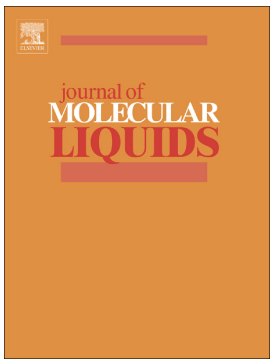

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A heating-assisted liquid-liquid microextraction approach using menthol: Separation of benzoic acid in juice samples followed by HPLC-UV determination

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Abstract

A heating-assisted liquid-liquid microextraction (HA-LLME) procedure was developed as a new approach for pretreatment of complex sample matrix. The procedure was applied for HPLC-UV determination of preservative (benzoic acid) in juices. Menthol was investigated as an extractant for the HA-LLME. The procedure consists in heating of an aqueous sample in a polymeric vial with solid-phase menthol located at the bottom of extraction vial. The heating promotes the melting of menthol and its dispersion in a sample phase. The extractant drops are moving from the bottom to the surface of the sample, forming a liquid organic phase containing target analyte. Thus separation is taken place without centrifugation. It was found that menthol provides for microextraction of benzoic acid from fruit and berry juice samples with recovery from 93 to 117 %. The conditions of the HA-LLME were optimized using factorial experimental designs. Under optimal experimental conditions the linear detection range was found to be 0.5 – 50 mg L^{-1} with LOD at 0.15 mg L^{-1}. The HA-LLME with menthol allowed for significant improvement of the selectivity of benzoic acid determination. The advantages of the HA-LLME are the simplicity, low cost, and using of environmentally friendly extractant.

Keywords: heating-assisted liquid-liquid microextraction; high performance liquid chromatography with ultraviolet detection; benzoic acid; juice

Introduction

Benzoic acid and its salts are widely used as food preservatives and known as E-numbers E210, E211, E212, and E213 [1-3]. The efficiency of benzoic acid and benzoates depends on the pH values of particular food samples. Using these preservatives in food products with a slightly