

INTERNSHIP REPORT

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ABOUT COMPANY

United Breweries Limited is synonymous with innovation and aggressive marketing that is complemented by a strong distribution network which encompasses an impressive spread of owned and contract manufacturing facilities across the country. Their flagship brand 'Kingfisher', has achieved international recognition consistently, and has won many awards at international beer festivals. Their most popular beer, Kingfisher Premium Lager beer, is currently available in 69 countries and leads the way among Indian beers in the international market.

INTRODUCTION

This report is the compilation of the basic techniques in research labs and processing of beer. An alcoholic beverage made by brewing and fermentation from cereals, usually malted barley, flavoured with hops with a slightly bitter taste. The alcohol must be produced exclusively from those ingredients which are converted to fermentation products during the brewing process. This work insist upon the fermentation process which causes a natural carbonation effect, which is then removed during procand replaced with forced carbonation.

WHAT IS BEER ?

- **Beer**, alcoholic beverage produced by extracting raw materials with water, boiling(usually with hops), and fermenting.
- In some countries beer is defined by law—as in Germany, where the standard ingredients, besides water are malt(kiln-dried germinated barley),hops, and yeast.



TYPES OF BEER

1.ALE –Ale is a general category of beer: You'll find sub-categories like brown ales or pale ales. This is the oldest style of beer, which dates back to antiquity.

2.LAGER -Lagers are a newer style of beer with two key differences from ales. Lagers ferment for a long time at a low temperature, and they rely on bottom-fermenting yeasts, which sink to the bottom of the fermenting tank to do their magic.

3.PORTER -A type of ale, porter beers are known for their dark black color and roasted malt aroma and notes. Porters may be fruity or dry in flavor, which is determined by the variety of roasted malt used in the brewing process.

4.STOUT- Like porters, stouts are dark, roasted ales. Stouts taste less sweet than porters and often feature a bitter coffee taste, which comes from unmalted roasted barley that is added to the wort.

5.WHEAT -An easy-drinking, light style of beer, wheat beers are known for a soft, smooth flavour and a hazy body. Wheat beers tend to taste like spices or citrus, with the hefeweizen or unfiltered wheat beer being one of the more common styles.



RAW MATERIALS

- ✓ **BARLEY MALT** –Body and soul of beer
- ✓ **YEAST** –Life of beer
- ✓ **HOPS** –Spice of beer
- ✓ **WATER** –Integrity and purity of beer
- ✓ **TANNIN** –Helps in precipitation of protein
- ✓ **ADJUVANTS** –Additive grains , fruits and spices



BREWING PROCESS

1. MALTING - The first step in the production of beer is malting. Firstly the fresh barley gets soaked in water and put in the so-called germinating boxes to germinate. In this phase the enzymes (amylase) are formed which are needed for the starch separation. The germinating process is then interrupted at the optimal stage by the drying (kilning). The green malt is dried carefully at 80°celsius and tastes slightly sweet when dried.

The malt sugar later serves to feed the yeast cultures, which then form the alcohol.

2. MILLING - The second step in the brewing process is milling. The finished malt is milled, similar to the making of flour, so that it dissolves better in water. Malt mills produce various grades of crushed malt: husks, groats, meal, semolina and powder (from the coarsest to the finest).

3. MASHING - The third step in the brewing process is mashing. The milled malt is mixed with water in the mash tun – mashing-in. The starch in the grist dissolves and sugar, protein and tannin are released. The so-called malt extract is produced by this mashing process.

4. LAUTERING - The fourth step in the production of beer is lautering. The mash is filtered in the lauter tun as the husks sink and the wort is separated from the solid substances (spent grains). The wort is then further used in the brewing process, whereas the spent grains are generally used as cattle fodder.

5. WORT BOILING - The fifth step in the brewing process is wort boiling. In the brewing pan or wort kettle the wort is boiled and the hops are added. The taste of the beer depends on the type and amount of hops used: the more hops the bitterer the beer. As the water evaporates the wort is concentrated to the original wort, the malt enzymes are deactivated and tannin and protein elements are separated out to form the so-called trub.

6. WORT CLARIFICATION - The sixth step in the brewing process is wort clarification or drawing off. Here the wort is fed into the whirlpool and starts to rotate. Hop particles that have not dissolved and protein –the so-called trub –form a cone in the middle of the container, and the clear wort can be tapped off at the side. Then the clear wort is cooled to a temperature of between 10 and 20°Celsius in the wort cooler.

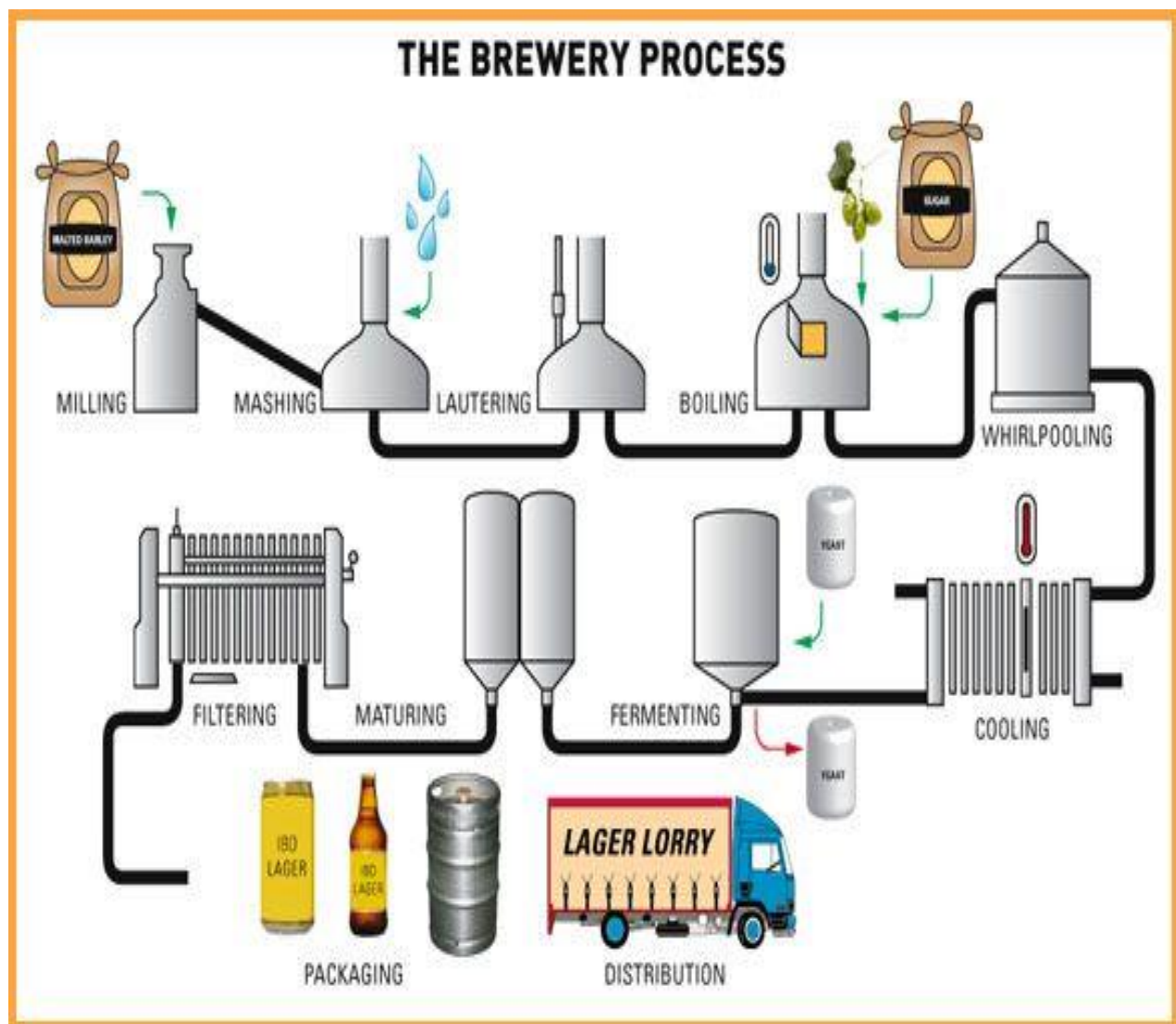
7. FERMENTATION - The seventh step in the beer making process is the alcoholic fermentation. This takes place in a fermentation tank where special brewing yeast is added. The yeast turns the malt sugar into alcohol and carbon dioxide. As soon as the malt sugar has fermented the yeast sinks and is collected. Depending on the type of yeast and the wort preparation used a top-or bottom-fermented beer is produced.

8. STORAGE - The eighth step in beer production is the storage. Young beer is stored anything from three weeks to three months in a storage tank at between 1 and 2°Celsius. A secondary fermentation takes place; remaining yeast particles and protein-tannin sink to the bottom. The beer becomes clear and acquires its characteristic colour.

9. FILTRATION - The ninth step in the brewing process is the filtration. At this last stage any substances still remaining

after fermentation and secondary fermentation, such as yeast particles, hop resin and protein are extracted and the beer gets its final clear colour.

10. FILLING - The tenth and final stage in the brewing process is the filling. The beer is filled using counter pressure to prevent any carbon dioxide from escaping. Barrels are filled directly in our brewery.



BREWERY INSTRUMENT



RESULTS AND DISCUSSIONS

- All processes in the beer production must be designed to ensure continuously high product quality.
- Constantly improved accuracy of process sensors, along with high repeatability enables you to run your process in the most efficient manner.
- The brewing process is the key to brewing consistent high quality home brewed beer.

- There are several tests which you should be doing. These include

1. Water Analysis and Treatment

2. Mash pH

3. Starch Conversion

4. Specific Gravity

5. Instrument Calibration

6. Yeast Viability

CONCLUSION

- The process of brewing involves many stages and the use of suitable raw materials are required for producing quality beer.
- The use of suitable machineries and fermenting agents are highly necessary for producing beer.
- Various types of beer can be synthesized by the use of suitable raw materials.
- Beer can increase good cholesterol, fight heart disease and many more health related issues.

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UNITED BREWERIES LIMITED

25th Sep 2021

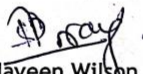
TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Greeshma Das (Reg No-40910001) of 2nd Year MSc Chemistry of Sathyabama University Chennai has successfully completed her Summer Internship.

During the period of her Internship from 10th September 2021 to 25th September 2021, her character and conduct was good.

We wish her all success in her future endeavors.

For United Breweries Limited,


Mr. Naveen Wilson
Executive Human Recourse



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