

Organophosphorus halloysite nanotubes as adsorbent for lead preconcentration in wine and grape juice

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Abstract

Preconcentration of Pb(II) in grape-based beverages using organophosphate-functionalized halloysite nanotubes was investigated by flame atomic absorption spectroscopy (FAAS). For this proposal, a central composition design (CCD) was performed for an optimum experimental condition on Pb(II) preconcentration procedure, pH 7.5, preconcentration time of 7.5 min and adsorbent mass of 40 mg. The detection and quantification limit values were calculated as 12 and 40 $\mu\text{g kg}^{-1}$, respectively. Additionally, considering Pb(II) tolerable recovery, the nanotubes could be reuse for six cycles. The preconcentration method was applied to wine and grape juice samples and concentrations below LOD were found for all samples. The proposed methodology presented great accuracy and limits compatible with current legislation, since spike/recovery tests were performed, and quantitative recoveries were obtained.

Author keywords

Grape juice
Halloysite nanotube
Organophosphate
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