THE EVOLUTION OF THE MAIN PHYSICO-CHEMICAL PARAMETERS IN *FETEASCĂ NEAGRĂ* WINE AFTER TREATMENT THE WINE WITH AZAHETEROCYCLES COMPOUNDS

EVOLUŢIA PRINCIPALILOR PARAMETRII FIZICO-CHIMICI DIN VINUL DE *FETEASCĂ NEAGRĂ* ÎN URMA TRATĂRII VINULUI CU COMPUŞI CU STRUCTURĂ AZAHETEROCICLICĂ

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Abstract. *The present study describes the evolution of the main phisico-chemical parameters from Fetească neagră wine after treatment with azaheterocycles compounds. The physical and chemical analysis emphasizes the wine peculiarities. In our work were analyzed: free SO2 and total SO2, volatile acidity, total acidity, density, alcoholic concentration, remanent sugars, pH. For each parameter the study was performed according to the methods and regulations of the International Organization of Vine and Wine (OIV).*
Key words: physical-chemical parameters, Fetească neagră, wine treatment with azaheterocycles compounds.

Rezumat. *Studiul de faţă descrie evoluţia principalilor parametrii fizico-chimici din vinul de Fetească neagră după tratarea vinului cu compuşi azaheterociclici. Analiza fizică şi chimică a principalilor parametrii din vin este necesară deoarece evidenţiază particularităţile vinului. În lucrare au fost analizaţi următori parametrii: SO2 liber şi SO2 total, aciditatea volatilă, aciditatea totală, densitatea, concentraţia alcoolică, zaharuri reducătoare, pH-ul. Determinările au fost efectuate în conformitate cu metodele şi reglementările Organizaţiei Internaţionale a Viei şi Vinului (OIV).*
Cuvinte cheie: parametrii fizico-chimici din vin, Fetească neagră, tratara vinului cu compuşi cu structură azaheterociclică.

INTRODUCTION

Wine is a natural product and is one of the most widely consumed beverages (Zoecklein *et al.*, 1994). It is made from the fermentation of sugars contained in grapes or grape juice, using yeast. As the end product, the wine contains a number of highly assimilable compounds such as sugars, alcohol, glycerin, organic acids, tannins, esters, aldehydes, proteins, amino acids, vitamins,

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minerals (Cotea *et al*., 2009) The physical chemical parameters of wines offer a real presentation of the wine.

The aim of this work is to perform a thorough study concerning activity of pyridazine derivatives (azaheterocycles compounds) in treatment of wine. because pyridazine derivatives, extensively investigated, posses different biological activities: anticancer, antituberculosis, antimicrobial, antihypertensive, platelent aggregation inhibitor etc (Mangalagiu, 2011; Rodrguez-Ciria *et al.,* 2003).

MATERIAL AND METHOD

The impact of the tested compounds during the treatment was studied on sample of wines obtained from *Fetească neagră* grape varieties, harvested in 2014.The grape juice obtained was subjected to a maceration–fermentation process at temperature of 10-12˚C, for 7 days. In the next step, the marc was pressed and the wines obtained were transferred in fermentation tanks for the completing of alcoholic and malolactic fermentation.

The pyridazine derivatives used in wine treatments, fig. 1 were obtained by organic synthesis and then purification.

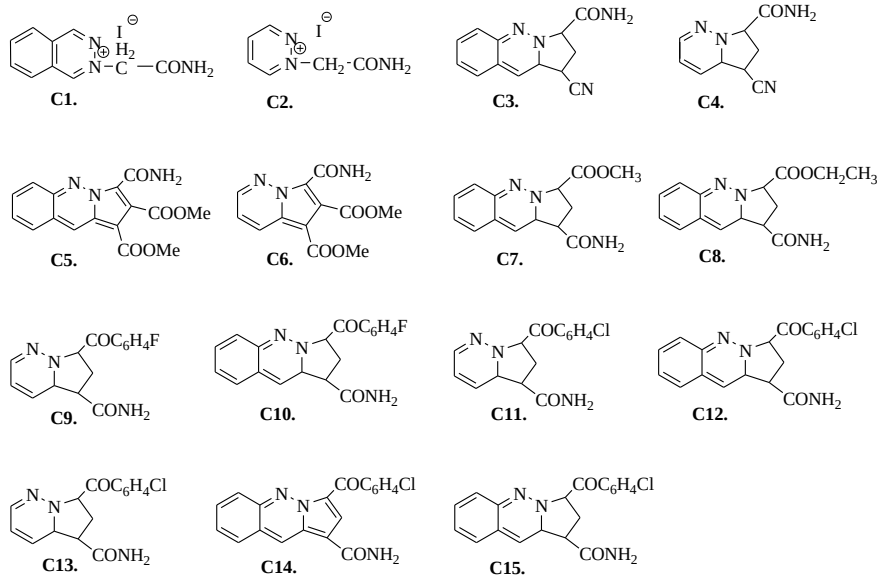

Fig. 1 The structure of pyridazine derivatives used in wine treatment

In preliminary communications (Butnariu *et al*, 2009; Tucaliuc *et al*, 2013; Zbancioc *et al,* 2010) are presented the synthesis and spectral analysis of pyridazine derivatives.

For the impact of the tested compounds, the wine samples (0.5 L) have been treated with 0.1 g from each tested products, according to the methods and regulations of the *International Organization of Vine and Wine* and specific literature. After 12 hours, the used compounds were recovered by filtering and their impact during the treatment was determined by physical chemical analysis (alcohol, relative density, extract, sugar-free extract, reducing sugar, total acid, volatile acid, total SO_2) using specific

reagents and equipments**.** The results were compared to the values of the control sample and demonstrated the wine quality before and after treatment.

The experiments were done at the Oenological Research Centre of the Romanian Academy, Iaşi branch and at the Oenology Laboratory of the University of Agricultural Sciences and Veterinary Medicine "Ion Ionescu de la Brad" Iaşi.

The use of the additive sulfur dioxide (SO_2) is an almost universally accepted winemaking practice. The most important mechanism of action for sulfur dioxide is as an anti-microbial agent. It regulates the growth of harmful yeast and bacterial growth in the wine. Another important role of sulfur dioxide lies in its anti-oxidant properties. This guards against browning and protects the fruit-like qualities of the wine.

Acids are very important structural components of wine: if a wine is too low in acid, it tastes flat and dull and if a wine is too high in acid, it tastes too tart and sour.

The majority of these acids are produced naturally by the vines, but their relative levels are adjusted based on a multitude of factors. One of them is the alcohol content, which is an indication of the sugar in wine. Alcohol by volume is a standard measure of how much alcohol is contained in an alcoholic beverage. Sugar is converted to alcohol by fermentation; thus the sugars present and their relative concentrations in the grapes are important for the overall character of the wine's chemistry.

Reducing substances comprise all the sugars exhibiting ketonic and aldehydic functions and are determined by their reducing action on an alkaline solution of a copper salt.

In the context of fermenting alcoholic beverages, the specific gravity, or relative density is compared to water, and is an important parameter which gives us a first indication on wine authenticity and quality.

Dry extract refers to the solid part of the wine - the powdery stuff that would be left if you removed all the water and alcohol from a wine (presumably, after playing with a centrifuge).

RESULTS AND DISCUSSIONS

The main physical chemical parameters of *Feteasc*ă *neagr*ă wine, before and after treatment, are present in table 1. Each parameter varied in normal limits.

Table 1

Principal compositional characteristics of analysed wines

Sample	Total SO_2 (mg/L)	Volatile acidity (g/L)	Total Acidity (g/L)	Alco-holic conc. (%)	Relative density (20^0C)	Reductive sugars (g/L)	Nonreductive extract (g/L)	Total extract (g/L)
F.R.	56.14	0.35	7.46	10.66	0.994	8.36	11.34	16.92
F.R.+C_1	56.14	0.36	7.49	10.65	0.994	8.36	11.32	16.92
F.R.+C_2	56.15	0.36	7.48	10.66	0.995	8.34	11.33	16.91
F.R.+C_3	56.15	0.37	7.49	10.66	0.995	8.35	11.33	16.91
F.R.+C_4	56.14	0.36	7.48	10.67	0.996	8.35	11.34	19.92
F.R.+C_5	56.14	0.37	7.49	10.67	0.994	8.34	11.32	16.90
F.R.+C_6	56.15	0.37	7.48	10.65	0.995	8.36	11.33	16.91
F.R.+C_7	56.15	0.38	7.50	10.67	0.994	8.36	11.32	16.92
F.R.+C_8	56.14	0.36	7.48	10.67	0.996	8.35	11.34	16.90

F.R.+C_9	56.15	0.37	7.49	10.65	0.996	8.34	11.33	19.91
F.R.+C_{10}	56.13	0.38	7.50	10.66	0.995	8.34	11.34	19.90
F.R.+C_{11}	56.15	0.38	7.50	10.65	0.995	8.35	11.32	16.90
F.R.+C_{12}	56.14	0.36	7.48	10.67	0.995	8.36	11.32	16.92
F.R.+C_{13}	56.15	0.35	7.49	10.67	0.994	8.35	11.34	16.91
F.R.+C_{14}	56.15	0.36	7.49	10.65	0.996	8.35	11.33	16.92
F.R.+C_{15}	56.13	0.36	7.49	10.66	0.994	8.36	11.34	16.92

F. R. = wine from Retească neagră (control sample)
F.R. + C_1 = wine from Retească neagră treat with compound 1

The comparative analysis of the obtained data, for the physical chemical parameters, leads to the conclusions:

- the initial values for the physical chemical parameters of *Fetească neagră* wine are within normal parameters

- the values obtained after treatment did not exceed normal limits allowed and were typical for *Fetească neagră* wine.

CONCLUSIONS

The wines data are important because is revealing information about wine quality.

In conclusion, a study concerning activity of some pyridazine derivatives in wine is reported. The comparative analysis of the obtained data leads to the conclusion that the tested derivatives not change the main parameters of *Fetească neagră* wine .

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