

THE EFFECT OF GRAPEVINE SPACE ON SUGARS AND TOTAL ACIDS CONTENT IN THE MUST OF THE VARIETY CABERNET SAUVIGNON

Radisav KOJOVIC¹, Dragoljub ZUNIC², Sasa MATIJASEVIC², D. BRKOVIC¹, M. KRSMANOVIC¹

¹Faculty of Agronomy, University of Kragujevac, Cacak, Serbia

²Faculty of Agriculture, University of Belgrade, Zemun – Belgrade, Serbia

(Corresponding author: gordasek@tfc.kg.ac.rs)

Abstract

Modern aspects of grape and wine production are reflected in how safe and appropriate as well as in how natural and beneficial for people's health it is. The wine grape fruits of the variety Cabernet Sauvignon are rich in sugars and in polyphenolic compounds hugely contributing to their taste, flavour and colour.

The paper aims to examine the effect of planting density of the variety Cabernet Sauvignon on the content of sugars and total acids in the must in 5 different planting densities. The highest average content of sugars was found in the variant I (3x0,75m) amounting to 19,1%, whereas the lowest one prevailed in the variant V (3x2,0m) being 18%. The content of the total acids was reported to range between 7,2 to 7,5g/l.

Keywords: *life space, vine, sugars, total acids*

Introduction

There are roughly 11.000 varieties of the grapevine *Vitis vinifera* L. worldwide. They differ from one another in terms of biological and productional-technological properties. However, among them far fewer are those which are economically significant and which can be grown on larger areas (Avramović, 1980). One of the most significant black grape varieties highly present in almost all the grapevine growing countries worldwide is considered to be Cabernet Sauvignon (Browes et al. 1997), which is none the less thought to be one of the highest quality varieties used for coloured wines production. However, this variety has not still been grown enough in Serbia, yet it is gaining in significance, particularly its more productive and better quality clones.

The yield and quality of grapes of the variety we have been concerned above, depends both, on its genetic propensity and on the environmental conditions, growing mode and production potential (Avramov et al., 1996). In such a manner, a new relationship between the vigour and fertility as well as that between the yield and grape quality has been established.

In order to obtain the best quality of grapes per vine, the optimal number of shoots, foliage surface and grape quantity should be provided (Burić et al., 1987). Some findings suggest the foliage surface needed to obtain 1g of sugar be 250-400m² (Žunić, 2000).

Growing high quality varieties is an imperative of an up-to-date viticulture. In this regard, a more massive cultivation of the varieties such as Cabernet Sauvignon would help grape and grape produces quality be improved in our country.

Materials and method

The research work embraced studying the content of sugars and that of total acids in the must of the wine grape variety Cabernet Sauvignon.

The must had been obtained from the grapes of this variety grown on the locality Navit –DOO 'Jagodina Cellars' in Jagodina.

The variety Cabernet Sauvignon had been grafted on the rootstock Caber 5BB. This variety is considered to be one the best quality ones. The must was found to contain from 20-24% sugars and from 5,5-8 g /l total acids (Cvetković et al., 1996). It was also found to contain 11-13% alcohol, as well as to be good quality and of characteristic smell and uniform flavour. The research work embraced the wine grape strain from 2011.

Of the elements comprising wine grape quality, sugars and acids contained in the must, were determined. The sugar content was established using Exl must gauge in wine and expressed in %. The content of the total acids was established through offsetting with N/4 NaOH using an indicator being expressed in g/l wine acid. Both parameters were followed in 5 various planting densities (variants) being, as follows: 3x0,75m; 3x1,0m; 3x1,25m; 3x1,5m and 3x2,0m with four replicates in order to obtain as accurate average contents as possible.

The obtained values of the numerical indices were processed through the analysis of variance while the significance of the differences was assessed through LSD at the level of significance of 1 and 5%.

Results and discussion

Wine grape quality of a variety is generally determined by numerous elements. The quality of wine grape varieties is determined by determining sugars and the total acids content in the grape juice.

Table 1. The content of sugars and total acids in the must of the variety Cabernet Sauvignon

Variants	Replicates	Sugar content in must %	Total acids content g/l
I 3x0,75m	I	18,7	7,6
	II	18,9	7,4
	III	19,2	6,9
	IV	19,4	7,0
Average		19,1	7,2
II 3x1,0m	I	18,9	7,2
	II	18,4	7,5
	III	19,5	7,0
	IV	19,2	7,1
Average		19,0	7,2
III 3x1,25m	I	18,5	7,3
	II	17,9	7,4
	III	19,0	7,0
	IV	19,6	6,9
Average		18,7	7,2
IV 3x1,5m	I	18,5	7,9
	II	18,1	7,7
	III	19,4	7,0
	IV	18,9	7,4
Average		18,7	7,5
V 3x2,0m	I	17,7	7,9
	II	18,4	7,1
	III	17,9	7,6
	IV	18,1	7,4
Average		18,0	7,5
For the variants LSD			
0,01		2,43	0,36
0,05		1,97	0,31

Sugar accumulation in the must as well as the content of the total acids is considered to be, in the first place, a genetic trait. Thus, in respect of interaction effects existing between the wine grape yield and its quality, Stoev (1973) found out that, up to a certain level, the wine grape quality had been unaffected by its yield, but that any further increase in its yield beyond that level could have even considerably worsened its quality.

The research work of Stoev et al., (1961), Nenov (1968) and Pavlov (1963), showed that the higher number of shoots per grapevine, was, the higher amount of sugars in the grape juice was, which was not proportional to the increase of buds per vine at the time of pruning.

It can be seen from the Table 1 that the highest average value of sugar content in must was reported in the variant I with planting density 3x0,75m, amounting to 19,1% (meaning that the grapevine life space was the smallest, which coincided with the results of Žunić et al., 2000), and the lowest one in the variant II (planting density 3x1,25m). The content of the total acids was found to range from 7,2 to 7,5 g/l.

Conclusion

The average content of sugars in grape juice (must) during the study year (2011) was found to depend on the life space of the grapevine.

Thus, the highest sugar content was revealed at dense planting (3x0,75) amounting to 19,1%, whereas the lowest one was reported at the thinner (3x2,0) planting, being 18,0%. As for acids, their overall content was found to range from 7,2 to 7,5 g/l.

References

- Avramov L., Nakalamić A., Tadijanović Đ., Stanojević S., Todorović Natalija, Jović S., Polak V. (1996): Variranje prinosa i kvaliteta grožđa i vegetativnog potencijala nekih sorti u interakciji uzgojnog oblika, rastojanja, visine stabla i mezoklimatskih uslova. Rad saopšten na IV Međunarodnom kolokviju o rezidbi i uzgojnim oblicima vinove loze. Gesko, Budimpešta.
- Avramov L. (1980): Savremeno podizanje vinograda. Nolit Beograd.
- Browsers E., Meredith P. (1997): The origin of Cabernet sauvignon. 48th Annual Meeting. Davis.
- Burić D., Paprić Đ., Kuljančić I. (1987): Uticaj rastojanja i gustine sadnje sorte Rizling italijanski na vegetativni potencijal, prinos i kvalitet grožđa. Savremena poljoprivreda, br. 1-2, Novi Sad.
- Cvetković D., Živković T., Lović R., Živić N. (1996): Rodni potencijal i kvalitet grožđa sorte Kaberne sovignon u jagodinskom vinogorju. Poljoprivreda, 383-385, Beograd.
- Nenov S. (1968): Poručavane visokostabilena formirovka oni sort Italijanski rizling. Lozarstvo i vinarstvo, br. 6, Sofija.
- Pavlov N. (1963): Proučavane rezidbata i natovaruvaneto na sortovete Vračanski misket, Tamjanka, Kaberne sovignon i Juni blan. Izvestija, Tom. 4, Pleven.
- Stoev K. (1961): Fiziološki osnovi vinogradarstva. Čast I, Sofija.
- Stoev K. (1961): Fiziološki osnovi vinogradarstva. Čast II, Sofija.
- Žunić D. (2000): Tipski projekat podizanja 1ha vinograda. Neven, Beograd.
- Žunić D., Kojović R., Matijašević S. (2003): Uticaj veličine životnog prostora čokota na svojstva sorte Kaberne sovignon. Zbornik naučnih radova XVIII Savetovanja „Unapređenje proizvodnje voća i grožđa“, Beograd.