

SOURING METHODS USING SELECTED LACTIC ACID BACTERIA

Modern sour beer making methods employ the use of bacteria (usually lactic acid bacteria and brewing yeast) to produce a very clean and drinkable sour beer in a relatively short amount of time.

Kettle souring is a popular method of producing sour beer. A traditional kettle sour involves inoculating sterile unhopped wort with bacteria and letting the bacteria produce lactic acid for 24-48 hrs prior to boiling the wort (with hops as desired), transferring to a fermenter and inoculating with a brewing yeast strain.

Fermenter souring is another technique for brewing sour beers. In this method, wort is brewed as normal and the brewer's selected bacteria is added to the fermenter. Advantages of this method include reduced brewhouse production time as well as potential flavor benefits.

- Sequential inoculation (preferred method) – Sterile, unhopped wort is soured in the fermenter by bacteria for 24-48 hrs and then inoculated with brewing yeast to complete the fermentation. Fermentation temperature may have to be adjusted to the optimal yeast fermentation temperature. Results are very consistent since the souring stage is separate from the fermentation stage.
- Co-pitching – Sterile, unhopped wort is inoculated simultaneously with bacteria and yeast. Notably, bacteria and yeast must have compatible fermentation temperatures (Figure 2) and the acidification process may be less consistent since bacteria and yeast are both competing for the same simple sugars.

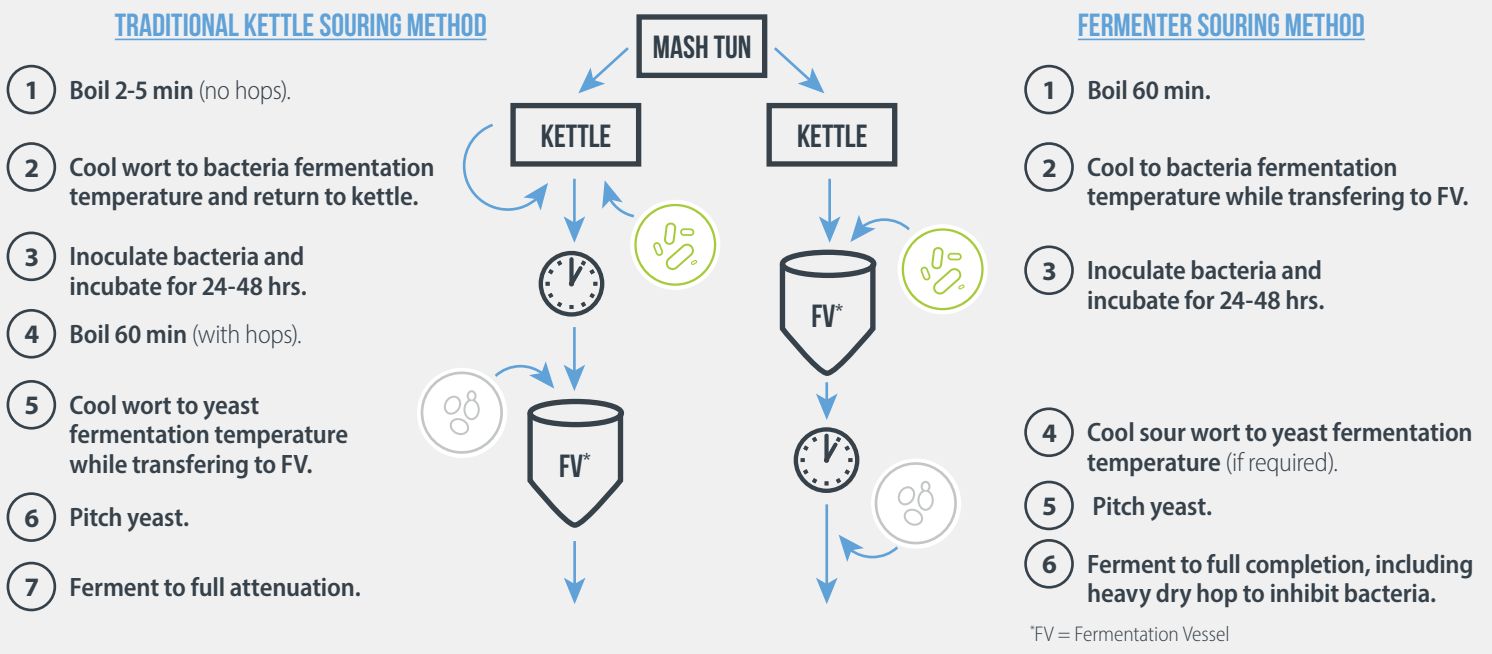


Figure 1. Comparison of a traditional kettle sour process to fermenter souring by sequential inoculation. Fermentation by co-pitching is not shown.

+ ADVANTAGES OF FERMENTER SOURING

- Simpler process
- Reduced production time
- Improved flavor profile (fruitier)
- Reduced off-flavors (THP)
- More flavor evolution over time

- DISADVANTAGES OF FERMENTER SOURING

- Kettle hops are not possible
- Increased risk of developing hop resistant bacteria (mitigated by adding a heat kill step)
- Risk of cross contamination (no kill step)

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TEMPERATURE CONSIDERATIONS FOR FERMENTER SOURING

Bacteria typically have a warmer optimal fermentation temperature range than brewing yeast, but there are exceptions (Figure 2). Wildbrew Sour Pitch™ can be co-fermented with LalBrew Voss™ or LalBrew Belle Saison™ in the range of 30-35°C. Wildbrew Helveticus Pitch™ can be co-fermented with LalBrew Voss™ at 38-40°C. While co-pitching of yeast and bacteria is technically possible for certain bacteria/yeast combinations with overlapping temperature ranges, more consistent results will be achieved with a sequential inoculation in order to reduce competition for simple sugars between yeast and bacteria.

If co-fermenting using other yeast strains with lower optimal temperature ranges, it is necessary to cool the fermentation slowly after souring is complete prior to inoculating the brewing yeast.

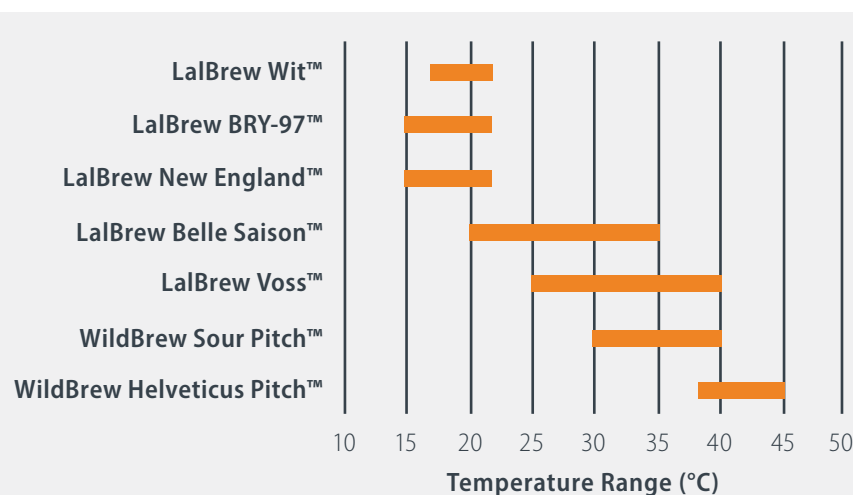


Figure 2. Optimal fermentation temperature ranges for selected yeast and bacteria strains. The highlighted temperature ranges are conducive to co-fermentation of yeast and bacteria without the need to cool the fermenting beer prior to yeast pitch.

RECOMMENDED BACTERIA/YEAST COMBINATIONS

The table below provides some suggestions for bacteria and yeast selection to achieve specific styles of sour beer. For more detailed recipes, visit our website at <https://www.lallemandbrewing.com/en/canada/brewers-corner/brewing-recipes/>

Style	Bacteria	Yeast	Temperature	Notes
Sour Saison	WildBrew Sour Pitch™	LalBrew Belle Saison™	Sour and ferment at 35°C	Fruit can be added as desired
Sour IPA	WildBrew Sour Pitch™	LalBrew Voss™	Sour and ferment at 35°C	Requires heavy dry hopping
Sour NEIPA	WildBrew Sour Pitch™	LalBrew New England™	Sour at 35°C Ferment at 22°C	Requires heavy dry hopping
Nordic Sour	WildBrew Helveticus Pitch™	LalBrew Voss™	Sour and ferment at 40°C	
Berliner Weisse	WildBrew Helveticus Pitch™	LalBrew Wit™	Sour at 40°C Ferment at 22°C	
Gose	WildBrew Helveticus Pitch™	LalBrew Wit™	Sour at 40°C Ferment at 22°C	Salt added to kettle

Acknowledgements:

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