



# PN4™

## *Oenococcus oeni*

MBR™ process  
direct inoculation

## Robust wine bacteria for a wide range of wine conditions

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As a producer of wine lactic acid bacteria, Lallemand developed a specific MBR™ production process that subjects the wine bacteria cells to various biophysical stresses, making them 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).

### DESCRIPTION

PN4™ was isolated from nature and selected by Fondazione Edmund Mach in Trentino, Italy.

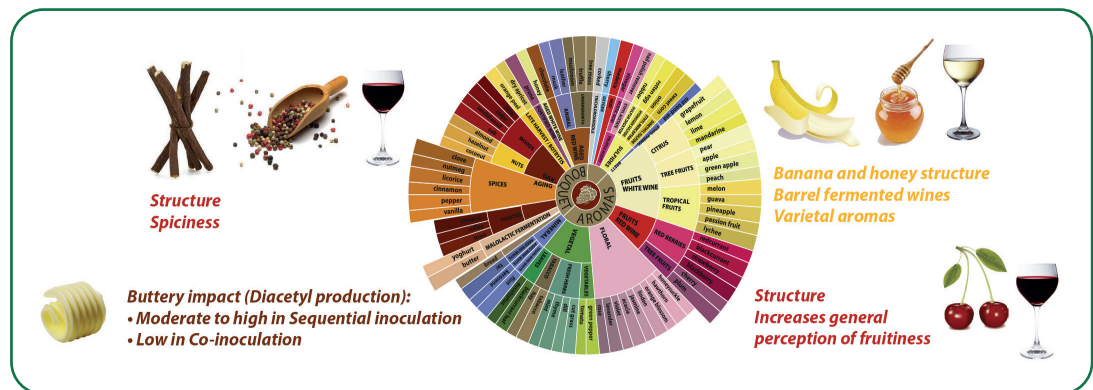
Produced with our MBR™ process, PN4™ is very competitive which helps to a rapid start of MLF with its good dominance in the must or wine. PN4™ has the capacity to achieve malolactic fermentation for red and white wines in limiting conditions.



### BENEFITS & RESULTS

PN4™ is a robust and reliable wine bacteria for difficult wine conditions (up to 15.5% vol. of alcohol, pH > 3.1 or total SO<sub>2</sub> up to 60 mg/L), with an easy-to-use protocol (direct inoculation without any rehydration step).

Beyond bio-deacidification PN4™ contributes to the wine sensory profile. In red wines, PN4™ highlights spiciness and structure; in traditional white wines, it will contribute to buttery flavor and mouthfeel, which will support the integration of oak.



PN4™ is a bio-protection tool to protect wines against *Brettanomyces* when inoculated as soon as possible to prevent the excessive development of the spoilage yeast.

### PROPERTIES

- pH tolerance: > 3.1
- Alcohol tolerance: up to 15.5% vol.
- SO<sub>2</sub> tolerance: up to 60 mg/L total SO<sub>2</sub> (pay attention to molecular SO<sub>2</sub> at low pH)
- T° tolerance: > 16°C
- Moderate nutritional 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*
- Fast degradation of citric acid: high production of diacetyl (buttery) or lactic notes

## INSTRUCTIONS FOR OENOLOGICAL USE

Use one sachet for the correct quantity of hL indicated on label. Lowering the dosage or doing cross seeding or pitching methods will reduce the bacteria performance.

### 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<sub>2</sub> addition at crush:

- SO<sub>2</sub> addition < 5 g/hL: wait for 24 hours
- SO<sub>2</sub> addition 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% alcohol is reached.
  - Complex nutrient addition at 1/3<sup>rd</sup> of alcoholic fermentation is recommended.
  - Monitor malic acid and volatile acidity.
  - Top the wine to ensure minimum ullage after alcoholic fermentation (AF) if MLF is not completed.
  - Otherwise rack and stabilize after MLF.

### 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 selected 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.
  - Monitor malolactic fermentation activity (malic acid degradation) every 2 to 4 days.
  - Stabilize wine once malolactic fermentation (MLF) is finished.

#### Recommended temperatures:

- White wine / rosé wine: from 16 to 20°C.
- Red wine:
  - › If alcohol < 14.5% vol.: from 17 to 25°C, with an optimal range: 18-22°C
  - › If alcohol > 14.5% vol.: from 18 to 20°C

## PACKAGING & STORAGE

- Product in powder form obtained by lyophilization.
- Dose for 25 hL (660 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.

Distributed by:

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The information in this document is correct to the best of our knowledge. However, this data sheet should not be considered to be an express guarantee, nor does it have implications as to the sales condition of this product. April 2024.



WINE  
YEASTS



WINE  
BACTERIA



NUTRIENTS  
/PROTECTORS



SPECIFIC  
YEAST DERIVATIVES



ENZYMES



CHITOSAN



VINEYARD  
SOLUTIONS



LALLEMAND OENOLOGY

Original by culture