

## Wine

### Using inovapure to Combat Wine Spoilage



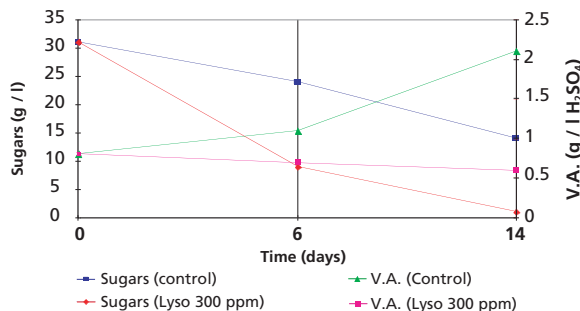
inovapure is used by winemakers to control the growth of spoilage bacteria which can create sluggish fermentations and increases in volatile acidity, to control certain aspects of a malolactic fermentation (MLF) and to stabilize wines after alcoholic fermentation or MLF is completed.

inovapure plays an important role in establishing a healthy environment for alcoholic fermentation. The growth of organisms such as *Pediococcus*, *Lactobacilli* and other spoilage organisms can be hard to control, especially in high pH wines where  $SO_2$  is less effective. The addition of high levels of  $SO_2$  needed to control these bacteria, may also inhibit the yeast involved in alcoholic fermentation. inovapure, unlike  $SO_2$ , does not inhibit yeast.

The addition of inovapure in low levels of between 100 and 150 ppm (10-15 g/hl) as early as possible to the grape must allows inhibition of the organisms leading to:

- Stuck fermentations
- Sluggish fermentations
- Increased volatile acidity
- The addition of inovapure in low levels to the must will control the development of indigenous bacteria. This control will also prevent the occurrence of premature malolactic fermentation, which can lead to an increase in VA and off flavors. The alcoholic fermentation will progress more smoothly, without competition for nutrients between the yeast and the lactic acid bacteria.

**Influence of Lysozyme on Sugars and V.A. changes during Stuck fermentations**



• If a wine begins to develop volatile acidity as a result of lactic acid bacteria activity, an immediate dosage of up to 250 ppm (25 g/hl) inovapure will assist in reducing the bacterial count and bring the volatile acidity under control. It is imperative that the inovapure be added quickly, before the bacteria count is too high. inovapure will not inhibit acetic acid bacteria.

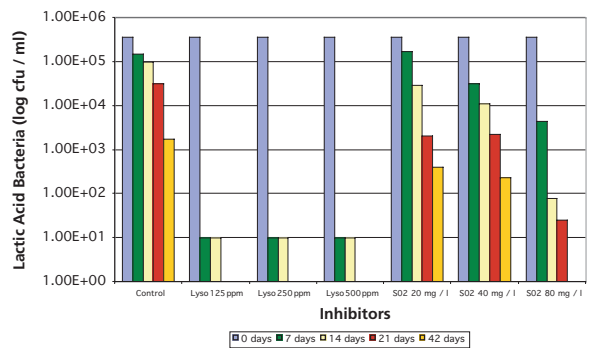
• At the first sign of a sluggish fermentation, inovapure should be added to the must at a level of 250 to 350 ppm (25 to 35 g/hl).

### Stabilizing Wine After MLF with Lower $SO_2$ Levels

Once MLF is complete, lactic acid bacteria remaining in the wine can cause organoleptic defects during aging or post-bottling, unless they are removed through filtration. inovapure can protect the wine by inhibiting these bacteria. For this application, a dosage of between 250 and 350 ppm (25 - 35 g/hl) is appropriate.

The use of inovapure after completion of malolactic fermentation to stabilize the wine during aging is attracting interest among winemakers looking to reduce the frequency and amount of  $SO_2$  they must add to their wines. This interest lies not only in keeping the bacteria levels down, but also in controlling the development of detracting compounds such as volatile acidity and biogenic amines.

**Evolution of Lactic Acid Bacteria after MLF**



This chart demonstrates the potential for using inovapure to stabilize wine during the post-malolactic aging process.



## Using inovapure to Control Malolactic Fermentation

inovapure can also be used to control certain aspects of a malolactic fermentation:

### Control of Onset of MLF

The addition of relatively low levels of inovapure at the onset of alcoholic fermentation will not inhibit the eventual development of an inoculated malolactic fermentation. From studies done in conjunction with a large culture manufacturer, we have concluded that inovapure, applied in must at a level up to 250 ppm (25 g / hl), prior to the onset on alcoholic fermentation, delays the growth of LAB. For a given strain of LAB, the delay is a function of the inovapure concentration and the pH of the wine.

### Total Inhibition of Malolactic Fermentation

Application is suitable for white or rosé wines, where total inhibition of MLF is desired to preserve delicate aromas and flavors. The recommended dosage is 500 ppm (50 g/hl), depending on the initial microbial load, the pH and the grape variety.

### Management of MLF to a Desired Level

The winemaker can effectively slow or stop the MLF while it is underway. This is desirable where a complete MLF would reduce the acidity in the wine too much. The recommended dosage is 350 to 500 ppm (35 to 50 g/hl).

## Advantages of inovapure

inovapure is a natural and harmless product which has positive evaluations from international regulatory agencies:

- JECFA (FAO / WHO)
- FDA
- Scientific Committee for Food of the European Union

It has been used with a safe track record for more than 15 years in both pharmaceutical and food applications (cheese).

inovapure has been recognized as an effective alternative to the use of sulfur dioxide by the O.I.V. (Organisation International du Vin)

- It does not impair the alcoholic fermentation
- if properly used at the right dosage, It does not have a negative impact on wine characteristics:

color	taste
flavor	aroma

inovapure can be used in a flexible manner, allowing winemakers to achieve different objectives, depending on the dosage and the stage of addition to the must or to the wine.

## Regulatory Issues

OIV has approved the use of the active ingredient in inovapure, lysozyme, in wine to the level of 500 ppm (50 grams per hectoliter). The European Union has approved the use of lysozyme as of October 26,2001.

In the US, BATF approval for the continuing use of inovapure on a commercial basis is available by letter application, with no labelling requirement. Please call us for information regarding other countries.

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