



# Malolactic Starter Buildup Liquid Culture

## APPLICATION

Malolactic fermentation (MLF) is best managed when properly prepared starter is added to wines in adequate volume at the completion of primary fermentation

## STORAGE

Liquid cultures should be refrigerated when received unless they will be used within two days. Refrigerated cultures can be held for about two weeks.

## GROWTH MEDIUM

Use clean settled juice which has had no SO<sub>2</sub> added. If possible, heat juice to 140°F for 5 minutes. Cool to 72°F. Dilute with water if necessary to bring sugar level to a density of 18° Brix.

Juice pH should be 3.5-3.6. If necessary, adjust with potassium carbonate.

Add 3g/gal Nutriferm ML or 3g/gal yeast extract (see Nutriferm ML note, below).

Further pH adjustment is not needed after the initial culture buildup is completed. However, if inoculating juices or wines that have a pH below 3.2, it is advisable to condition the bacteria by an intermediate buildup stage at pH 3.4.

## CONTAINERS

Use clean, sanitized containers with some headspace for foaming. Fit with fermentation lock.

## INOCULATION

Add the malolactic culture to prepared juice as a 10% inoculum at each buildup stage; e.g. 32 ounces into 2.5 gallons, 2.5 gallons into 25 gallons and so on until there is 2-5% by volume for the wine to be inoculated.

## YEAST

Add 0.25 g/gal. active dry yeast at time of inoculation with ML bacteria, or a few hours after. (A slow fermenting strain is recommended, do not use a vigorous SO<sub>2</sub> producing strain). Alcohol produced will control growth of spoilage organisms and condition malolactic bacteria to an alcohol environment.

## INCUBATION TEMPERATURE

Maintain an even temperature of 72°-78°F (22°-26°C) for the culture. The bacteria will not grow well at temperatures below 68°F (20°C).



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## INCUBATION TIME

With a 10-fold expansion and incubation at proper temperature, cultures should attain full growth in 3 to 7 days.

## MONITORING

Begin monitoring at 3 days with chromatograms or malic acid assay. When malic acid is completely metabolized (disappearance of malic spot on chromatogram) the bacterial population is near maximum growth and should be transferred to a new medium.

When monitoring by microscan, young cultures will be made up of pairs and short chains of cells. Full growth cultures will contain larger numbers of cells in longer chains (6-20 cells).

## WINE INOCULATION

Inoculate at the completion of primary fermentation to avoid risk of spoilage.

If MLF occurs during primary fermentation, it should be kept in mind that an active population of ML bacteria in the presence of sugars (as with a sluggish fermentation) can produce spoilage quantities of acetic and lactic acid from the sugars.

Recommended inoculation volumes, post primary fermentation: 2-5%

## ADDITIONAL INSTRUCTIONS

If SO<sub>2</sub> (25-50 ppm maximum) has been added to juice to be used for ML buildup, inoculate with yeast and wait for signs of fermentation before adding bacteria.

Examine growing cultures carefully for signs of spoilage. Evaluate by microscope examination, especially if any potential spoilage is observed (e.g. film growth, off odors).

## STARTERS FOR FINISHED WINES

When fresh grape juice is not available, start cultures in a mixture made up of 50% wine, 25% apple juice and 25% water. Follow all other instructions for preparation. Expand culture by doubling the starter volume with wine until the starter volume is 5-10% of the amount to be inoculated. Wine to be used must have less than 10 ppm free SO<sub>2</sub> and low total SO<sub>2</sub>.

## NUTRIFERM ML

Nutriferml ML Malolactic Nutrient contains amino acids, pectins, vitamins and minor growth factors to stimulate growth of malolactic bacteria. Available in 1 kg packages to be added to starters at a rate of 3 g/gal or in wine at a rate of 1 g/gal.

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