ROBUSTE STRAIN FOR A WIDE RANGE OF WINE CONDITIONS

Lactic acid bacteria selected from nature

# PN4™

**Oenococcus oeni**

MBR™ process direct inoculation

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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).

## 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, $SO_2$ 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.

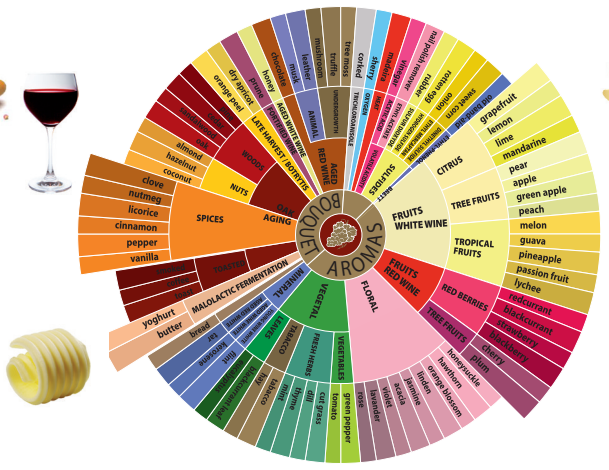
## OENOLOGICAL AND MICROBIOLOGICAL PROPERTIES

- **pH tolerance : > 3.1**
- **Alcohol tolerance : up to 15,5 % vol.**
- **$SO_2$ tolerance : up to 60 mg/L total $SO_2$ (pay attention to molecular $SO_2$ at low pH)**
- **T° tolerance : > 16°C**
- **Moderate nutrition demand**
- **Good implantation**
- **MLF Kinetic : Fast**
- **Low volatile acidity production**
- **No production of biogenic amines**
- **Co-inoculation possible**
- **Bacteria cinnamoyl esterase negative: cannot produce precursors for ethylphenol production by *Brettanomyces***

## 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***




***Banana and honey structure***
***Barrel fermented wines***
***Varietal aromas***



***Buttery impact***
***(Diacetyl production) :***
***• Moderate to high in Sequential inoculation***
***• Low in Co-inoculation***

***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.**

LALLEMAND

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# INSTRUCTIONS FOR USE

## Sequential inoculation (Post-alcoholic Fermentation)

Bacteria inoculation : two options

- **Direct inoculation without rehydration :** Open the sachet and add the bacteria directly into the wine after the end of alcoholic fermentation at the top of the tank or while emptying the tank.
- **Direct inoculation with rehydration step :** For best distribution, you can rehydrate the packet of freeze-dried seleted wine bacteria in 20 times its weight of clean chlorine free water at 20°C for a maximum 15 minutes. Add this suspension directly to the wine towards the end of the alcoholic fermentation.

- Stir gently to evenly distribute the selected wine bacteria and minimize the oxygen pickup.
- Under more difficult conditions, add a specific bacteria nutrient.
- Check malolactic fermentation activity (malic acid degradation) every 2 to 4 days.
- 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 $SO_2$ > 45 ppm) : from 18 to 22°C.

## 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 $SO_2$ addition at crush:

- Sulfitage < 5 g/hL : wait for 24 hours
- Sulfitage 5-8 g/hL : wait for 48 hours

- **Direct inoculation of bacteria without rehydration** : open the sachet and add the bacteria directly to the must/ wine to be fermented from the top of the tank (white must) or during a pumping-over (red must).
- **Direct inoculation with rehydration step** : for best distribution, you can 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 and 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

- Product in powder form obtained by lyophilisation.
- Dose for 2,5 hL (66 US gal), 25 hL (660 US gal) and for 250 hL (6,600 US gal).
- This product can be stored for 18 months at 4°C / 39°F and 36 months at - 18°C / 0°F in original sealed packaging. Once opened, the sachet must be used immediately.
- During delivery, sealed packets can be held at ambient temperature for 3 weeks (< 25°C / 77°F) without significant loss of viability.

DISTRIBUTOR



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