



LalBrew®

HARD SELTZER FERMENTATION

WHAT IS HARD SELTZER?

Hard seltzer is produced from a sugar based fermentation that produces a neutral alcohol base that is often flavored with fruit or other aromatics.

CHOOSE YOUR STRATEGY

There are many different strategies for producing hard seltzer depending on the priorities of the brewer. For example, some brewers might favor higher alcohol yields or faster fermentation times, while others might focus on a cleaner flavor profile with fewer off flavors. Priorities of the brewer will determine the choice of yeast strain and nutrient strategy.

We present here a protocol for fermentation of 20°P cane sugar wort to achieve alcohol yields of ~12% ABV using organic nutrient sources. This protocol is intended as a starting point that could then be optimized according to the needs of the brewer.

CHOOSE THE SUGAR SOURCE

In principle, many different sources of sugar may be used to produce hard seltzer including dextrose, sucrose, cane sugar, liquid invert sugar, agave syrup and honey, to name a few. In this document, we focus on **cane sugar** since it is widely available, often organic certified, and is generally perceived as a high quality ingredient when listed on a label.

CONTROL THE PH

Unlike a beer, wine or cider fermentation, sugar-based fermentations have almost zero buffering capacity. As a result, the CO₂ produced by the fermenting yeast will react with water to form carbonic acid (H₂CO₃) resulting in a rapid drop in pH in the absence of any buffer.

To maintain optimal yeast health during fermentation, the pH should be maintained above 3.5-4.0. This is best achieved by the addition of **potassium bicarbonate (K₂HCO₃)** as a buffer. The exact amount required will vary depending on the mineral and salt composition of the water as well as the fermentation volume (larger fermenters have higher hydrostatic pressure in the fermenting liquid leading to higher CO₂ and carbonic acid concentrations and therefore requiring more buffer). Generally, 10-15g/hL of potassium bicarbonate is a good starting point.

PROTECT THE YEAST

A high quality, highly viable yeast strain such as **LalBrew® CBC-1** is ideal for hard seltzer fermentation. This strain is tolerant to high levels of alcohol, high osmotic pressure and low pH and produces a neutral flavor profile. The high purity of a premium brewing yeast strain such as **LalBrew® CBC-1** reduces the bacterial count in the finished product.

Yeast should be rehydrated in the presence of **GoFerm Protect Evolution**. The high sterol and unsaturated fatty acid content of GoFerm Protect Evolution provides additional protection to the cell wall against stress caused by high osmotic pressure, low pH and high levels of alcohol.

FEED THE YEAST

In addition to sugar, yeast requires vitamins, mineral and a source of nitrogen. While a typical beer fermentation contains sufficient nutrients in the wort to support a healthy fermentation these elements are completely absent in a sugar wort and must be added in large quantities to support to fermentation.

An organic source of nitrogen such as **Fermaid O** is preferred as it leads to gentler fermentations and fewer off flavors than inorganic nitrogen sources such as diammonium phosphate (DAP).



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PROTOCOL AND TYPICAL RESULTS

Ingredient	Dosage
Cane sugar ¹	20 kg/hL to achieve 20°P
Potassium bicarbonate	As needed (see "Control the pH" above)
GoFerm Protect Evolution ²	30 g/hL
Fermaid O ²	150 g/hL
LalBrew® CBC-1	50 g/hL

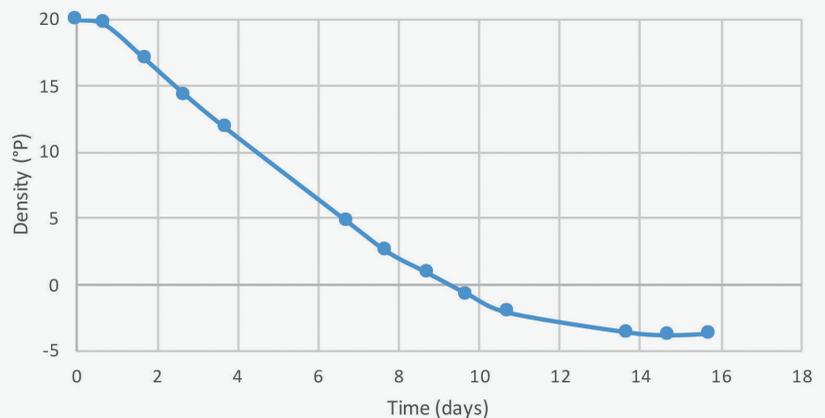
¹ Often available as organic² OMRI Listed

Sugar Wort Preparation	Yeast Preparation	Fermentation
<ul style="list-style-type: none"> - Dissolve cane sugar in filtered water to achieve 20°P sugar wort - Add 150 g/hL Fermaid O and boil for 5 minutes - Cool sugar wort to 20°C 	<ul style="list-style-type: none"> - Dissolve 30g/hL GoFerm Protect Evolution in hot water (>80°C) and then cool to 35-40°C. - Add 50 g/hL LalBrew® CBC-1 to the rehydrated GoFerm Protect Evolution and stir gently - Wait 20 minutes, stir again and then inoculate yeast into sugar wort 	<ul style="list-style-type: none"> - Ferment at 20-25°C - Monitor pH closely and add additional buffer as necessary (make sure to dissolve potassium bicarbonate well and add slowly to avoid foam-overs) - Typical results are shown in Figure 1

Figure 1:

Typical density curve for hard seltzer fermentation

A 20°P cane sugar wort buffered with potassium bicarbonate (10g/hL) and supplemented with Fermaid O (150 g/hL) was inoculated with LalBrew® CBC-1 yeast (50g/hL) that was rehydrated in GoFerm Protect Evolution (30 g/hL)



OPTIMIZE THE FERMENTATION

Higher alcohol yields may be achieved by staggering the nutrient and sugar additions over the first few days of fermentation. Higher nutrient requirements and yeast pitch rate may be required to achieve higher alcohol yields. Higher density sugar wort (>20°P) is not advised prior to achieving proper pH control on a lower density sugar wort.

If lower alcohol yields are acceptable then the amount of Fermaid O may be reduced for sugars worts <20°P.

Our technical team would be happy to assist with fermentation optimization, contact us at brewing@lallemand.com

FILTRATION, DILUTION AND FLAVORING

Hard seltzer fermentations are typically filtered to remove yeast prior to adding fruit juice or flavoring. If a highly neutral hard seltzer is required then carbon filtration may be employed to reduce the flavor of the seltzer base prior to dilution and flavoring. Hard seltzers that are back-sweetened with fermentable sugars may require pasteurization or addition of stabilizers such as potassium sorbate to increase product stability.