J Pharm Innov (2013) 8:240–246
DOI 10.1007/s12247-013-9164-z

RESEARCH ARTICLE

Rapid Dispersive Micro-Solid Phase Extraction Using Mesoporous Carbon COU-2 in the Analysis of Cloxacillin in Water

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Published online: 5 November 2013

Abstract
Purpose A new microextraction technique termed COU-2 dispersive micro-solid phase extraction (COU-2-D-μ-SPE) has been developed. The proposed method utilized synthesized mesoporous carbons, COU-2, as sorbent for sample pretreatment in the determination of cloxacillin (CLOX) in water.
Methods The optimized conditions involved the use of 100 mg of COU-2 as adsorbent, 50 mL of water sample at pH 2 containing 10 % (*w/v*) sodium chloride in a sample tube, 1 min of extraction time, methanol as desorption solvent, and 5 min of desorption time. After extraction, COU-2 was collected on a filter and CLOX was desorbed with 300 μL of methanol and dried under a gentle stream of nitrogen. The extract was then reconstituted to 60 μL with distilled water.
Results Under the optimized conditions, the method showed excellent detection and quantification limits for CLOX (0.06 and 0.17 μg L^{-1}, respectively) with good reproducibility (relative standard deviation <8 %) for both intra- and inter-day analyses. The method provided acceptable extraction recoveries for drinking water samples in the range of 89.7–113.6 %. The extraction of blank samples indicated that both samples were free from CLOX contamination. The high recoveries and good precision for CLOX suggest that the COU-2-D-μ-SPE is potentially a good alternative microextraction technique for the monitoring of pharmaceuticals in water samples.

Keywords Cloxacillin · Mesoporous carbons · Dispersive solid phase extraction · High-performance liquid chromatography · Water

Introduction

In the past few decades, miniaturization has become an important trend in the development of sample preparation techniques due to environment and economic perspectives. Sample preparations with new technologies have been focused on reducing hazardous waste and generating safe products. They give benefits not only to the human health and environment but also to the economic aspects. Microextraction is a sample preparation technique where the volume of extracting phase is very small in relation to the volume of the sample [1]. A polymer-based extraction technique called solid phase microextraction (SPME) is a solventless technique introduced by Pawliszyn and coworkers [2]. However, the preparation of fibers requires specialized equipment, which accounts for the high price of commercially available SPME fibers. Furthermore, the fibers are fragile and must be handled with great care [3]. Other microextraction techniques have also been developed such as stir bar sorptive

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