MICROBES IN HUMAN WELFARE

MICROBES IN INDUSTRIAL PRODUCTS

Microbes in Industrial product: -

Industry used a number of microbes to synthesize products valuable to human.

Production at Industrial scale require growing microbes in large vessels called fermenters.

1.Fermented Beverages: -

Microbes especially Yeast have been used for production of beverages like wine, beer, whisky, brandy or rum.

Saccharomyces cervisiae (brewer's Yeast) is used for bread making.

Saccharomyces cerevisiae is used for fermenting malted cereals & fruit juices to produce ethanol. Saccharomyces ellipsoids is called wine yeast.

Depending upon type of raw material used & type of processing (with or without distillation), different types of alcoholic drinks are obtained.

Wine & Beer are produced without distillation.

Whisky, Brandy & Rum are produced by fermented broth, by distillation.

Nutrient medium is Barley malt for Beer, Rye malt for Gin. Potato for Vodka, Cereals for Whisky, Molasse for Rum, Juices for Wine & Brandy.

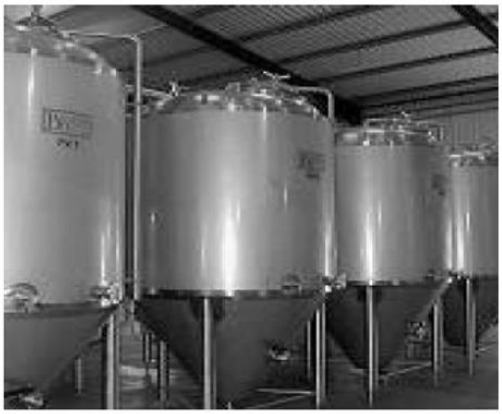

Figure : Fermentors

Figure : Fermentation Plant

2. Antibiotics: -

Antibiotics produced by microbes are one of the most significant discoveries of 20th century.

Antibiotics are chemicals produced by some microbes and can kill or retard growth of disease-causing microbes.

Chloromycetin is obtained from Streptomyces Venezuela.

Term antibiotic was coined by Selman Waksman.

Penicillin was first antibiotic, to be discovered.

It was chancily discovered by Alexander Fleming, while working on Staphylococci bacteria.

Staphylococci was unable to grow around Petry dish as penicillin was formed from mould.

Fleming coined the name Penicillin.

Potential of Penicillin as antibiotic was established by Ernest chain & Howard Florey.

Fleming, chain & Florey were awarded Nobel in 1945.

Antibiotic was extensively used to treat soldiers wounded in World War-II.

Antibiotics have greatly improved out capacity to treat deadly diseases as Plague. Whooping cough, Diphtheria, Leprosy.

Mentalism is used for production of antibiotics.

3. Chemicals, Enzymes & other Bioactive Molecules: -

Acid Producer

Aspergillus Niger (fungus) - Citric acid, used in preservation of food, candies, medicines.

Acetobacter acetic (bacteria) - Acetic acid, used for preparation of vinegar.

Clostridium botulinum (Bacteria) - Butyric acid, used as food & perfume additives for aroma.

Lactobacillus (bacteria) - Lactic acid.

Modern Detergent contain enzyme preparation of Acidophiles.

Yeast (Saccharomyces cervisiae) is used for commercial production of enzymes.

Lipase enzyme is used for detergent formulation & removing oil stains.

Bottled juices are clearer due to use of protease (from Mattarella reinspire, Aspergillus and Bacillus) & pectinase (from Aspergillus Niger and Byssochlamys fulvo).

Streptokinase produced by Streptococcus and modified by genetic engineering is used as clot buster for removing clots from blood vessel of patients who have undergone myocardial infarction leading to heart attack.

Statins produced by Yeast Meniscus purpures is used as blood - cholesterol lowering agent. It act by competitively inhibiting enzyme responsible for synthesis of cholesterol.

Stains are competitive inhibitors of b-hydroxy, b-methylglutaryl coenzyme A reductase or HMG-CoA reductase

Amylase is used in textile industry.

Chakravarthy bug is superbug of Pseudomonas with multiple plasmids, useful for removing oil spills in the sea.