

## STUDIES OF THE MAIN PHYSICAL CHEMICAL CHARACTERISTICS IN SOME GRAPE VARIETIES FROM IAȘI VINEYARD

### STUDIUL PRINCIPALELOR CARACTERE FIZICO-CHIMICE LA UNELE SOIURI DE VIȚĂ DE VIE CULTIVATE ÎN PODGORIA IAȘI

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**Abstract.** The article analyses local, newly created grape varieties for table grapes, in order to highlight valuable sources of germplasm as to fulfill the biological and economic potential of Iasi vineyard, area with a low favourability for table grapes cultivation. The main goal is the analysis of structural, physicochemical and biochemical characterization of local varieties for table grapes. Having information regarding the type and concentrations of biochemical compounds available in the grapes, and the relationships between them, technological characteristics, therapeutic value, as well as sources of germplasm for other grape varieties. The objectives were to determine the structural characteristics of the grapes at full maturity, determination of physico-chemical characteristics of the studied varieties, as well as their qualitative characteristics.

**Keywords:** new creations, table grapes, table grapes, Iasi vineyard, structural analysis

**Rezumat.** Lucrarea constă în analiza unor soiuri autohtone, creații noi românești de viță de vie pentru struguri de masă, în vederea evidențierii surselor de germoplasmă viticolă valoroase, cu scopul de a pune în valoare potențialul biologic și economic al acestora în podgoria Iași, zona cu favorabilitate scăzută culturii de viță de vie pentru soiuri de masă. Scopul principal îl constituie analiza și caracterizarea fizico-structurală și biochimică a unor soiuri autohtone pentru struguri de masă, aparținând speciei *Vitis vinifera* L., fam. Vitaceae, genul *Vitis*. Cunoscându-se tipul și concentrațiile de compuși biochimici disponibili în struguri, precum și raportul dintre aceștia, pot fi apreciate însușirile tehnologice, valoarea alimentară și terapeutică, dar și calitățile ameliorative, în perspectiva utilizării acestora ca sursă de germoplasmă viticolă a soiurilor autohtone luate în studiu. Obiectivele urmărite au fost: determinarea caracterelor de structură ale strugurilor la maturitate deplină, determinarea caracterelor fizico-chimice ale soiurilor studiate, caracteristicile de calitate ale soiurilor studiate.

**Cuvinte cheie:** creații noi, struguri de masă, podgoria Iași, analize structurale

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## INTRODUCTION

In the north-east area of Romania, the cultivation of table grapes is less favourable, because of limitative climatic conditions (very cold winters and very dry summers). Usually, the table grapes that can be cultivated here are part of Chasselas group. Therefore, the research units are trying to characterize new grape varieties with a higher adaptability degree to the restrictive climatic factors and a shorter vegetation period (Damian *et al.*, 2006).

Among Romanian creations that were considered acceptable are: Gelu (SCDVV Iași), Cetățuia, Napoca, Transilvania (SCH Cluj), Milcov. This study presents the behavior of each of these grape varieties cultivated in Iasi vineyard. They are characterized by resistance to frost, fertility degree, yield capacity, quantity and quality of grapes (Rotaru *et al.*, 2010).

## MATERIAL AND METHOD

The present article studies five grape varieties for table grapes with middle maturation, new Romanian creations: Transilvania, Napoca, Cetățuia, Milcov and Gelu, all cultivated in the Ampelographic Collection of Vasile Adamachi didactic farm Iași. In order to establish the behavior of these grape varieties in Copou-Iași viticultural center, structural and physical-chemical analyses were made on grapes harvested in 2014.

The aims of this article were: analysis of structural characteristics of grapes at full maturity, analysis of physical-chemical characteristics, analysis of quality characteristics (OIV, 2013).

## RESULTS AND DISCUSSIONS

The main physical-chemical results of analysed varieties were centralized as average values, with a standard deviation and are presented in table 1.

After maturation, the weight of a grape ranges between 236,96 g  $\pm$  3,67 in Milcov variety to 428,30 g  $\pm$  8,34 in Gelu variety, values confirmed by specific literature. A tight correlation between weight of grapes, no of berries/grape and weight of 100 berries is registered. A comparison between the 5 grape varieties shows that the highest weight is registered in the case of Gelu variety, of 428,30 g, as well as the highest number of berries (76,33). The highest weight of 100 berries is registered for Transilvania variety, with a minimum of berries /stalk (53,33). The lowest values are registered in the case of Milcov variety, with a weight of 236,96 g, berries/stalk - 69,67, weight of 100 berries 297,7 g.

Skin weight has similar values in all 5 grape varieties, between 0,43 g (Milcov) and 0,61 g (Cetățuia). Pulp weight has a maximum value in the case of Transilvania variety (6,21 g), while the minimum is registered in Milcov (2,45 g).

In general, the weight of the grape stalk is higher than the weight of a grape berry, except in the case of Transilvania variety, where the values are 6,67 g, for the grape stalk and 6,85 g for one berry. The relative humidity coefficient (%) is highest in the case of Milcov grape variety (89,61%), while the lowest total dry substance (%) is the lowest (10,29%).

Table 1

Main structural and physical-chemical characteristics of studied grape varieties

Grape varieties Parameters	Gelu		Milcov		Cetățuia		Transilvania		Napoca	
	Average	±	Average	±	Average	±	Average	±	Average	±
Grape weight (g)	428,30	5,16	236,96	3,76	352,32	8,34	371,98	31,19	282,20	33,80
No berries/stalk	76,33	1,53	69,67	3,79	80,00	12,29	53,33	5,51	67,67	2,52
Berry weight (g)	5,50	0,32	3,30	0,41	4,29	0,18	6,85	0,62	3,96	0,33
100 berries weight (g)	474,23	24,31	297,70	23,38	357,24	4,89	875,17	73,96	443,32	8,38
Stalk weight (g)	8,49	1,03	7,05	1,11	9,12	0,52	6,67	0,79	14,23	0,74
Seed no/berry	1,67	0,58	3,00	0,01	3,33	0,58	2,00	0,01	3,00	1,00
Skin weight (g)	0,59	0,07	0,43	0,07	0,61	0,02	0,51	0,09	0,54	0,12
Pulp weight (g)	4,32	0,21	2,45	0,13	3,54	0,33	6,21	0,97	3,79	0,56
Seed weight (g)	0,53	0,40	0,15	0,02	0,14	0,03	0,13	0,01	0,17	0,09
Structural index	20,89	3,44	23,12	4,37	29,46	2,70	31,09	3,15	17,85	1,65
Berry index	20,12	1,31	32,65	4,47	20,87	0,77	11,02	0,77	20,28	1,33
Compositional index	4,28	1,88	4,27	0,45	4,72	0,53	9,81	0,06	5,48	1,29

Table 2

Humidity and total dry substance of of studied grape varieties

Grape varieties Parameters	Gelu	Milcov	Cetățuia	Transilvania	Napoca
Relative humidity (%)	78,49	89,61	76,71	78,53	85,62
Total dry substance (%)	21,51	10,29	23,29	21,47	14,38

Table 3

Sugars' concentration of studied grape varieties

Grape varieties Parameters	Gelu	Milcov	Cetățuia	Transilvania	Napoca
Sugars (g/l) in 2014	187,27	175,07	217,36	200,09	147,7
Values in literature	160	185	175	160	140

The highest concentration of vitamins is found in the case of vitamin C, which, at full maturity, ranges between  $3,43 \pm 0,03$  mg/100 g at Transilvania grape variety and  $5,45 \pm 0,14$  mg/100 g in the case of Milcov grape variety and  $5,73 \pm 0,43$  mg/100 g in Napoca variety.

The pH of the analysed grape varieties is in normal range, between 3,29 in Napoca and 3,53 at Gelu. However, in Gelu, the acidity was found to be at deficit compared to normal values. The majority of samples registered a normal acidity of over 7,1 g/L acid tartaric.

The sugars' concentration in 2014 overpassed in general the specific of the grape varieties, as follows: Cetățuia and Transilvania register 217,36 g/L respectively 200,09 g/L sugars, the only exception being Milcov where only 175,05 g/L, compared to the specific values, of 180-185 g/L.

The gluco-acidimetric index ranges between  $26,53 \pm 1,69$  (Milcov) –  $39,56 \pm 2,28$  (Cetățuia).

## CONCLUSIONS

The studied grape varieties present values that are proof for their suitability in the viticultural region of North-east of the country, respectively Iasi vineyard.

Gelu, Transilvania and Cetățuia grape varieties have a grape weight of over 350 grams, a good commercial aspect and a better adaptability to Iasi vineyard.

The sugars accumulations have been, in general, higher than the values described in literature.

The values of the glucoacidimetric index are much higher than the inferior limit set by the OIV, 2008, of 20.

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