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A simple poly(styrene-co-divinylbenzene)-coated glass blood spot method for monitoring of seven antidepressants using capillary liquid chromatography-mass spectrometry

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Abstract

A simple, rapid, selective and sensitive monitoring method for the simultaneous determination of the widely-prescribed antidepressants agomelatine, bupropion, citalopram, fluoxetine, mirtazapine, paroxetine, trazodone in just a human blood drop is here developed and validated. This methodology is based on the use of lab manufactured poly(styrene-codivinylbenzene)-coated glass (PS-DVB) blood spot for the extraction of the analytes and their subsequent separation and detection by capillary liquid chromatography-mass spectrometry (CLC-MS). Briefly, 10 mm-side squares were punched out from blood spots collected on glass substrate coated by 10 μ g of the PS-DVB polymer and eluted with 1.0 mL of 2.0% acetic acid in methanol. The analytes were then separated and detected in less than 20 minutes by capillary CLC-MS using a Jupiter 4 μ Proteo 90A column and water: acetonitrile (20:80 v/v) and ammonium acetate (5 mM, pH 3.0) as mobile phase. Limit of detection (LOD) ranged from 0.018 to 0.038 μ g mL⁻¹, and remarkable precision values for the responses and retention times lower than 5.89% and 1.92% were calculated, respectively. Moreover, accuracy values ranging between 85% and 104% were obtained.

Keywords:

Antidepressants, drug monitoring, blood spot, capillary liquid chromatography-mass spectrometry, poly(styrene-co-divinylbenzene)-coated glass.

1. Introduction

Antidepressant drugs are widely prescribed to treat and relieve depression disorder symptoms, as well as to support the treatment of chronic pain, panic disorder, social phobia and/or narcolepsy, which affect millions of people worldwide, of whom only about half of those affected receive treatment. Furthermore, the expected clinical response is not always attained and/or undesired effects frequently occur [1,2]. The different existing types of antidepressants can be classified according to the brain chemicals regulated. Among these, fluoxetine,

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