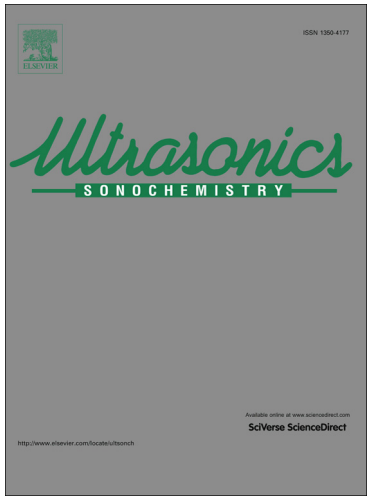

Novel synthesis of nanocomposite for the extraction of Sildenafil Citrate (Viagra) from water and urine samples: Process screening and optimization

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Novel synthesis of nanocomposite for the extraction of Sildenafil Citrate (Viagra) from water and urine samples: Process screening and optimization

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Abstract

A sensitive analytical method is investigated to concentrate and determine trace level of Sildenafil Citrate (SLC) present in water and urine samples. The method is based on a sample treatment using dispersive solid-phase micro-extraction (DSPME) with laboratory-made Mn@ CuS/ZnS nanocomposite loaded on activated carbon (Mn@ CuS/ZnS-NCs-AC) as a sorbent for the target analyte. The efficiency was enhanced by ultrasound-assisted (UA) with dispersive nanocomposite solid-phase micro-extraction (UA-DNSPME). Four significant variables affecting SLC recovery like; pH, eluent volume, sonication time and adsorbent mass were selected by the Plackett-Burman design (PBD) experiments. These selected factors were optimized by the central composite design (CCD) to maximize extraction of SLC. The results exhibited that the optimum conditions for maximizing extraction of SLC were 6.0 pH, 300 µL eluent (acetonitrile) volume, 10 mg of adsorbent and 6 min sonication time. Under optimized conditions, virtuous linearity of SLC was ranged from 30 to 4000 ng mL^{-1} with R^2 of 0.99. The limit of detection (LOD) was 2.50 ng mL^{-1} and the recoveries at two spiked levels were ranged from 97.37 to 103.21% with the relative standard deviation (RSD) less than 4.50 % (n = 15). The enhancement factor (EF) was 81.91. The results show that the combination UAE with DNSPME is a suitable method for the determination of SLC in water and urine samples.

Keywords: Mn@ CuS/ZnS-NCs-AC; Screening and optimization; Sildenafil citrate; Spectrophotometry; Ultrasound assisted extraction; Urine samples.

1. Introduction

An unswerving and specific assay is of great importance for characterization of a drug's disposition, tolerance and safety [1, 2]. Viagra is a citrate salt of Sildenafil citrate (SLC) and is commonly used for the treatment of erectile dysfunction, has become one of the most popular and widely used drugs in the recent

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