

Brewing Beer

*B*eer is one of the oldest alcoholic beverages and is produced by the brewing process. In modern times beer has taken an evident omnipresence in our everyday life and is an ideal tool for gathering people. For some nations beer plays a central role to the lifestyle and you may be surprised to hear for example that Germans drink beer at lunchtime, after work, in the evening and some people have it even during breakfast. Today, there are available over 70 styles of beer and each has different characteristics derived from the ingredients and brewing process. I personally really like the saying: Not everyone enjoys every beer, but every beer is brewed because somebody enjoys it.

Beer is thought to be more than 10,000 years old. Archeologists believe that it first started accidentally when a grain was soaked by rain and then warmed by the sun. This mixture was fermented by natural yeast producing beer. The drink became famous in the Middle Age when people were fighting for clean water, which was difficult to find, and so *beer* became a safer beverage to drink.

Early brewers heated grain over open fires resulting in dark, smoky malt that produced dark beer. In the industrial revolution in the mid-1800s brewers invented a way to dry malt in large rotating heated drums that left the grain light in colour and produced a pale, golden beer. In the late 19th century it was discovered *refrigeration*, which meant the brewers no longer had to worry about the outdoor temperatures of heating and cooling stages. Some breweries developed mass production, employing large-scale equipments and large-scale production.

Today beer is made by large manufactures in all industrialized countries, especially in Germany, Great Britain and United States.

The four basic ingredients needed in brewery are barley, hops, yeast, and water. Although the process is not hard and it can be done at home with the right equipments, brewing beer is considered as a mix of science and art.

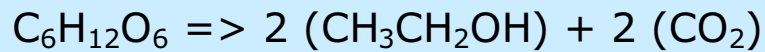
Barley is soaked in water for several days and then it is dried at about 15.5 C. The barley starts to sprout and this is called the green malt. During this process enzymes are released that will break down the proteins and starches ($2C_6H_{10}O_5$) to release the malt sugar.



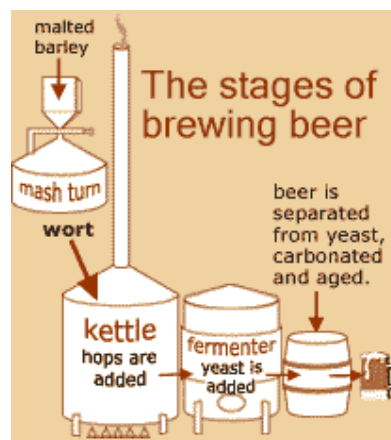
Hops are members of the hemp family and they contain acid and oil that give beer its bitterness and aroma. However, the addition of hops inhibits it with some bacteria that can spoil the beer. The malt sugar is boiled with hops for seasoning. The solution is cooled and yeast is added at room temperature to begin fermentation where glucose is produced.



Another enzyme of yeast, catalyses the decomposition of glucose to ethanol and carbon dioxide. There are two main categories of beer: ale and lager beer. If the beer being made is ale, the wort will be maintained at a constant temperature of 20 C for about two weeks. While lager beers are slower and prefer to maintain the temperature at around 10 C.



Once the fermentation is finished, the beer is slowly pumped from the fermenter and is filtered to remove any remaining solids. After this, the beer is bottled by adding some extra CO_2 to provide the carbonization.



A diagram of the brewing process

There are a lot of advantages in building a brewery in Istanbul because it is a big market. However, there are also some disadvantages which need to be taken into consideration.

A new brewery would be an advantage because Istanbul and Turkey in general is a self-sufficient country for agriculture products. Therefore, it is possible to find every raw material needed for brewing without importing them from foreign countries.

The labor costs in Turkey is relatively low -150 dollars per month and also there is a great deal of unemployment. Therefore, there are lots of possibilities of hiring specialists and workers with not a high salary.

Another advantage would be the geographical location of Turkey. Being surrounded by the Middle Eastern countries that are less developed, future export of beer would be possible. Then export is possible because the transport infrastructure from Turkey to neighboring countries is also good possibility. From the economic point of view, this is a very practicable and profitable project.

There are also a number of disadvantages in building a brewing in Istanbul.

A cultural disadvantage would be that more than 90% of the population is Muslim. The Islamic religion does not allow the use of any alcoholic drink and that is why most Turks are non-alcoholic consumers. This is a disadvantage because the rate of consumption may be low. However, this problem is diminishing everyday due to the fact that the atmospheres in large cities like Istanbul which is becoming more and more cosmopolitan.

As I already mentioned before, in the brewing process water is one of the main ingredients and it is important to have a lot of clean water. However, the quality of water in Turkey, especially in Istanbul is not good. Therefore, to get good quality of water it is necessary to install modern machinery, which costs extra money and this would be a disadvantage.

Wastewaters and used barleys are also concerns. Since they pollute the environment, the installation of cleaning and other special equipments is a must. However, the used barleys might be treated for the production of animal' food.

Another environmental disadvantage is that the brewing process releases large amount of carbon dioxide (CO₂) and causes global warming. Carbon dioxide is one of the most important greenhouse gases and therefore people are continually trying to reduce it.

As a conclusion, I think that Istanbul is an advantageous place for building a brewery because economical factors are positive, environmental obstacles could be

overcome and cultural disadvantages are progressively changing. For the above factors it is clear that the opening of a brewery would a profitable achievement.

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