

Derivatitation Cinnamaldehyde from Cassia Oil to Calix[4]resorcinarene and Its Application for Solid Phase Extraction of Heavy Metals Hg(II) and Pb(II)

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Abstract

A study on synthesis calix[4]resorcinarene from cassia oil and its application for solid phase extraction of heavy metals Hg(II) and Pb(II) has been conducted. A new extractor C-Cinnamal calix[4]resorcinarene (CCCR) was produced by one step synthesis from resorcinol, cinnamaldehyde and HCl. The synthesis was carried out at 77°C for 24 hours, and afforded the extractor in 75 %. Cinnamaldehyde was isolated from cassia oil by bisulphite methods and give cinnamaldehyde in 79% with 99,5% purify. Solid phase extraction of Hg(II) and Pb(II) was conducted in batch system and variation of pH, interaction times, and metal concentrations. Solid phase extraction of Pb(II) went optimal on pH 4, 180 minutes of contact time, and 6.6 mg/L of initial Pb(II) concentrations, followed pseudo second order kinetics models, fit well with Langmuir isotherm models, and give extraction capacity in 1.986 $\mu\text{mol/g}$ or 37.2%. In other hand, solid phase extraction of Hg(II) give optimal condition, i.e. pH 4, interaction time was 180 minutes, and initial Hg(II) concentrations was 0.36 mg/L. In addition, Hg(II) extraction followed pseudo second order kinetics models, fit well with Freundlich isotherm models, and have extraction capacity in 0.71 $\mu\text{mol/g}$ or 79.1%.

Key words: solid phase extraction, C-Cinnamal Calix[4]resorcinarene, Cassia Oil, Pb(II), Hg(II).