Rapid method for the detection of chloroanisoles in cork stoppers

J. R. B. Carvalho[1], B. J. R. Gregório[1], J. Queiroz[1], L. Barreiros[1,2], L. M. Magalhães[1], I. V. Tóth[1], A. Graça[3] and M. A. Segundo[1]

[1] UCIBIO, REQUIMTE, Dep. Química, Faculdade de Farmácia, Universidade do Porto
[2] Núcleo de Investigação e Intervenção em Farmácia (NIIFA), Centro de Investigação em Saúde e Ambiente (CISA), Escola Sup. Tecnologia da Saúde do Porto (ESTSP), Instituto Politécnico do Porto
[3] Sogrape Vinhos, S.A. – Departamento de Investigação & Desenvolvimento

The presence of chloroanisoles in cork stoppers is considered the most frequent cause of organoleptic defects in wines bottled with natural corks. These compounds, namely 2,4,6-trichloroanisole (TCA), are generally associated with musty off-flavors and odors in food products. Having this in mind, the major aim of the present work was the development of a rapid and low cost screening method for TCA detection in cork stoppers prior to wine bottling.

The proposed methodology comprises the preconcentration of TCA using solid-phase extraction (SPE) in disk format and analyte detection through measurement of fluorescence quenching of a specific probe previously immobilized in the disk, after irradiation with UV light. SPE was performed using C18 disks as sorbent and methanol as eluent. The selected probe was 8-anilino-1-naphthalenesulfonic acid (ANS). Different parameters were tested and evaluated, namely probe concentration and volume, analyte concentration and eluent volume. TCA selective retention in C18 disks was assessed through eluate analysis by HPLC-DAD at 282 nm.

Envisaging the future application in the wine industry, the developed detection device was used to determine TCA in cork stoppers. The device was adapted to a plastic bag containing cork stoppers spiked with TCA. The air of the bag was filtered by vacuum through the SPE C18 disk with immobilized ANS until there was no air left inside the bag. Subsequently, the device was disassembled, the disk was exposed to UV light and a digital image was captured. The visual comparison with a blank assay (cork stoppers not contaminated) permitted to conclude if there was fluorescence quenching of the ANS probe due to the presence of TCA.

The proposed strategy constitutes a valuable, simple and rapid alternative for TCA detection in cork stoppers. The whole procedure was completed after approximately 20 minutes. Values as low as 2.5 μg of TCA could be determined.

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