

AGRICULTURAL TECHNICAL STUDY AND USE IN WINE PRODUCTION OF
FORGOTTEN ABORIGINAL SPECIES: VARDISPERI RKATSITELI, KAKHIS TETRI
AND LECHKHUMIS ODJALESHIS. Zautashvili¹, O. Gotsiridze¹, M. Mikiashvili¹, M. Ormotsadze², L. Kotorashvili³, I. Khositashvili¹¹Caucasus International University, 73, Chargalis street, Tbilisi, GeorgiaE-mail: olan.gotsiridze@ciu.edu.ge, marina.khositashvili@yahoo.com, marika.mikiashvili@ciu.edu.ge²Iakob Gogebashvili Telavi State University, 1, University street, Telavi, GeorgiaE-mail: medea.ormotsadze@tesau.edu.ge³Georgian Technical University, 77, Merab Kostavas street, Tbilisi, GeorgiaE-mail: lkotorashvili7@gmail.com**Abstract**

In the paper, Georgian aboriginal species of vine, such as: Kakhis Tetri, Vardisperi Rkatsiteli, Lechkhumis Odjaleshi and their agricultural technological characteristics and use for the production of different types of wines are discussed. Within the mentioned research, we gain new knowledge about the given species on the basis of comparative analysis that provides an interesting basis for further research in this direction.

Keywords: aboriginal, technological, characteristics, organic acids, ampelographic, gene pool

1. ACTUALITY OF THE TOPIC

Vineyards in Lechkhumi are cultivated on relatively fewer and heavily sloping slopes, which gives us different types of vines. The area of distribution of Lechkhumis Odjaleshi is the villages of Orbeli, Ladjana, Latsoria, and Tsilamimria. These villages are famous for their high-quality original semi-sweet wines.

T. Kobaidze (2014) considers Vardisperi Rkatsiteli as a bud variation of Rkatsiteli. He ampelographically describes it, talks about its productivity (7-19t/ha), period of its ripeness in the middle of September, when its sugar content reaches 20-24%, and acidity 6-8 g/dm³. The author considers that high-quality dry table wine and dessert wine are made from this specie of vine. In terms of viticulture-winemaking, we can consider Kakheti as a cellar of Georgia, which is due to its favorable soil-climatic conditions. The famous species of the vine of Kakheti, and the wines made from them, have already gained recognition locally and abroad, but it is noteworthy that in addition to these commonly used agricultural species, the gene pool of Kakheti is distinguished by the abundance of other aboriginal species, most of which can be found only in collection land plots for today.

To remedy this situation, a thorough study of each of them and protection of varietal purity is necessary, as a result of which we will be able to propagate them and use them to plant new vineyards. In the collection, several species are protected, which are considered to be varieties that deserve attention and ampelographic description. One of them was Kakhis Tetri.

2. RESEARCH OBJECTS AND METHODS

Research objects, in particular, the samples of Lechkhumis Odjaleshi, Vardisperi Rkatsiteli and Kakhis Tetri were taken from specific viticulture zone of Djighaura-Bitsmenda, plant nursery of Djighaura.

In modern viticulture-winemaking, the study of agricultural-technological indicators of the research species serves the development of high-quality wine production.

The vine, like all other plants with the ability to reproduce vegetatively, under the influence of environmental factors undergoes various changes (Gotsiridze V. et al., 2009). First of all, the quality of the wine depends on the variety of grape, its agricultural, technological and physical-chemical parameters.

By studying these indicators, it is possible to give direction to the use of various species in terms of winemaking (Navari K., 2004).

Research objects, in particular, the samples of Lechkhumis Odjaleshi, Vardisperi Rkatsiteli and Kakhis Tetri were taken from specific viticulture zone of Djighaura-Bitsmenda, plant nursery of Djighaura.

For the purposes of the study, we studied the agricultural-technological indicators of the bunch of grapes of the research species.

To obtain the mechanical composition of the bunch of grapes, ten large, ten medium, and ten small size bunch of grapes of each variety were gathered during the full maturity period.

After that, the structure of the bunch and composition of the grape was studied.

The method of weight and numerical ratios is used to study the mechanical composition of the bunch of grapes (N. Ketskhoveli, 1960). Samples of test varieties of grapes were taken: Kakhis Tetri, Vardisperi Rkatsiteli, and Lechkhumis Odjaleshi, from which the capacity to produce sweet were determined.

According to the capacity to produce sweet, in the higher position is Kakhis Tetri, then Vardisperi Rkatsiteli, which was close to the Lechkhumis Odjaleshi.

The chemical parameters of sweet were determined in the obtained samples (results are given in Table 1).

Table 1. The chemical composition of sweet of the test grapes

Parameters	<u>Kakhis Tetri</u>	<u>Vardisperi Rkatsiteli</u>	<u>Lechkhumis Odjaleshi</u>
Sugar content %	22.1	25.0	26.3
Titrateable acidity, g/l	5.5	4.8	5.8
pH	3.3	3.5	3.9

Since the study included the study of forgotten aboriginal species in terms of winemaking, we chose the traditional Kakhetian wine-making method – on Chacha (only dregs) with a 6-month delay as one of the technologies for test varieties (Gelashvili, 1961).

The second method was the classic wine-making method. In the case of white grape varieties (Kakhis Tetri, Vardisperi Rkatsiteli) classically only juice was fermented and in the case of Lechkhumis Odjaleshi, only juice was fermented without contact with dregs.

The wine was made from all samples of grapes with Kakhetian technology. As soon as the grapes were received, the stalk was removed mechanically, the grape was squashed and alcoholic fermentation was happening only on dregs.

In the case of white-grape varieties, as soon as it was squashed, after giving sulfur dioxide and yeast to the sweet – it started fermentation and after completing fermentation, wine continued ripening with Chacha. In the case of Lechkhumis Odjaleshi – it was removed from Chacha (dregs) in 10 days and continued fermentation.

3. EXPERIMENTAL PART

Wines were chemically analyzed. The results are given in Table 2.

Table 2. Chemical composition of wine made from test varieties

Indicators, g/dm ³	<u>Kakhis Tetri classic</u>	<u>Kakhis Tetri on Chacha</u>	<u>Vardisperi Rkatsiteli classic</u>	<u>Vardisperi Rkatsiteli on Chacha</u>	<u>Lechkhumis Odjaleshi classic</u>	<u>Lechkhumis Odjaleshi on Chacha</u>
Strength%	12.7	12.9	14.3	14.5	11.1	14.8
Residual sugar	4.3	4.8	5.0	4.5	69.2	4.0
Titrateable acidity	4.6	4.4	4.5	4.2	4.5	5.2
Volatile acidity	0.42	0.40	0.45	0.4	0.35	0.3
pH	3.93	4.01	3.85	4.07	3.91	4.11
SO ₂ inj./total	8/13	8/28	8/46	8/14	5/26	18/69
Reduced extract	17.1	18.4	17.5	20.1	20.3	23.4

The table shows that samples of wine made by the classical method differ from those made by the traditional method by the content of the reduced extract. In all samples of wine delayed on Chacha (dregs) extract is more than extract of wine samples made by the classical method.

This is natural because the amount of extractive substances in the wine increases with a delay on the Chacha.

Wine samples are distinguished by the content of total acidity, the amount of organic acids varies from 4.2 g/l to 5.2g/l. Among the test species, the number of organic acids was relatively high in Lechkhumis Odjaleshi - 4.5-5.2g/l. To confirm these data, we studied the dynamics of change in organic acids of Lechkhumis Odjaleshi in connection with the ripening phases of the grape and was compared to the samples made by the classical method and the Kakhetian method.

Organic acids were determined by the OIV international method MA-AS313-04, considering the Regulations on Liquid Chromatography.

4. DISCUSSION

The data obtained from determination of organic acids by liquid chromatography are given in Table 3.

Table 3. Dynamics of change of organic acids of Lechkhumis Odjaleshi in different ripening phases of grape and in wines made with different technologies.

Indicators, g/dm ³	Ripening	Ripeness	Classically vinified	Vinified by the Kakhetian method
Tartaric acid	4.0	3.4	2.1	2.5
Malic acid	2.8	1.7	1.2	1.3
Lactic acid	0	0	0.5	0.6
Citric acid	1.3	0.7	0.4	0.5
Total amount of organic acids	8.1	5.8	4.2	4.9

As table 3 shows, the total amount of organic acids in the ripening phase is more (8.1 g/l) than in ripeness phase (5.8 g/l). After alcoholic fermentation its quantity was reduced to 4.2-4.9 g/l (Volschenk, et al., 2006). These data are relevant because it is known from the literature that the amount of organic acids decreases by 1.0 g/l during alcoholic fermentation. As for the wines made by the European classical method and the Kakhetian traditional method, there also is relevant dependence, as the amount of organic acids increases by almost 0.7 g/l as a result of fermentation on Chacha.

5. CONCLUSIONS

Within the study, the agricultural-technological characteristics of the research species were described and summarized. From the mentioned vine varieties, the wines were made with classical and Kakhetian technology, and chemical and organoleptic evaluation of these samples was performed. According to the chemical indicators, all tree species are characterized as the varieties with potential to give high-quality table wine.

6. REFERENCES

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