

BREWING STABILITY FACT SHEET – Minimizing Flavour Changes in Beer

To extend the stability of your beer, the simplest rule of thumb is to keep oxygen out and keep it cold. The stability of beer is measured by flavour changes that occur over time, including if off flavours are detected or the taste is not of optimal quality. While keeping the products cold and reducing the dissolved oxygen (DO) in the final package is important, there are several other factors that affect the stability of beer throughout the brewing process.

Checklist for improving flavour stability of beer

Grist Selection

- When/if possible, use lipoxygenase (LOX) free malts

Wort Production

- Mashing in at a lower pH (<5.2) will lessen LOX activity.
- Decrease the number of transfers and pumping events to limit oxygen exposure. Be mindful of steps that can increase dissolved oxygen (DO) getting into the wort.
- Purge air from milled grist with nitrogen.

Boiling

- Vigorous boiling will purge off volatile staling substances from the malting or mashing.
- Balance vigorous boiling versus time as heat induces the production of aging substances like furfural or Strecker aldehydes.

Hops/Hop Products

- Trans isomers of iso- α -acids are more prone to degradation into staling compounds than are cis isomers.
- Reduced iso- α -acids that are used for light-resistant beers do not produce unsaturated carbonyl substances, which can contribute to stale off notes.

Yeast and Fermentation

- Good yeast husbandry (healthy yeast, correct pitch rates) is very important in ensuring the yeast scavenges the carbonyl substances.
- Beer is more susceptible to staling as the pH decreases from 4.5-4.0. Consider moving the pH up in this range (i.e. higher out of the fermenter).
- Yeast produces sulfur dioxide, which binds to carbonyl substances. To increase sulfur dioxide, increase the sulfate supply to yeast, increase wort clarity, decrease oxygenation of wort, reduce pitching rate and reduce fermentation temperature.

Cold Conditioning

- It is important at this stage to ensure the beer has its lowest possible content of dissolved oxygen (DO).

Dry Hopping

- Make sure the hops or hop products being added do not contain high levels of manganese, iron and copper.

Filtration and Stabilization

- Use de-aerated water for the filter aid and any other downstream additions.
- Divert the water used to precoat filters to drain as it may contain iron.
- Consider using filter-aid-free technologies.

Packaging

- Use low-air-packaging equipment with low-air filling protocols (undercover gassing, tappers and jettors, inert gases).
- Use pry-off rather than twist-off crown caps if bottling.
- Use oxygen-scavenger crown caps.
- If canning, ensure proper seaming is occurring.

Warehouse and Distribution

- Keep as cold as possible with the least amount of agitation.

The Retailer

- Ensure proper stock rotations: selling oldest first

The Customer

- The consumer needs to be instructed on the proper storage conditions at home.
- Provide realistic best-before dates—or production dates— so the customer knows when it was produced and/or when recommended to consume by.
- Informative labeling.

Reference:

Bamforth W. Charles. (2017). Practical Guides for Beer Quality: Freshness. American Society of Brewing Chemists

For additional information, check out [The Science of Brewing fact sheet](#)