



OENOVEGAN[®] range

Synergy of
active ingredients
for a vegan approach
to modern winemaking



OENOVEGAN® range

Synergy of active ingredients for a vegan approach to modern winemaking

More and more winemakers are aware of the changes in consumer trends and are offering vegan wines.

For this reason, OenoFrance® is evolving and adapting to its customers' needs and concerns.

The creation of the OENOVEGAN® range in 2012 takes advantage of the properties of several non-animal-based active ingredients and relies on their synergy to offer a range of specific products for each stage of the winemaking process

Chitin and its derivatives, chitosan and chitin-glucans, are polysaccharides belonging to the glycosaminoglycan family. Using these molecules on must and wine makes it possible to reduce and control the presence of spoilage microorganisms responsible for organoleptic deviations, such as *Brettanomyces* or acetic and lactic bacteria. It is also an effective clarification agent thanks to its interaction with polyphenols.

Pea proteins offer a non-allergenic and plant-based alternative to fining. Authorized by the OIV in the early 2000s and more recently in the US by the TTB, they make a very effective solution for the clarification and fining of musts and wines.

Yeast protein extracts (YPE) were studied in the late 2000s and for over 10 years. They showed great potential to substitute for traditional fining agents, such as gelatin. These proteins react with polyphenols and make them precipitate. They have a strong impact on turbidity and therefore allow a quick sedimentation. By eliminating the fraction of oxidizable phenolic compounds they preserve the organoleptic characteristics of musts and wines.

ON MUST

OENOVEGAN® MICRO FA

Preventive tool
to control
the microbial
diversity

OENOVEGAN® F

Optimal flotation
and static
clarification

ON MUST & WINE

OENOVEGAN® EPL

Effective,
respectful and low
dosage fining

OENOVEGAN® Extra

Fining of
musts and wines
affected by
smoke taint

ON WINE

OENOVEGAN® MICRO

Curative solution
to manage spoilage
microorganisms

OENOVEGAN® Finesse

Fining and cleaning
of wines altered by
microorganisms

OENOVEGAN® SBS

Optimal
ageing and
roundness of
wines

Find these products in their respective families

■ Fining products ■ Yeast derived products ■ Stabilizers



OENOVEGAN® MICRO FA

WHAT IS IT?

It is a 100% natural biocontrol tool with a **broad spectrum of action** used to **curb the growth and reduce the population of spoilage microorganisms** including *Brettanomyces*.

Microbiological stability



100% natural

A synergistic association between

Activated chitosan + Yeast hulls



TO CONTROL

THE MICROBIAL DIVERSITY OF MUSTS

EFFECTS OF OENOVEGAN® MICRO FA

ACTIVATED CHITOSAN

- ✓ LIMITS THE GROWTH OF MICROORGANISMS
- ✓ SECURES FERMENTATION KINETICS
- ✓ ALTERNATIVE TO SO₂

YEAST HULLS

- ✓ DETOXIFIES THE MUST (UNDESIRABLE MOLECULES)
- ✓ ALLOWS FOR A CLEARER AROMATIC PROFILE

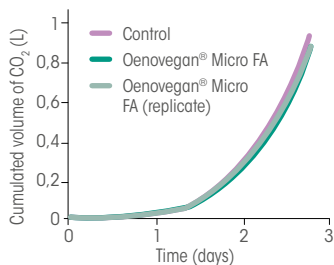
Chitosan is a polymer derived from chitin contained in the cell wall of microorganisms such as *Aspergillus niger*. Positively charged in an acidic environment (pH<5.5), its molecule reacts by electrostatic attraction with negatively charged compounds contained in the walls of microorganisms, leading to membrane dysfunction and cell death.

OENOLOGICAL PROPERTIES

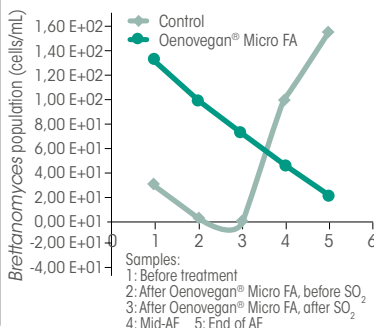
- Used on grapes and musts prior to alcoholic fermentation:
- Reduces the microbial diversity and allows indigenous population management
- Helps to start AF
- Replaces or reduces the use of SO₂

However, the use of chitosan at this dosage does not affect the kinetics of alcoholic fermentation thanks to the particular metabolism of *Saccharomyces cerevisiae*.

IMPACT OF CHITOSAN ON THE FERMENTATION KINETICS OF *SACCHAROMYCES CEREVISIAE*. MONITORING OF CO₂ RELEASE.



GROWTH OF THE *BRETTANOMYCES* POPULATION DURING WINEMAKING (MERLOT, BORDEAUX). ANALYSIS BY qPCR.



APPLICATION ON MUST

Application phase: on grapes and/or must prior AF.

Dosage: 15 to 20 g/hL depending on the microbiological risk.

Preparation: to be carried out in water.

THE DIFFERENCE BETWEEN BIOCONTROL AND BIO-PROTECTION

Unlike bio-protection, which consists of colonizing a medium in the pre-fermentation phase with selected microorganisms to limit the development of other species, biocontrol aims to slow down and reduce the overall microbial diversity of the must. This ensures lasting protection against contamination, but also facilitates the development of yeasts of interest (limiting competition) because *Saccharomyces cerevisiae* is a species that is not very sensitive to chitosan, the active compound used in this solution.



100% natural



Clarification and settling

WHAT IS IT?

The separation of solid and liquid phases **during the pre-fermentation phase** remains a priority issue in oenology.

The use of animal-based products is becoming a major constraint for winemakers. For several years, OENOFRANCE® has devoted time and research to propose an alternative solution of **non-animal** origin.

OENOVEGAN® F is a **fining agent** specifically formulated for **optimal flotation and static clarification of musts**.

A synergistic association between

Pea proteins + Chitin derivatives

FOR THE FLOTATION OF MUSTS

EFFECTS OF OENOVEGAN® F

CHITIN DERIVATIVES

- ✓ PROTECTION AGAINST OXIDATION
- ✓ FAST FLOCCULATION

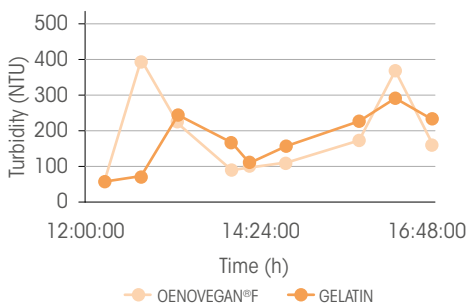
PEA PROTEIN

- ✓ FAST AND THOROUGH CLARIFICATION
- ✓ IMPROVED SETTLING OF THE CAP

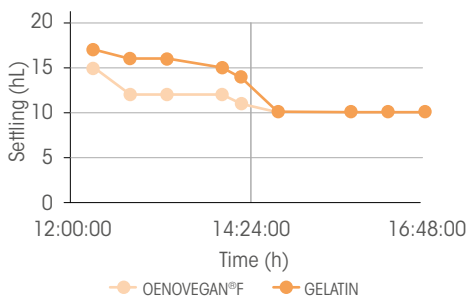
The pea proteins facilitate clarification and the elimination of oxidized and oxidizable polyphenols while the chitin derivatives allow a very fast flocculation with the formation of large flocs and a better compaction and settlement of the lees.

OENOLOGICAL PROPERTIES

EVOLUTION OF TURBIDITY (NTU) DURING FLOTATION PROCESS ACCORDING TO TIME (MUSCAT, AUSTRALIA).



EVOLUTION OF SETTLING (hL) DURING FLOTATION PROCESS ACCORDING TO TIME (MUSCAT, AUSTRALIA).



APPLICATION ON MUST

Application phase: Directly into the must after enzyme treatment, especially for flotation.

Dosage: 2 to 15 cL/hL.

Preparation: Stir actively the drum and homogenize the product well before use.

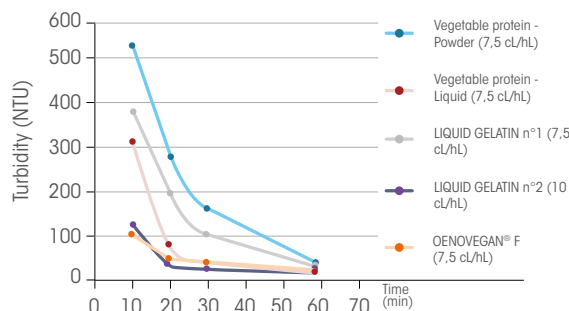
It is necessary to depectinize the must. Previous flotation is mandatory. The recommended pectolytic enzyme preparations for this step are :

- LYSIS® UC at a dose of 0.5 g/hL to 2 g/hL

- LYSIS® IMPACT at a dose of 2 mL/hL to 4 mL/hL.

OENOVEGAN® F is a liquid product, it can be used as a direct addition to the float must.

EVOLUTION OF SETTLING (hL) DURING CLARIFICATION PROCESS ACCORDING TO TIME (CHARDONNAY).



These graphs illustrate must clarification tests.

WHAT IS IT?

Thanks to the experience acquired in collaboration with various European universities (University of Dijon in France and University of Geisenheim in Germany) since the late 2000s **on yeast protein extracts**, Oenofrance®'s development and application department has developed **a new solution for fining musts and wines.**



A synergistic association between
Pea proteins + Yeast protein extracts
 TO OPTIMIZE FINING

EFFECTS OF OENOVEGAN® EPL

YEAST PROTEIN EXTRACTS

- ✓ **DECREASES OXIDIZED POLYPHENOLS AND BITTERNESS**
- ✓ **RESPECTS THE WINE'S ORGANOLEPTIC CHARACTERISTICS**

The combination of pea proteins and yeast protein extracts decreases oxidized and easily oxidizable phenolic compounds in musts and wines, including certain tannins that cause bitterness. It also improves length and intensity.

PEA PROTEIN

- ✓ **IMPROVED CLARIFICATION, FINING AND SETTLING**

APPLICATION ON MUST AND WINE

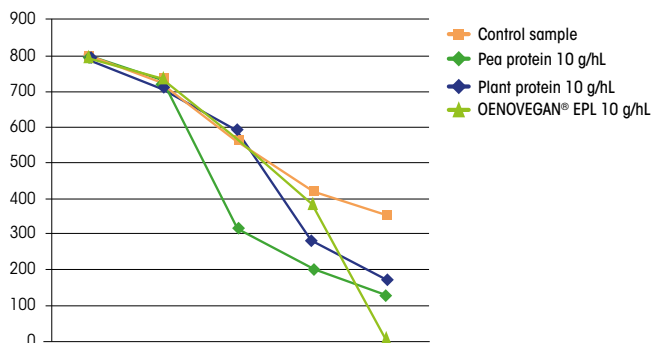
Application phase: on must after enzyme treatment, on wine at the end of AF or MLF.

Dosage: static settling and flotation 5 to 10 g/hL ; fining of wines 5 to 30 g/hL depending on turbidity and oxidation levels encountered.

Preparation: to be carried out in water.

OENOLOGICAL PROPERTIES

EVOLUTION OF TURBIDITY (NTU) DURING FLOTATION PROCESS ACCORDING TO TIME (PINOT GRIS MUST, ITALY)

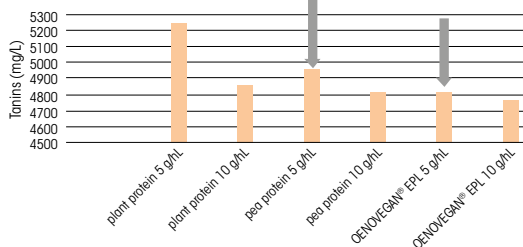


TEST CARRIED OUT ON RED WINE TO EVALUATE THE IMPACT OF TURBIDITY WITH TREATMENT BY OENOVEGAN® EPL

Sample	Control	OENOVEGAN® EPL 10 g/hL	OENOVEGAN® EPL 20 g/L	OENOVEGAN® EPL 30 g/hL
NTU	28,6	8,87	6,59	5,53

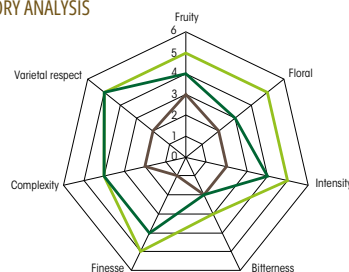
The turbidity of the medium is greatly improved, especially with a dosage of 30 g/hL as shown in our table.

RED WINE FINING



At equivalent doses, OENOVEGAN® EPL is more effective than a dose of vegetable protein. It has a high efficiency on tannins compared to other alternative products to animal fining.

SENSORY ANALYSIS



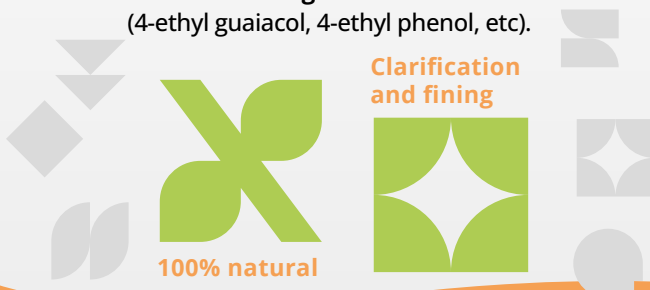
Significant impact with OENOVEGAN® EPL treatment at 7 g/hL on fruit perception and aromatic intensity.

— PVPP 20 g/hL — OENOVEGAN® EPL 7 g/hL — OENOVEGAN® EPL 12 g/hL

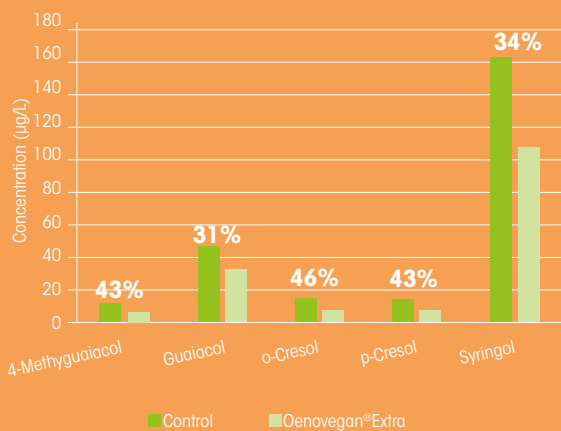
WHAT IS IT?

Years of research in the US have led to the development of a fining product that reduces volatile phenols responsible for smoke taint. The application of **OENOVEGAN®**

EXTRA on red grapes prior to maceration, musts and wines allows the decrease in concentration of several molecules identified to be playing key roles in smoke taint, including 4-methylguaiacol and guaiacol, thus **restoring the fruitiness and freshness**. **OENOVEGAN® EXTRA** has also an impact on **volatile phenols produced by microbiological deviations** (4-ethyl guaiacol, 4-ethyl phenol, etc).



CONCENTRATIONS IN VOLATILE PHENOLS IN CALIFORNIA WINES TREATED WITH OENOVEGAN® EXTRA COMPARED WITH A CONTROL WINE.



EFFECTS OF OENOVEGAN® EXTRA

CHARCOAL + CHITIN DERIVATIVES

- ✓ ELIMINATES VOLATILE PHENOLS
- ✓ RESTORES FRUITINESS AND FRESHNESS

PEA PROTEIN

- ✓ CLARIFICATION AND FINING

It is recommended to perform a treatment with glycosidases to break the glycosides that lead to the release of volatile phenols after bottling to enable their optimal removal by OENOVEGAN® EXTRA.

WHERE DOES SMOKE TAIN COME FROM AND HOW DOES IT IMPACT WINES?

With global warming and hotter summers come droughts and an increasing number of bush fires. When smoke occurs near vineyards before harvesting, grapes accumulate **free volatile phenols** produced when wood is burnt. Directly absorbed by grapes, these volatile compounds can bind to sugars to form non odorant **glycosides** in the berries. These glycosides can break apart and release the volatile phenols during fermentation, ageing and storage. These free volatile phenols are responsible for unpleasant **smoke taint aromas and masking fruity notes**. Moreover, the salivary enzymes also make it possible to release the volatile phenols contained in glycosylated forms accentuating the perception of smoky flavors in the mouth, which can explain why certain wines are more marked in the mouth than in the nose.

APPLICATION ON MUST AND WINE

Follow our specific protocol.

Application phase: On must, fermenting must and wine for fining after prior enzymatic treatment with β -glycosidases (LYSIS® ESSENTIA)

Dosage:

- For wines undergoing fermentation: 40 to 100 g/hL depending on the degree of alteration.
- For musts derived from grapes affected by smoke: apply 40 g/hL as a preventive measure.

Additional treatment on the fermenting wine may be necessary after tasting.

Recommended dose for fining test: 20-60 g/hL

Preparation: to be carried out in water.

WHAT IS IT?

It is a specific formulation to **control the development of microorganisms** that cause organoleptic alteration in wines.

Microbiological stability

Low SO₂

100% natural

A formulation based on **Activated chitosan**

TO MANAGE GRAPE MICROORGANISMS IN WINE

EFFECTS OF OENOVEGAN[®] MICRO

ACTIVATED CHITOSAN

- ✓ **CONTROL OF MICROBIAL POPULATIONS INCLUDING *BRETTANOMYCES***
- ✓ **PREVENTION OF CONTAMINATIONS ON LOW SO₂ ITINERARIES**
- ✓ **NO ORGANOLEPTIC IMPACT**

Activated chitosan directly impacts:

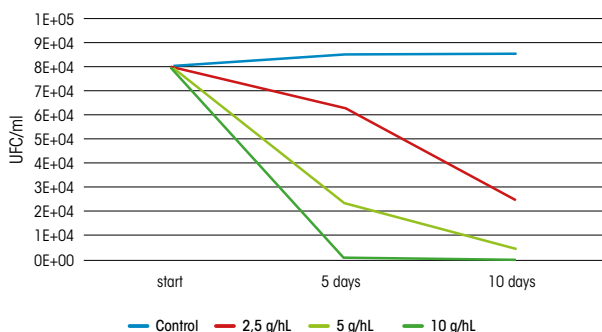
- Lactic acid bacteria (GRAM+) through interactions with membrane liposaccharides,
- Acetic bacteria (GRAM-) by interactions with the techoic acids of the peptidoglycans of the cell wall,
- *Brettanomyces bruxellensis* and other yeast species by interaction with mannosylphosphates and sphingolipids of the membranes.

OENOLOGICAL PROPERTIES

Used on wines after alcoholic fermentation or malolactic fermentation as a curative solution

- Eliminates *Brettanomyces* and other microorganisms of alteration and prevents their development.
- Its granulated form ensures immediate dispersion and an easy implementation.

MONITORING OF *BRETTANOMYCES* POPULATION BY QUANTITATIVE PCR (NEBBIOLO, ITALY) AFTER ADDITION OF OENOVEGAN[®] MICRO AT DIFFERENT CONCENTRATIONS.



The specific manufacturing process in the form of granules for immediate dispersion guarantees a high speed of action: elimination of *Brettanomyces* in 3 to 4 days where other products on the market require about 15 days.

APPLICATION ON WINE

Application phase: after AF or after MLF.

Dosage: 2 to 10 g/hL depending on the microbiological risk.

Homogenize: to be carried out in water.

Racking: wait until *Brett* populations are eliminated.

DOSAGE AND IMPACT FOR SEVERAL MICROORGANISMS.

Microorganism	Dosage and impact
<i>Brettanomyces</i>	3 - 15 g/hL - Eliminated
<i>Zygosaccharomyces</i>	> 2,5 g/hL - Reduction of population
<i>Acétobacter</i>	20 - 40 g/hL - Eliminated
<i>Lactobacillus</i>	5 - 20 g/hL - Eliminated
<i>Pediococcus</i>	> 10 g/hL - Reduction of population

Treatment of base wines before second fermentation :

In the event of contamination of a base wine by alteration-causing microorganisms of the *Brettanomyces* type, it is recommended to wait at least 15-20 days before second fermentation.

WHAT IS IT?

It is a specific formulation developed to **reduce organoleptic alteration** related to growth of spoilage micro-organisms.



100% natural

Clarification and fining



A synergistic association between

Pea proteins + Chitin-glucan



TO CLEAN AND FINE WINES

EFFECTS OF OENOVEGAN® FINESSE

CHITIN-GLUCAN

- ✓ ELIMINATES UNDESIRABLE COMPOUNDS CAUSING OFF FLAVORS (i.e. ethyl phenols, etc.)

PEA PROTEIN

- ✓ CLARIFICATION AND FINING

Chitin-glucans are macromolecules composing the cell wall of microorganisms. Their adsorption properties allow them to fix unwanted aromatic molecules.

OENOLOGICAL PROPERTIES

- Traps foul-smelling compounds (such as animal, pharmaceutical and stagnant water notes) that appear due to the growth of certain micro-organisms (*Brettanomyces bruxellensis*, etc).
- Can be used as an auxiliary agent for the clarification and fining of wines as an alternative to fining agents of animal origin.

TASTING NOTES OF WINES WITH FAULTS TREATED WITH OENOVEGAN® FINESSE AT 10 g/hL



On red wine

#1 PINOT NOIR (BURGUNDY)

Control: Intense reduction

Treated wine: Disappearance of the reduction and perception of fruity notes

#2 PINOT NOIR (ALSACE)

Control: Strong reduction in the nose and mouth

Treated wine: Suppression of the reduction and drying structure in the mouth is eliminated



On white and rosé wines

#1 CHARDONNAY (LANGUEDOC)

Control: Mousy

Treated wine: Disappearance of the fault and improvement of the freshness and fruitiness

#2 MUSCAT (ALSACE)

Control: Lack of clarity in the nose and loss of aromatic intensity

Treated wine: Very clear aromatic improvement and typicity of the grape variety recovered

APPLICATION ON WINE

OENOVEGAN® FINESSE obtains **rapid results in 48 hours** and should be racked at the end of this time to avoid release of these undesirable compounds.

OENOVEGAN® FINESSE's action **complements that of OENOVEGAN® MICRO**. Combining the use of these two products guarantees the absence of micro-organisms and undesirable compounds in wines. **Make sure to proceed with a racking in between the use of both products.**

Application phase: before or after AF, following the use of OENOVEGAN® MICRO.

Dosage: 5 to 40 g/hL depending on the degree of alteration.

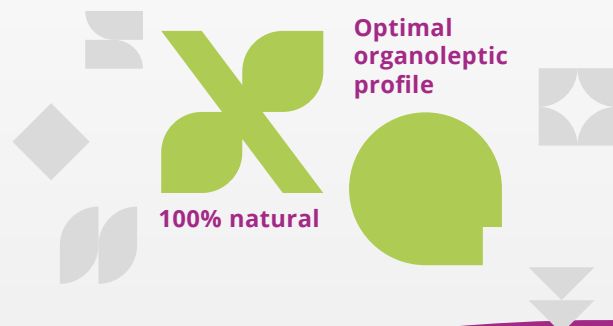
Homogenize: to be carried out in water.

Racking: 48 to 72h after treatment.

OENOVEGAN® SBS

WHAT IS IT?

It is a specific formulation for technological ageing. It helps protect against oxidative drift, preserving and enhancing the aromatic content, while improving the organoleptic characteristics of treated wines.



Yeast derived compounds rich in reducing substances + Plant polysaccharides

TO OPTIMIZE AGEING OF WINES

EFFECTS OF OENOVEGAN® SBS

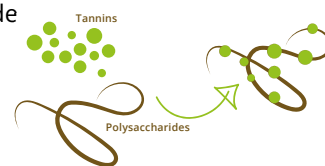
PLANT POLYSACCHARIDES
+ YEAST POLYSACCHARIDES

- ✓ BRINGS VOLUME AND STRUCTURE
- ✓ ENHANCES THE INTEGRATION OF WOOD

REDUCING ELEMENTS

- ✓ IMPROVES FRUITINESS
- ✓ PROTECTS FROM OXIDATION
- ✓ REDUCES DRYNESS

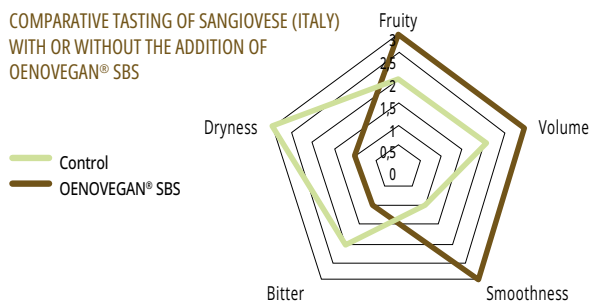
Plant and yeast polysaccharide fractions react with tannins. They soften the structures, allow for greater integration of wood and increase the sensations of volume.



OENOLOGICAL PROPERTIES

- Protection of aromas and color
- Softening of tannins: reduces astringency while providing volume and structure
- Management of redox balance
- Reduced SO₂ during the production phase
- Reduced vegetal character
- Saves time and improves quality thanks to the use of the dynamic infusion system

COMPARATIVE TASTING OF SANGIOVESE (ITALY) WITH OR WITHOUT THE ADDITION OF OENOVEGAN® SBS



APPLICATION DURING AGEING

The association of polysaccharides derived from yeast and vegetables makes it possible to optimize the integration of oak alternatives in static or dynamic ageing. **Recommended** for the production of white or red wines aged in wood (Casks, Barrels, Barriques) and/or through oak alternatives with or without micro-oxygenation.



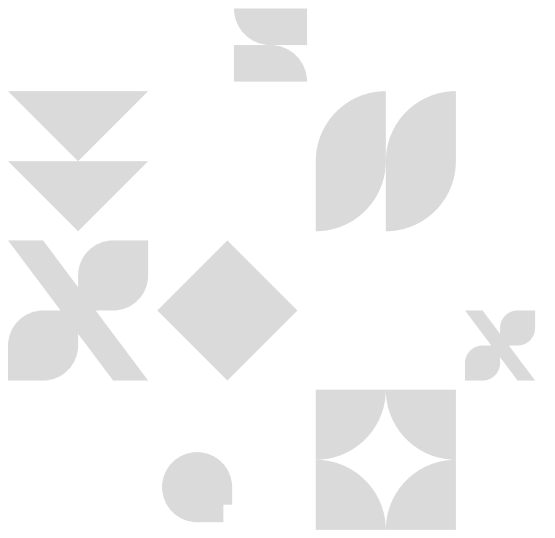
White and Rosé wines

Application phase: Post-AF
Dosage: 10-20 g/hL supplied in 1-2 additions
Oxidative protection: 20 g/hL
Homogenize: every 7 days
Racking: after 1-2 months



Red Wines

Application phase: Post-MLF
Dosage: 20-30 g/hL supplied in 1-2 additions
Volume effect: 20 g/hL
Oxidative protection: 30 g/hL
Homogenize: every 7 days
Racking: after 1-3 months





OENOFFRANCE

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