Ch. MICROBES IN HUMAN WELFARE

Microbes in household:
- Lactobacillus / lactic acid bacteria
  milk → Curd
- Inoculum: transfer of microbe
  - digest milk partially
  - Bio vitamin
  - check pathogen in stomach.

Fermentation:
Saccharomyces Cerevisiae
- Anaerobic process
- make dough
- puffed appearance due to CO_2
- Baker's yeast
  Idli, dosa,

Toddy:
- Sap from plum - fermentation
- other fermented food - fish, Soya bean, Bamboo shoot.

Swiss cheese - Bacteria Propionibacterium shermanii
Roquefort cheese - Fungus Penicillium Roquefort

Alcohol:
- Big fermentor
- Brewer's yeast - Saccharomyces Cerevisiae
- Ferment malted Cereals, fruit juice → Ethanol
  - without distill° — Wine, Beer
  - With distillation — Whisky, Rum, Brandy

Antibiotics:
Penicillium → penicillium notatum
- Alexander Fleming discovered.
- Ernest Chain & Howard Jeffery
  Full potential Ab

Microbe in industry:

Aspergillus niger (Fungus)	citric acid
Acetobacter aceti (bacteria)	Acetic acid
Clostridium butylicum (bacteria)	butylic acid
Lactobacillus (bacteria)	lactic acid

Enzymes:
- lipase - detergent remove oil stains
- Pectinase & Protease degrade pectin - protein
- Streptokinase Clot busters. remove blood clot from Vessels
- Cyclosporine A
  Trichoderma polysporum (Fungus)
  Immunosuppressive agent in organ transplant
  Statins = blood Cholesterol lowering agent

Ganga Action plan
Yamuna Action plan

Microbes in Sewage Treatment:
Sewage = domestic + office waste.

Primary treatment: physical removal of particles (sand, soil)

Secondary Treatment:
Supernatant Primary Effluent → Aerobic tank → Growth of aerobic microbe in flocs (mesh like bacterial growth) → consume organic matter → Reduce BOD → Sediment° of flow → activated sludge → Digester produces gases CH_4, H_2S, CO_2

Biogas Production:
- Biogas - mixture of gases (CH_4)
- methanobacterium.
- Cattle dung - methanogens biogas production



Indian Agriculture Research Institute
Khadi and village Industries Commission

Bio Control:
Chemical Pesticides / Insecticides:
- pollution
- Biomagnification

lady bird - Aphids
Dragon flies - Mosquitoes
Moth - Prickly pear Cactus

Bacillus thuringenesis
Crystal Cry gene → Insect alkaline gut → Protoxin into toxin → Insect die due to starvation

Spores:
dry spore mix with water → Spray on plant → Baccica - mustard

Trichoderma Sp: (Fungus)
- Control plant pathogen of roots.

→ Baculoindenses → attack insect & other arthropod. → Integrated pest management

Microbe as Fertilizer:
Bacteria:
Rhizobium (Symbiotic) - N_2 fix°. Root nodules of legumes.

Azospirulum & Azotobacter (free living) - N_2 fix°

Fungus:
Mycorrhiza - Symbiotic association of fungus + roots of higher plant.
- Resistance to root pathogen Eg. Glomus

Cyanobacteria:
Anabaena, Nostoc, Oscillatoria
Azolla (Symbiotic)

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