

## Author's Accepted Manuscript

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PII: S0039-9140(18)30114-0  
DOI: <https://doi.org/10.1016/j.talanta.2018.02.006>  
Reference: TAL18325

To appear in: *Talanta*

Received date: 18 October 2017  
Revised date: 1 February 2018  
Accepted date: 2 February 2018

Cite this article as: Myrsini Papageorgiou, Dimitra Lambropoulou, Calum Morrison, Jacek Namieśnik and Justyna Płotka-Wasyłka, Direct solid phase microextraction combined with gas chromatography – mass spectrometry for the determination of biogenic amines in wine, *Talanta*, <https://doi.org/10.1016/j.talanta.2018.02.006>

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## Direct solid phase microextraction combined with gas chromatography – mass spectrometry for the determination of biogenic amines in wine

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### Abstract

A direct method based on immersion solid phase microextraction (DI-SPME) gas chromatography mass-spectrometry (GC-MS) was optimized and validated for the determination of 16 biogenic amines in Polish wines. In the analysis two internal standards were used: 1,7-diaminoheptane and bis-3-aminopropylamine. The method allows for simultaneous extraction and derivatization, providing a simple and fast mode of extraction and enrichment. Different parameters which affect the extraction procedure were studied and optimized including ionic strength (0-25%), fiber materials (PDMS/DVB, PDMS/DVD+OC, Polyacrylate, Carboxen/PDMS and DVB/CAR/PDMS) and timings of the extraction, derivatization and desorption processes. Validation studies confirmed the linearity, sensitivity, precision and accuracy of the method. The method was successfully applied to the analysis of 44 wine samples originating from several regions of Poland and 3 wine samples from other countries. Analysis showed that many of the samples contained all examined biogenic amines. The method, assessed using an Eco-Scale tool with satisfactory results, was found to be green in terms of hazardous

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