

Biology

SOME INFORMATION ABOUT QUALITATIVE COMPOSITION
OF BRANDY MATERIALS MADE FROM GRAPEVINE INFECTED
WITH OIDIUM AND MILDEW DISEASES

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We have investigated wine materials, made of Rkatsiteli, Kangun and Meghrabuyr grape cultivars grown at vineyards of Ararat lowland infected with oidium and mildew diseases. Organoleptic assessment and bacteriological investigation of samples have been carried out. According to the obtained results, it is necessary to control the recycled raw material quality and avoid the presence of infected grapes as far as possible. The infected grapes lose their technological value, they are distinguished with their low quality and are worthless for brandy production. The received wine material can at least be used for grape vodka production.

Keywords: grapevine, oidium and mildew fungal diseases, wine material for brandy.

Introduction. It is well known that the quality of wine-making product is essentially conditioned by the sort of the grape, as well as by land growing and climatic conditions, taken agro technical measures for grapevine cultivation and etc. [1]. The harmony of grape fruit chemical ingredients develops during its proportionate maturing, which mainly depends on the amount of active temperatures and favorable conditions of air relative humidity. The Armenian climate is strictly continental, winter is cold, summer is hot with obvious fluctuations of air temperature and relative humidity. The latter is often the cause of development of fungal diseases having a negative impact not only on grape fruitfulness, but also on the qualitative characteristics. Oidium and mildew grape diseases are bright examples of them [2–4].

According to the literature data, grape fruits, infected with oidium and mildew diseases, lose their biological value, particularly fruits fade, wax layer is damaged, gaps appear and the balance of natural growth of grape fruits is violated. The development of the disease leads to the decomposition of grape fruit tissues. The mentioned diseases also have a negative impact on the accumulation of aromatic substances in a grape fruit [5–7].

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During the last decade in the sphere of brandy production of RA measures, directed to the improvement of production quality, have been noticed. It is conditioned by the export market demands towards Armenian brandy. The best corroboration of the ready product quality is the quality of recycled raw material, provision of technological process during production and its conformation to valid normative documents of that sphere.

The aim of the research is the qualitative and technological value assessment of wine material, received from recycled grapes infected with oidium and mildew diseases.

Materials and Methods. The subject of the research has been wine materials, made from Rkatsiteli, Kangun and Meghrabuyr cultivars grown in vineyards of Ararat lowland, infected with oidium and mildew diseases. Wine materials, based on healthy sorts of grapes of Ararat lowland, have been used as comparative verified research samples. For the experiment, 20 kg of each grape cultivar with their corresponding diseased and healthy versions have been chosen.

The analyses have been carried out at the laboratory of Scientific Research Centre of Yerevan Ararat Brandy–Wine–Vodka Factory OJSC and experimental laboratory of mycology of YSU. The laboratory analyses of grape and wine materials have been made according to AST 179-99, AST 271-2007, AST 341-2011, AST 388-2011, GOST 12280-75, GOST 13193-73, GOST 13194-74, GOST 14138-76, GOST 14139-76 (National Institute of Standards CJS).

Results and Discussion. To research the grape, according to the classical technology of making wine material for brandy, has initially undergone laboratory analysis, the degree of disease infectiveness of the grape fruit has been determined, then the grape has been assorted and separated according to analyzed versions.

The researched grape versions have been princered and pressed by the laboratory press. In the received versions of must sugar, titratable acidity, pH and outcome percentage of must have been determined (Tab.1).

Table 1

Must result and chemical indexes of analyzed versions or variants

Index name	The analyzed grape versions / variants								
	Rkatsiteli			Kangun			Meghrabuyr		
	healthy (control)	oidium	mildew	healthy (control)	oidium	mildew	healthy (control)	oidium	mildew
must quantity, %	55.98	42.45	54.05	50.00	43.96	46.00	65.30	44.07	49.29
sugar mass concentration, g/100 cm ³	21.84	22.65	23.56	23.31	24.20	28.89	23.30	20.91	22.00
titratable acids mass concentration, g/dm ³	6.71	10.41	9.26	6.08	8.44	7.70	6.30	11.86	10.50
pH	3.61	3.40	3.57	3.57	3.80	3.36	3.60	3.32	3.50

According to Tab. 1, it is obvious that fluctuations of must output and chemical indexes are noticed in the analyzed grape cultivars.

In comparison with recycled healthy grape results the output of must has decreased in all the infected variants. The output index of must is particularly low in the variants of grape infected with oidium. The latter is explained by the low content of juice in infected grape cultivars. To compare with healthy variants analysis infected variants have been described by high index results of mass density of sugar and titratable acids as the disease was the cause of tissue modification of grape fruits.

That is sugar mass density is mainly high in grapes samples among the infected with mildew analyzed variants. The maximum index result has been recorded 28.89 g/100 cm³ in the variant of Kangun grape cultivar.

The maximum titratable acidity has been in oidium infected grape cultivars, the maximum index value has been recorded in Meghrabyr cultivar making 11.86 g/dm³.

The variants of diseased sorts of grape must are described with lower hydrogen values. After the laboratory research the analyzed must variants were fermented. The fermentation of analyzed samples was done according to the classical way accepted in wine-making production [1, 8]. “*Saccharomyces cerevisiae* FC9” of Dutch production biomass of dry active yield was used.

After the alcohol fermentation young wine materials were separated from deposit and underwent laboratory research (Tab. 2).

Table 2

Chemical analysis and organoleptic indexes of wine material samples for brandy

Index name	The analyzed wine versions								
	Rkatsiteli			Kangun			Meghrabyr		
	healthy (control)	oidium	mildew	healthy (control)	oidium	mildew	healthy (control)	oidium	mildew
ethyl alcohol, vol. %	12.64	13.13	13.62	13.49	13.51	13.65	13.49	11.71	12.64
mass concentration titratable acids, g/dm ³	6.70	10.40	9.70	6.10	8.36	7.7	6.24	11.84	10.42
mass concentration volatile acids, g/dm ³	0.34	1.64	1.76	0.48	1.32	1.8	0.16	1.04	1.28
iron mass concentration, mg/dm ³	0.18	0.2	0.18	0.12	0.10	0.08	0.13	0.08	0.06
residual sugar content, g/100 cm ³	0.30	0.28	0.30	0.3	0.25	0.22	0.15	0.22	0.34
sulfur dioxide, total mass concentration mg/dm ³	10.5	22.0	32.4	11.0	43.0	36.2	9.5	26.5	42.1
taste rating, points	9.7	2.4	4.5	9.3	3.0	4.2	9.1	2.5	4.5

According to Tab. 2, results the analyzed wine material samples are directly comparable with recycled raw material quality. Thus, in the analyzed samples mass

density of exhaled acids is high in the wine material variants received from infected grape recycling.

Table 3

Indexes of microbiological analyses of wine material samples of brandy (1 preparation)

Index name	The analyzed wine versions								
	Rkatsiteli			Kangun			Meghrabuyr		
	mildew	healthy (control)	oidium	mildew	healthy (control)	oidium	mildew	healthy (control)	oidium
lactic acid bacteria	unit	–	unit	unit	medium	medium	medium	medium	unit
acetic acid bacteria	unit	a lot	a lot	unit	a lot	medium	unit	a lot	a lot
yeasts	a lot	a lot	a lot	a lot	a lot	a lot	a lot	a lot	a lot

Evidently high index was recorded in mildew diseased samples' variant. Total sulphur dioxide mass content is also high in wine material samples received from diseased grapevine. The latter is explained by the agro technical measures taken during diseased grapevine growing.

According to bacteriological results acetic acid bacteria prevail in grape samples infected with mildew and oidium diseases, which are the result of low quality of a recycled grape fruit and its worthlessness (Tab. 3).

For summarizing the analyzed results we have done organoleptic assessment of samples (Tab. 2).

According to tasting results of those variants, received from diseased grape, are distinguished outwardly by their color oxidation tints and turbidity. Those wine materials, especially oidium variants, are distinguished by their unpleasant smell, taste and underlined bitterness accompanied with taste, emptiness.

Mildew variants are characterized by over matured, destroyed grape aroma, dried fruits' tints accompanied with bitterness. In both disease variants unpleasant acidity was observed.

In oidium variant underlined sulphur hydrogenic smell was observed as a result of which the mentioned variants got low tasting assessment.

The research results have shown that it is necessary to control recycled raw material and in case of possibility to avoid the existence of a diseased grape. It has been found out that especially oidium infected grape fruits lose their technological value and are worthless for brandy production. Mildew variant wine material samples are also distinguished by their low quality and can only be used in grape vodka production.

Thus, summarizing the results, it is necessary to mention that brandy production is the leading branch of RA agriculture recycling sphere, raw material and further product quality control must be realized strictly preserving brandy production standards.

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