Solid-phase extraction element based on epoxy polymer monolith for determination of polar organic compounds in aqueous media

T. Takahashi, K. Odagiri, A. Watanabe, C. Watanabe, T. Kubo, K. Hosoya

Abstract:
A solid-phase extraction element based on epoxy polymer monolith was fabricated for sorptive enrichment of polar compounds from liquid and gaseous samples. After ultrasonication of the element in an aqueous solution for a given period of time, the thermal desorption (TD) using a pyrolyzer with gas chromatography/mass spectrometry (GC/MS), in which TD temperature was programmed from 50 to 250ºC for the analytes absorbed in the element, was used to evaluate the element for basic extraction performance using the aqueous standard mixtures consisting of compounds having varied polarities such as hexanol, isoamyl acetate, linalool, furfural and decanoic acid, in concentrations ranging from 10 μg/L to 1 mg/L. Excellent linear relationships were observed for all compounds in the standard mixture, except decanoic acid. In the extraction of beverages such as red wine, the extraction element showed stronger adsorption characteristics for polar compounds such as alcohols and acids than a non-polar polydimethylsiloxane-based element. This feature is derived from the main polymer structure along with hydroxyl and amino groups present in the epoxy-based monolith polymer matrix.

* Excerpted from online journal website (Click the title)

Frontier Labs products used:
Multi-Shot Pyrolyzer (EGA/PY-303D), UA-1