



Lactic acid bacteria selected from nature

PN4[®]
Oenococcus oeni

MBR[®] process
direct inoculation

APPLICATION

PN4[®] was isolated and selected by the Institute of San Michele in Trentino, Italy. This lactic acid bacteria stood out as a robust strain that demonstrates its capacity to achieve malolactic fermentation for red and white wines in limiting conditions for pH, alcohol, SO₂ and temperature. In red wines, PN4[®] is recognized to highlight spicyness and structure ; in traditional white wines, it will contribute to buttery flavor and mouthfeel, which will support the integration of oak.



The MBR[®] form of lactic acid bacteria represents a Lallemand specific process that subjects the lactic acid bacteria cells to various biophysical stresses, making them better able to withstand the rigors of direct addition to wine. The conditioned MBR[®] lactic acid bacteria that survive are robust and possess the ability to conduct reliable malolactic fermentation (MLF).

OENOLOGICAL AND MICROBIOLOGICAL PROPERTIES

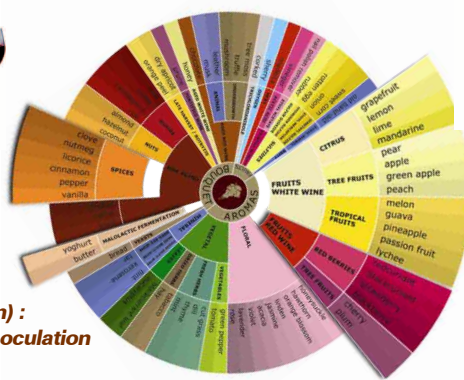
- **pH tolerance : > 3.0**
- **Alcohol tolerance : up to 15,5 % vol.**
- **SO₂ tolerance : up to 60 mg/L total SO₂**
- **T° tolerance : > 16°C**
- **Moderate nutrition demand**
- **Good implantation**
- **MLF Kinetic : Fast**
- **Low volatile acidity production**
- **No production of biogenic amines**
- **Co-inoculation possible**

ORGANOLEPTICAL PROPERTIES

Beyond bio-deacidification, PN4[®] is a true winemaking agent, which contributes to the sensory complexity and the quality of wine as follows :



Structure
Spiciness



Buttery impact (Diacetyl production) :

- **Moderate to high in Sequential inoculation**
- **Low in Co-inoculation**



Banana and honey structure
Barrel fermented wines
Varietal aromas



Structure
Increases general perception of fruitiness

This sensory contribution can be further supported by the combination with an appropriate selected yeast strain and timing of ML bacteria inoculation.



INSTRUCTION FOR USE

Direct inoculation is possible. For best distribution, we recommend the following :

● SEQUENTIAL INOCULATION (POST-ALCOHOLIC FERMENTATION)

- Rehydrate the packet of freeze-dried lactic acid bacteria in 20 times its weight of clean chlorine free water at 20°C for a maximum of 15 minutes.
- Add the suspension directly to the wine towards the end of the alcoholic fermentation, then stir gently to evenly distribute the lactic acid bacteria and minimize the oxygen pickup.
- Monitor malic acid.
- Stabilize wine once malolactic fermentation (MLF) is finished.

Recommended temperature range :

- White wine / rosé wine : from 16 to 20°C.
- Red wine : from 17 to 25°C.

If limiting conditions (high alcohol > 14.5 vol, or low pH < 3.1, or high SO₂ > 45 ppm): from 18 to 22°C.

Check malolactic fermentation activity (malic acid degradation) every 2 to 4 days.

● CO-INOCULATION (SIMULTANEOUS ALCOHOLIC FERMENTATION)

1/ Yeast addition

Rehydrate the selected dry yeast according to the instructions. Preferably in presence of a rehydration nutrient and inoculate the must.

2/ Bacteria addition

Depending on the SO₂ addition at crush :

- Sulfitage < 5 g/hL : wait for 24 hours
- Sulfitage 5-8 g/hL : wait for 48 hours
- Rehydrate the packet of freeze-dried lactic acid bacteria in 20 times its weight of clean chlorine free water at 20°C for a maximum of 15 minutes.
- Add the suspension to the must/wine to be fermented.
- Assure a good distribution.
- Carefully monitor must temperature, which must be below 30°C at lactic acid bacteria inoculation (alcohol < 5%vol) and below 27°C when the level of 10 % of alcohol is reached.
- Complex nutrients addition at 1/3rd of alcoholic fermentation is recommended.
- Monitor malic acid and volatile acidity.
- If MLF takes place during AF and an unusual increase in volatile acidity is observed add Lysozyme (150-200 mg/L).
- Top the wine after alcoholic fermentation (AF)
- Otherwise rack and stabilize after MLF.

PACKAGING AND STORAGE

- Available in different dosages 25 g for 25 hL (660 US gal.) – 250 g for 250 hL (6600 US gal.)
- Once opened, lactic acid bacteria sachet must be used immediately.
- This product can be stored for 18 months at 4°C and 30 months at -18/-20°C in original sealed packaging.
- Sealed packets can be delivered and stored for a few weeks at ambient temperature (<25°C/77°F) without significant loss of viability.

The information herein is true and accurate to the best of our knowledge however this data sheet is not to be considered as a guarantee expressed or implied or as a condition of sale of this product.

Distributor