VOLATILE ORGANIC COMPOUNDS IN SOME WHITE WINES OF IAŞI VINEYARD

COMPUŞI ORGANICI VOLATILI LA UNELE VINURI ALBE DIN PODGORIA IAŞI

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Abstract. *Volatile compounds are plant metabolites and are resulting in fermentation processes. They are important factor for evaluating the quality of wines from technological point of view and allows in most cases to characterize sensory characteristics felt by consumers at a fundamental level. In this case are presented some wines produced with grapes from the 2006 harvest as following: Cioinic, Creaţă de Banat, Cruciuliţă, Fetească albă, Fetească regală, Frâncuşă, Gordan, Mustoasă de Măderat, Zghihară varieties. For these wines physicochemical characterization was performed to better understand the quality of the end product. In these wines were identified by ITEX-GC-MS method a series of fatty acids such as isobutyric, hexanoic, octanoicdecanoic acids and fermentation alcohols 2- and 3- butanols that varied greatly depending on the variety from which they originated. The data were compared with the products of the fermentation of refined sugar and alcohols highlight differences in fermentation batches.*
Key words: *native grapes varieties, ITEX-GC-MS, fatty acids*

Rezumat. *Compuşii volatili sunt metaboliţi ai plantelor şi rezultate ale proceselor de fermentaţie şi reprezintă un factor tehnologic cu importanţă crucială pentru evaluarea calităţii vinurilor şi permite în cele mai multe cazuri caracterizarea caracteristicilor senzoriale resimţite de consumatori la nivel fundamental. În cazul de faţă sunt prezentate unele vinuri obţinute cu struguri din recolta anului 2006 pentru varietăţile: Cioinic, Creaţă de Banat, Cruciuliţă, Fetească albă, Fetească regală, Frâncuşă, Gordan, Mustoasă de Măderat, Zghihară. Pentru aceste vinuri s-a realizat o caracterizare a proprietăţilor fizico-chimice. În aceste vinuri au fost identificate prin procedeul ITEX-GC-MS o serie de acizi graşi precum acidul izobutiric, hexanoic, octanic, decanoic dar şi alcoolii de fermentaţie 2- şi 3- butanoici care au variat foarte mult funcţie de soiul din care au provenit. Datele au fost comparate cu produse de fermentaţie din zaharuri şi s-a evidenţiat diferenţele pe alcoolii de fermentaţie.*
Cuvinte cheie: *soiuri autohtone, ITEX-GC-MS, acizi graşi*

INTRODUCTION

Determination of organic acids plays an important role in the evaluation of the development of wine in terms of chemistry and biochemistry. In grapes, organic acids are involved in glycolytic and shikimic pathway, but can also result

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from the Krebs cycle or the glyoxylic pathway, where mostly they remained unchanged (compared to those from the grapes) (Ribereau-Gayon.et. al., 2006).

A comprehensive exhaustive study on various issues relating to the organic acids in wines there evolution and how they are influenced by various treatments it is not yet known. (Niculaua et al., 2010).

MATERIAL AND METHOD

Grapes samples of were vinification by the traditional fermentation method for white wines technology. After gravity settler was done seeding with selected yeasts *Saccharomyces cerevisiae*.

After alcoholic fermentation is finalized the wine was clarified with bentonite and then bottled. After a period of 1 year the samples were analysed.The samples were identified by numbers as follows:1. Cioinic; 2. Creaţă de Banat; 3. Cruciuliţă; 4. Fetească albă; 5. Fetească regală; 6. Frâncuşă; 7. Gordan; 8. Mustoasă de Măderat; 9. Zghihară.

Concentration method involving ITEX type (in tube extraction method) directly coupled to the gas chromatograph in order for wine analysis (directly). By using automation (which can process samples during the analysis of wine in the gas chromatograph) it is possible to perform a working sequence for approximately one hour are able to handle a large number of samples fast.

Since the mass spectrometer only provides structural information on the analysts analysed and due to the lack of standards for all compounds identified in order to quantify analytical information only qualitative evaluation was used.

Working conditions of the autoinjector ITEX is a resin material adsorption of 2,6-diphenylene oxide, 65 °C incubation temperature, incubation time is 10 minutes at 1500 rotations extraction volume of 50 µL extraction cycles.

The total flow rate on the column 100 mL/min. Temperature program: initial 35°C for 2 minutes, gradient 18°C/min to 80°C stationary for 2 min., than increasing to 2.8°C/min up to 220°C stationary for 10 min., and then cooling down to 35°C (total working time 71 min.). Optimal separation of grapes and wine from thermo volatile compounds is for using a Thermo TR-WAX column 60 m × 0.25-MS × 0.25 µm mm ID column. Conditions for mass spectrometer analysis of the sensitivity of the detector is 0.9 kV, scan speed 2000 amu/s.

The method can determine the composition of the sample of wine (or grape) by identifying volatile acids (C_3-C_{21}) mostlyethylesters andconjugates acids. In the extraction were introduced 7 mL of the wine in a vial for analysis by headspace and concentration were carried out according to the program ITEX.

RESULTS AND DISCUSSIONS

Figure 1 presents results obtained by processing grapes and the obtained wines that have a low level of acidity compared to initial raw material. Samples of selected grapes sortsfor wine shows a relatively wide range of variation from highly acidic wines obtained from Creață de Banat orGordanwhile Fetească albăwine presents the lowest acidity from them all.

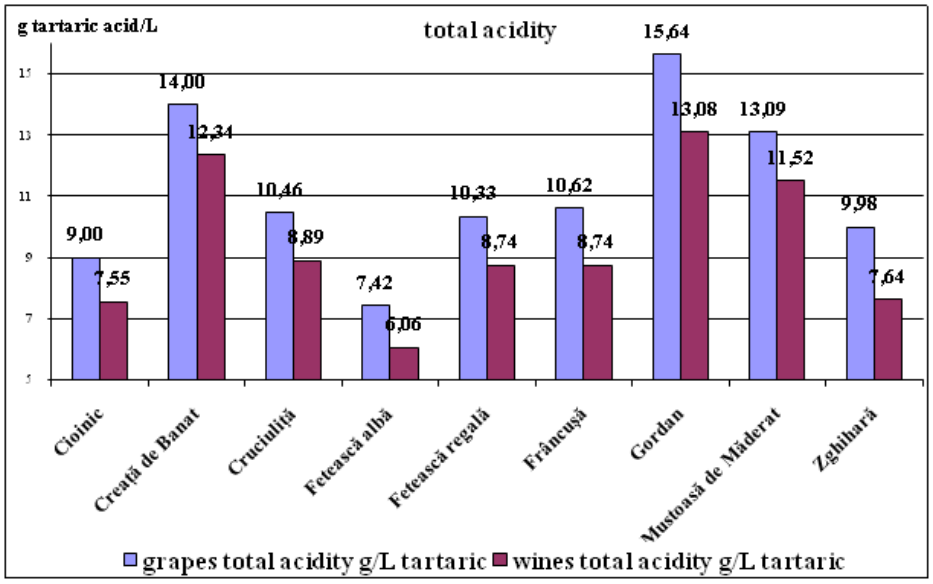

Fig. 1 - Total acidity before and after fermentation

In Table 1 we analysed the variation of total acidity and notes that most wines do show a greater variation of 10-15% of the initial acidity from the grapes. In the case of wine Zghihară acidity loss is higher. The volatile acidity is within acceptable limits and vary depending on ripeness of the grapes in most cases studied. From the values of the wines hare highly acidic pH and conductivity values are characteristic of the acidity of the wine not form ionic salts form, but rather in the form of anhydrite or other forms of molecular association.

Table 1

Acidity parameters of wines

	1	2	3	4	5	6	7	8	9
%Δ total acidity	16,11	11,86	15,01	18.33	15,39	17,70	16,37	11,99	23,45
volatile acidity g/L acetic acid	0,65	0,27	0,46	0,31	0,44	0,42	0,52	0,38	0,31
pH	2,85	2,7	2,82	2,92	2,84	3,01	2,7	2,78	3,05
conductivity µS/cm	1885	2315	2420	1615	1665	2055	1844	2010	1937

1. Cioinic; 2. Creaţă de Banat; 3. Cruciuliţă; 4. Fetească albă; 5. Fetească regală; 6. Frâncuşă; 7. Gordan; 8. Mustoasă de Măderat; 9. Zghihară

By analysing Figure 2 shows that there are products that have a low alcohol level below 8.5 % vol., some wines like those fromFeteascăalbă,Feteascăregală and Frâncuşă are superior and specific acidic wine quality.

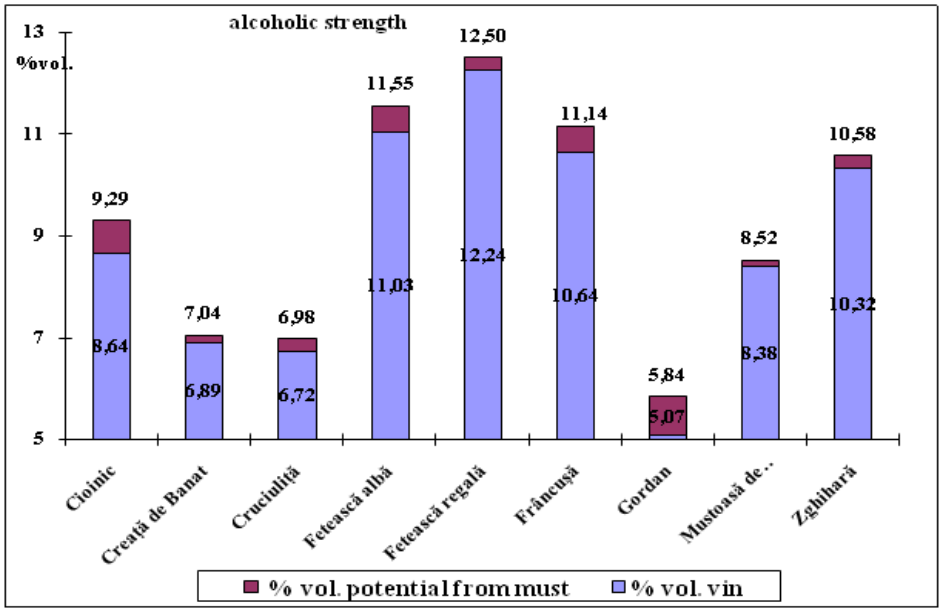

Fig. 2 - Potential alcohol level from grapes and real alcoholic strength of wines

Figure 3 presents the evolution of the amount of acetic acid found in the analysed samples observed and we observed that those that did not generate good quality wines presents the highest values also. In comparison with the samples salted the direct analysis by headspace don't have the high values for the compounds presented in Figures 3, 4, 5 or 6. Also in the study from the four figures there is a similar variation of the profile of volatile compounds being practically perfect correlationbetween the four molecules studied. Creață de Banat and Mustoasă de Măderatwines can generate interesting wines with high values in acidity, capable of correcting acidity by blending with other wines obtained from varieties with low acidity grapes.

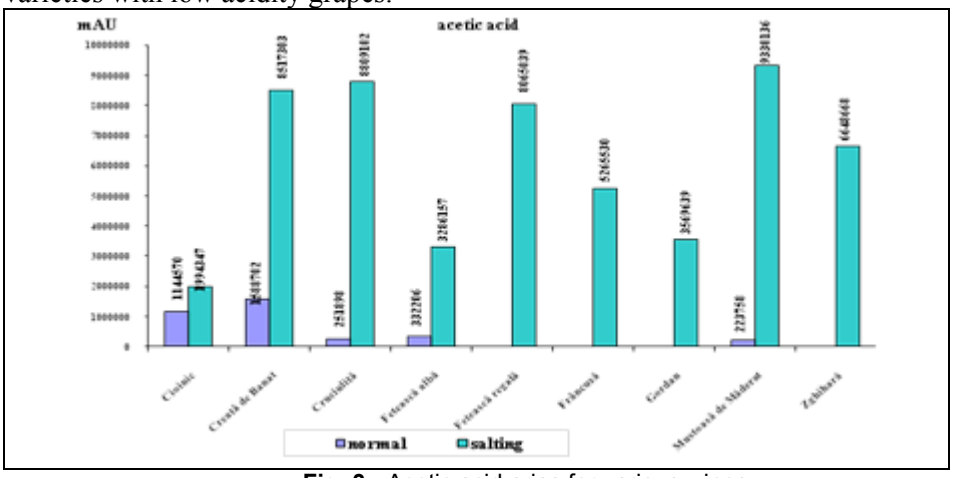

Fig. 3 - Acetic acid arias for various wines

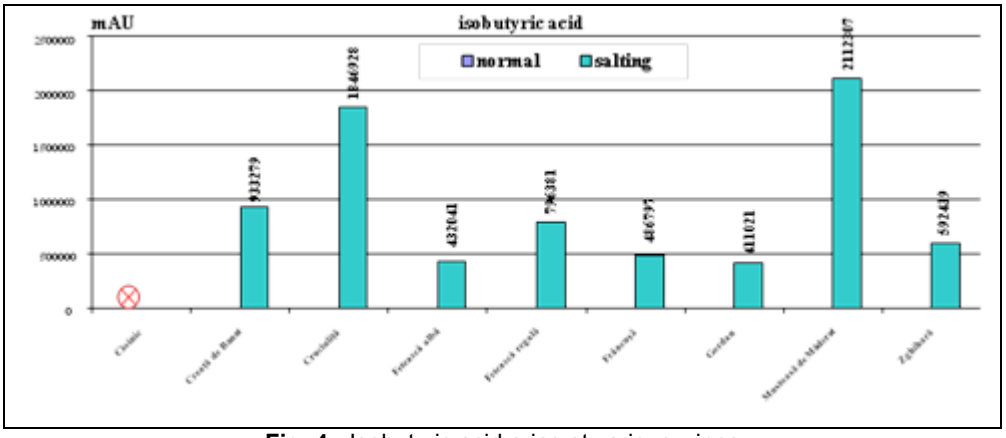

Fig. 4 - Isobutyric acid arias at various wines

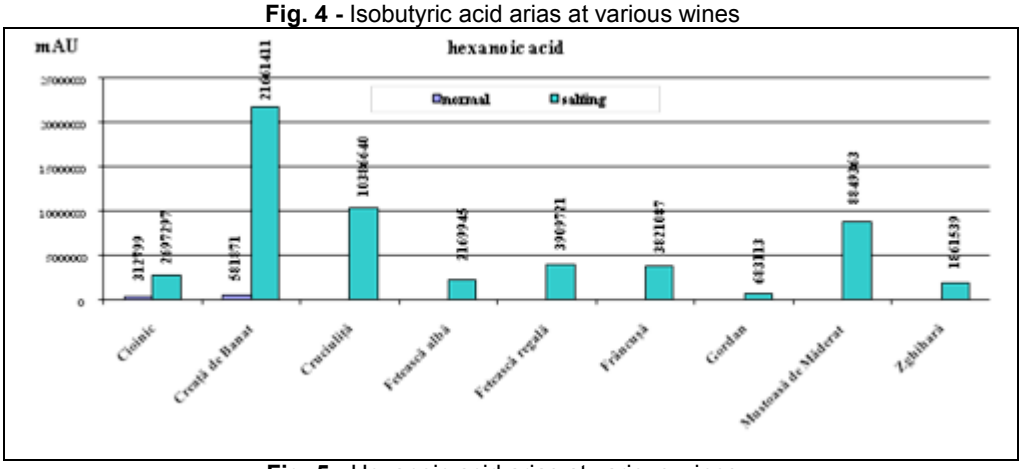

Fig. 5 - Hexanoic acid arias at various wines

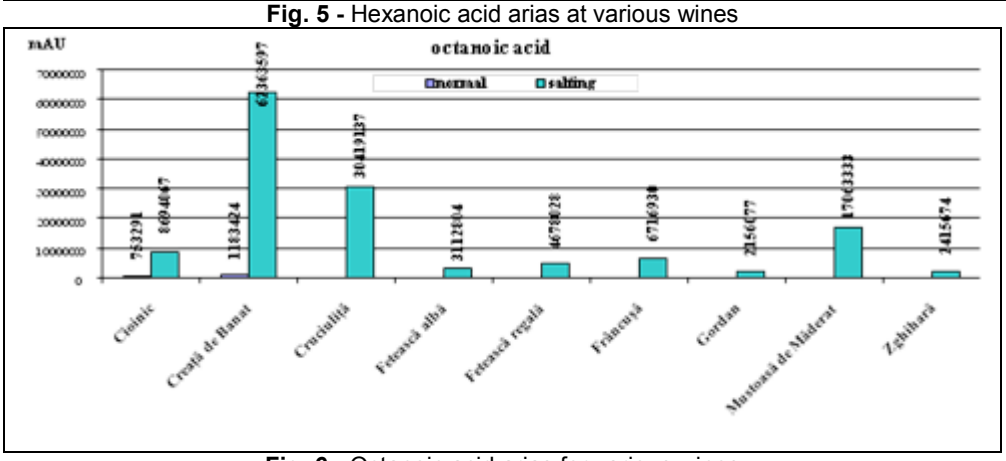

Fig. 6 - Octanoic acid arias for various wines

Through comparative analysis of alcohol from fermentation (table 2) is noted that wine samples show a distinct profile of alcohol, but also by the fermentation of invert disaccharides these compounds are obtained.

Table 2

Percentage ratios of volatile alcohol in wine samples

	fermented sugar	1	2	3	4	5	6	7	8	9
1-propanol	0,24	0,3	0,03	-	-	-	-	-	0,89	1
2-methyl-1-propanol	0,82	0,14	0,17	0,89	0,45	0,30	0,61	0,90	1	0,69
1-butanol	0,58	-	-	-	0,99	0,62	-	-	-	1
2-methyl-1-butanol & 3-methyl-1-butanol	0,75	0,67	0,70	1	0,43	0,39	0,60	0,87	0,72	0,58
1-hexanol	0,05	-	0,98	0,43	0,42	-	-	1	0,22	0,32
phenylethyl alcohol	-	1	0,78	-	0,10	0,05	0,04	-	-	0,05

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These compounds are specific to different wines types certifying that each wine is defend but we cannot have discrimination from simple alcoholic fermentations of different vegetable sugars types.

CONCLUSIONS

1. Wines produced from recognized grape varieties have however even if they have not reached full maturity for harvesting have traces of volatile fatty acidspresent in composition.

2. The method for releasing flavors by adding inorganic salts yielded good results for a much lower detection limit than the direct analysis version.

3. Increased acidity of wines kept in check for a period of one year, until analysis, physico-chemical characteristics of the products without major defects to appear as re fermentation or products.

4. Automatic analysis can be achieved without too complex preparation for the wine samples in order to identify the amount of fatty acids in a 1-2 hours' time rage after bottle opening.

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