

PHYSICO CHEMICAL ANALYSIS OF CYPRIOT AND ROMANIAN RED WINE FOR QUALITY CONFIRMATION

ANALIZA PARAMETRIILOR FIZICO CHIMICI A UNOR VINURI CIPRIOTE ȘI ROMÂNEȘTI PENTRU CONFIRMAREA CALITĂȚII

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Abstract. *The production of winemaking in Cyprus and in Romania dates back to ancient times with years of tradition and had an important role in the everyday life. To ensure the quality of wines produced in the two countries, it is absolutely necessary to characterize and establish the typicity and physico-chemical parameters in order to achieve a database. The aim of this research was the comparative analysis of Cypriot and Romanian wine samples using standard methods of OIV, for determining the physico-chemical parameters of red wine samples (volatile acidity, total acidity, free SO₂, total SO₂, TDM, Sugars, pH, alcoholic content). Following the results, we observed statistically significant differences between samples. These results, together with the metal and phenolic compounds content analysis will be used to confirm the authenticity of the Romanian and Cypriot wines.*

Key words: *wine, physico-chemical parameters, authenticity*

Rezumat. *Producerea de vinuri în Cipru și România este o tradiție pentru cele două popoare încă din cele mai vechi timpuri. Este absolut necesar, pentru a se asigura calitatea vinurilor produse în cele două țări, caracterizarea și stabilirea caracteristicilor fizico - chimice și a tipicității vinurilor produse, în vederea realizării unei baze de date. Scopul acestei lucrări constă în analiza comparativă a unor probe de vinuri roșii, cipriote și românești, cu ajutorul metodelor standard OIV pentru stabilirea parametrilor fizico-chimici (aciditate volatilă, aciditate totală, SO₂ liber, SO₂ total, TDM, conținutul de zaharuri, pH, concentrația alcoolică). În urma analizei rezultatelor obținute s-au observat diferențe semnificative între probele analizate. Aceste rezultate, împreună cu analiza conținutului de metale și de compuși fenolici, vor fi utilizate pentru confirmarea autenticității vinurilor românești și cipriote.*

Cuvinte cheie: *vin, parametri fizico-chimici, autenticitate*

INTRODUCTION

Studying the authenticity of wine is one of the most important issues in food quality control validating to guarantee the safety and to protect the rights of consumers and producers. A chemical approach to assuming the properties of wine is

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based on analysis of chemical composition as a unique combination of constituents (Arvanitoyannis, 2010).

The authenticity of wine may be a subject of legal interest, especially when it involves economic costs or causes negative health effects (Cozzolino and Heather, 2013).

Practiced since earliest times, wine fake has become more sophisticated in the present day, taking many forms. Consumers and manufacturers are all interested to have consistent analytical tools and information to allow the authentication and detection of wine adulteration or incorrect classification (Schlesier *et al.*, 2009).

The production of winemaking in Cyprus and in Romania dates back to ancient times with 4000 years of tradition and had an important role in the everyday life.

Cyprus is situated in the southeastern Mediterranean, at the crossroads of the three continents of Europe, Asia and Africa. It is the third largest island in the Mediterranean after Sicily and Sardinia. The vineyards of Cyprus are mostly on the southern peaks of the Troodos Mountain, near Limassol. The second area is in the south-western part of the island near Pafos. The long, sunny Mediterranean summers are a great asset; they ripen the fruit and give it its full flavor. The winters are mild and the gentle winds and breezes check the frosts, dispel the fogs and protect the vines and grapes from fungus diseases (Cyprus remains one of the few phylloxera-free wine-producing countries in the world) (Psaras and Zambartas, 1981).

Romania is one of the top ten wine producing countries in the world and one of the top six in Europe, along with France, Spain, Italy, Germany and Portugal. Wine production follows the same trends as grape production (Arvanitoyannis *et al.*, 1999).

The scope of this work consists in the comparative study on the chemical and physical properties of commercial and authentic wine samples from Romania and Cyprus.

MATERIAL AND METHOD

Were analyzed eleven commercial red wines from Cyprus and eight Romanian red wines: five authentic wines from ampelographic collection, vinified on the Research Center and three commercial wine.

Wine analyzes were performed in the Laboratory of Oenology from Oenology Research Center of Romanian Academy Iasi Branch. Physico-chemical analyzes were carried out according to the methods specified in the international standards and studies (Garrido and Borges, 2011; Iland *et al.*, 2004; Ribéreau-Gayon, 1972). The following were registered: total acidity, volatile acidity, total and free SO₂, sugars and alcohol of the wine. The methods used are according to the OIV (***) OIV, 2013).

RESULTS AND DISCUSSIONS

The physico-chemical characteristics for the analysed Cypriot wines are present in table 1 and for Romanian wines in table 2. Analyzed parameter values vary significantly from one country to another as well as from one sample to another.

The higher value of the pH is 3.88 for Romanian wines, in the Cabernet Sauvignon 2012 c sample. The Cypriot wines are characterized by the pH-values exceeding 4, for example Morakanella has a pH of 4.4.

Alcoholic concentration varies in wine samples from Cyprus from very low values - 5.28 (in Merlot), uncharacteristic for a product called wine, to higher values - 14.65 (in Maratheutiko 3). Romanian wines have an alcohol concentration between 9.72 and 14.49.

The values of total acidity, is between 8.11 (Cabernet Franc) and 3.05 (Morakanella) in samples of wine from Cyprus and between 9.43 and 4.42 in local wine samples.

Table 1

Physical-chemical analysis of Cypriot wines

Sample	Free SO ₂ (mg/L)	Total SO ₂ (mg/L)	Volatile acidity (g/L acetic acid)	Total acidity (g/L tartaric acid)	□ (g/L)	Alco-holic conc. (%)	Remanent sugars (g/L)	pH
Merlot	9.13	42	0.37	5.9	1.005	5.28	4.33	3.9
Mara- theutiko1	15.07	68.71	0.23	5.16	0.997	10.64	3.56	3.8
Giannoudi	14.61	66.66	0.21	3.64	0.995	10.94	2.8	4.1
Mara- theutiko 2	15.3	72.82	0.12	5.16	0.993	12.71	3.92	3.5
Mara- theutiko 3	8.49	90.86	0.4	5.11	0.992	14.65	3.4	3.5
Cabernet Franc	22.37	71	0.32	8.11	0.994	13.4	3.3	3.4
Morak- anella	2.97	171.22	0.5	3.05	0.993	10.67	0.83	4.4
Mauro	31.73	66.2	0.78	3.44	1.000	6.18	2.15	4.2
Ofthalgo	19.18	64.83	0.45	4.81	0.991	13.04	2.09	3.56
Mara- theutiko 4	31.05	70.77	0.42	6.09	0.993	11.66	1.8	3.14
Gian- noudi	28.54	51.59	0.4	3.34	0.999	7.04	2.05	4.3

Table 2

Physical-chemical analysis of Romanian wines

Sample	Free SO ₂ (mg/L)	Total SO ₂ (mg/L)	Volatile acidity (g/L acetic acid)	Total acidity (g/L tartaric acid)	□ (g/L)	Alcoholic conc. (%)	Remanent sugars (g/L)	pH
Pinot noir 2014 a	16.2	46.79	0.23	6.77	0.991	14.26	3.55	3.41
Feteasca neagra 2014 c	13.7	56.16	0.2	7.47	0.994	10.68	1.67	3.31
Pinot gri 2014 a	65.52	138.57	0.33	6.68	0.989	14.49	4.81	3.24

Babeasca neagra 2014 a	10.5	40.41	0.25	9.43	0.994	9.72	1.42	3.11
Feteasca neagra 2013 c	23.74	75.79	0.63	4.42	0.994	13.72	2.59	3.78
Babeasca neagra 2013 a	20.09	55.47	0.26	8.45	0.997	10.02	14.86	3.16
Cabernet Sauvignon 2013 a	6.81	38.09	0.22	6	0.992	11.58	1.44	3.42
Cabernet sauvignon 2012 c	36.54	99.72	0.14	7.52	0.994	12.21	2.84	3.88

a= authentic; c=comercial

CONCLUSIONS

1. pH values for samples coming from Cyprus are higher than those of Romanian wine samples and reached more than 4.

2. Low alcoholic concentration in some samples of wine vinified in Cyprus is not correlated with the climatic conditions of the Island; the high temperature should lead to obtain wines with higher alcohol concentrations.

3. Even if the processing of grapes to obtain wine is a preoccupation for hundreds years to the both countries, the results indicates that though, the wine industry has evolved differently, probably under the influence of traditions and local practices, resulting wines with clear defined and authentic characteristics.

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