



Unit IV - Topic 4
Beer pasteurization, fermentation and packaging

Fermentation:

- Beer production utilize strain of *Saccharomyces carlsbergens* and *S. varum* which are bottom yeast and *S. cerevisiae* which is a top yeast.
- Yeast cells for inoculation are usually recover from previous fermentation tank by treatment with phosphoric acid, tartaric acid or ammonium persulphate to reduce the pH and removed considerable bacterial contamination.
- Fermentation is usually carried out at 3-4 °C but it may range from 3- 14° Fermentation usually completes in 14 days.
- During fermentation yeast converts sugar mainly into ethanol and CO₂ plus some amount of glycerol and acetic acid.
- For fermentation open tank fermenter can be used however closed fermenter tank is preferred, so that CO₂ liberated during fermentation can be collected for later carbonation step.
- CO₂ evolution is maximum by fifth day of fermentation, there is no evolution of CO₂ by 7-9 days because yeast cells become inactive and flocculate.
- Most beer contains 3.5-5% alcohol.

Pasteurization is a process that significantly changed the health of the world's population. The purpose of this document is to describe the pasteurization process and the impact the process has had on the packaging and serving of beer.

Pasteurization Process

Heat Destroys Bacteria – By heating a liquid to a high temperature, the bacteria in that liquid can be destroyed. In the brewing process pasteurization is used to stop the growth of the yeast that might remain in the beer after packaging.

Cans and Bottles – Traditionally, in the U.S., only beer in cans and bottles is pasteurized. The pasteurization process often occurs after the beer has been placed in the can or bottle and the package has been sealed. The process involves running the package through a hot water spray (approximately 140° F) for two to three minutes.

Kegs – Domestic draft beer is not normally pasteurized, and so it must be stored at 38° F in order to prevent secondary fermentation from occurring in the keg. Imported draft beers are usually pasteurized, and so the kegs can be stored at room temperature without negatively affecting the beer. For proper serving, and to ensure an appealing taste the imported kegs of beer must be stored and served at 38° F.



Benefits

Pasteurization enables a can or bottle of beer to be stored at room temperature for periods of time up to 120 days and beyond. Draft beer that is not pasteurized has a life 45 to 60 days. Draft beers that are pasteurized often have a life of 6 to 9 months. This enables the pasteurized draft beer to endure long shipping times.

The contents of non-pasteurized kegs that are used at special events or picnics, and stored outside during the event should not be served once the event has ended. Pasteurized kegs can be returned to the cooler, and the contents can be served at a later time.

Impact on Beer Flavor – Does pasteurizing draft beer impact the taste of the beer? This is a question that has long been debated, and truly a matter of personal taste.

Two things to consider in answering this question:

1. When a brew master wanted to demonstrate their prowess at brewing a quality beer, the true measure of the quality of that beer was how good it tasted right from the brewing vessel.
2. Do you like to eat your vegetables raw or cooked? Some people might argue that uncooked vegetables have the best taste, and best attributes, such as crispness, and others might argue that cooking the vegetable releases more flavors in the vegetable.

Note: One thing is certain about draft beer, whether it is pasteurized or not, it must be stored at 38° F in order to ensure proper dispensing and taste.