

# STUDIES CONCERNING THE INFLUENCE OF OENOLOGICAL TANNINS ON OXIDASIC STABILITY OF FRANCUȘA WINE FROM COTNARI VINEYARD

## STUDIUL PRIVIND INFLUENȚA UNOR TANINURI OENOLOGICE ASUPRA STABILITĂȚII OXIDAZICE LA VINUL FRÂNCUȘĂ DE COTNARI

**GHERGHINĂ Nicoleta<sup>2</sup>, COTEA V.V.<sup>2</sup>,  
SIMIONESCU Mihaela<sup>1</sup>, VIZITEU G.A.<sup>1</sup>**

<sup>1</sup>S.C. Cotnari S.A, Romania

<sup>2</sup>University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

**Abstract.** *The importance of protecting the wine during its making and aging against unwanted micro-flora and CO<sub>2</sub> excess has lead winemakers to using antiseptics and antioxidants. The first one and most well-known is sulphur dioxide. Presently, a growing number of scientists raise awareness on the possible danger a high consumption of sulphur dioxide may bring. This study aims at reducing the quantity of sulphur dioxide used by utilizing instead oenological tannins. The products were: Protan pépin, Noxitan, Tanethyl, Ellagitane, Gallovin and Taniblanc. The best results were obtained when applying Noxitan which lead to a growth of antiseptic efficacy of SO<sub>2</sub> and a reduction in quantity of about 20%.*

**Key words:** wine stability, tannins, Frâncușă.

**Rezumat.** *Necesitatea protejării vinului în timpul elaborării și maturării sale împotriva microflorei nedorite cât și a excesului de oxigen, a condus la utilizarea primelor materiale oenologice cunoscute astăzi sub numele de antiseptici și antioxidanți. Cel mai vechi și mai utilizat este dioxidul de sulf. Un număr tot mai mare de igienişti atrag atenția asupra pericolului pe care îl poate reprezenta pentru sănătatea consumatorilor conținutul ridicat de SO<sub>2</sub>. [1,4]. Prezentul studiu urmărește reducerea cantității de SO<sub>2</sub> prin folosirea unor taninuri oenologice. Produsele folosite au fost: Protan pépin, Noxitan, Tanethyl, Ellagitane, Gallovin și Taniblanc. Cele mai bune rezultate s-au obținut în urma utilizării produsului Noxitan care a dus la creșterea eficacității antiseptice a SO<sub>2</sub> și reducerea dozei acestuia cu cca 20%.*

**Cuvinte cheie:** stabilitatea vinului, taninuri, Frâncușă

### INTRODUCTION

Must and wine are perishable products. For a better preservation, antiseptics must be used as authorized additives. Due to its qualities, sulphur dioxide imposed itself on the market, becoming a general and constant product in wine conservation.

Although it is widely used, scientists say that sulphur dioxide may have a harmful effect on the human body. This is why new products are developed in order to minimize the quantities of sulphur dioxide.

The present study accentuates the effect oenological tannins have on Frâncușă wine from Cotnari when using smaller SO<sub>2</sub> dosage.

The composition characteristics (relative density, pH, total acidity, total polyphenolic index) of the wine have been analysed as well. Oenological tannins can be found as:

- condensed catehinic tannins, extracted from grape seeds (oenotannins);
- elagotannins and hydrolysable gallotannins, mainly extracted from oak and chestnut tree bark.

## MATERIAL AND METHOD

The grapes were harvested in September 2008, with 195 g/L sugars and 9,25 g/L C<sub>4</sub>H<sub>6</sub>O<sub>6</sub>. Frîncușă de Cotnari wine was obtained by the classical technology for white wines.

The control sample (Frâncușă) had the following parameters (table 1):

Table 1

Main quality indexes of control sample

Control sample	Free SO <sub>2</sub> mg/L	Combined SO <sub>2</sub> mg/L	Total SO <sub>2</sub> mg/L	pH	Total acidity g/L	TPI	Relative density
Frâncușă de Cotnari	10,63	90,32	100,9	3,5	7,43	6,6	0,9923

The following oenological tannins were added: Protan Pépin (P<sub>1</sub>, P<sub>2</sub>), Noxitan (N<sub>1</sub>, N<sub>2</sub>), Ellagitane (E<sub>1</sub>, E<sub>2</sub>), Gallovin (G<sub>1</sub>, G<sub>2</sub>, G<sub>3</sub>), Tanethyl (T<sub>1</sub>, T<sub>2</sub>), and Taniblanc (T<sub>3</sub>, T<sub>4</sub>).

Protan Pépin is a proanthocyanidolic tannin extracted from white grape seeds, without any other additives. It is granulated and it is perfectly soluble in wine. Doses of 2g/hL and 20g/hL were used.

Noxitan is an oenological product obtained in accordance with the EU regulations, composed from potassium metabisulfite and ellagic tannins. Doses of 7 g/hL and 10 g/hL were used.

Ellagitane is a yellowish-brown powdered ellagic tannin. It was obtained according to the EU regulations and does not come from genetically modified organisms. Doses of 5 g/hL and 20 g/hL were used.

Gallovin is extracted from the galls of *Robinia pseudoacacia*. Doses of 5 g/hL, 20 g/hL, and 30 g/hL were used.

Tanethyl is extracted from white grape seeds and corresponds to the requirements of the Codex. The used doses were: 2,5 g/hL and 5 g/hL.

Taniblanc is a special tannic acid, pinkish-brown in color, extracted from South-American wood, grinded and extracted in hot water at 100 °C and then dried by atomizing. It was used in doses of 5 g/hL and 20 g/hL.

A few days after the treatment, Frâncușă wine was analysed according to the international standards and to the specialized literature: free SO<sub>2</sub>, combined SO<sub>2</sub>, total SO<sub>2</sub>, pH, total acidity, TPI, relative density [5,6].

The analyses were done in the Laboratory of Oenology of the Agricultural University in Iasi and in the laboratory of Cotnari.

## RESULTS AND DISCUSSIONS

The data in table 2 was obtained after the analyses were done.

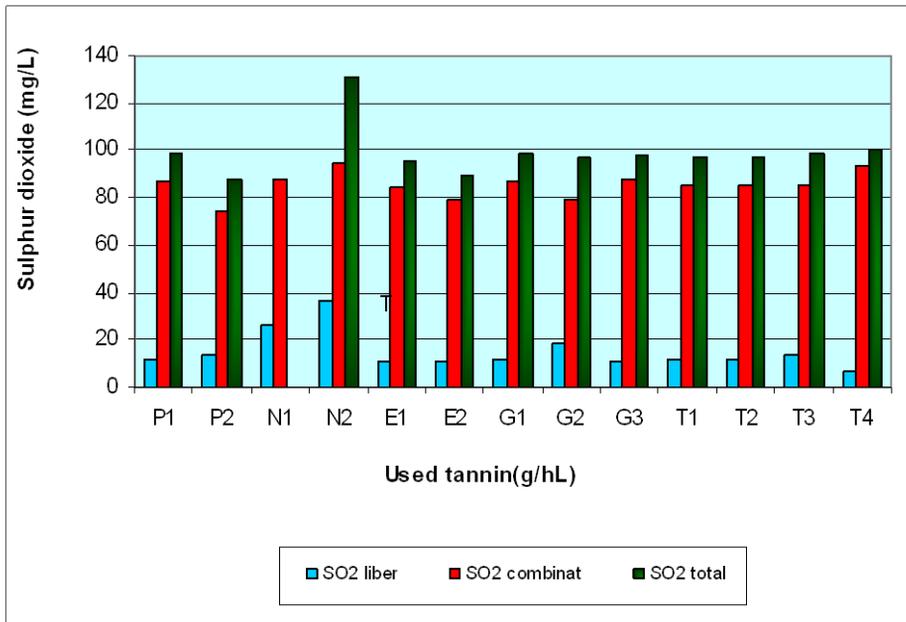
*Table 2*

**Physical-chemical parameters of analysed wine samples**

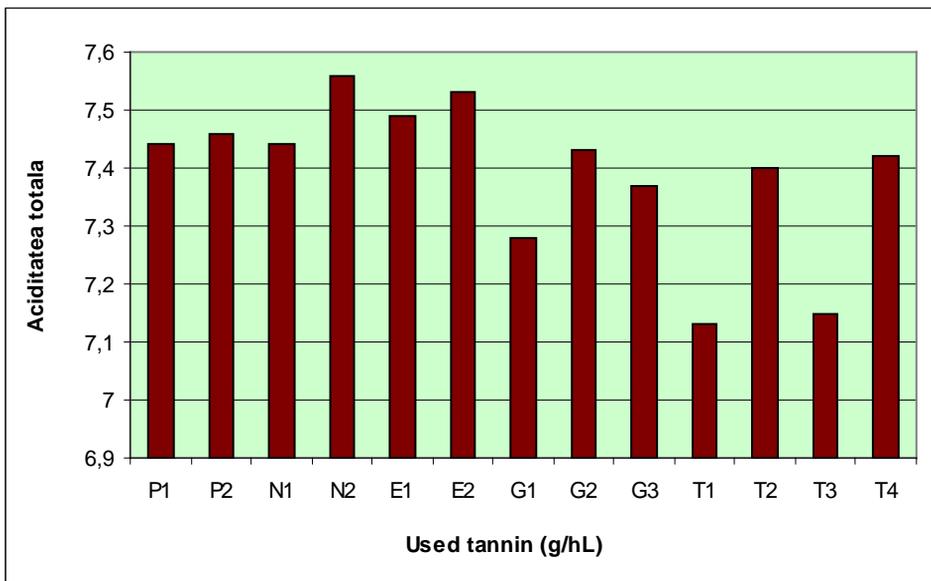
Used tannin	Doses g/hL	Free SO <sub>2</sub> mg/	Combined SO <sub>2</sub> mg/L	Total SO <sub>2</sub> mg/L	pH	Total acidity g/L	TPI	Relative density
P <sub>1</sub>	2	12,62	86,53	99,20	3,55	7,44	6,5	0,9923
P <sub>2</sub>	20	13,60	74,38	87,98	3,50	7,46	11,0	0,9924
N <sub>1</sub>	7	26,0	88,04	114,04	3,53	7,44	5,8	0,9924
N <sub>2</sub>	10	36,4	94,5	130,9	3,55	7,56	5,9	0,9924
E <sub>1</sub>	5	10,6	84,63	95,23	3,55	7,49	7,1	0,9924
E <sub>2</sub>	20	10,6	78,93	89,53	3,55	7,53	10,0	0,9924
G <sub>1</sub>	5	12,14	86,94	99,08	3,54	7,28	7,5	0,9923
G <sub>2</sub>	20	18,22	78,94	97,16	3,55	7,43	13,4	0,9924
G <sub>3</sub>	30	10,63	87,5	98,2	3,55	7,37	18,6	0,9925
T <sub>1</sub>	2,5	11,5	85,33	96,83	3,54	7,13	6,4	0,9923
T <sub>2</sub>	5	11,5	85,33	96,83	3,55	7,40	6,8	0,9923
T <sub>3</sub>	5	13,1	85,33	98,43	3,54	7,15	7,1	0,9924
T <sub>4</sub>	20	6,5	93,5	100,0	3,54	7,42	9,9	0,9924

The highest influence of the tannins was observed on the free, combined and total SO<sub>2</sub> level (figure 1). Free (active) SO<sub>2</sub> is the one that gives an antioxidant protection to the wine. After the tannins' treatment, changes in the SO<sub>2</sub> content were registered in comparison to the control sample. The noted values are between 6,5 mg/L (T<sub>4</sub> wine sample) and 36,4 mg/L (N<sub>2</sub> wine sample). Combined (bonded) SO<sub>2</sub> represents the fraction that combines with different substances from the wine. These values also were modified, just like the free SO<sub>2</sub>. Total SO<sub>2</sub>, which is obtained by summing the free and combined SO<sub>2</sub> registers values of 87,98 mg/L and 114,04 mg/L.

The used tannins did not have a significant influence on the pH or on the total acidity (figure 2). The lowest value of the total acidity (7,13 g/L) was found in the wine sample in which Tanethyl (2,5 g/hL) was added, while the biggest one (7,56 g/L) in the wine sample in which Noxitan (10 g/hL) was used.

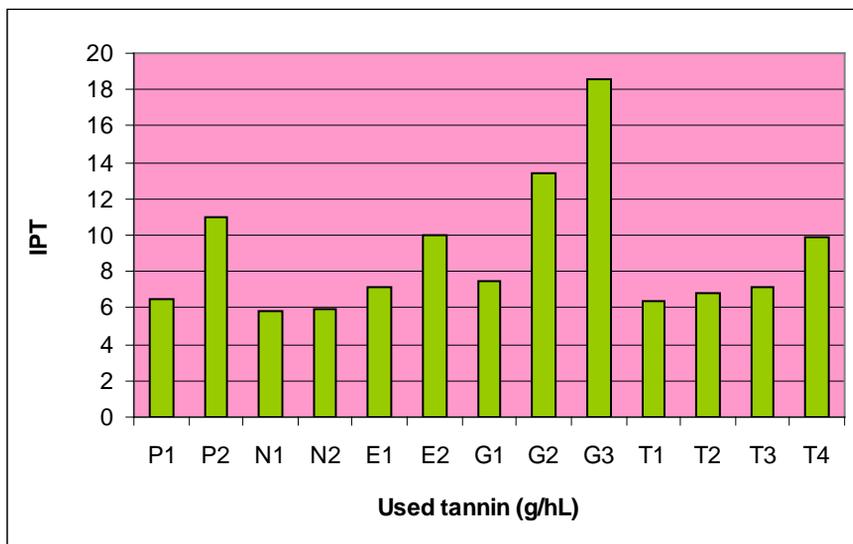


**Fig.1.** Tannins influence on SO<sub>2</sub> content in Frâncușă de Cotnari



**Fig. 2.** Oenological tannins influence on total acidity of Frâncușă de Cotnari

Another analysed parameter was the total polyphenolic index (TPI). The polyphenols in wine are represented by tannins, flavons and anthocyanins. The TPI values were registered between 5,8 (N<sub>1</sub> wine sample) and 18,6 (G<sub>3</sub> wine sample). The best result (18,6) was obtained in the 30 g/hL Gallovin treated sample (figure 3).



**Fig.3.** Oenological tannins influence on total phenolic index of Frâncușă de Cotnari

## CONCLUSIONS

Oenological tannins helped to increase the antiseptic and antioxidant effect of free, combined and total SO<sub>2</sub> from Frâncușă de Cotnari. This is extremely important as, in this way, the quantity of added SO<sub>2</sub> can be lowered.

The best results were obtained when using Noxitan, which reduces oxidative phenomena and assures a better preservation of sensorial characteristics, banishing at the same time, the formation of unwanted sulphurous compounds.

The oenological products that were used in this study had a certain noticeable influence on the other wine parameters, as pH, total acidity and TPI.

Although oenological tannins have a positive influence on Frâncușă de Cotnari wine, SO<sub>2</sub> cannot be totally dropped in wine-making.

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