

ANTHOCYANINS AND POLYPHENOLS CONTENT IN RED MERLOT, CABERNET SAUVIGNON AND PINOT NOIR WINES FROM RECAS VINEYARD

— short communication —

Ecaterina LENGYEL, Letitia OPREAN, Ramona IANCU, Otto
KETNEY, Ovidiu TITA¹

*“Lucian Blaga” University of Sibiu, Faculty of Agricultural Sciences, Food
Industry and Environmental Protection, Str. I. Rațiu 7-9, 550012 Sibiu,
Romania*

Abstract: The characterization of the grape breeds for red wines has a distinct importance, both for viticulture and for oenology. The secondary metabolites, such as anthocyanins from red grapes, confer some specific and particular characteristics confer some specific and particular features to wines that can be influenced by environmental conditions, the conservation period and the culture technology that is applied. The present paper studies the evolution of the content of anthocyanins and polyphenols, specific for the red wines from the Recaș vineyard, the following breeds being selected: Merlot, Cabernet Sauvignon and Pinot Noir, production years 2010 and 2011. The obtained results showed the particular profile of the selected wine, with specific performance that emphasis on the viticulture potential of the area, in accordance to the worldwide viticulture tendencies, granting local breeds with a special importance in view of obtaining authentic products.

Keywords: *anthocyanins, polyphenols, Merlot, Cabernet Sauvignon, Pinot noir*

INTRODUCTION

Anthocyanins are vegetal pigments derived from flavone that confers colours to plants, flowers, fruit or other of their components. Anthocyanins are part of the flavones category, being widely spread in the vegetal world and thus establish an important component of current nutrition system (Cotea et al., 2009). They are accumulated in the vacuoles of the cells that compose the

¹ Corresponding author. Mailing address: University “Lucian Blaga” of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection, Str. I. Rațiu 7-9, 550012 Sibiu, Romania. Phone: 0040/269/211338. Fax: 0040269212558. E-mail address: ovidiu.tita@ulbsibiu.ro

epidermis tissue and the colour they confer is due to the pH of the cellular juice and to the microelements in the vegetal organism with which they combine. The anthocyanins present a series of antioxidant effects (Amrani, 1996). The antioxidant action is based on the transfer of electrons or hydrogen atoms of the hydroxyl groups on the reactive oxygen species, the radicals (Blouin et al., 2005). Another special feature of the anthocyanins is their capacity to combine with metal ions that are part of the oxidant process (Tița, 2004). When the oxidation of an anthocyanins takes place by a radical, the newly formed radical can be stabilized and delocalized through the electron- π system of the anthocyanins, thus a chain reaction of the radical is formed.

MATERIALS AND METHODS

Research aimed to evaluation of the anthocyanics profile of the red wines from Recaș vineyard from 2010 and 2011 production years. This led to of need of establishing the anthocyanins potential of the breeds Cabernet Sauvignon, Merlot and Pinot Noir, using the spectrophotometrical method (Celotti et al., 2007) (Țârdea, 2007).

This method aims at modifying the anthocyanins colour depending on the pH, the optical density of the samples being measured in relation with the distilled water. The method is based on the variation of the absorption of colour in anthocyanins at the wave lengths of 520nm, pH of 0.6 and 3.5. The work method requires the following reagents:

1. Buffer pH 0.6 (HCl 2%)
2. Buffer pH 3.5 (21.7 g disodium phosphate, 14.6 g citric acid, distilled water up to 1L in a marked balloon).
3. Ethylic acid 95%, acidified with 0.1% pure HCl.

Two test tubes were prepared for the determination of the anthocyanins; they contained:

A: 1mL wine, 1mL acidified alcohol, 10 mL buffer pH 0.6

B: 1mL wine, 1mL acidified alcohol, 10 mL buffer pH 3.5

The absorbance was read at 520 nm, related to the distilled water.

The anthocyanins were calculated with the formula:

$$\text{Total antocyanins} = (DO_A - DO_B) \times 400, \text{ mg/L}$$

where :

DO_A represents the absorbance value read on test tube A

DO_B represents the absorbance level read on test tube B

400 represent the factor that is obtained by using the calibration plot.

The polyphenols have been determined with help of the method offered by Hanna Instruments, with the associated kits and procedures .

Sensorial analysis was performed by a specialised team formed by 12 oenologists, which analysed the wines produced in 2011.

The obtained analytical data were processed using the F test (Fisher) - ANOVA test. The statistical processing of data obtained was done primarily to calculate the following statistical parameters: arithmetic average, standard deviation and relative standard deviation. The statistical significance of differences was analysed at the probability levels of $P * 0.05$. Statistical calculations were performed with ANOVA Logos factor calculation algorithm (Microsoft Excel).

RESULTS AND DISCUSSIONS

As shown in Figure 1, the content of anthocyanins and polyphenols present different values depending on the breed that was taken into consideration, but also depending on the production year.

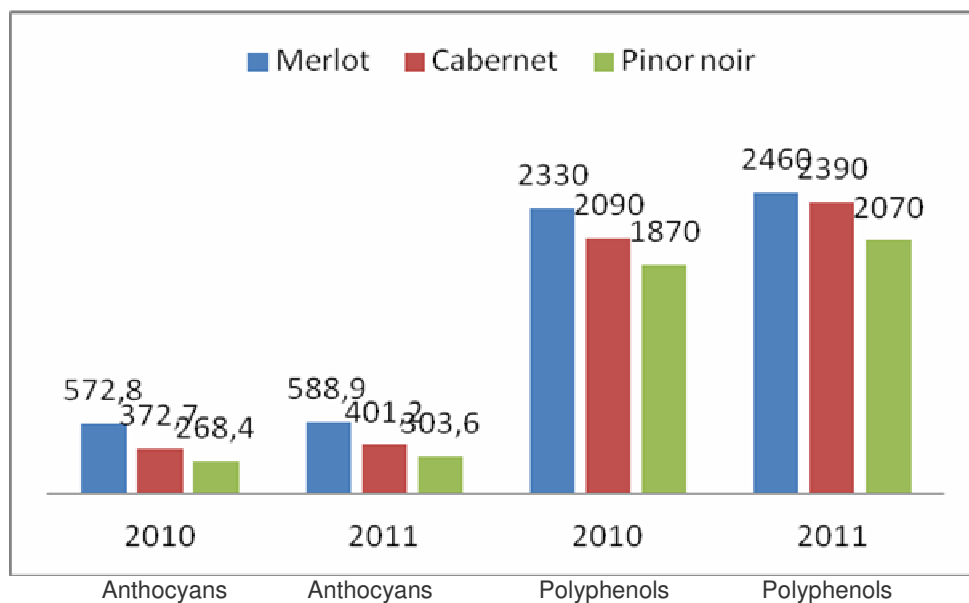


Figure 1. The total anthocyanins and polyphenols content highlighted in red wines Cabernet Sauvignon, Merlot and Pinot noir from Reçaş vineyard, expressed in ml/L

The Pinot noir breed has the lowest quantity of anthocyanins, between 268.4 and 303.6 mg/L compared to Merlot, which presents the highest values

(572.8 and 588.9 mg/L). The Cabernet Sauvignon wine presents moderate characteristics, the obtained values being situated between the two wine samples described above. The highest total polyphenols value is found in the Merlot wine, varying between 2330 and 2460 mg/L. The Cabernet Sauvignon wine follows with values between 2090 and 2390 mg/L, while the lowest total polyphenols quantity is noticed in the Pinot noir (1870 and 2070 mg/L).

In view of accomplishing the targeted comparisons, the results regarding total polyphenols and anthocianins have been expressed both in mg/L. Figure 1 shows that for year 2011, the anthocyanins quantity is superior to the one in 2010 with about 1%, and in the case of polyphenols with about 0.9%. The differences are not significant, fact which leads to the idea that in both situations, the crops were good and the technological process was fully respected.

The statistical analysis Anova confirmed the correlation from the total anthocyanins and polyphenols in the selected samples from Recas vineyard. The results are presented in Table 1.

Table 1. Results of the Anova test: Single Factor

SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Varianc</i>		
Row 1	4	5951.7	1487.925	1099907		
Row 2	4	5253.9	1313.475	1159733		
Row 3	4	4512	1128	952158.5		

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	259173	2	129586.5	0.121041	0.887416	4.256495
Within Groups	9635396	9	1070600			
Total	9894569	11				

The *p* result of the test, delivered by the program, has the same interpretation as the other statistic tests: $p > 0,05$ H_0 is not rejected, the differences are insignificant for the significance step of 95%

The sensorial analysis evidences the characteristics presented in Table 2. It is difficult to make a correlation between the composition and the sensorial characteristics. For example, Merlot has the highest anthocyanins content but no colour higher intensity is observed. More analyses are necessary to make a good correlation between the two types of results, from the chemical and sensorial analysis.

Table 2. Sensorial characteristics of wines from the Recaş vineyard from the year 2011

Sensorial characteristic	<i>Merlot</i>	<i>Cabernet Sauvignon</i>	<i>Pinot noir</i>
Aspect	clear, transparent	clear, translucent	clear, transparent
Colour	ruby-red, shiny, with terracotta dyes	purple red	brown red, shiny
Odour	plum bouquet	hot pepper and cranberries flavour	flavour changing from cherry to raspberry
Taste	temperate astringency, specific smoothness	herbaceous, with a fine astringency, smooth	fine, smooth, delicate, complex and demanding

CONCLUSIONS

The quality and characteristics of the red wines from the Recaş vineyard are in strong correlation to the vine cultivation conditions, the geographical environment together with both its natural and human factors.

Along the formation, maturation and aging of the Cabernet Sauvignon, Merlot and Pinot noir from Recaş vineyard, the constitutive elements of the anthocyanins complex evolves in such a manner that the result leads to significant improvement of the sensorial characteristics.

Quality wines from 2011 year showing higher concentrations of anthocyanins and polyphenols proved superior and resulted in a deeper sensorial palettes.

Aknowledgements

This work was co-financed from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project numbered 76851 *Harmonization of Romanian academic valences to those of European Community* coordinator Phd .eng. Ovidiu Tita

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