BEST PRACTICES

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. We recommend using dextrose as it is generally cheap, widely available and allows for full attenuation. Using sucrose based sugars may lead to lower attenuation and residual levels of fructose at the end of fermentation.

CONTROL THE PH

Unlike a beer, wine or cider fermentation, sugar-based fermentations have almost zero buffering capacity. As a result, the CO_2 produced by the fermenting yeast will react with water to form carbonic acid (H_2CO_3) 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 (K_2HCO_3)** 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 CO_2 and carbonic acid concentrations and therefore requiring more buffer). Generally, 10-15g/hL of potassium bicarbonate is a good starting point.

CHOOSE YOUR 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.

FEED THE YEAST

An organic source of nitrogen is preferred for hard seltzer fermentations. ABV YeastLife O™ has been optimized to improve the sensory profile of hard seltzer fermentations. ABV YeastLife O™ does not contain mineral salts or inorganic sources of vitamins or nitrogen (such as DAP). All micronutrients are yeast-derived and perfectly balanced and bioavailable for yeast metabolism. Organic nutrition from ABV YeastLife O™ promotes cleaner fermentations compared to inorganic nutrition that may lead to off flavors due to rapid yeast growth.

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

PROTOCOL AND TYPICAL RESULTS

Ingredient	Dosage
Dextrose	20 kg/hL to achieve 20°P
Potassium bicarbonate	As needed (see "Control the pH" beside)
YeastLife O™*	150-250g/hL*
LalBrew CBC-1™	50 g/hL

*Depending on the initial gravity of the fermentation

Sugar Wort Preparation

- Dissolve cane sugar in filtered water to achieve 20°P sugar wort.
- Add 150 g/hL **YeastLife O™** and boil for 5 minutes.
- Cool sugar wort to 20°C.

Yeast Preparation

- Innoculate with 50g/hL of rehydrated **LalBrew CBC-1™** yeast. For full rehydration instructions check out our Rehydration Instructional video here: https://youtu.be/yzvggVuTaMk

Fermentation

- 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.

HARD SELTZER FERMENTATION

Figure 1:

Typical fermentation curve for hard seltzer fermentation

A 20% w/w (20°P) dextrose substrate buffered with potassium bicarbonate (+50 g/hL) supplemented with YeastLife O™ (150 g/hL) and inoculated with LalBrew CBC-1™ yeast (100 g/hL).

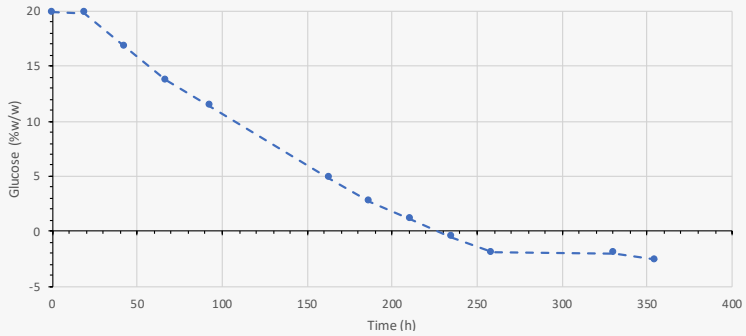


Figure 2:

Typical lower-density fermentation curves at 12%w/w (12°P) dextrose for faster fermentation times and lighter applications

100 g/hL YeastLife O™ Additions
50 g/hL Yeast
100 g/hL Yeast

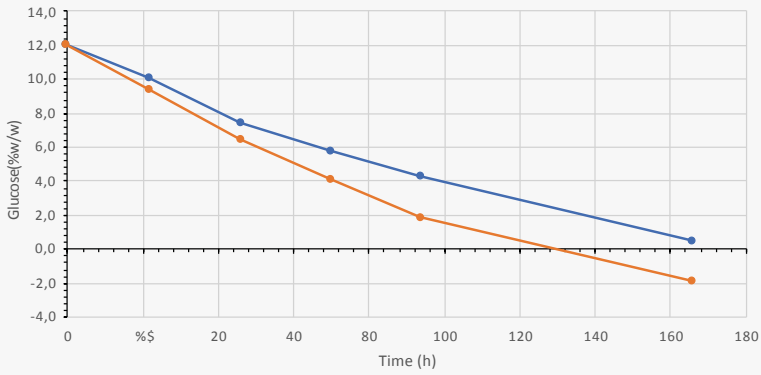
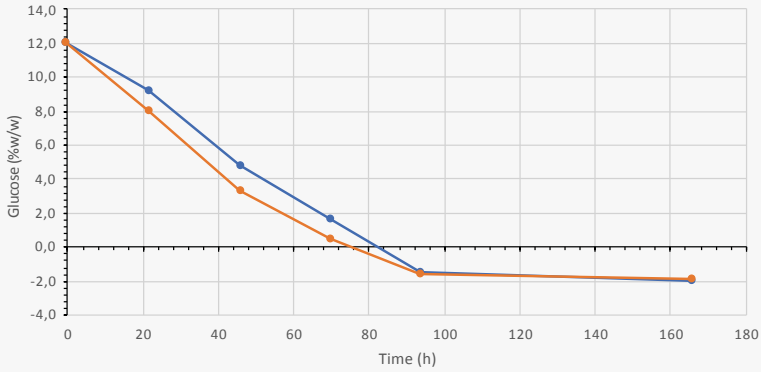


Figure 3:

Typical lower-density fermentation curves at 12%w/w (12°P) dextrose for faster fermentation times and lighter applications

250 g/hL YeastLife O™ Additions
50 g/hL Yeast
100 g/hL Yeast



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.

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.