

# STUDY OF COMPOUNDS AROMA IN AROMAT DE IAȘI WINES

## STUDIUL COMPUȘILOR DE AROMĂ DIN VINURI OBTINUTE DIN SOIUL AROMAT DE IAȘI

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**Abstract:** The volatile compounds in Romanian wines obtained from new grape varieties are not studied enough. This article wants to identify aroma substances in Aromat de Iasi wines from Iasi vineyard. During 2011 harvest, the grapes were processed following the aromatic wines technology. After a two weeks fermentation at 15 °C, the wine samples were filtered and bottled. Gas-chromatography coupled with mass-spectrometry (headspace method) used to determine individual aroma compounds. The wines obtained from Aromat de Iasi grape variety, as expected, have an aroma profile characterized by terpenic compounds, alcohols and esters. The compounds were identified using spectrum libraries NIST 08, Wiley 08 and SZTERP.

**Key words:** local wines, aroma compounds, gascromatography

**Rezumat:** Compușii volatili din vinurile românești obținute din soiuri de struguri noi nu sunt suficient studiate. Acest articol dorește să identifice substanțele de aromă în vinurile obținute din soiul Aromat de Iași din podgoria Iași. În cursul anului 2011, strugurii au fost prelucrați folosind tehnologia vinurilor aromate. După o fermentare de două săptămâni la 15 °C, probele de vin au fost filtrate și îmbuteliate. S-a utilizat gaz-cromatografia cuplată cu spectrometria de masă (metoda headspace), pentru a determina compușii de aromă. Vinurile obținute din soiul de struguri de Aromat de Iași, cum era de așteptat, au un profil de aroma caracterizat prin compuși terpenici, alcooli superiori și esteri. Compușii au fost identificați cu ajutorul bibliotecilor de spectre NIST 08, Wiley 08 și SZTERP.

**Cuvinte cheie:** vinuri locale, compuși de aromă, gaz-cromatografie

## INTRODUCTION

The aroma profile of wine depends on many factors, among which the grape variety, maturity degree at harvest, yeast activity, prefermentative procedures and aging (Ribéreau-Gayon, 2006). Specific literature mentions more than 800, and growing, aroma compounds in wine: alcohols, aldehydes, cetones, esters, acids and monoterpenic compounds (Marais and Rapp, 2001).

The analysis of the aroma compounds is done by gaschromatography and mass spectrometry, using different techniques and devices: headspace, solid phase extraction and in-tube extraction, each method specific in its own way (Schneider, 2001).

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## MATERIAL AND METHOD

Romanian grape variety Aromat de Iasi from Iasi vineyard has been used. Aromat de Iasi is a grape variety obtained by free fecundation of Tămăioasă românească variety, approved for culture in 1980. The newly developed grape variety originates from a strong sensorial genitor, thus being able to produce aromatic or semi-aromatic wines.

The wine samples were obtained by applying the classical technology for aromatic wines (Cotea et al., 1985): harvested at full technological maturity, sorted, destemmed and crushed. The obtained free fall must was collected separately and divided in half. One half was fermented as such, while the other half was macerated with the grape solids.

The must obtained by pressing the grape marc was collected separately and divided in half, of which a part was fermented as such and the other one macerated with the grape solids.

Maceration was done for 24 hours at 15°C, using beta-glycosidase enzymes with the commercial name of Zymoclaire M® 25g/hL and commercial yeasts Fermactive Muscat® (5 g/hL). Fermentation was kept at 15 °C and lasted for 2 weeks. Fining was done with bentonite. After filtering and SO<sub>2</sub> addition, the sample wines were bottled. 4 variants were obtained: AI 1 – Aromat de Iasi free fall must, no maceration; AI 2 – Aromat de Iasi free fall must with maceration; AI 3 – press must, no maceration; AI 4 – press must with maceration.

As analysis method, gas chromatography coupled with mass spectrometry, headspace technique, is used.

1000 µL gas from headspace are injected in the GC column, splitless. Analysis conditions: temperature grew from 35 °C to 250 °C at a rate of 5 °C/min. Reaching 250 °C, it was maintained at this level for 2 minutes. Injector temperature 220 °C, detector temperature 250 °C. Scanning was done in the range of 30 m/z – 200 m/z (detector sensibility 1,0 kv) and 50m/z - 200m/z (detector sensibility 1,1 kV). The analysis lasted 55 minutes.

## RESULTS AND DISCUSSIONS

The resulted compounds are presented in table 1, 2, 3 and 4.

**Volatile compounds identified in Aromat de Iasi wine, variant 1**

*Table 1*

No.	Retention time	Peak area	Identified compound
1	1.368	29246	Ethyl Acetate
2	2.940	18759623	1-Butanol, 3-methyl-
3	3.367	39667	Propanoic acid, 2-methyl-, ethyl ester
4	4.684	99532	Butanoic acid, ethyl ester
5	8.164	356228	1-Butanol, 3-methyl-, acetate
6	12.385	737119	ethyl hexanoate
7	17.473	1307868	Octanoic acid, ethyl ester
8	20.631	387656	Decanoic acid, ethyl ester

Table 2

**Volatile compounds identified in Aromat de lasi wine, variant 2**

No.	Retention time	Peak area	Identified compound
1	1.373	631274	Ethyl Acetate
2	1.653	117292	1-Propanol, 2-methyl-
3	2.922	16909287	1-Butanol, 3-methyl-
4	4.683	56417	Butanoic acid, ethyl ester
5	8.123	286734	1-Butanol, 3-methyl-, acetate
6	12.386	463663	Hexanoic acid, ethyl ester
7	16.861	13562	Linalool
8	17.474	730575	Octanoic acid, ethyl ester
	20.632	116820	Decanoic acid, ethyl ester

Table 3

**Volatile compounds identified in Aromat de lasi wine, variant 3**

No.	Retention time	Peak area	Identified compound
1	1.930	3808487	1-Propanol, 2-methyl-
2	3.009	43962167	1-Butanol, 3-methyl-
3	3.373	96978	Propanoic acid, 2-methyl-, ethyl ester
4	4.641	153756	Butanoic acid, ethyl ester
5	7.995	492024	1-Butanol, 3-methyl-, acetate
6	12.368	2288426	ethyl hexanoate
7	16.858	68814	linalyl formate
8	17.464	4799274	Octanoic acid, ethyl ester
9	20.628	2121992	Decanoic acid, ethyl ester

Table 4

**Volatile compounds identified in Aromat de lasi wine, variant 4**

No.	Retention time	Peak area	Identified compound
1	2.988	36271221	1-Butanol, 3-methyl-
2	3.823	34739	Acetic acid, 2-methylpropyl ester
3	4.626	182527	Butanoic acid, ethyl ester
4	8.023	259325	1-Butanol, 3-methyl-, acetate
5	12.368	1383758	ethyl hexanoate
6	16.858	48288	Linalool
7	17.467	2259926	Octanoic acid, ethyl ester
8	20.629	350790	Decanoic acid, ethyl ester

The only identified terpene in the given conditions, linalool was registered in wine samples obtained with maceration (AI 2 and AI 4). Linalyl formate was identified in the wine samples obtained from the pressed must, proving that even a short contact between must and skins leads to terpenic compounds extraction.

From the volatile alcohols class, isobutyl alcohol and 1-butanol, 3-methyl- were identified. Isobutanol has a strong solvent smell, bitter while 3-methyl-1-butanol is a main ingredient in the production of banana oil, an ester found in nature and also produced as a flavouring substance in industry.

The identified esters are ethyl isobutyrate, ethyl butyrate, isoamyl acetate, ethyl hexanoate, ethyl caprylate, ethyl decanoate.

The esters of fatty acids (ethyl hexanoate, ethyl octanoate, ethyl decanoate) have specific aromas, those of fruit, respectively apple and grape.

Isoamyl acetate smells nice, of bananas and melon, is characteristic of cool-fermented whites.

## CONCLUSIONS

The wines obtained from Aromat de Iasi grape variety present a well established aroma profile, composed of superior alcohols (1-Butanol, 3-methyl-), esters (1-Butanol, 3-methyl-, acetate and linalyl formate) and terpenic compounds (linalool).

The influence of the maceration process is clearly visible from the point of view of the number of identified compounds, as well as from the point of view of the specific peak area.

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