



EXPERIENCE AND INNOVATION

AGROVIN has reinforced its leadership in the wine sector by developing a specific process for producing lactic acid bacteria for the malolactic fermentation of wines.

This process is the result of several consecutive research projects carried out in collaboration with the Department of Microbiology of the University of Valencia, which has led to the design and development of two specific fermenters, through our own technology, for the culture of *Oenococcus oeni*, liquid lactic acid bacteria, for direct inoculation in wine, and marketed under the viniferm OE trademark.



www.agrovin.com



viniferm **oe** AG-20

SECOND GENERATION LACTIC ACID BACTERIA



AGROVIN

Targeted malolactic fermentation

Malolactic fermentation is a microbiological process involving several factors which affect the wine's quality. Spontaneous malolactic fermentation can increase the volatile acidity and the biogenic amine content, and produce excessive amounts of diacetyl. High levels of certain biogenic amines (putrescine and cadaverine) can cause a retronasal perception that is reminiscent of rotting meat. However, even moderate amounts of these compounds will have an effect on the fruit aromas of wines by reducing their intensity.

Selecting bacteria allows us to use strains that don't produce biogenic amines, without an increase in volatile acidity and with minimum diacetyl production. To attain this, however, after their addition to the must or wine, the bacteria need to have the capacity to adapt to the wine environment and impose themselves as the dominant microorganism (bioprotection).

Expertise and innovation

AGROVIN's Technical and R&D&I Department has been working for years on the selection of autochthonous lactic bacteria adapted to the characteristics of current wines, which have a high alcoholic content and more polyphenols, or wines with a low pH.

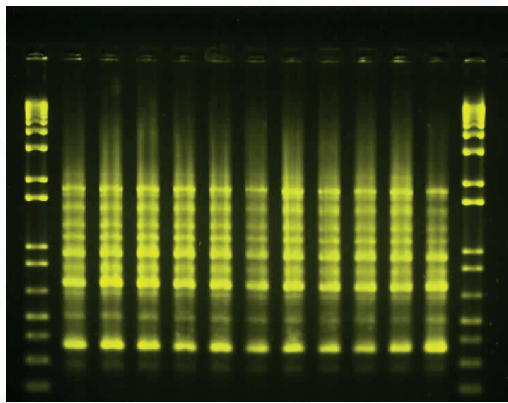


When selecting lactic acid bacteria, AGROVIN intends to produce stable and healthy wines (zero histamine), with bioprotective features, to avoid any possible microbiological deviations and the reduction of sulphur dioxide doses during conservation that can lead to a significant increase in the organoleptic quality of wines.

Production and quality control

Oenococcus oeni biomass production undergoes rigorous quality control throughout the entire process, using a culture medium specially designed to adapt bacteria to the adverse conditions found in wines these days.

Our Microbiology Laboratory, with over 10 years' experience in the multiplication of *Oenococcus oeni*, studies the evolution of the culture throughout the entire process to ensure the culture's viability and the absence of contaminating flora. To ensure the effectiveness and homogeneity of all containers, the RAPD-PCR molecular technique is used to control and genetically identify each of the production lots and a count of viable cells is performed.



Quality and safety

The RAPD-PCR image of an *O. oeni* production.

Bands 1 and 12: molecular weight markers.
Band 2: Control/original strain.
Bands 3 - 11: *O. oeni* isolated from production.
The electrophoretic profile observed in the *O. oeni* production is the same as in the CONTROL strain.



This formulation comes from the research results of the LACTICAUX project "Incorporation of laboratory assets in Auxiliary Wine Industry".

viniferm^{OE} AG-20

Viniferm OE AG-20 is a natural selection of *Oenococcus oeni* from musts and wines of the Guarantee of Origin (D.O.) Ribera del Duero.

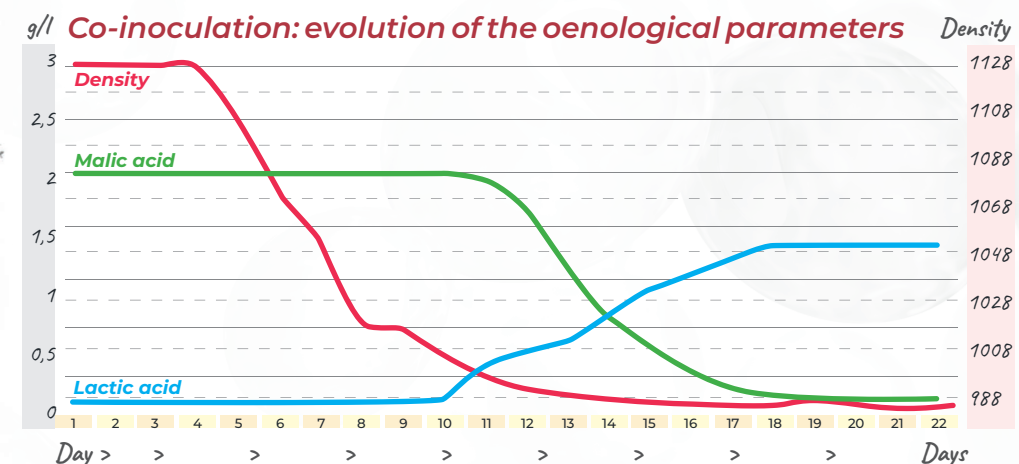
Viniferm OE AG-20 are second generation lactic acid bacteria for the production of quality red wine, fully respecting the varietal character of the wine at both the analytical and sensory levels. This strain has been selected for its low production of volatile acidity and biogenic amines and for its respect for the wine's fruit character.



Carácter bioprotector Importancia de la población activa inicial.

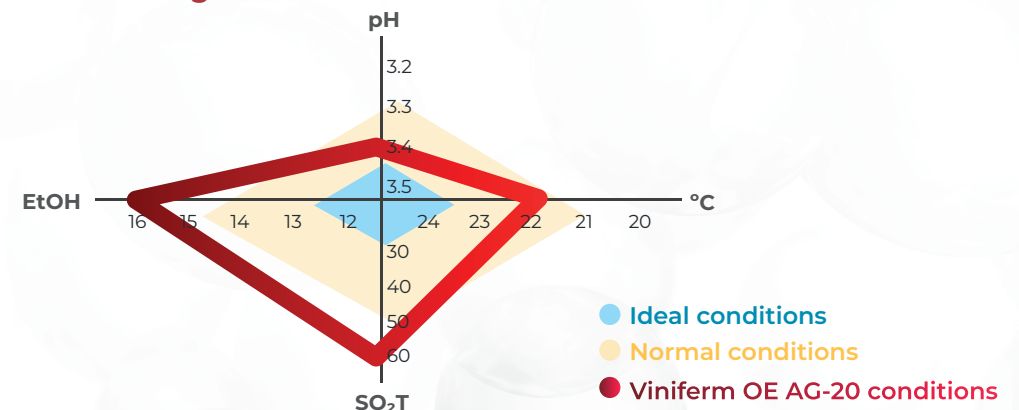
The consumption of malic acid and nutrients present in wine during MLF reduces the possibilities of most microorganisms present in wine from developing. In order for bioprotection to be effective, bacteria must reach a large population as fast as possible to prevent the development of other undesirable microorganisms. This rapid development also exhausts the resources of the wine environment, inhibiting the subsequent development of contaminating flora, even when the selected lactic acid bacteria are not present.

Viniferm OE AG-20 is a fresh culture of lactic acid bacteria with a viable bacterial count $>5 \times 10^9$ cfu/ml. This large population of viable bacteria not only allows a rapid onset of MLF, but also gives the culture excellent bioprotection properties.



The kinetics of alcoholic and malolactic fermentation. Tinto Fino, 2018 harvest. Spontaneous alcoholic fermentation. Probable ABV: 16.2°.

MLF limiting factors.



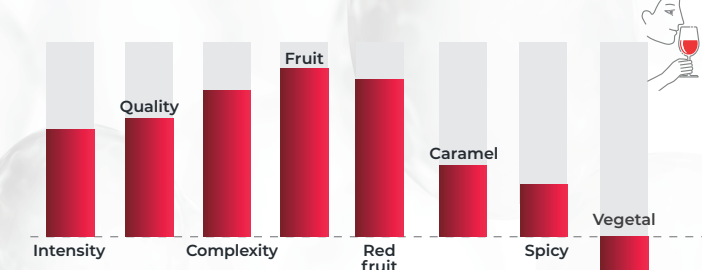
The pH, alcoholic content, total sulphur dioxide, and temperature are limiting factors for the development of lactic acid bacteria. These factors have a cumulative effect, i.e. the greater the number of factors far from the ideal conditions, the more difficult the MLF will be. Viniferm OE AG-20 is adapted to challenging wines.

Organoleptic properties

Viniferm OE AG-20 is a liquid *Oenococcus oeni* culture, particularly suitable for premium red wines with a varietal character and softness in the mouth, evolving over time. Perfect for all types of red wine varieties: Tempranillo, Grenache, Monastrell, Merlot, Cabernet, Sauvignon, Syrah, etc.

Excellent results with malolactic fermentation in barrels, since it maintains the colour qualities and varietal profile of the wine (red fruit, black fruit and spices). A complex wine with integrated wood, balanced and with a long-lasting presence in the mouth.

Olfactory impact on red wine:



Gustatory impact on red wine:



Viniferm^{OE} AG-20

Enhances the varietal aromatic characteristics.

- Maintains the fruit and floral expression of wines.
- Very low production of dairy aromas (diacetyl and acetoin) which mask the fruit aromas.
- Does not produce biogenic amines (putrescine and cadaverine) which reduce the fruity taste.

Maintains the colour intensity after MLF.

- Due to its low impact on acidity, it helps delay the colour evolution
- No colour loss due to dragging of the bacterial cell walls.
- Emphasises the mouthfeels of body and volume.

Direct inoculation



Advantages of liquid cultures

- Fast and safe fermentation
- Maximum cell viability
- Rapid implantation
- Cultures pre-adapted to challenging wines
- Malate dehydrogenase enzyme active from onset:

- >Limits sugar consumption
- >Reduces volatile acidity production



1000 ml: (100 hl)
500 ml: (50 hl)
30 ml: (225 l)

If you wish to discover the entire Viniferm OE bacteria family, please visit www.agrovin.com