ALCOHOL PRODUCTION
PRODUCTION METHODS

- Session Objectives-

- By the end of the session one should be able to distinguish between Fermentation and distillation and recall the two types of distillation method used.
CONTENTS

- FERMENTATION
- DISTILLATION-
  - POT STILL DISTILLATION
  - PATENT STILL DISTILLATION
FERMENTATION

- Fermentation is the action of yeast in a sugar solution, which breaks down the sugar into carbon dioxide and alcohol.
- CO2 escapes into the air, and the alcohol, a liquid, remains behind in the original liquid, which thus becomes a fermented beverage.
- Beer and wines are fermented beverages.
FERMENTATION

- All alcoholic beverages begin with the fermentation of a liquid food product containing sugar.

- Formula = \((C_6 H_{12} O_6)N + \text{yeast} \rightarrow 2C_2H_5OH + 2CO_2\)
DISTILLATION

- Water evaporates at 100°C, and ethyl alcohol evaporates at 78°C (to maximum)
- This is used to separate ethyl alcohol from water & residue, it is of Dutch origin
POT STILL DISTILLATION
POT STILL DISTILLATION

- Pots are made of copper, with a capacity 1000 to 1200 litres, also called alembics.
- Copper is a good conductor of heat & does not react with alcohol.
- They are supported on brick kilns with fire beneath in group of twos.
POT STILL DISTILLATION

- The wash is filled in the alembics, and it starts heating.
- Both the vapours of alcohol & water rise up, but more of alcohol as it vaporizes at 78°C.
- The vapours pass through condensers and condense into the vessel on other side.
POT STILL DISTILLATION

- First distillate yields 25 to 30% alcohol
- Second distillate yields 65 to 70% alcohol
- Distilled water is added to bring down the strength to 43%.
- First lot of vapours are called heads or fore shoots & the last lot of vapours are tails
COFFEY / PATENT STILL DISTILLATION

- Invented by Robert Stein which was later modified and patented by Aeneas Coffey in the year 1831
- It is a continuous distillation, process
- There are two towers 80 feet high
- First one is analyzer and second is rectifier
COFFEY / PATENT STILL DISTILLATION

- Hot wash is pumped into rectifier column & steam is injected in analyzer
- Both mix up in baffles (special perforated trays) resulting in formation of vapors of ethanol
Coffey / Patent Still Distillation

- The condenser cools and condenses the ethanol vapors, the remaining vapors are recycled as spent wash
- The net result is a yield of 96% alcohol
PATENT STILL DISTILLATION

1. Wash
2. Steam
3. Liquid out
4. Alcohol vapor
5. Less volatile components are recycled
6. Most volatile components
7. Spirit
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THANK YOU

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