THE MONITORING OF THE WINE ORIGIN BY REVERSED-PHASE THIN-LAYER CHROMATOGRAPHY

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Introduction

One of the main properties used for the monitoring of red wine quality is their bright red color given by pigments [1]. Moreover, the pigments give antioxidant properties to the wine [2]. The total amount of pigments in fruit and vegetables is usually measured spectrophotometrically [3]. Because of the considerable commercial importance of wine composition much effort has been devoted to the development of liquid chromatographic methods (TLC or HPLC) suitable for the separation of red wine pigments [4-6]. The fingerprint chromatograms are used as powerful tools to evaluate and compare the composition of compounds in natural products [7].

The wine screening is also important in order to compare their antioxidant activity [8] because is well known the French paradox, i.e. the phenomenon that people residing in certain parts of France, where red wine is customarily consumed, have low mortality by coronary heart disease.

The aim of this study was the development of new RPTLC method for the red wine analysis in order to monitoring their origin and to detect the adulteration.

Experimental

Chromatography

Stationary phase: RP-18 silica gel F_{254s} (Merck)
Mobile phase: acetonitrile-water-formic acid 40 : 58 : 2, v/v/v
Detection: VIS, UV light λ=366 nm
spraying with methanolic solution (0.5 mg/mL) of DPPH(2,2-diphenyl-1-picrylhydrazyl)
Scanning: flatbed scanner-CanoScan-Lide20-600x1200 dpi
smoothing and baseline subtraction

Wines

Wine 1 – Cabernet Sauvignon – Recas 2002
Wine 2 – Cabernet Sauvignon – Recas 2003
Wine 3 – Cabernet Sauvignon – Recas 2005
Wine 4 – Cabernet Sauvignon – Minis 1995
Wine 5 – Cabernet Sauvignon – Minis 2000
Wine 6 – Merlot – Recas 2003
Wine 7 – Merlot – Recas 2005
Wine 8 – Burgund – Recas 2003

All red wines were produced by Romanian wineries.

Conclusions

- Reversed-phase thin-layer chromatography (RPTLC) on silica gel C_{18} can be successfully used for the separation of color pigments from red wines.
- The chromatographic results show that there are differences between the pigment composition of red wines.
- The pigment composition depends on the year of manufacturing and the winery.
- Different grape sorts (Cabernet Sauvignon, Merlot, and Burgund) have different antioxidant capacity.
- RPTLC separations can be used in wine monitoring in order to identify the origin of wine and to detect the adulteration.
- RPTLC chromatogram can be used as fingerprint in the quality control of the red wine.

Results

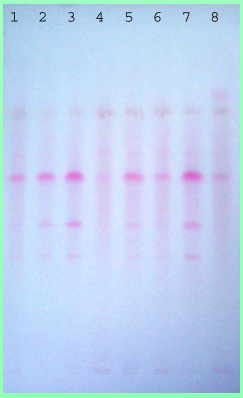


Fig. 1. The fingerprint of wines in VIS light.

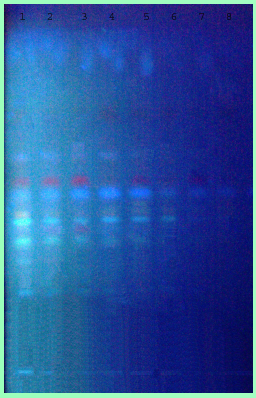


Fig. 2. The fingerprint of wines in UV light (366nm)

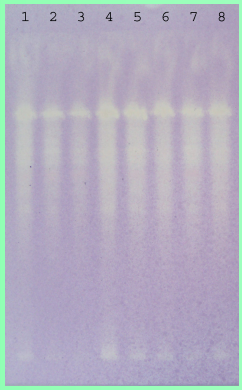
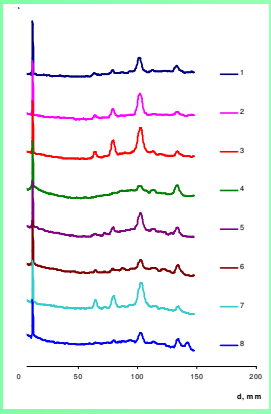
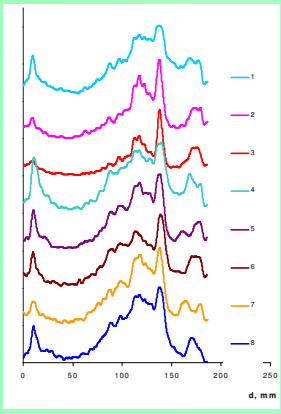


Fig.3. The fingerprint of wines after spraying with DPPH.



a



b

Fig. 4. The chromatograms of wines: a – VIS light; b – after spraying with DPPH

References:

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