THE CONTAIN OF ORGANIC ACID IS ONE OF NATURILITY INDICE IN DRY WINES

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Abstract: This article presents results about organic acids contents in must and wines. It was studied wines and from 2007-2010 harvest from diverse wineries.
Key words: grapes, must, organic acid content.

Introduction

Organic acids make major contributions to the composition, stability and organoleptic qualities of wines, especially white wines. Their preservative properties also enhance wines' microbiological and physicochemical stability.

Thus, dry white wines not subjected to malo-lactic fermentation are more stable in terms of bitartrate and tartrat precipitation. Young white wines with high acidity generally also have greater aging potential.

Content and ratio of organic acid in grapes depends on the variety, environmental factors, and in the wines from production technology. Their general content also plays an important role in the formation of wine used for the production of wine distillates.

Materials and Methods

We studied samples of grape juice and wine from 2007-2008harvest of diverse grapes, as: White of Suruceni, White of Oniţcani, Riton, Prime of Magaraci, Bianca, Aligote on content of organic acids. From all organic acids, we studied oxalic, formic, tartaric, malic, citric, succinic and lactic acids. We determined organic acid content by capillary electrophoresis with "КАПЕЛЬ 103Р" device from "Люмэкс" enterprise.

Results

Contain of organic acids in juice grapes and wines are presented in table 1 and table2.

We can see from table 1, that analogically quality and quantity of acids content: tartaric and malic in grapes juice of White of Suruceni and White of Onişcani; tartaric, citric and malic acids in grapes juice of Bianca, Aligote.

The grapes juice from Riton and Prime of Magaraci are close to tartaric acid content, but different on malic and succinic acids content.

Table 1. The organic acids content in grapes must from 2007-2008

Organic acids	Musts					
	White of Suruceni	**White of Oniţcani**	**Riton**	**Prime of Magaraci**	**Bianca**	**Aligote**
Oxalic, g/dm^3	0,05-0,06	0,06-0,1	0,09-1,0	traces	0-0,1	0,12-0,17
Formic, g/dm^3	-	-	-	-	-	-
Tartaric, g/dm^3	4,0-5,1	4,9-5,1	4,8-4,9	4,6-4,8	3,7-4,0	3,8-4,0
Malic, g/dm^3	traces	traces	traces	traces	traces	traces
Citric, g/dm^3	1,9-2,1	1,9-2,6	2,8-3,0	2,8-3,0	2,5-3,0	2,8-3,0
Succinic, g/dm^3	0-0,3	0,3-0,32	traces	traces	0,02-0,19	0-0,4
Lactic, g/dm^3	-	-	-	-	-	-
Total, g/dm^3	5,95-7,56	7,16-8,12	6,09-6,22	7,4-7,8	6,22-7,19	6,72-7,21

Table 2. The organic acids content in white wines from 2007-2010

Organic acids	Wines					
	White of Suruceni	**White of Oniţcani**	**Riton**	**Prime of Magaraci**	**Bianca**	**Aligote**
Oxalic, g/dm^3	0,2-0,4	0,20-0,30	0,10-0,17	0,10-0,2	0,10-0,20	0,1-0,2
Formic, g/dm^3	-	-	-	-	-	-
Tartaric, g/dm^3	3,80-4,20	4,20-4,80	3,8-4,8	3,50-4,13	3,20-4,10	3,5-4,0
Malic, g/dm^3	1,20-1,25	1,00-1,20	0,50-0,70	0,70-0,90	0,6-0,8	0,5-1,0
Citric, g/dm^3	0-0,15	0,13-0,40	-	-	-	-
Succinic, g/dm^3	0,50-1,00	0,80-1,80	1,00-1,10	1,00-1,15	1,1-1,2	1,2-1,25
Lactic, g/dm^3	0,70-1,00	0,50-0,80	1,65-2,00	1,20-1,7	1,8-2,5	1,7-2,0
Total, g/dm^3	6,40-7,85	6,83-9,30	7,05-8,77	6,50-8,08	6,8-8,92	7,0-8,0

The results of research (table 3) correspond in accord by dates from bibliography. How we can see in table 3, organic acids contain in wines compared to grapes juice: malic acid decreases, succinic and lactic acids increase, over acid content remains at the same level. The changes of malic and lactic acids content in grapes juice and wines are the result of malo-lactic fermentation; succinic acid is formed by fermentation of tartaric and malic acids.

Quality and quantity of oxalic, tartaric, malic and lactic acids content are the same as in wines obtained from White of Suruceni and White of Oniţcani (controlled sample), but acids content of wines from Riton, Prime of Magaraci, Bianca grapes are closely to content in Aligote wines (controlled sample).

Table 3. The organic acids content in must and wine

Organic acids	Test samples		Bibliography	
	Must	**Wine**	**Must**	**Wine**
Oxalic, g/dm^3	0-0,17	0,10-0,40	0,07-0,1	0,07-0,1
Formic, g/dm^3	0	0	0	0
Tartaric, g/dm^3	3,70-5,10	3,2-4,8	2,0-8,0	1,0-6,0
Malic, g/dm^3	1,20-3,00	0,5-1,25	2,0-7,0	0-5,0
Citric, g/dm^3	0-0,32	0-0,40	0-0,7	0-0,7
Succinic, g/dm^3	traces	0,50-1,80	0-0,3	0-1,5
Lactic, g/dm^3	0	0,50-2,50	0	0-2,5

The results present that wine from complex-resistant varieties of grapes planted in Doibanscoi region is closely on quality and quantity content of organic acids with controlled samples.

The above limits of variation in concentration of organic acids in wines are characterized with respect to the production process. The infraction of production technology causes a change in their content (table 4).

Table 4. Contain of organic acids from different wineries

Organic acids	**Samples**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Oxalic, g/dm^3	0,2	0,1	0,05	0,1	0,2	0,16	0,07	0,4	0,2
Formic, g/dm^3	-	-	-	-	-	-	-	-	-
Tartaric, g/dm^3	2,1	2,8	3,8	3,1	1,2	1,2	0,8	1,0	0,2
Malic, g/dm^3	-	-	-	-	-	-	-	-	-
Citric, g/dm^3	-	-	1,8	1,7	1,9	2,0	1,0	1,0	1,0
Succinic, g/dm^3	1,0	1,1	2,1	2,1	0,9	0,9	0,5	1,0	0,8
Lactic, g/dm^3	3,3	2,8	2,9	2,6	1,7	1,1	-	-	-
Total, g/dm^3	6,6	6,8	10,3	9,6	6,3	5,7	6,8	3,4	3,0

How we can see in table 4, contain of tartaric acid (except for samples 3 and 4) is below in 1,2 to 2 times than wines produced by keeping technology (table 6), malic acid is absent, citric acid higher in 1,5 to 2 times lactic acid content is several higher (samples 1 and 3). The reasons in changes on organic acids content in wines can serve the processes of their transformation in the offense regimes fermentation of juice grapes and storage wines. Decrease of malic acid content or it disappearance (samples 1-9, table 4) may be caused: long-term storage prior to processing, at high temperature; processing rotten berries and their must fermentation under wild yeast, causing decay of malic acid to dioxide of carbon and water.

Table 5. Contain of organic acids

Organic acids	**Samples**					
	1	**2**	**3**	**4**	**5**	**6**
Oxalic, g/dm^3	0,13	0,07	0,2	0,1	0,02	0,1
Formic, g/dm^3	-	-	-	-	-	-
Tartaric, g/dm^3	2,6	1,9	2,1	2,8	2,8	2,7
Malic, g/dm^3	-	-	-	-	-	-
Citric, g/dm^3	-	-	-	-	-	-
Succinic, g/dm^3	0,96	1,1	1,0	1,1	0,7	1,2
Lactic, g/dm^3	2,7	2,3	3,3	2,8	2,7	2,6
Total, g/dm^3	6,4	5,4	6,6	6,8	6,2	6,6

Increasing of citric acid content compared to average values in wines due to it artificial addition, which allowed till 2,0 g/dm^3 for dry ordinary wines and not allowed to wines for distillates (samples 3-9, table 4). Wines for distillates obtained by keeping technology (table 6) contains organic acids within the limits: oxalic acid from 0,1 to 0,2 g/dm^3, tartaric acid from 3,0 to 6,0 g/dm^3, malic acid from 1,0 to 3,0 g/dm^3, citric acid from 0 to 1,0 g/dm^3, succinic acid from 0,5 to 2,0 g/dm^3, lactic acid from 0,5 to 2,8 g/dm^3. In the

same time were made controlled samples fermenting sugar and pomace in condition of laboratory to study quality and quantity of organic acids content (table 5).

Table 6. Limits of variation organic acids content in wines made by different methods

Organic acids	**Limit of organic acid content in wines**		
	Keeping technology (table 2)	**Offense technology (table 4)**	**Wine pomace (table 6)**
Oxalic, g/dm^3	0,07-0,3	0,05-0,4	0,02-0,13
Formic, g/dm^3	-	-	-
Tartaric, g/dm^3	3,0-6,0	1,0-3,8	1,9-2,8
Malic, g/dm^3	0,5-2,0	-	-
Citric, g/dm^3	0-0,7	1,0-2,0	-
Succinic, g/dm^3	0,5-2,0	0,5-2,1	0,7-1,2
Lactic, g/dm^3	0,5-2,5	0-3,3	2,3-3,3
Total, g/dm^3	7,0-8,9	3,0-10,3	5,4-6,8

In these wines observed absence of malic and citric acids and sum of organic acids content is visibly lower. Generation of dates about organic acids content in wines obtained by diverse methods (table 4, 5) presented in table 6.

The ratio of tartaric acid with sum of malic and lactic acids is an additional criterion for recognition of natural and falsified wines. The ratio is 1:0,61 by keeping technology, but in wines obtained with sugar and pomace, this ratio is 1:1,19.

The study has demonstrated that citric acid content in the wines obtained by offense technology was higher in 1,7 to 2,0 times from natural wines.

Conclusions

In this way, organic acids content and its correlation, we can judge about level of falsified wines, but it is not always possible to determine the used way by producer.

The comparison between concentration of organic acids in studied and controlled samples allows detecting products of concrete producer.

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