Сапожников А. М., Савин М. А., Кувшинов А. А.

Обоснование рациональной технологической схемы орудия для непрерывного прессования виноградной лозы

Предложена технологическая схема устройства для непрерывного прессования виноградной лозы в рулоны и нарезания ее на фрагменты необходимой длины.

Ключевые слова: виноградная лоза, упаковка, пресс-подборщик, рулон, уплотняющая камера.

A. Sapozhnikov, M. Savin., A. Kuvshinov

Ground of rational flowsheet instruments for the continuous pressing of grape-vine

The flowsheet of device is offered for the continuous packing of grape-vine in rolls and cutting of her on the fragments of necessary length.

Keywords: grape-vine, packing, device for the selection and pressing, roll, making more compact chamber.

УДК 663.252: 663.253

N. G. Taran, *d-r habilitat, prof-r,*
E. V. Soldatenco, *d-r habilitat, docent,*
S. S. Vasiucovich*., d-r,*
O. V. Soldatenco, *d-r*
PI Scientific and Practical Institute of
Horticulture and Food Technologies
Republic of Moldova

PRODUCTION TESTING AND IMPLEMENTATION OF IMPROVED TECHNOLOGY FOR CORRECTION OF ALCOHOLIC CONTENT IN WINES USING VACUUM DISTILLATION METHOD

Detailed examination of existing technologies for low-alcohol wine production has shown that process of alcohol reduction leads to significant losses of aroma compounds from wine that exert a detrimental effect on wine quality. In this article the elaborated technology for reduced alcoholic content wines production using vacuum distillation method was implemented and tested in production conditions at "Nectar S" LTD.

Keywords: white wine, red wine, alcohol reduction, quality, technology.

Introduction

For the past several years there has been a steady increase of the alcoholic degree of wines because of climate change and the southwards shift of grape varieties from cooler areas. This amount is changing every year, depending on various circumstances like occasionally unfavorable climate conditions. Statistical data has shown a consistent alcohol increase in Californian wines, from 12,5% vol. to 14,8% vol. between 1978 and 2001. In

Australian wines, alcohol content has increased from 12,4% vol. to 14% vol. between 1984 and 2004 [1].

Hence, the production of wines with reduced ethanol concentration is an important aspect of wine production that has gained considerable attention over the past 10 years or so [3]. Consumer demand for wines that are perceived as healthier, more favourable, excise rates for lower alcohol products and changing attitudes of consumers regarding the social consequences of excessive ethanol consumption are just some of the attitude drivers for lowering ethanol levels in wine. Significant consumer demand is apparent for wines with lower ethanol levels [4, 2].

Materials and methods

Research was carried out in the laboratory of "Biotechnologies and Microbiology of Wine" at the Scientific and Practical Institute of Horticulture and Food Technologies and on the winery "Nectar S" LTD. In production conditions installation for correction of alcoholic content in white and red wines "Tetra Therm Aceptic Drink" of "Alfa Laval" (Sweden) was used. The operation principle of the equipment includes the following stages: heating of wine to desired temperature by heat-exchange unit, after this the heated wine is fed to evaporation unit, where it gets to heated plate. In the evaporation unit a vacuum is created and ethanol vapors under the vacuum are condensed at the top of the unit. The top of the column is cooled and vapors after condensation are removed from installation. Main physical-chemical indices of obtained wines was determined using conventional and standard methods of analysis.

Results and discussions

On the first stage white wine Aligote and red wine Merlot with high alcoholic content was selected in order to be used in the process of ethanol correction. It is worth emphasizing, that selected wines to be dealcoholized are stable to crystal, protein and colloidal hazes and without any organoleptic defects. The correction of alcoholic content was conducted according to the OIV Resolution, with removal of 20% of the total alcoholic content. The main physical-chemical indices was determined and presented in the table 1.

Table 1

Physical-chemical indices of initial white and red wines

Nr.	Wine	Alcohol content,% vol.	Mass concentration of, g/dm³			pH	SO_2 total/free, mg/dm³	Sensory evaluation, points
			Titratable acids	Volatile acids	Residual sugars			
1	Aligote	13,9±0,1	5,50±0,08	0,36±0,03	1,0±0,5	3,07±0,01	120/31	7,9±0,01
2	Merlot	14,1±0,1	5,1±0,1	0,39±0,03	1,2±0,5	3,24±0,01	103/22	7,9±0,01

According to obtained results presented in table 1 initial wines distinguish by high alcoholic content equal to 13,9% vol. in white wine and 14,1% vol. for red wines. Initial wines are of high quality without any defects as well as stable against crystal, protein hazes. According to OIV recommendations estimated alcohol level content should not exceed 11,0% vol. for white wine and 11,4% vol. for red wine. Sensory evaluation demonstrated high quality of initial white and red wines which was appreciated with high notes of 7,9 points.

The process of ethanol removal was carried out by vacuum distillation installation using elaborated technological regimes presented in table 2.

Table 2

Operating conditions of the industrial plant for ethanol removal from white and red wines

Nr	Wine	Temperature	Pressure	Volume
1	Aligote	(30±1)°C	4 kPa	1000 dal
2	Merlot	(30±1)°C	4 kPa	1000 dal

Process of ethanol removal was carried out at the temperature which varies in a very close limits from 29ºC to 30ºC with constant pressure of the process (4 kPa). The initial volume is equal to 1000 dal for both wines. After the process of alcohol level reduction the wine was sent to the rest for 10 days in order to recover its balance. In the obtained production batches of white and red wines the main physical-chemical indices and stability of obtained wines was determined. The results are presented in tables 3 and 4.

Physical-chemical analysis of wines after alcohol strength correction has shown insignificant influence of the process on wine composition except for alcohol. Reduction of alcohol in white wines constitutes 2,4% vol. and for red wines 2,1% vol. Concentration of titratable acids varies from 5,5 g/dm³ to 5,7 g/dm³ for Aligote and from 5,1 g/dm³ to 5,4 g/dm³ for Merlot as a result of volume decrease.

Table 3

Physical-chemical indices of obtained wines with reduced alcohol content after dealcoholization process

Nr.	Wine	Alcohol content,% vol.	Mass concentration of, g/dm³			pH	SO_2 total/free, mg/dm³	Sensory evaluation, points
			Titratable acids	Volatile acids	Residual sugars			
1	Aligote	11,5±0,1	5,7±0,08	0,33±0,03	1,2±0,5	3,05±0,01	110/21	8,0±0,01
2	Merlot	12,0±0,1	5,4±0,1	0,37±0,03	1,5±0,5	3,20±0,01	91/12	8,0±0,01

Volume decrease is related to quantity of removed ethanol. Slight reduction of volatile acidity occurs as a consequence of some acetic acid molecules losses during distillation. Regarding the concentration of residual sugars an increase from 1,0 g/dm³ to 1,2 g/dm³ for white wine and from 1,2 g/dm³ to 1,5 g/dm³ for red wine was determined. Organoleptic evaluation of obtained wines with reduced alcohol content demonstrates the positive effect of dealcoholization process on wine quality. Obtained white and red wines were appreciated with 8,0 points.

Table 4

Influence of process of alcoholic content correction on stability of white and red wine

Parameter	Initial wine Aligote	Aligote	Initial wine Merlot	Merlot
Alcohol content, % vol	13,9±0,1	11,5±0,1	14,1±0,1	12,0±0,1
Potassium, mg/dm³	526	534	619	623
Tartaric acid, g/dm³	1,9	1,9	1,6	1,6
Stability:				
-Bio-chemical	+	+	+	+
-protein haze	+	+	+	+
-colloidal	+	+	+	+
-crystal haze	+	+	+	+
-microbiological	+	+	+	+

Legend: +-stable
-unstable

According to obtained results presented in table 4 process of ethanol removal of white and red wines have no influence on its stability. Stable to different hazes initial wines remain stable and after process of alcoholic strength correction.

On the base of organoleptic evaluation of obtained samples of white and red wines performed by the taste panel, the sensory profiles of initial wines and corresponding wines with reduced alcohol content are presented in the fig.1 and 2.

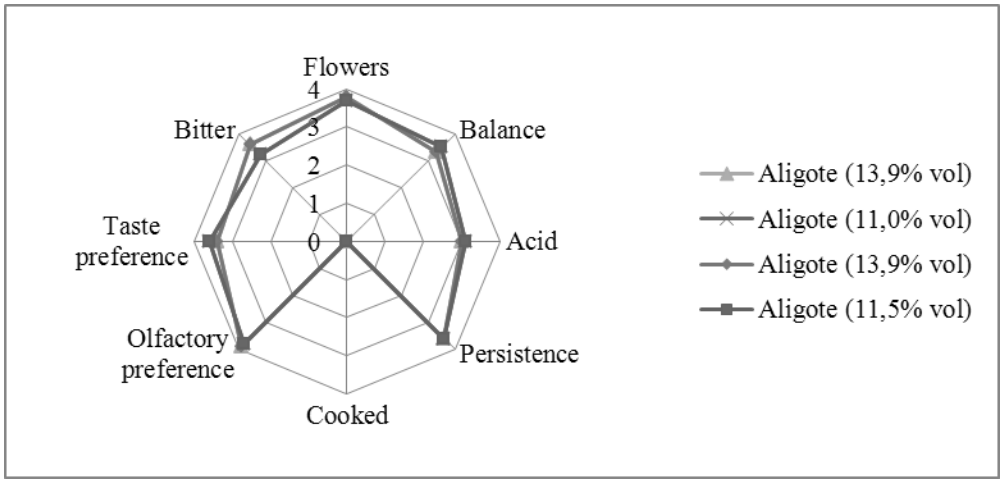

Fig. 1. Sensory profiles of white wine Aligote before and after the correction of alcoholic content in production conditions

Fig. 1 demonstrates that alcohol correction of white wines contributes to improvement of wine quality and balance of its components. The attribute "Flowers" decreased insignificantly as a result of compounds responsible for floral aroma removal. However, ethanol level reduction contributed the improvement of "Balance" and "Taste preference" of obtained wines by reduction of "Bitterness" caused by excess of alcohol.

Comparable situation is observed in the case of red wine Merlot after the correction of alcoholic content. A reduction of "Fruit" aroma is perceived and consequently "Olfactory preference" decreased.

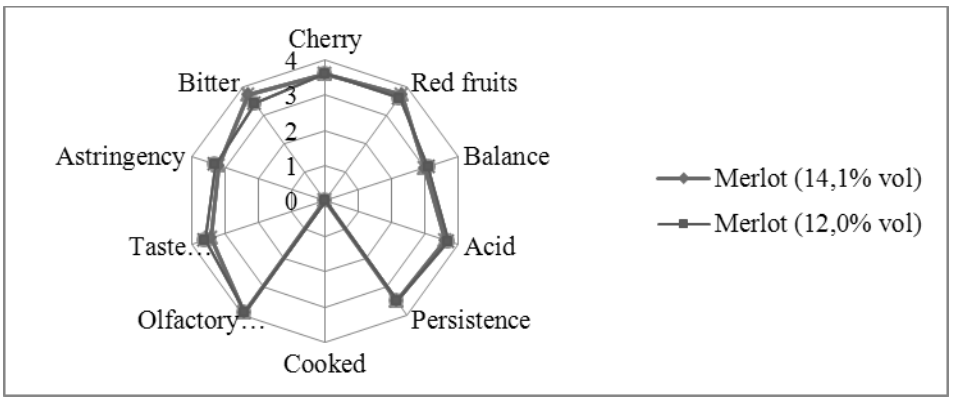

Fig. 2. Sensory profiles of red wine Merlot before and after the correction of alcoholic content in production conditions

Perception of Bitterness decreased because of ethanol removal what leads to increasing of "Balance" and "Taste preference" of wine with reduced alcohol content in comparison to initial wine.

Conclusions

On the base of obtained results regarding the implementation of elaborated technological regimes in production conditions can be concluded that correction of alcoholic strength of white and red wines by vacuum distillation process has shown the effectiveness and beneficial effect on quality of obtained wines. Reduction of alcoholic content to 20% leads to insignificant change of

physical-chemical composition of wines as well as improvement of organoleptic characteristics of obtained wines.

Bibliography

1. Duchene E. Grapevine and climatic changes: a glance at the situation in Alsace / E. Duchene, C. Schneider // In: Agron.Sustain. – Dev, 2005. – Vol. 25. – P. 93-99.
2. Preference and acceptability of partially dealcoholized white and red wines by consumers and professional / S. Meillon et al. // In: Am.J. Enol. Vitic. – 2010. – Vol. 61(1). – P. 42-52.
3. Review of processing technology to reduce alcohol levels in wines / B. Saha et al. // In: 1st International Symposium Alcohol level reduction in wine – Oenoviti International Network. – 2013. – P. 78-86.
4. Consumer attitudes to low alcohol wine: an Australian sample / A. Saliba et al. // In: Wine and Viticulture Journal. – 2013. – P. 58-61.

Таран Н. Г., Солдатенко Е. В., Васюкович С. С., Солдатенко О. В.

Производственное тестирование и внедрение усовершенствованной технологии корректирования содержания спирта в винах методом вакуумной перегонки

Детальное изучение существующих технологий производства вин с пониженным содержанием спирта показало, что процесс снижения спиртуозности приводит к значительным потерям ароматических веществ, что оказывает отрицательное влияние на качество вин. В статье представлена усовершенствованная схема снижения содержания спирта методом вакуумной перегонки, которая была внедрена и прошла тестирование в производственных условиях на винодельческом предприятии «Nectar S».

Ключевые слова: белое вино, красное вино, снижение содержания спирта, качество, технология.

УДК 663.256.1

Н. Г. Таран, *д-р хаб. техн. наук, проф.,*
Е. В. Солдатенко, *д-р хаб. техн. наук, доцент,*
О. П. Христева, *асп.,*
С. С. Васюкович, *д-р техн. наук*
Публичное Учреждение ”Научно-Практический Институт Садоводства, Виноградарства и Пищевых Технологий”,
Республика Молдова

ВЛИЯНИЕ РАЗЛИЧНЫХ ТЕХНОЛОГИЧЕСКИХ СХЕМ ПРИГОТОВЛЕНИЯ ВИНОМАТЕРИАЛОВ НА ФИЗИКО-ХИМИЧЕСКИЕ ПОКАЗАТЕЛИ И СТАБИЛЬНОСТЬ БЕЛЫХ СУХИХ ВИН

В статье рассматриваются исследования по изучению влияния различных технологических схем приготовления виноматериалов на физико-химические показатели, а также стабильность белых сухих вин Шардоне, приготовленных в сезон виноделия 2015 года.

***Ключевые слова*:** ферменты, дрожжи, бентонит, дубовые чипсы, фенольные вещества, белковые вещества, танин, галловый танин, мутность, белое вино.