Solid-Phase Microextraction Coupled to Gas Chromatography-Mass Spectrometry for the Analysis of Famoxadone in Wines, Fruits, and Vegetables

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ABSTRACT A sensitive, selective, and solvent-free method based on direct immersion solid-phase microextraction (DI-SPME) followed by gas chromatography with mass spectrometry (GC-MS) is proposed for the determination of trace amounts of famoxadone in wines, fruits, and vegetables. Parameters affecting the sample enrichment step, such as sample mass, ionic strength, adsorption and desorption times, and temperatures were carefully optimized. A polar 85 μm polyacrylate fiber was found to be suitable for extraction at 60°C in 20 min under continuous stirring. Desorption was carried out at 270°C for 5 min. Undiluted wine samples and diluted extracts obtained from the solid samples submitted to an ultrasound treatment in the presence of ethanol were quantified against external aqueous standards prepared in 12% ethanol (v/v). Under the optimized conditions, detection limits of 5 ng L⁻¹ and 10 pg g⁻¹ were obtained for liquid and solid samples, respectively. SPME-GC-MS analysis yielded good repeatability (RSD under 10% in all cases). The method provided recoveries of 91.6–110.9% from spiked samples. The method was applied to different samples, and none of them was found to contain famoxadone at concentrations above the corresponding detection limits.

KEYWORDS direct immersion-solid phase microextraction (DI-SPME), famoxadone, fruits, gas chromatography-mass spectrometry (GC-MS), vegetables, wine

INTRODUCTION

Famoxadone is a synthetic fungicide included in the oxazolidinedione family, which was first sold in 1997. This chemical is cataloged as a Quinone outside Inhibitor (QoI) fungicide, and is therefore effective when applied early in the disease cycle. Famoxadone has been widely applied because of its effectiveness against a broad spectrum of fungi that infect grapes, cereals, tomatoes, and many other crops. In order to minimize possible risks to human health, the agricultural products obtained from these crops