


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 dextrose 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™ | 100 g/hL |

*Depending on the initial gravity of the fermentation

### Sugar Wort Preparation

- Dissolve dextrose 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

- Inoculate with 100g/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 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.

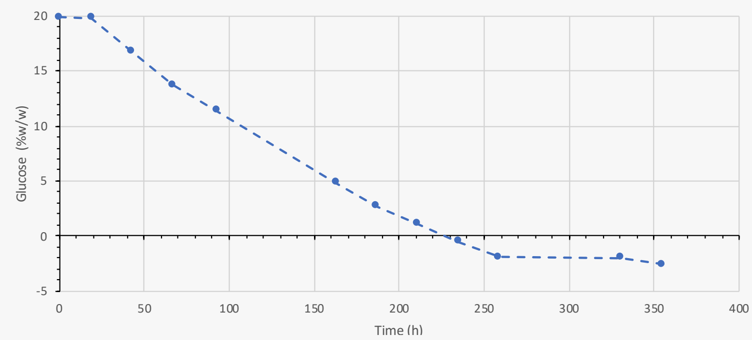



# HARD SELTZER FERMENTATION

## 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).

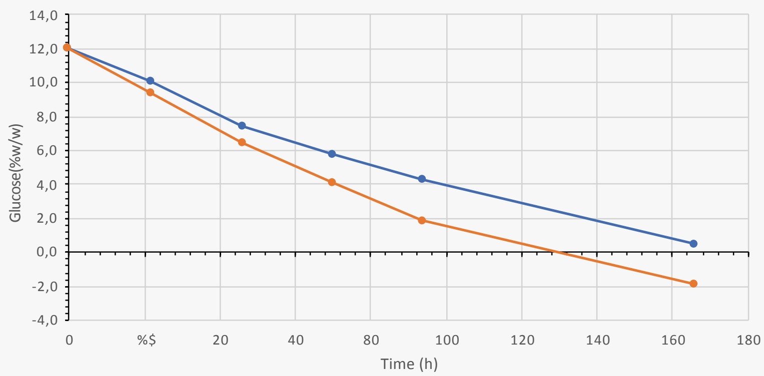



## Figure 2:

### Typical lower- density fermentations (12°P dextrose) optimized for minimal nutrient and yeast pitch rates

100 g/hL YeastLife O™ Additions

- 50 g/hL Yeast
- 100 g/hL Yeast

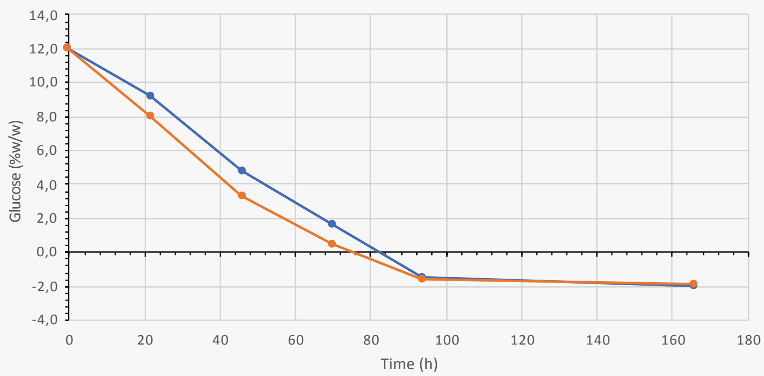



## Figure 3:

### Typical lower-density fermentations (12°P dextrose) optimized for faster fermentation times

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.

## 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.

*Our technical team would be happy to assist with fermentation optimization, contact us at brewing@lallemand.com. Hard seltzer fermentations are being studied and optimized in our lab on an ongoing basis. This document represents our Best Practices for Hard Seltzer Fermentations as of 20-Aug-2021.*