RESEARCH ON THE NATURALNESS AND AUTHENTICITY OF SOME WINES EXPRESSED BY MAIN PARAMETERS AND QUALITY INDICES

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ABSTRACT

Wine is a product widely consumed and establishing its authenticity is one of the most important aspects in quality and food safety.

The naturalness and authentication, identification of fraud and determination of compliance of the product with the legal specifications on the label are the requirements of consumers and the European Community. In order to optimally solve this problem, the development and harmonization of valid analytical methods at national and European level, but also the establishment and expansion of the database necessary to improve the efficiency of wine control are priorities at international level.

INTRODUCTION

The concept of authentic, with phrases from the same semantic field: original, genuine, etc., applied to food products, attests that they are of undoubted origin, in accordance with the standards and norms in force of presentation. Authenticity as a component of quality must be certain and certified, therefore, each product must have a name accompanied by a legal set of characteristics to avoid any confusion in the market. Aspects of food authenticity do not normally raise safety issues (Banu, C. et al., 2013).

Counterfeiting of food is an intentional act of lowering its quality, food intended for sale, either by removing a valuable component and replacing it partially / totally with a lower quality, or by adding substances that depreciate and adversely affect the product, dilution with water respectively with lower value ingredients, the use of an imitation as a product substitute, coloring to improve attractiveness, the addition of preservatives not allowed by law.

The transition to a market economy, the intensification of trade (on intern and international markets), the increase in the number of commercial and economic agents involved in the production and trade of food products, the deficient legislation in the field, favored the development of fraudulent labor (Marano, P., Siri, M., 2017).

As production technologies and methods of analysis have evolved, fraudulent practices have also evolved and become increasingly difficult to discover and prove. The problem of detecting counterfeits is considered the main means of consumer protection (Valant, J., 2005).

Given that our country is a full member of the European Union and must face competition with major wine producers in countries with a rich viticultural tradition, Romanian viticulture must evolve rapidly, in order to obtain high quality wines, by maximizing the ecopedoclimatic potential it has in abundance.

The main objectives of the study were:

1. Determining the quality parameters of some wine samples from different private producers.

2. Determination of the main indicators of the authenticity of wine samples from different private producers

MATERIAL AND METHOD

Between October 2018 and February 2019, 6 wine samples, 3 white wines and 3 red wines were purchased from four different producers. The samples were collected from Vâlcea County, directly from private producers in order to have as much certainty as possible regarding their authenticity.

The wines were obtained in their own households, from mixtures of grape varieties. The vinification was done traditionally, differently for white wines than for red ones.

After purchasing the 6 wine samples, in a quantity of 2 liters each, packed in plastic bottles, they were analyzed from an organoleptic point of view and the main quality parameters were determined: alcohol, total acidity, glycerol, extract and mineral substances. - ashes. Subsequently, the most important indicators of wine quality and typicality were calculated.

All samples were analyzed following the method used by the Laboratory of the Department of Horticulture and Food science and the laboratory of S.C.D.V.V Dragasani.

RESULTS AND DISCUSSIONS

The results of the analysis of the main quality parameters for the white wine samples are given in Table 1.

Along with the chemical analyzes, the sensory analysis of each wine sample studied was also performed. These were carried out in the discipline laboratory by a commission of 3 tasters made up of teachers from the discipline (Stoian V., 2001).

Table 1

The main quality parameters of white wine samples

Wine sample	Alcohol		Extract unred. g/l	Ash g/l	Residual sugar g/l	Glycerol g/l	Total acidity g/l	Fixed acidity g/l
	%vol	g/l						
D1	14,5	119,84	21,63	1,72	1,10	7,36	3,70	3,33
C1	9,66	77,28	16,9	1,21	2,05	3,91	4,03	3,64
P1	9,75	78,0	17,3	1,82	1,98	4,78	3,03	2,38

The D1 wine sample is a white, clear, sediment-free wine with a straw-yellow to golden yellow color. Specific, pleasant, fresh smell and the taste is dry, burning (Stoica Felicia, 2015).

Sample C1 is a white, table wine, clear, without sediment. The color is straw yellow, with a pungent odor due to sulfur dioxide, an atypical aroma. The taste is sweet, juicy, without freshness, thin.

The last white wine sample analyzed is P1, a clear white wine without sediment. The color is straw yellow, with a pungent odor due to excess sulfur dioxide, neutral aroma, no other foreign odor. The taste is persistent sweet, slightly thin, flat, soft, without freshness, unbalanced.

Regarding the values of the quality parameters, at a first glance of these results one can notice a more or less obvious imbalance in all three samples of white wine. This imbalance is noticeable both in terms of alcohol content but also between the alcohol-glycerol and residual sugar and acidity ratios.

The residual sugar values show that all the wines are dry, but the sensory analysis certifies that the C1 and P1 samples have a sweet, persistent taste, which is not in accordance with the values obtained from the chemical analysis.

Also, the glycerol content is totally inconsistent with the alcohol in wines, in all cases having very low values, especially in wine samples C1 and P1.

The results of the analysis of the main quality parameters for the red wine samples are given in Table 2.

Table 2

The main quality parameters of red wine samples

Wine sample	Alcohol		Extract unred. g/l	Ash g/l	Residual sugar g/l	Glycerol g/l	Total acidity g/l	Fixed acidity g/l
	%vol	g/l						
D2	13,6	110,4	25,0	2,49	3,59	18,17	4,99	4,61
C2	10,06	80,47	21,0	1,45	3,72	8,97	4,59	4,13
P2	8,8	70,4	14,6	1,60	6,05	5,75	3,56	2,52

Following the sensory analysis of the three samples of red wines, the following clarifications can be made:

Sample D2 has a clear, sediment-free appearance, a bluish-purple hue which indicates a young wine. The smell is neutral, no foreign smell and the taste is harsh, astringent, fresh (Muntean Camelia, et al., 2018).

Sample C2 is a wine with an appearance: clear, without sediment

- color: light cherry red, hint of old wine red
- odor: neutral, no foreign odor
- taste: persistent sweet, light, neutral, short, watery

The last sample analyzed P2, after tasting it can be appreciated that it is a wine with a clear appearance, without sediment

- color: brownish red to brown, similar to Coca-Cola.
- odor: pungent due to very high sulfur dioxide and volatile acidity.
- taste: excess sulfur dioxide burner, persistent, persistent sweet, watery, thin without freshness.

As with white wine samples, at first glance these results show a more or less obvious imbalance. This imbalance is noticeable both in terms of alcohol content but also between the alcohol-glycerol and alcohol and extract ratios (Mihalca A., Iancu G., 2002).

The identification of forgeries or suspicions of forgeries in the wine industry can be done with the help of several indicators that can be calculated based on the values of the main chemical quality parameters and whose values can give us such indications.

The GAUTIER index is calculated as the Sum of alcohol + Fixed acidity. To obtain this index, the fixed acidity is added to the total alcoholic degree.

The amount of alcohol + fixed acidity generally varies between 13-17. For French red wines it is assumed that the addition of water was made when the amount falls below 12.5 or in the case of plain wine (Aramon) below 11.5. This rule applies almost entirely to white wines (Mihalca A., Iancu G., 2002).

HALPHEN indicator. This author, based on the observations that the acidity of wine varies in the opposite direction with the alcoholic degree, appreciates the addition of water according to the amount of acidity that the wine can provide through the alcoholic degree. The alcohol content is considered, decreasing with the alcohol that comes from a possible enrichment by adding alcohol or sugar.

The acidity contemplated by HALPHEN is the fixed acidity of a wine, not considering the added acids and not containing more than 0.70 of the volatile acidity expressed in sulfuric acid (Mihalca A., Iancu G., 2002).

BLAREZ indicator. This author, unlike GAUTIER and HALPHEN, considers only fixed acidity in establishing the rules he proposes and envisages as follows:

1. The amount (alcoholic strength + fixed acidity) has a minimum value which is in relation to the alcoholic strength. This amount increases at the same time as the components, but not in

the same amount. The minimum values vary with the origin of the wine (Macici M., 1996).

2. The ratio between the alcoholic strength of a wine and its fixed acidity is represented by a maximum number, depending on the alcoholic strength, but which varies with the origin of the wine.

For the application of these rules, the origin of the wine subject to expertise must be known (Macici M., 1996; Mihalca A., Iancu G., 2002).

The ROSS indicator. This index (**I_R**) is based on the fact that the alcohol / extract ratio is lower the lower the alcohol content of the wine. It is obtained by dividing the sum of alcohol + fixed acidity by the alcohol / extract ratio. For red wines, the value of this ratio is usually equal to or greater than 3.2, even for weak natural wines. It does not fall below 3 in the most exceptional cases.

For white wines, this limit is a minimum of 2.4. When this ratio reaches a value lower than this minimum, there is a presumption of water addition.

To determine the alcohol-glycerol ratio, the alcohol content is multiplied by 10 to obtain the amount of alcohol by volume. The amount of alcohol by volume is then multiplied by 0.79 (molecular weight) to give the amount of alcohol by weight. Then by mathematical calculation the ratio between the weights of the two elements is determined. The variation limits of this ratio are between 5.5 and 13.5, with an average of 8.5 for Romanian wines (Macici M., 1996; Banu C., et al., 2013).

To determine the Ross ratio (**R_R**), alcohol - extract, the alcohol content is multiplied by 10 to obtain the amount of alcohol in volumes. The amount of alcohol by volume is then multiplied by 0.79 (molecular weight) to give the amount of alcohol by weight. The variation limits of the RR ratio are 4.3-5.5, for white wines and 3.6 - 4.5 for red wines (Banu C., et al., 2013).

To determine the extract - ash ratio, the extract is considered 100%, and the ash represents% of the extract. There is no linear relationship between the reduced extract and the ash (Macici M., 1996; Banu C., et al., 2013).

The results on the quality and authenticity indicators for white wines are presented in Table 3.

In the case of white wine D1 the BLAREZ sum = 14.98 + 3.33 = 18.31 is too high and requires extrapolation with the BLAREZ ratio = 14.98: 3.33 = 4.50, corresponding to a wine of 12.5% vol. The addition of alcohol is excluded.

Due to the ROSS Index = 18.31: 5.54 = 3.30 which has normal value and the Ratio R = 119.84: 21.84 = 4.80, normal value.

Glycerol / alcohol ratio = (7.36: 14.98) x 100 = 4.91 value less than 6.5% due to high alcoholic strength.

Ratio (ash x 100): non-reducing extract = 172: 21.63 = 7.95 normal value

Note: Natural wine with a high alcohol content requiring no extrapolation for BLAREZ rules (Stoica Felicia et al., 2018).

Table 3

Quality indicators for the analyzed white wine samples

Wine sample	Blarez		I_R	R_R	Glycerol/alcohol x 100	Ashx100/extract
	Sum	Ratio				
D1	18,31	4,55	3,30	4,80	4,91	7,95
C1	13,24	2,65	2,91	4,57	4,0	7,15
P1	12,08	2,38	2,68	4,5	4,9	10,52

In the case of C1 white wine from the very beginning, an abnormality in the composition can be noticed, so a falsification. The wine has a total extract of 18 g / l corresponding to a dry wine and not semi-sweet. Also, the reducing sugar content (glucose and fructose) is of a dry wine, 2.05 g / l. The wine is sweetened with non-fermentable synthetic sweetener. According to the

taste, the jam would correspond to 15-20 g / l of sugar.

The chemically determined sugar content (a method that can only capture sugars from grapes, glucose and fructose) is only 2.05 g / l.

The wine is semi-sweet and organoleptic corresponds to a normal sugar content of 15-20 g / l.

The synthetic sweeteners used (non-fermentable) did not respond to the fermentability test.

For the white wine sample P1, BLAREZ sum = dosed alcohol + fixed acidity = 9.7 + 2.38 = 12.08, corresponding to a wine of 8 vol%%.

The ratio BLAREZ = dosed alcohol / fixed acidity = 9.7 = 4.07. According to control Tables, the fixed acidity of this wine should have been 3.30 g / l.

Our wine having only 2.38 g / l, the acidity is equivalent to a wine over 14.0% vol. The dilution with water is certain.

The results on the quality and authenticity indicators for red wines are presented in Table 4.

Table 4

Quality indicators for the analyzed red wine samples

Wine sample	Blarez		I_R	R_R	Glycerol/alcohol x 100	Ashx100/extract
	Sum	Ratio				
D2	18,21	2,95	4,12	4,41	16,4	9,96
C2	14,03	2,40	3,70	3,83	8,91	6,90
P2	11,02	3,69	2,35	4,82	6,5	10,95

In the case of wine sample D2, BLAREZ sum (see control table) - value too high due to high acidity

The BLAREZ ratio of 2.95 corresponds to a wine of 10.3 vol.%. Suspect of alcoholism, which is not the case.

The ROSS index = 18.21: 4.41 = 4.12 is appropriate

The ratio R = 110.4: 25.0 = 4.41 is appropriate

The ratio (glycerol / alcohol) x 100 = (18.17: 110.4) x 100 = 16.4% is too high due to the high glycerol content.

The ratio (ash x 100): extract = 2.49: 25 = 9.96 is very good.

Note: Wine is natural, with too high a content of acidity and glycerol.

In the case of the last two wine samples C2 and P2, from the analysis of the quality indicators, according to the composition they seem to be some natural wines, with moderate sulfur dioxide content, except for the sugar content. The wines being semi-sweet, denoting that it was sweetened with synthetic sweeteners.

CONCLUSIONS

Frauds and counterfeits in wine production and trade fall into the generic name of "corruption" and / or generate corruption, being practiced by those who want to get rich overnight, sometimes by the producer who is forced to withstand unfair competition, tolerated corrupt and combated by consumers.

Any action determines its reaction, any falsification has its antidote, more difficult for us, due to the lack of means of investigation - but not only - and easier in countries that have respected and respect the law.

The delay in taking a position on such practices will surely lead to the compromise of the prestige of Romanian wines on the international market and to the destruction of national viticulture.

The most common counterfeits are: obtaining "wines" without using grapes as raw material, dilution (addition of water), alcoholization, obtaining red wines from white wines (with the addition of natural or synthetic dyes) sweetening (with the addition of sweeteners synthetic) addition of artificial flavors (flavoring) addition of antiseptics prohibited by current legislation, etc.

There are some counterfeit wines that for the general public seem pleasant to the taste, drinkable (especially if they are sweetened), and organoleptic only a good connoisseur could detect them.

BIBLIOGRAPHY

1. Banu C. şi colab., 2013- *Industria alimentară între adevăr şi fraudă*, Editura ASAB, Bucureşti;
2. Macici M. 1996 – Vinurile Romaniei, Ed. Alcor
3. Marano P., Siri M.,- 2017 - *Insurance Regulation in the European Union,*
4. Mihalca A., Iancu G., 2002 – *Mustul şi vinul în legislaţie. Metode pentru identificarea falsurilor*, Arad
5. Camelia Muntean, Felicia Stoica, Constantin Băducă Câmpeanu, Daniela Doloris Cichi, 2018 - Study of the anthocyanic potential of grapes varieties for red wines in Dranic wine center, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Horticulture, Scientific papers, seria B Horticulture, vol. LXII, p. 255-260, http://horticulturejournal.usamv.ro/pdf/2018/vol2018.pdf
6. Popa A., 2008 –*Secretul vinului bun – contribuţii şi retribuţii*, Ed. Alma, Craiova
7. Stoian V., 2001 – *Marea carte a degustării vinurilor. Degustarea pe înţelesul tuturor*, Ed. Artprint, Bucureşti
8. Stoica Felicia, 2015 - The Main Parameters And Indicators That Define The Quality And Authenticity Of White Wines From Vineyard Drăgăşani – Romania, Carpathian Journal of Food Science and Technology, vol. 7(4), p.139-144, http://chimie-biologie.ubm.ro/carpathian_journal/Vol_7(4)_2015.pdf
9. Stoica Felicia, Balaban A., Popescu Raluca, 2018 **- C**ontrol the main parameters of quality and authenticity of wines from Oprişor, Analele Universităţii din Craiova, vol XXIII, (LIX), p.233-238
10. Valant J., - 2015 - *Consumer protection in the EU. Policy overview,* aei.pitt.edu
11. Recueil des methodes internationales d'analyse des vins et des mouts edition, 2011. Organisation internationale de la vigne et du vin.