TECHNOLOGICAL AND OENOLOGICAL VALUE OF GRAPE VARIETIES AND WINES FROM COTNARI VINEYARD IN 2011

VALOAREA TEHNOLOGICA SI OENOLOGICA A SOIURILOR DIN PODGORIA COTNARI IN CONDITIILE ANULUI 2011

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Abstract. *Cotnari vineyard is one of the benchmarks of Romanian viticulture and wine-making. The four grape varieties of the vineyard, Tămâioasă românească, Fetească albă, Grasă de Cotnari and Frâncuşă are undried resources of worldwide famous wines. This study wants to present from an ampelographic (technological) and oenological point of view the grapes and wines of the vineyard.*
Key words: Cotnari, analytical connection between grapes-must-wine

Rezumat. *Podgoria Cotnari reprezinta unul din stindardele viticulturii si oenologiei romanesti, fiind astfel permanent in vizorul cercetarilor din domeniu. Cele patru soiuri etalon ale podgoriei, si anume Tămâioasă românească, Fetească albă, Grasă de Cotnari and Frâncuşă sunt surse inepuizabile de vinuri cu renume mondial. Studiul de fata doreste sa prezinte atat din punct de vedere ampelografic - tehnologic dar si din punct de vedere oenologic vinurile si strugurii podgoriei.*
Cuvinte cheie: Cotnari, conexiune analitica strugure-must-vin

INTRODUCTION

Cotnari vineyard is situated in the north-east of Romania and is part of the renowned European vineyards found at the most northern limit of vine culture for economical purpose (45–50° north latitude): Tokaj - Hungary, Rheingau - Germany, Champagne - France, vineyards with world-wide recognized wines (Cotea, 1985).

From the oldest times, the Cotnari assortment is constituted of local grape varieties. The vines are the same with those cultivated in the time of Stephen the Great and are in the following proportion: Grasă de Cotnari 35%, Fetească albă 35 %, Frâncuşă 20% and Tămâioasă românească (Busuioacă de Moldova) 10%. Cotnari is the only Romanian vineyard that has not changed the vine assortment after the phylloxera attack (Cotea et al., 2009).

The main aim of this article is the study of the analytical connection between grapes, must and wine, from a interdisciplinary (ampelography and oenology) point of view.

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MATERIAL AND METHOD

Frâncuşă, Fetească albă, Grasă de Cotnari and Tămâioasă românească grapes were harvested from Cotnari vineyard in September 2011. Grapes were harvested from 45 vines chosen at random from the production parcels, with an area of 1 ha and a vine density of 3200 vinetrunks, so that the plants have variety-specific vegetative growths and production capacity. The harvest was programmed on the 25th of September, the average date for harvesting in Cotnari vineyard.

Before processing, some grape characteristics were determined: grape quantity (kg), 100 grape berries mass (g), marc quantity (L), stem mass (kg), grape marc quantity (kg), must quantity (L) and wine quantity of (L) for each grape variety.

The grapes' processing was done according to the technology of obtaining dry white wines. A series of preliminary tests for the must were registered: sugars quantity (g/L), total acidity (g/L tartaric acid). Selected yeasts (20 g/100 kg) were added to the must that were then settled in stainless steel tanks in order to finish their alcoholic fermentation. The obtained wines were conditioned and then bottled.

The following general physical-chemical analyses were determined: alcoholic concentration, reductive sugars, relative density, total acidity, volatile acidity, non-reductive extract, total dry extract. All the analyses were based on national and international standards as well as in the specialty literature (Compendium of International Methods of Analysis of Wines and Musts, 2011).

RESULTS AND DISCUSSIONS

Table 1 present the technological characteristics of the raw matter from the analysed grape varieties. The lowest production is registered at the Frâncuşă variety, of 82 kg, while Tămâioasă românească had the highest quantity of harvested grapes, of 199,5 kg.

The mass of 100 grape berries is mainly determined by the ampelographic characteristics of the variety and less by the applied agro-technical measures. The highest values are registered at Grasă de Cotnari, with 375,77 g, with berries of average to big dimensions. At the other end is Fetească albă variety, with small berries, the mass of 100 berries 225,01 g.

The grape structure index is within limits: for Tămâioasă românească, the ratio between berries' weight and stems weight is 33,25, for Grasă de Cotnari, 42,5, close to that of table grapes due to the berries' dimensions. Fetească albă has a structure index of 21,3, while Frâncuşă has 27,3. Stem mass represents 4,69% of the total quantity of Fetească albă grapes, 3,65% of the total quantity of Francusa grapes, 2,35% of the total quantity of Grasă de Cotnari and 3% of the total quantity of Tămâioasă grapes.

After pressing, the grape marc represents 34,48% of the total quantity of crushed grapes of Fetească albă, 30,37 % of the total quantity of crushed grapes of Frâncuşă, 36,14% of the total quantity of crushed grapes of Grasă de Cotnari and 34,62 of the total quantity of crushed grapes of Tămâioasă românească. The ratio between the obtained wine and the total quantity of harvested grapes is 56 L Fetească albă (52,58%), 47 L Frâncuşă (57,31%), 43 L Grasă de Cotnari (50,58%), 116 L Tămâioasă românească (58,14%).

Table 1

Technological characteristics of raw matter from Fetească albă, Frâncușă, Grasă de Cotnari and Tămâioasă românească

Grape variety	Grape mass (kg)	100 berries mass (g)	Crushed grapes mass (L)	Stem mass (kg)	Grape marc (kg)	Must (L)	Wine (L)	Structure index
Fetească albă	106,5	225,01	101,5	5	35	66,5	56	21,3
Frâncuşă	82	310,6	79	3	24	55	47	27,3
Grasă de Cotnari	85	375,77	83	2	30	53	43	42,5
Tămâioasă românească	199,5	322,7	193,5	6	67	126	116	33,25

Table 2

Quality characteristics of Fetească albă, Frâncușă, Grasă de Cotnari și Tămâioasă românească musts

Grape variety	Sugars (g/L)	Total acidity (g/L $C_4H_6O_6$)	Efficiency in must (%)
Fetească albă	192	7,28	62,44
Frâncuşă	177,2	7,5	67,07
Grasă de Cotnari	191,9	8,83	62,35
Tămâioasă românească	203,3	6,5	63,15

Table 3

Physical-chemical characteristics of Fetească albă, Frâncușă, Grasă de Cotnari și Tămâioasă românească wines

Wine	Volatile acidity (g/L $C_4H_6O_6$)	Total acidity (g/L $C_4H_6O_6$)	Alcoholic conc. (% vol.)	Density (g/cm³)	Reductive substances (g/L)	Total dry extract (g/L)	Non-reductive extract (g/L)	Total SO_2 (mg/L)	Free SO_2 (mg/L)
Fetească albă	0.21	6.74	12.22	0.99166	0.80	20.10	19.30	63.06	29.86
Frâncuşă	0.19	6.53	11.43	0.99303	0.74	21.10	20.36	55.14	27.11
Grasă de Cotnari	0.26	6.83	12.57	0.99236	0.77	22.90	22.13	73.42	34.73
Tămâioasă românească	0.27	5.97	11.71	0.99237	1.52	20.30	18.78	40.52	17.97

Table 2, presents the characteristics of musts of the 4 grape varieties. Tămâioasă has 203 g /L while Grasă de Cotnari registers 191 g/L, with an equilibrated total acidity 8,83 (g/L $C_4H_6O_6$) and 6,5 (g/L $C_4H_6O_6$) respectively. The grape to must conversion rate at all grape varieties was specific to obtaining quality wines, the highest values being registered at Frâncuşă, known in literature also as "Vinoasă" due to the structure of the grape berry that allows the accumulation of higher quantities of must compared to other varieties from the same quality category (Rotaru, 2009).

Table 3 presents the physical-chemical characteristics of the 4 wines. All wines are classified as DOC, due to the values of alcoholic concentration and dry extract. Grasă de Cotnari wine has the highest alcoholic concentration (12, 57% vol.) and the highest non-reductive extract (22,9 g/L). The lowest values are found in Frâncuşă (11,43% vol.) and Tămâioasă românească (11,7% vol.). The reductive substances are in small quantities, the wines are dry. Total acidity is equilibrated, with an average of 6,5 g/L tartaric acid. As expected, the musts' acidity drops with approx. 1-1,5 g/L tartaric acid in the obtained wines.

CONCLUSIONS

1. The obtained production levels and compositional characteristics of the grapes prove that the four grape varieties are well adapted to the ecopedoclimatic conditions of Cotnari vineyard, the obtained values being characteristic to the varieties.

2. Although grape harvest was not realised at technological harvest, the obtained wines for 2011 are classified as controlled origin denomination (DOC).

3. Grasă de Cotnari variety proves it quality, the obtained wine having alcoholic concentration, equilibrated acidity and a well structured body, being the etalon variety for Cotnari vineyard.

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