

## Qualitative characteristics of the wine obtained from Italian Riesling grapes variety, grown at Ostrov Vineyards, along three successive crops 2004, 2005 and 2006

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CULEA RODICA-ELENA\*, CAMPEANU GHEORGHE\*, TAMBA-BEREHOIU RADIANA\*, POPA NICOLAE-CIPRIAN\*\*

\*University of Agronomic Sciences and Veterinary Medicine of Bucharest  
[romus1970@yahoo.com](mailto:romus1970@yahoo.com)

\*\*FARINSAN S.A. Giurgiu

### Abstract

*The physical and chemical characteristics ( $d^{20}$ , alcohol % vol., total dry extract mg/l, free sugar g/l, unreducing extract g/l, total acidity g/l  $C_4H_6O_6$ , free  $SO_2$  mg/l, total  $SO_2$  mg/l) have been analyzed, known for being critical for the wine quality made from the Italian Riesling grapes variety, in three successive years: 2004, 2005 and 2006. The climatic peculiarities of the forenamed years, determined the appearance of some quality statistic differences, as follows:*

*- the Density of Italian Riesling wine, differed very significantly between 2004 and 2006 crops, being insignificantly different for the other crops pairs (2004 – 2005 and 2005 – 2006);*

*- The parameters Total dry extract and Unreducing extract differed very significantly, respectively distinctly significant between 2004 and 2005 crops ( $t = 4,661$ , respectively  $t = 3,399$ ). For the other crops pairs there had been no significant differences;*

*- The Total acidity parameter differed distinctly significant ( $t = 3,383$ ) between 2004 and 2006 crops, its value having an evident tendency of diminution along the three years period.*

*Conclusively, for a half of the analyzed parameters there are no significant differences between crops (Alcohol content, Free sugar, Free  $SO_2$  and Total  $SO_2$ ). Also, we noticed that the most meaningful differences have been established between the wine parameters from 2004 and 2005 crops, respectively 2004 and 2006 crops.*

Keywords: Italian Riesling, quality, physical and chemical characteristics, statistic differences

### Introduction

This study recommends a comparative characterization of the dry wine quality obtained from the *Italian Riesling* grapes variety grown at SC OSTROVIT SA, from three production crops 2004, 2005 and 2006. The physical and chemical analysis emphasizes the wine peculiarities in the preceding stage of bottling and commercialization. The wine Italian Riesling is a dry white wine, with temperate alcoholic potential and moderate dry extract. It is showing a high acidity, which confers itself a note of characteristic freshness. As a rule, the better wines are obtained from plantations situated in the up hill zones [2,3].

### Materials and methods

Samples of unbottled wine from the Italian Riesling grapes variety have been taken for analysis, during three successive years (2004-2006), in 10 repetitions for each crop. The

following quality parameters of the wine have been analyzed:  $d_{20}^{20}$  (picnometric method STAS 6182/8-71), alcohol % vol. (picnometric method STAS 6182/6-70), total dry extract mg/l (densimetric method STAS 6182/9-80), free sugar g/l (iodometric method STAS 6182/18-81), unreducing extract g/l, total acidity g/l  $C_4H_6O_6$  (titrimetric method STAS 6182/1-79), free  $SO_2$  mg/l (iodometric method STAS 6182/13-72), total  $SO_2$  mg/l (iodometric method STAS 6182/13-72) [4]. The obtained results were statistically processed using the professional program COHORT.

## Results and discussions

The results, concerning the variability estimates of the analyzed physical and chemical parameters, in the case of the wine obtained from the Italian Riesling grapes variety of 2004 crop, are presented in the table 1.

Parameter	$\bar{X} \pm s$	s	CV %
$d_{20}^{20}$	$0.9939 \pm 0.00038$	1.454E-07	0.04
Alcohol (vol %)	$11.230 \pm 0.183$	0.033	1.630
Total dry extract (g/l)	$22.320 \pm 0.933$	0.870	4.180
Free sugar (g/l)	$1.420 \pm 0.464$	0.215	32.61
Unreducing extract (g/l)	$20.860 \pm 0.811$	0.658	3.890
Total acidity (g/l $C_4H_6O_6$ )	$5.993 \pm 0.173$	0.029	2.890
Free $SO_2$ (mg/l)	$40000 \pm 0.000$	0.000	0.000
Total $SO_2$ (mg/l)	$127.200 \pm 11.698$	136.844	9.200

**Table 1.** The variability estimates of the wine samples derived from Italian Riesling grapes variety, according to 2004 crop (n =10).

As noticed from table 1, the average values obtained for investigated physical and chemical parameters were characteristic for white dry wines of superior quality. The values of Free sugar and Total  $SO_2$  were affected by the greatest variation coefficients (32,61 %, respective 9,200 %). The smallest variation coefficients have been registered in the case of Free  $SO_2$ , to which we registered the same values, in the case of all the 10 analyzed samples and also in the case of Density parameter (0,04 %). The absence of the variations for Free  $SO_2$  parameter, may be explained as an effect of qualitative homogeneity of the raw material, or the technological conditions, while low variation of the Density is a normal consequence of the low variation registered by other parameters [1], especially the Alcoholic concentration (1,630 %).

In table 2 are presented the variability estimates of the wine samples, resulted from the Italian Riesling grapes variety, according to 2005 crop.

Parameter	$\bar{X} \pm s$	s	CV %
$d_{20}^{20}$	$0.9871 \pm 0.019$	0.00036	1.920
Alcohol (vol %)	$11.060 \pm 0.189$	0.036	1.710
Total dry extract (g/l)	$20.710 \pm 0.568$	0.323	2.740
Free sugar (g/l)	$1.180 \pm 0.493$	0.244	41.780
Unreducing extract (g/l)	$19.630 \pm 0.806$	0.651	4.110
Total acidity (g/l $C_4H_6O_6$ )	$5.966 \pm 0.366$	0.134	6.130
Free $SO_2$ (mg/l)	$36.500 \pm 9.443$	89.166	25.870
Total $SO_2$ (mg/l)	$131.700 \pm 10.467$	109.566	7.950

**Table 2.** The variability estimates of the wine samples from Italian Riesling grape variety, according to 2005 crop (n =10)

Like noticed in table 2, in the case of physical and chemical wine parameters derived from 2005 crop, the variation coefficients were most increased. For some of the parameters, such as Free sugar, we noticed even excessive values (41,780 %).

Quite increased values of the variation coefficients were noticed also for the parameter Free SO<sub>2</sub> (25,870 %), in the context in which Total SO<sub>2</sub> was characterized by a quite small variation coefficient (7,950 %). An explanation for the increased variations of these parameters can be the fact that this is the result of either of the processing of the raw material which is not alike from the point of view of the quality parameters, or of the existence of some variations of the technological process (oscillations of temperature, the application of some various doses of SO<sub>2</sub> etc).

In table 3 are presented the results concerning the variability estimates of wine samples, from the Italian Riesling grapes variety according to 2006 crop.

Parameter	X±s	s	CV %
d <sup>20</sup> <sub>20</sub>	0.993 ± 0.00024	5.88E-08	0.04
Alcohol (vol %)	11.330 ± 0.416	0.173	1.630
Total dry extract (g/l)	21.450 ± 1.050	1.102	4.180
Free sugar (g/l)	1.205 ± 0.387	0.150	32.61
Unreducing extract (g/l)	20.240 ± 0.864	0.747	3.890
Total acidity (g/l C <sub>4</sub> H <sub>6</sub> O <sub>6</sub> )	5.727 ± 0.178	0.031	2.890
Free SO <sub>2</sub> (mg/l)	40.500 ± 2.368	5.611	5.846
Total SO <sub>2</sub> (mg/l)	127.300 ± 11.528	132.900	9.200

**Table 3.** The variability estimates of the wine samples from Italian Riesling grapes variety, according to 2006 crop (n =10)

As noticed in table 3 the most increased values of the variation coefficients characterized the same Free sugar parameter (32,610 %), while the values of the variation coefficients related to other parameters being relatively small.

Concerning the differences between the physical and chemical parameters from a crop to another, the results obtained following the Student test (test t) are processed in table 4.

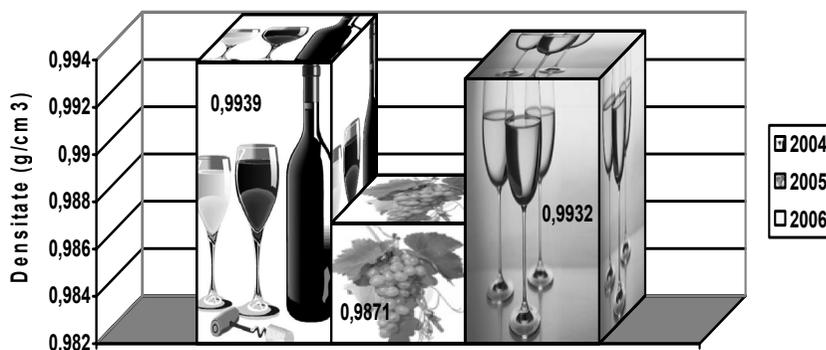
Parameter	Pairs	Average (a)	Average (b)	t
d <sup>20</sup> <sub>20</sub>	2004 (a) – 2005 (b)	0.9939	0.9871	0.788
	2004 (a) – 2006 (b)	0.9939	0.9932	<b>4.758***</b>
	2005 (a) – 2006 (b)	0.9871	0.9932	1.016
Alcohol (vol %)	2004 (a) – 2005 (b)	11.230	11.060	2.040
	2004 (a) – 2006 (b)	11.230	11.330	0.696
	2005 (a) – 2006 (b)	11.060	11.330	1.867
Total dry extract (g/l)	2004 (a) – 2005 (b)	22.320	20.710	<b>4.661***</b>
	2004 (a) – 2006 (b)	22.320	21.450	1.959
	2005 (a) – 2006 (b)	20.710	21.450	1.960
Free sugar (g/l)	2004 (a) – 2005 (b)	1.420	1.180	1.120
	2004 (a) – 2006 (b)	1.420	1.205	1.125
	2005 (a) – 2006 (b)	1.180	1.205	0.125
Unreducing extract (g/l)	2004 (a) – 2005 (b)	20.860	19.630	<b>3.399**</b>
	2004 (a) – 2006 (b)	20.860	20.240	1.654
	2005 (a) – 2006 (b)	19.630	20.240	1.631
Total acidity (g/l C <sub>4</sub> H <sub>6</sub> O <sub>6</sub> )	2004 (a) – 2005 (b)	5.993	5.966	0.210
	2004 (a) – 2006 (b)	5.993	5.727	<b>3.383**</b>
	2005 (a) – 2006 (b)	5.966	5.727	1.855
Free SO <sub>2</sub> (mg/l)	2004 (a) – 2005 (b)	40.000	36.500	1.165
	2004 (a) – 2006 (b)	40.000	40.500	0.861

	2005 (a) – 2006 (b)	36.500	40.500	1.322
Total SO <sub>2</sub> (mg/l)	2004 (a) – 2005 (b)	127.200	131.700	0.906
	2004 (a) – 2006 (b)	127.200	127.300	0.019
	2005 (a) – 2006 (b)	131.700	127.300	0.893

**Table 4.** The meaning of average differences (t test) for physical and chemical parameters between annual crops  
\* significant different, \*\*distinctly significant different, \*\*\*very significant different

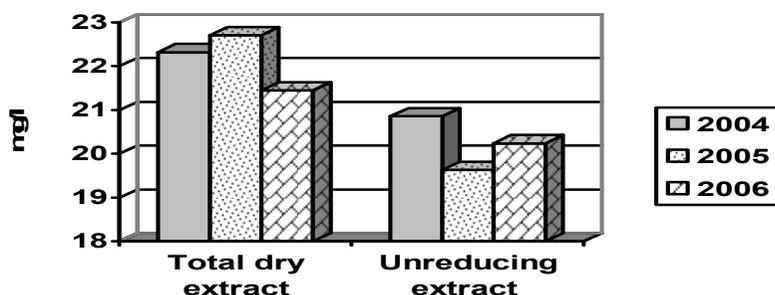
In table 4 we can see that for a half of the analyzed parameters, there are no *significant* differences between crops (Alcohol, Free sugar, Free SO<sub>2</sub> and Total SO<sub>2</sub>). Also, we noticed that the most *significant* differences have been established between the wine parameters from 2004 and 2005 crops, respectively 2004 and 2006 crops.

In figure 1 it is shown that the Density of Italian Riesling wine, differed very *significant* between 2004 and 2006 crops, being *insignificant* different for the other crops pairs (2004 – 2005 and 2005 – 2006).



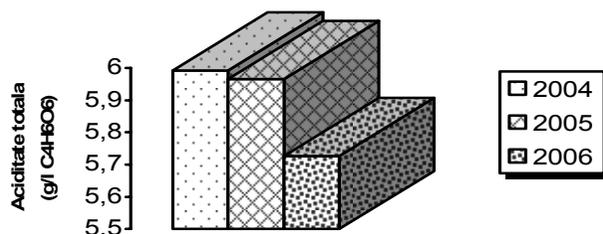
**Figure 1.** The meaning of Density averages differences between 2004, 2005 and 2006 crops

The parameters Total dry extract and Unreducing extract differed very *significant*, respectively distinctly *significant*, between 2004 and 2005 crops ( $t = 4,661$ , respectively  $t = 3,399$ ). For the other crop pairs there had been no *significant* differences (figure 2).



**Figure 2.** The meaning of average differences concerning Total dry extract, respective Unreducing extract, between 2004, 2005 and 2006 crops

The Total acidity parameter differed distinctly *significant* ( $t = 3,383$ ) between 2004 and 2006 crops, its value having an evident tendency of diminution along the three years period (fig.3).



**Figure 3.** The meaning of average differences concerning Total acidity, between 2004, 2005 and 2006 crops

## Conclusions

The average values calculated for the physical and chemical parameters, in the case of Italian Riesling grape variety wines, were typical for the white, dry and superior quality wines.

The greatest values of the variation coefficients were registered by the Free sugar parameter, more than 30 % each year. The fact suggests either the existence of some qualitative variations of the raw material, concerning the content in fermentescible sugars, or the existence of *significant* variations due to the technological process (most unlikely).

The only differences noticed between crops were the differences registered by Density and Total acidity (for 2004-2006 pair), Total dry extract and Unreducing dry extract (for 2004-2005 pair).

## References

1. BLOUIN, J., CRUEGE, J., 2003, *Analyse et composition des vins-comprendre le vin*, Ed. Dunod, Paris
2. POMOHACI, N., SÎRGHI, C., STOIAN, V., COTEA, V., NĂMOLOȘANU, I., 2000, *Oenologie*, Vol.1, Editura Ceres, București.
3. POMOHACI, N., SÎRGHI, C., STOIAN, V., COTEA, V., NĂMOLOȘANU, I., POPA, A., ANTOCE, A., 2001, *Oenologie*, Vol.2, Editura Ceres, București.
4. *Culegere de Standarde Române comentate/Metode de analiză*, 1997, I.R.S. Institutul Român de standardizare, București.