

# Food Technology practical

## Lab6

### Beer production

#### Essential Ingredients of Beer:

1. Malted Barley.
2. Hops.
3. Yeast not required, but frequently found Ingredient.
4. Water.
5. Starch adjuncts (corn and rice starches).

**Yeast:** Yeast be found naturally on the can surface of most plants including barley seeds.

\* "Wild" yeast will most likely produce flavors that are undesirable.

***Saccharomyces cerevisiae*** is the species most often used for ales, its optimum fermentation temperature is 16-24 C°.

***Sucharomycas uvarium*** is largely used in lagers, and steam beers, the optimum temperature for this fermentation is 2-13 C°.

#### What qualities should yeast have?

1. Rapid initiation of fermentation.
2. High fermentation efficiency.
3. High ethanol tolerance.
4. Desired flavor characteristics.
5. High genetic stability.
6. Range of alcohol product.

#### Raw materials:

**Malt:** is one of the main ingredients and is obtained from barley, which is subjected to process of germination under controlled conditions, this operation called (**malting**).

**Corn:** is very common, the oils are extracted, then it is milled and called **(grits)**.

**Barley:** rice or wheat may also be used.

**Humulus lupulus (hops):** hops are the flowering portion of the hop vine, these flowers not only fight off bacterial infections in the beer, they aid in clarification of the beer, stabilize the flavor, help retain head, and aid in one's ability to drink the beer.

**Production process:** The first phase in the process of beer production is the preparation of the **wort** [8-14% total solids, 90-92% are carbohydrate: (glucose, maltose and fructose), vitamins: (biotin, inositol, pantothenic), nitrogenous compounds].

**Wort preparation has four stages:**

1. Milling. 2. Mashing. 3. Filtration of the wort. 4. Boiling the wort.

**Milling:** In order for the malt components to be rapidly extracted and converted the malt is milled to obtain coarse flour.

**Mashing:** The flour from the cereals is mixed with water, these conditions encourage the development of complex starch molecules and proteins.

**Filtration of the wort:** it is done to separate the spent grains from the wort itself.

**Boiling the wort:** the filtered wort is boiled for 2 hours.  
The purpose of boiling is to:

- Transform and make soluble the bitter substances in the hops.
- Sterilize the wort.
- Establish the final concentration of wort.
- Eliminate undesirable volatile substances.
- Provoke the precipitation of proteins of high molecular weight.

## **Fermentation / Maturation**

**Fermentation:** The wort sugars are converted by transformation of yeast into alcohol and carbon dioxide.

**Maturation:** The period in which the beer is allowed to rest at suitable temperatures in order for the undesirable volatile.

**Stabilization:** This consists of letting the beer stabilize at temperatures of between 24-30c°.

**Clarification:** is the operation that gives the beer it's clear limpid, quality, eliminating the last remaining traces of Clouding still in suspension.

**Transferring:** The final stage of beer production, process is transferring the beer into different Kinds of containers (bottles, barrels, cans etc).

**Note:** Type of beer depends on the type of used yeasts in production process.



