

NEW HORIZONS **DEALCOHOLISATION**



**REGULATORY STANDARDS AND TECHNOLOGICAL SOLUTIONS
FOR THE PRODUCTION OF DEALCOHOLIZED WINES**

VASONGROUP

AURORAS®

ENLIGHTENING. OENOLOGY



DEALCOHOLISATION

Dealcoholised and partially dealcoholised wines represent an emerging category with great potential.

VASONGROUP

Vasongroup offers advanced solutions for the dealcoholisation process, using innovative mild technologies to achieve partial or total reduction of the alcohol content.

These technologies are meant to ensure that the dealcoholised wine retains the characteristics that make it unique, while minimising undesired modifications caused by the removal of ethanol. This approach is based on a combination of advanced enological techniques and the use of specific biotechnologies, able to optimize the process and guarantee high quality results.

BALANCE

Use Dealcoholisation to Reduce the alcohol content, without affecting colour, structure and aromatic profile.

FRESHNESS

Preserving wine aromas and tones with oenological products such as X-PRO® specific inactive yeasts.

STABILITY

Redox, protein, tartaric and microbiological stability with advanced technologies and selected biotechnologies.

JUCLAS
Advanced beverage systems



MASTERMIND® REMOVE

- + Preservation of the wine's integrity
- + Process carried out at ambient pressure and temperature
- + Energy and economic savings
- + Compact, user-friendly system, easy to use

Dealcoholisation technology at the service of new production requirements. MASTERMIND® REMOVE is an innovative membrane-based process for wine dealcoholisation, which allows the alcohol content to be reduced without affecting the original colour, structure, and aromatic profile.

Description

With MASTERMIND® REMOVE, it is possible to reduce the alcohol content in a wine without affecting its original colour, structure, and aromatic profile, following a patented process (nr. 0001387862). It is a gentle approach to wine, carried out at ambient pressure and temperature, through direct passage on membrane contactors, where

there is a hydrophobic interface that enables the passage of alcohol in gaseous form towards the extracting section.

MASTERMIND® REMOVE ensures hourly ethanol flow rates that depend on the processing temperature, the quantity of extraction solvent (water), and the surface area of the membrane used.

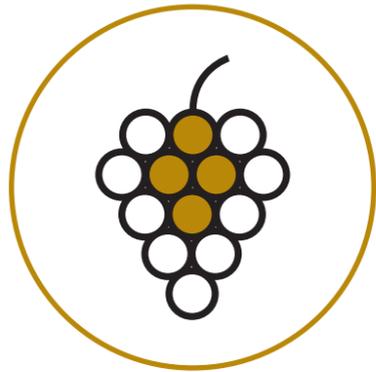
Manual Models

- MMR 10-20
- MMR 50-100
- MMR 200-300

Automatic Models

- MMR 50-100
- MMR 150-200
- MMR 200-300

THE WINE BASE IS CRUCIAL



For the process of partial or complete dealcoholisation, For partial or complete dealcoholisation, **the wine must be produced from healthy grapes in excellent condition.** The range of sensory experiences will differ compared to their non-alcoholic wine counterparts, as the reduction or absence of ethanol impacts its role as a carrier of volatile elements and as a solvent for aromatic components.

	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B
Isoamyl Acetate (µg/L)	166,4	152,3	72,4	70,2	100,3	94,2	349,6	304	622,2	613,4

Tab. 1-Variation of Isoamyl Acetate concentration (µg/L) with varying alcohol content in red wine samples before (sample A) and after treatment (sample B).

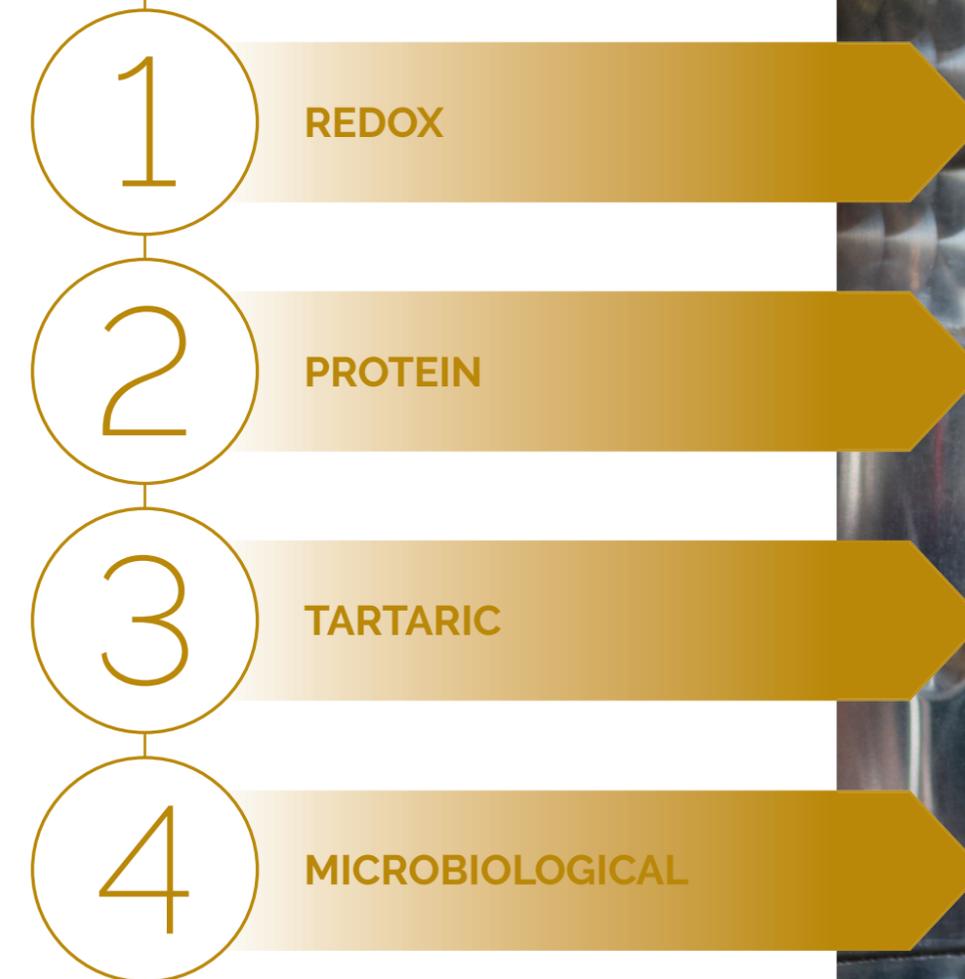


The concentration of isoamyl acetate changes little as the alcohol content varies, primarily thanks to its solubility in alcohol. This is mainly due to the fact that the contactor membrane technique is particularly gentle on aromatic compounds.

In fact, " in the pairs of wines shown in the table, it can be seen that sample A, which always corresponds to pre-treatment wines ranging from 12.5 to 14 % v/v, has slightly higher values than the corresponding sample B, which has alcoholic strengths close to 0 % v/v.

THE PILLARS OF WINE STABILITY

One of the main aspects of the dealcoholisation process involves wine stability.



Each aspect must be overseen and handled with accuracy to guarantee the completely or partially dealcoholised wine maintains its chemical-physical properties as well as its taste and scent profile.

1

REDOX STABILITY: oxidative stability control

Redox stability refers to the ability of the wine to resist oxidation, a phenomenon that can significantly alter the taste and colour of the product. During dealcoholisation, redox stability is even more critical, since **alcohol acts as a natural preservative, and its removal makes wine more vulnerable to oxidation.**

To deal with this challenge, **VASONGROUP** has developed solutions such as **X-PRO® PROTECTION**, a specific inactivated yeast that acts **as a natural antioxidant, helping to protect wine from oxidation** without having to resort to high levels of sulphites. This technology is particularly important in no/low alcohol wines, where the presence of sulphites can be perceived more intensively due to the reduction of alcohol.



Browning test at 420 NM (%)							
Test		X-PRO® Protection 5 g/hL		SO ₂ 5 g/hL		Ti Premium® 5 g/hL	
Pre	Post	Pre	Post	Pre	Post	Pre	Post
16	37	6	11	12	29	10	23

Tab. 2-Reaction of white wine sample to oxidisability test carried out at 420 nm before and after dealcoholisation with different additives and adjuvants.

2

PROTEIN STABILITY: a technical

Protein stability represents another significant challenge in the production of dealcoholised wines. **Proteins in wine can cause cloudiness and unpleasant physical changes.** In the case of dealcoholisation, the removal

of alcohol can make the proteins more stable, but it is still **necessary to carry out clarification treatments before dealcoholisation in order to avoid stability issues** in the final product.

	PRE (ANTU)	POST (ANTU)
Chardonnay 2021	34 (unstable)	9 (stable)
Garganega 2022	4 (stable)	4 (stable)
Viognier 2023	47 (unstable)	10 (stable)

ab. 3- Analysis of variation in protein stability before and after dealcoholisation of 3 white wines subjected to total dealcoholisation. Protein stability measured with Proteotest® by Enologica Vason.

We can see how protein stability varies before and after dealcoholisation across a series of 3 white wines subjected to total dealcoholisation.



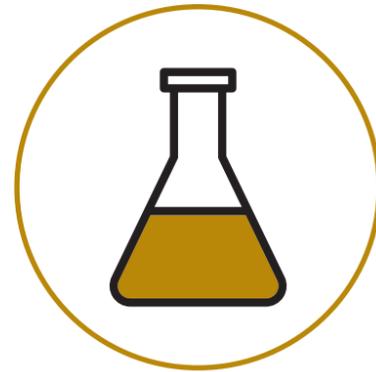
The inclusion of X-PRO® PROTECTION demonstrates enhancement both before dealcoholisation and after total dealcoholisation.





Stabilising the proteins before dealcoholisation is recommended, especially with evaporation techniques, to prevent sensory alterations and issues in equipment.

After dealcoholisation, acidity and bitterness management is crucial, with clarifiers such as Premium® Fish, Premium® Gel Grade 3 and Phytprotein P, depending on the enological aim and the starting wine.



Findings of a panel test of 23 technical tasters who were asked to assess different phases of dealcoholisation in yellow Muscat grape wine without separate management of acidity, removal of bitterness profile and structure.

- 12 % vol
- 0,5 % vol
- 4,5 % vol
- 8,5 % vol
- 10,5 % vol

As the alcohol content decreases, the perception of acidity and bitterness increases. Generally speaking, it can be stated that perception of structure and persistence decreases. The remaining sensations lessen, yet they become noticeably subtler, all thanks to the membrane technology.

3

TARTARIC STABILITY: absence of precipitates means quality

Removing the alcohol content generally enhances the wine's tartaric stability because the concentration of potassium bitartrate salts is consistently reduced below their solubility limit

as ethanol levels drop. **This lowers the likelihood of potassium bitartrate salt precipitation in the dealcoholised wine, simplifying the management of this phase compared to other challenges.**

Technology	Alcohol content starting wine [%v/v]	Alcohol removed [%v/v]	Concentration output alcohol [%v/v]	Volume loss total [%]	Water loss [%]
Contactor membrane	10	9,5	Close to 100%	9,5	None
Distillation vacuum with adjustment	10	9,5	85	11,2	1,7
Vacuum evaporator	10	9,5	40	23,8	14,3
Spinning cone column	10	9,5	40	23,8	14,3
Pervaporation	10	9,5	40	23,8	14,3

Tab. 4-Techniques of dealcoholisation and concentration of wine components

Demonstration of how distinct dealcoholisation techniques affect the concentration of all other wine components, excluding ethanol.

>> Historical data indicates that with membrane techniques, the acid concentration can remain notably low under particular circumstances, this is true even when a selective reduction of 12% v/v ethanol does not significantly influence the dissociation balances of tartaric acid.

4

**MICROBIOLOGICAL STABILITY:
a critical step**

The microbiological aspect represents one of the most complex challenges for the production of no/low alcohol wines and requires extra attention, especially at the packaging stage.

Alcohol acts as a natural preservative and its removal makes wine more susceptible to microbial contamination. To ensure microbiological stability, VASONGROUP adopts procedures of rigorous plant sanitisation and advanced filtration techniques.

The use of preservatives such as VELCORIN® (DMDC) is a strategic choice to guarantee the microbiological stability of dealcoholised or partially dealcoholised wine, without compromising quality. Used at the bottling stage, VELCORIN® ensures the wine and its container remain sterile, effectively eliminating any threat of undesired re-fermentation.

- Guarantee of cold microbiological stability
- Reduction of sulphur dioxide content
- Respect for organoleptic properties
- Reduction of final filtrations
- Total absence of residues
- Cost-effectiveness of the service

	U.d.M	Sample 1	Sample 2	Sample 3
Microbial count at 30°	UFC/mL	3,0 x 10³	7,5 x 10³	n.d.
Coliform count at 37°	UFC/mL	n.d.	n.d.	n.d.
Coagulase-Positive Staphylococci count at 37°	UFC/mL	n.d.	n.d.	n.d.
Research Salmonella spp.	Presence / Absent 25 mL	Absent	Absent	Absent

Tab. 5-Microbiological tests on 3 samples of dealcoholised wine (<0.5 % v/v)

Microbiological controls on 3 samples of dealcoholised wine (< 0.5 % v/v) ready to be marketed.

In every instance, no microorganisms dangerous to human health were detected. It can be seen that in samples 1 and 2, the presence of microbial load is particularly high and therefore potentially risky for placing on the market. **In sample 3, in which the procedures of Enologica Vason were meticulously followed, the microbial load is zero.**

AND THE CALORIE ASPECT?

From a health point of view, **it is considered imperative to pursue the goal of avoiding achieving products with high residual sugar and energy value.** In addition, in the absence of ethanol, the perception of sweetness given by residual sugar is lower than in the presence of normal alcohol levels.

	Unit measure	1	2	3	4	5	6	7	8
Alcohol	% v/v	13,65	13,65	9,04	9,04	9,04	0,22	0,22	0,22
Sugars	g/L	0,97	9,1	0,97	9,1	18,2	0,97	9,1	44,8
Energy value	Kcal/100 mL	75	78	49	53	57	1,6	4,8	19,2

Tab. 6-Data from a dealcoholisation test at different alcohol removal steps and different sweetening levels

Data from a dealcoholisation test at different steps of alcohol removal and different levels of sweetening.

>> It is noticeable that the energy value is elevated in sweetened dealcoholised products.

The use of the mild technologies of VASONGROUP processes leads to the production of no/low alcohol wines without residual sugar.

The use of the right Mild Technologies VASONGROUP such as:

- X-PRO® Specific Inactivated Yeasts
- MPA
- Stabilisers such as Icon® Gum

They can be strategic in ensuring balanced taste, without leading to sharp or sugary results.



Would you like more information about the VASONGROUP dealcoholisation process?

Write to nolo.approach@vason.it for tailored advice.

VASONGROUP

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