PECULIARITIES OF AROMATIC COMPOSITION OF WINES MADE FROM WHITE VARIETIES OF MOLDOVIAN SELECTION LEGENDA AND RITON

PARTICULARITĂȚILE COMPOZIȚIEI AROMATICE ALE VINURILOR OBȚINUTE DIN SOIURILE ALBE DE SELECȚIE MOLDOVENEASCĂ LEGENDA ŞI RITON

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Abstract. *An important role in the formation of white wines quality it has aroma compounds. In this context, white wines produced from Moldavian selection varieties Legenda and Riton have been submitted to research on aromatic composition. The determination of aromatic compounds was performed on the gas chromatograph coupled with mass spectrometer Clarus 600T. Research has proved that Legenda and Riton wine are distinguished by the structure of aromatic compounds. Thus, the proportion of higher alcohols in wine from the Legenda variety is about two times higher compared to wine produced from Riton variety. Also in the Legenda wine terpenic compounds share is lower than the Riton variety. Characteristic to aromatic complex of Riton wine is the large share of lactones in comparison with Legenda wine (over 1.000% and respectively 0.219%) and of furans (0,366% and 0.138%). The share of odorant oxides in the Riton wine is 0.107% and pyrans 0.034%, while in the Legenda wine respective compounds were not identified.*
Key words: *wine, aromatic complex, higher alcohols, terpenic compounds, lactones, furans, odorant oxides, pyrans.*

Rezumat. *Un rol important la formarea calității vinurilor albe îl au compuşii de aroma. În acest context au fost supuse cercetărilor referitor la compoziția aromatică vinurile albe obținute din soiurile de selecție moldovenească Legenda şi Riton. Determinarea compuşilor aromatici s-a realizat la cromatograful de gaze cuplat cu spectrometru de masă Clarus 600T. Cercetările au demonstrat că vinurile Legenda şi Riton se disting prin structura compuşilor de aromă. Astfel, ponderea procentuală a alcoolilor superiori în vinul obținut din soiul Legenda este de circa două ori mai mare în raport cu vinul produs din soiul Riton. Totodată în vinul Legenda ponderea compuşilor terpenici este mai mică față de soiul Riton. Caracteristic pentru complexul aromatic al vinului Riton este ponderea mare a lactonelor în raport cu vinul Legenda (peste 1,000% şi respectiv 0,219%) şi a furanilor (0,366 şi 0,138%). Ponderea oxizilor odoranți în vinul Riton constituie 0,107% şi a piranilor 0,034%, atunci cînd în vinul Legenda compuşii respectivi nu au fost identificați*
Cuvinte cheie: *vin, complex aromatic, alcooli superiori, compuşi terpenici, lactone, furani, oxizi odoranți, pirani.*

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INTRODUCTION

Besides the non-volatile compounds that mainly influence the taste of white dry wines, an important role in formation of their quality is owed to aromatic complex. Recent studies concerning consumer preferences for quality of wines proved that the aroma is considered an important attribute which is taken into consideration when purchasing (Lamberchts and Pretorius, 2000). Therefore, the wines with intense aroma, such as: Muscat, Traminer, Busuioacă etc have lately become very popular among consumers.

As noted Bartowsky et al. (2004) the wine aroma represents a harmonious blend of several chemicals of different nature and origin. Among the wine compounds, the aromatic substances have been more studied. It worths mentioning the fundamental works of Cordonnier R. and Bayonovo C. (1981), Dubois (1994), Rapp (1994), Delcroix et al. (1994), Bayonove et al. (1984).

In Romania, the researches related to the development of certain aroma constituents during grapes ripening and wine elaboration were committed by Heroiu et al. (1994).

Extensive reviews concerning aromatic compounds of the wines obtained from noble varieties are presented in the works: "*Tratat de oenologie*", vol. I by Cotea, 1985; "*Chimia şi analiza vinului*" by Ţârdea, 2007; "*Tratat de oenochimie*" by. Cotea et al., vol. I, II, 2009; french monograph "*Le vin. Composition et transformation chimiques*" by Taillandier and Bonne, 2005, as well as in the monograph "*Oenologie. Chimia şi analiza senzorială*" by Antoce Oana Arina et al., 2007.

In the Republic of Moldova, the Sherry-type wines were submitted to fundamental researches related to aroma composition, the works being performed in the 80's of last century at the Institute of Technologies and Engineering SPA "Ialoveni".

Through gas chromatographic method there were identified 34 volatile compounds – aroma constituents of Sherry-type wines. The obtained results were used to determine regression equations concerning the correlation of volatile compounds with the quality of Sherry-type wines.

Once the improvement of the analytical equipment and especially with the advent of mass spectrometers was essentially increased the number of odorous compounds detected in wine aroma.

According to Cotea et al. (2009), odorous compounds mean those components of the grapes, must and wine that excite the sense of smell, as volatile substances or after their formation from bound forms.

So far there have been discovered over 500 odorant substances which individually or in association within a large and complex variety of blends, can give 10.000 odor variations to wine relatively to a maximum of five taste sensations (sweet, bitter, salty, sour, alkaline) formed by other components of the wine.

It should be mentioned that the wines submitted for research on aroma composition were obtained from mainly European varieties and especially those that are distinguished by accentuated aromas.

To this end, it presents interest the research of aromatic substances in white wines produced from local varieties of new selection Riton and Legenda.

MATERIAL AND METHOD

As objects of research were used wine samples obtained from white varieties Legenda and Riton of harvest year 2010. The grapes of concerned varieties were processed under microvinification conditions with pomace maceration for 8 hours for Legenda and 10 hours for Riton.

The extraction of wine aromatic compounds was achieved by passing it through a DIAPAK type cartridge with the adsorption layer composed of hydrophobic polystyrene of high quality, which was subsequently activated with methyl chloride. The elution of aromatic substance was carried out with a mixture of ethyl acetate and methyl chloride in a ratio of 1:1 (by volume).

The analysis of the concentrated eluent in the air stream up to 0.5 mL was carried out on the gas chromatograph with a PE – WAX RETR column (having a length of 50 meters and an internal diameter of 0.32 mm) and coupled with the mass spectrometer Clarus 600T. The analysis conditions were the following: the carrier gas – helium, evaporator temperature 220 °C, column temperature 75 °C (0 min) – heating with 4 °C/min up to a final temperature of 225 °C. The total duration of the analysis was 60 min. The identification of the separated chromatographic peaks was performed according to the general library of NIST mass spectrometer and to the published data about the fragmentation of individual compounds.

The percentage share of detected compounds was achieved by calculating the peak area of that substance against the sum of all the compounds of the eluent. A compound peak area is directly proportional to its concentration in the aromatic extract.

RESULTS AND DISCUSSIONS

The researches have proved that the aromatic composition of the investigated wines is quite complex due to detection of a large number of chemical compounds classes: alcohols, organic acids, esters, terpenic compounds, aldehydes, ketones, lactones, furans, odorant oxides, volatile phenols, pyrans, etc. It was also found that the percentage share of aromatic compounds classes is different according to grape variety.

Figure 1 presents the percentage share of volatile compounds classes obtained as a result of summing the share of each compound from the respective category, detected in the aromatic extract of Legenda wine.

Typically for Legenda wine aroma is the large share of higher alcohols that is over 63%, as well as organic acids – 14.62%. Relatively to other categories of volatile compounds, researches have proved a low rate in the varietal aroma structure of some of them. Thereby, in comparison with the Riton variety, the share of esters is only 6.7%, terpenic compounds 0.147%, lactones 0.218%, aldehydes 0.021% and furans 0.138%.

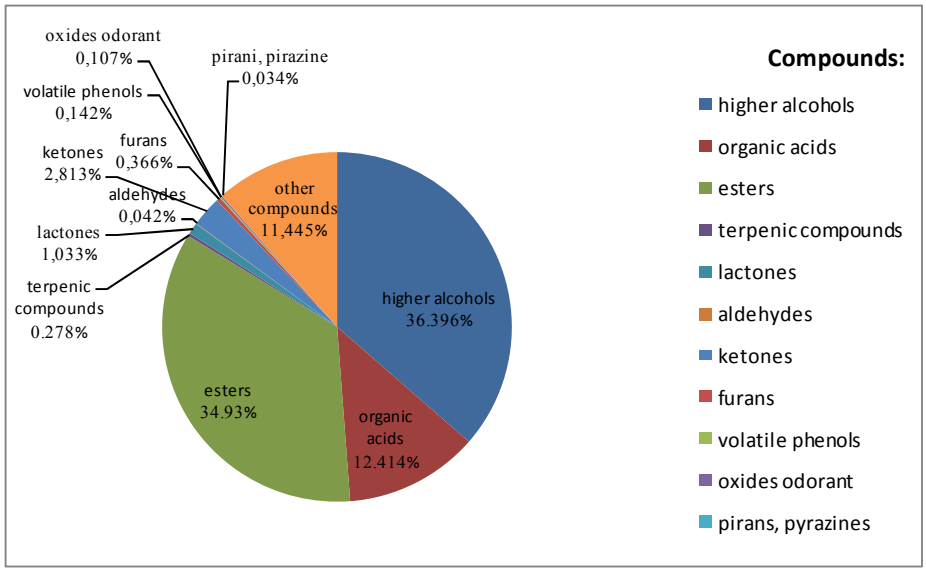

Fig. 1 - Percentage share of compound classes determined in the aromatic extract of Legenda wine.

In the structure of aromatic compounds of Legenda wine have not been identified odorant oxides, pyrans and pyrazines, and the share of sulfur compunds and volatile phenols is the lowest in comparison with Riton wine – 0.010% and respectively – 0.038%.

Between the investigated wines, the Riton sample is characterized by a very specific aroma composition structure (fig. 2.). This is reflected through the fact that in the aromatic structure is highlighted the lowest share of higher alcohols and organic acids of 36.396% and respectively 12.414%, and also the higher share of esters of approximately 35%.

It should be mentioned that higher alcohols and esters in the aroma structure of Riton wine is 1:1, while in the Legenda wine is about 9:1.

In the composition of the aromatic extract of this wine it has been detected a large amount of terpenic compounds and their summary share is 0.271%, that is almost two times more in comparison with Legenda wine.

To be noted that in the aromatic structure of the Riton wine lactones are about 1.0% and this is the highest value among the investigated wines.

Also, worth noting that in the structure of this wine, as opposed to the other samples, it was detected the presence of a large amount of furans with a summary share of 0,366 %, of odorant oxides – 0.107% and also pyrans and pyrazines – 0.039 %.

At the same time, in the composition of the aromatic extract of the wine were not identified sulfur compounds and the volatile phenols share is 0.142%.

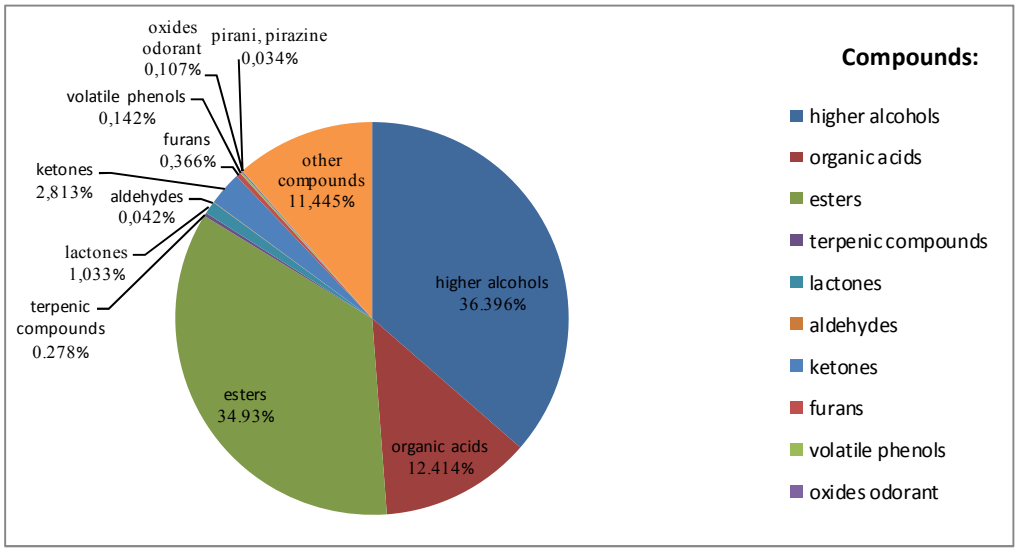

Fig. 2 - Percentage share of compound classes determined in the aromatic extract of Riton wine.

CONCLUSIONS

As a result of research it was found that white dry wines obtained from Moldavian selection varieties, Legenda and Riton, are distinguished by the aromatic compounds structure. The aroma of Legenda wine is dominated by higher alcohols, whose share represents more than 63%, by volatile acids - about 15% and ketones - 2.75%. The share of esters is much lower in comparison with Riton wine, likewise lactones, aldehydes, furans and volatile phenols.

In the structure of Riton wine aroma in equal measure prevail higher alcohols (over 36%) and esters (about 35%). Besides these categories in the concerned wine aroma is highlighted the presence of lactones, terpenic compounds, furans, odorant oxides, pyrans and pyrazines.

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