

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 spiciness and structure ; in traditional white wines, it will contribute to buttery flavor and mouthfeel, which will support the integration of oak.

PROCESS



The 1-STEP™ starter Kit is a highly efficient Starter culture to promote Malolactic Fermentation (MLF) of most red and white wines, in a wide range of oenological conditions. The 1-STEP™ starter Kit consists of a malolactic active freeze-dried *Oenococcus oeni* strain and specific activator. The excellent activity and high vitality of the 1-STEP™ starter culture is achieved during a short acclimatization step that activates their metabolism to induce a fast onset of malolactic fermentation.

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
- Bacteria cinnamoyl esterase negative : cannot produce precursors for ethylphenol production by *Brettanomyces*
- 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**



**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.



Lactic acid bacteria
selected from nature

INSTRUCTION FOR USE

• SEQUENTIAL INOCULATION (POST-ALCOHOLIC FERMENTATION)

1A. Mix and dissolve content of the activator sachet in drinking water (temperature between 18 and 25°C) according to the table below.

1-Step® Kit	1A	2
	Volume of drinking water (L)	Volume of wine (L)
For 100 hL	10	10
For 250 hL	25	25
For 500 hL	50	50

1B. Add content of the lactic acid bacteria sachet and dissolve carefully by gently stirring. Wait for 20 minutes.

2. Add to this suspension the appropriate volume of wine (see table above) pH > 3.5, total SO₂ <45 ppm, no free SO₂ (temperature between 18 and 25°C). Wait for 18 to 24 hours. If malic acid content is < 1,2 g/L, wait only for 8 to 12 hours.

3. Transfer the activated malolactic bacteria starter culture into the wine according to the volume indicated on the kit.

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

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.

• CO-INOCULATION (SIMULTANEOUS ALCOHOLIC FERMENTATION)

The 1-STEP™ activator and lactic acid bacteria can be used in co-inoculation without doing an acclimatization step when the conditions and must are suitable (pH >3.4 and sulphite addition to the grapes <8 g/hL).

1A. Mix and dissolve content of the activator sachet in drinking water (temperature between 18 and 25°C) according to the table below.

1-Step® Kit	Volume of drinking water (L)
For 100 hL	10
For 250 hL	25
For 500 hL	50

1B. Add content of the lactic acid bacteria sachet and dissolve carefully by gently stirring. **Wait for 10 mn to 2 hours maximum.**

2. Transfer the rehydrated mix (activator and lactic acid bacteria) into the fermenting must / wine 24 hours after the yeast is added.

3. Check malolactic fermentation activity (malic acid degradation) every 2 to 4 days, as well as volatile acidity.

In the case of must with pH <3.4 or sulphite addition >8 g/hL, it is recommended to use the 1-STEP™ activator and lactic acid bacteria after alcoholic fermentation.

Recommended temperature range :

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.

PACKAGING AND STORAGE

Distributor

- Available in sachet for inoculation of 25hL, 100hL, 500hL and 1000hL.
- Once opened, activator and lactic acid bacteria sachet must be used immediately
- Activator and lactic acid bacteria sachet must not be used separately.
- This product can be stored for 18 months at 4°C/40°F or 36 months at -18°C/0°F in original sealed packaging.
- Sealed packets can be delivered and stored for 3 weeks at ambient temperature (<25°C/77°F) without significant loss of viability.