

STUDY ON REDUCING THE CALCIUM CONCENTRATION IN WHITE WINES

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Abstract: The article presents results of research on the comparative study of the reduction of calcium content of white dry wine material treated Aligote, harvest in 2008 by chemical methods. Data are presented for carrying out the process at different temperatures and the process. Reduction was performed with use of calcium preparations "Decalcic" and "Crystal-ex". Proved that temperature of 18-22°C reduction of calcium content about 25 mg/dm³ occurs within 12 days of preparation “Decalcic” and the “Crystal-ex” - within 30 days. To decrease the calcium content of 50 mg/dm³ at the same temperature better use of preparation “Crystal-ex”. Spending process at a temperature of minus 3° C allows reducing the duration of treatment up to 2-3 days.

Keywords: chemical reduction, preparations “Decalcic” and “Crystal-ex”, temperature, process.

With prolongation of the warranty period the wine storage need to a more thorough study of their composition in order to achieve long-term stability against physical and chemical haze.

Often wines that passed the complete cycle of technological treatments on the conclusion of the laboratory and determined to be stable to all kinds of haze, do not maintain the warranty period - they appear fine crystalline precipitate is not always accompanied by the opalescence. After filtration and subsequent testing the wines are resistant to all kinds of haze. Most susceptible to the formation of such sediments are young white wines.

The reason for the formation of precipitation in bottled wines are often to be found in excessive amounts of calcium and its compounds with organic acids of wine.

According to the literature it is known that the real danger of calcium haze exists for mass content of calcium in wine 80 - 100 mg/dm³ [1,2,3], according to other sources - more than 40 mg/dm³ [4, 5].

According to C. Țîrdea [6] calcium causes physical - chemical haze of wine, forming in the cold season (winter) crystals of calcium tartrate, and in warm weather (summer) - crystals of the calcium salt of malic acid. In wines with a pH over 3.3 its possible the formation of the precipitate of calcium tartrate, while at a pH of less than 3.2 the occurrence of these sediments is less likely. [7]

The deposition rate of calcium tartrate for cold treatment is very low, the balance can be achieved in a few months. Consequently, the cold treatment is ineffective against the opacities associated with the precipitation of calcium tartrate and stabilization of these wines can only be achieved by removing excess calcium from wine.

Widespread in Italy has received decalcification wines with racemic tartaric acid (DL - tartaric acid), [8]. Also known to remove excess calcium from the wine using the drug "Decalcic" (oxalate Amon 1 - aq), [9].

The purpose of this study was a comparative evaluation of removing excess calcium from the wine by chemical means using drugs "Decalcic» and «Cristal-ex» (DL - tartaric acid).

Materials and methods.

We studied processed natural dry white wine material Aligote 2008 harvest, which is defined as vulnerable to a clouding of the crystalline calcium to calcium tartrate saturation temperature on the device "IziKristaTest" (firm ERBSLÖH). Mass concentration of calcium was determined permanganometric method [10], other indicators - under existing procedures.

For the deposition of excess calcium used the drug firms "ERBSLÖH" – "Cristal-Ex" and the drug "Decalcic". Reducing the mass concentration of calcium was performed on 25mg/dm^3 50mg/dm^3 and at different temperatures and duration of treatments.

Results and discussion.

The studies found that the natural dry white processed wine material Aligoté contains calcium 92 mg/dm^3 , the pH is 3.28, the concentration of total soluble solids - 871 mg/dm^3 and conductivity - $1727\text{ }\mu\text{S/cm}$.

It should be noted that the treatment of drug "Decalcic" We recommend a wine stock for clarification by settling for a period of not less than 2 days, and the drug «Cristal-Ex" - not less than 14 days.

The results of research on removing excess calcium from dry wine material processed Aligote preparations "Decalcic » and «Cristal-Ex" at different temperatures and duration of treatment are given in the table. The data show that at lower calcium content rate of 25 dm^3 at $18 - 22\text{ }^\circ\text{C}$ removed 22 mg/dm^3 to 12 days using the drug "Decalcic" and 24 mg/dm^3 to 30 days preparation «Cristal-Ex" . This results in a reduction to the value of pH 3.15 and 3.13, the concentration of total soluble solids to 779 and 692 mg/dm^3 and electrical conductivity to 1547 and $1380\text{ }\mu\text{S/cm}$, respectively.

In case the amount of calcium the rate of 50 mg/dm^3 in temperature $18-22\text{ }^\circ\text{C}$ for 30 days actually removed 36 mg/dm^3 drug "Decalcic" and 50mg/dm^3 , mean estimated amount of calcium preparation «Cristal-Ex":

From the data table shows that the treatment of a temperature of minus $3\text{ }^\circ\text{C}$ helps to reduce the duration of the process of the removal of calcium up to 2-4 days. Thus, with a decrease in calcium content for 25 mg/dm^3 in the cold the desired effect is achieved by the preparation "Decalcic" for 2 days (23 mg/dm^3 calcium is removed), and the drug «Cristal-Ex" - up to 3 days (removed 26 mg/dm^3 calcium).

With an estimated reduction of calcium 50 mg/dm^3 for 3 days at a temperature of minus $3\text{ }^\circ\text{C}$ removed 52 mg/dm^3 drug «Cristal-Ex", while the drug "Decalcic" is removed only 36mg/dm^3 to 4 days.

Thus, during the treatment of the cold to remove calcium at 25 mg/dm^3 , both used the drug can reach it in 2 - 3 days, and when deleting large amounts of calcium (50 mg/dm^3) more effective is the drug «Cristal-Ex". The process of decalcification in the cold is accompanied by a natural decrease of the pH, total soluble solids and conductivity.

Table The results of research on removing excess calcium from dry white processed wine material Aligote

Treatment variant	Estimated reduction in the content of the calcium mg/dm ³	Processing time, day	The mass content of calcium after treatment mg/dm ³	Actual reduction in calcium content, mg/dm ³	Conductivity, $\mu\text{S}/\text{cm}$	Concentration of total soluble substance, mg/dm ³	pH
Temperature 18 – 22 °C							
Decalcic	25	2	83	9	1870	935	3,21
	25	6	81	11	1826	913	3,20
	25	12	70	22	1547	779	3,15
	50	4	76	16	1682	832	3,20
	50	12	60	32	1269	615	3,16
	50	16	58	34	1245	598	3,16
	50	30	56	36	1239	582	3,16
Cristal-ex	25	14	77	15	1656	829	3,15
	25	22	73	19	1516	758	3,13
	25	30	68	24	1380	692	3,13
	50	14	78	14	1814	907	3,15
	50	22	54	38	1573	774	3,13
	50	30	42	50	1341	642	3,10
Temperature minus 3 °C							
Decalcic	25	1	82	10	1826	914	3,20
	25	2	69	23	1529	767	3,15
	50	1	66	26	1452	726	3,20
	50	2	61	31	1344	684	3,20
	50	4	56	36	1311	656	3,15
Cristal-ex	25	1	88	4	1723	861	3,15
	25	2	78	14	1542	792	3,13
	25	3	66	26	1452	724	3,10
	50	1	74	18	1631	736	3,14
	50	2	55	37	1450	689	3,13
	50	3	40	52	1280	642	3,10

Conclusions

1. When removing excess calcium from dry white processed wine material Aligote for 25 mg/dm³ at 18 - 22 ° C is better to use the drug " Decalcic " that allows you to reach this goal for 12 days (the drug «Cristal-Ex" - for 30 days).
2. When removing large amounts of calcium (50 mg/dm³) for the same duration of the process (30 days) is more efficient to use the drug «Cristal-Ex."
3. Duration of the process to remove the excess calcium at minus 3 ° C can reduce the processing time of up to 2 - 3 days, and when you remove the excess calcium from the calculation (50 mg/dm³) rational use of the drug «Cristal-Ex."

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