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Hutatma Rajguru Mahavidyalaya

Arts, Science and Commerce

Rajgurunagar, Tal-khed, Dist. Pune

T.Y.B.Sc. Sem-IV

Industrial chemistry paper- 505

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As per new revised syllabus w.e.f. June 2021

Topic - Fermentation industry

Sub-topic - Ethyl alcohol from food grain hydrocarbon, fruit -wine

Ethyl alcohol from food grain

To obtain the ethyl alcohol from food grain involve the following steps

a) Malting – The barley are soak it in water allow to germinated for 20 days and drying is carried out and malt is prepared. It is mostly carried out in separate industry

b) Mashing- malt contain a considerable amount of starch and small amount of sugar together with enzyme the malt is crushed and mix with hot water and raw grain or potato starch temp is maintain 40-60 0c As a result of it fermentation in the presenceof enzyme diastage the starch is converted into maltose or malt sugar , this process is called as mashing

c) Fermentation-The sweet liquid or wort is transfer to fermentation tank after the complete mashing and yeast is added , the enzyme zymase present in the yeast convert glucose into ethanol and CO2 small amount of higher alcohols and glycerine, succinic acid etc. are also produce.

d) Distillation- By fractional distillation method, Ethanol is separated from mixture and scotch whiskey is prepared from barely malt.

Manufacture of ethyl alcohol from hydrocarbon

1) Liquid phase hydration – the ethylene is undergoes hydration reaction in the presence of H2SO4 gives ethanol but in this process the ether is formed as side reaction

2) Gas phase- the addition of water into alkene in presence of acid it gives the alcohol. the reaction is exothermic and favoured by low temp and high pressure.

Ethyl alcohol from fruit -wine

The fermentation of fruit juice, is used to manufacture of wine, wine is obtain from grapes involved the following steps

Preparation of must- The juice of grapes contain the glucose, fructose, various acids and skin of grapes contain tannin, various oil, colouring matter The seeds and part steam is remove and the juice is extracted from wooden roller called as must.

Fermentation- The ethyl alcohol is obtain by fermentation of must after first active fermentation. new wine is filled full into cake which are loosely closed in order to prevent the conversion of alcohol into acetic acid, it kept for 3-4 month during this period the yeast is settle down and tartaric acid, salt and colouring matter separated out, is then filter

Ripening – The clear wine is ripe for 2-4 years During this process tanning and other impurities are ppt out, in this period

alcohol and fusel oil react with acid present to form ester which gives flavour to the wine

Bottling- The quality of wine varies from place to place and verities of groups and After ripening the wine is bottled

Manufacture of alcoholic Beverages

1) Wine
2) Whisky
3) Rum
4) Beer
5) Power alcohol

References: According to the new revised syllabus of Savitribai Phule Pune University from June 2021, Text book of Industrial chemistry for T.Y. B.Sc. course (CH-505), Sem-V Manali Publication, Nirali Publication and google images