

Fordras Lysozyme

Lysozyme is a naturally occurring enzyme isolated from egg whites. It is used in wine to inhibit lactic acid bacteria. Lysozyme degrades the cell wall of gram-positive bacteria such as *Oenococcus*, *Pediococcus*, and *Lactobacillus*. Due to their protective external membranes, Lysozyme is not effective against gram-negative bacteria like *Acetobacter*. It also has no activity against yeast.

Lysozyme's effectiveness depends not only on the type of bacteria, but also the number of cells present. Unlike SO₂, Lysozyme is more effective at higher pH's when lactic acid bacteria growth is favored.

Lysozyme cannot replace SO₂ because it has no anti-oxidative effect. It can, however, be used to help greatly reduce the amount of SO₂ needed to achieve microbial stability over the life of both red and white wines.

Lysozyme can be used in the following applications:

- If grapes are unsound and have the potential to develop high levels of *Lactobacillus*, add Lysozyme to discourage the growth of *Lactobacillus* at the juice stage.

Recommended Dosage: Reds and Whites: 100 – 200ppm (0.38-0.75g/gal)

- Add to hinder the onset of malolactic fermentation (MLF) at the juice stage. Some yeast strains have difficulty completing alcoholic fermentation when MLF occurs simultaneously. MLF may inhibit the primary fermentation due to the bacteria's competitive utilization of fermentable sugars.

Recommended Dosage: Reds: To delay MLF - 100 ppm (0.38g/gal)
Whites: To delay MLF - 100ppm (0.38g/gal)
To prevent MLF-200–500ppm (0.75-1.90g/gal)

- Use Lysozyme to inhibit lactic acid bacteria populations during stuck alcoholic fermentation. *Lactobacillus*, *Pediococcus* and *Oenococcus* can form excessive amounts of volatile acidity which, if too high, become toxic to the yeast and cause a stuck or sluggish fermentation. Treat the stuck wine with Lysozyme and then reinoculate.

Recommended Dosage: Reds and Whites: 250 – 300ppm (0.94-1.10g/gal)

- Add Lysozyme to a finished wine that has partially completed MLF to inhibit the onset of MLF in the bottle.

Recommended Dosage: Whites: 200 – 300ppm (0.75-1.10g/gal)

Directions for Lab Scale Additions of Lysozyme

Prepare a 5% solution of Lysozyme by dissolving 5.0 grams of Lysozyme in 100 ml of cool or lukewarm water. Be sure to mix gently! Lysozyme is fragile and easily denatured by vigorous mixing or hot water. When dissolved, the Lysozyme solution will be a completely clear liquid.

For a 375ml Bottle:

<u>PPM Lysozyme</u>	<u>Milliliters of 5% Lysozyme Solution to Add</u>
50	0.37
100	0.74
150	1.11
200	1.48
250	1.85
300	2.22
400	2.96
500	3.70

Lysozyme Rehydration Procedures

1. Weigh-out the quantity of Lysozyme to be added.
2. Add this quantity of Lysozyme to approximately 5 times its weight in tepid (warm) water.
 - 1 kg Lysozyme to approx. 1.5 gal or approx. 5.7 L water
 - 1 lb Lysozyme to approx. 0.75 gal or approx. 2.8 L water
3. Stir this mixture **gently** for about 1 minute. Avoid foaming!
4. Allow this mixture to 'soak-up' for at least 45 minutes.
5. Repeat steps three and four until the solution has completely dissolved into a clear, colorless liquid.

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