour, as frequency recover under dried nitrogen carrier was complete. Calibration lasted at least for two months. Comparing this sensor with the analogue previously coated with the soluble decamolybdovanado phosphoric acid, the main advantage comes from the superior stability, and the possibility of keeping it in a wet environment without deterioration.

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