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Sub. Biology

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## In Industrial Products :-

Beverages and antibiotics.

- **Fermentors** : Large vessels for growing microbes.

Fermented Beverages :-

- Beverages like wine, beer, whisky, Brandy, Rum (*Saccharomyces cerevisiae*) Malted cereals and fruit juices used to produce ethanol, wine and beer produced without distillation. Whisky, brandy, rum produced after distillation.

♦Antibiotics :- (Against life)

- Penicillin produced by Alexander Fleming from *Penicillium notatum* while working with Staphylococci Earnest Chain and Howard Florey awarded Nobel Prize in 1945 for establishing Penicillin as an effective antibiotic.

- **Uses** : Treat diseases like plague, whooping cough, diphtheria, leprosy.

- **Chemicals** : Enzymes and other Bioactivities Molecules:

• **Uses:**

- **Aspergillus niger** for production of Citric Acid.
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- **Acetobacter aceti** for production of Acetic Acid.
- **Clostridium butylicum** for production of Butyric Acid.
- **Lactobacillus** for production of Lactic acid.
- **Lipases used** in detergents to remove oil stains from Laundry.
- **Pectinases** and **Proteases** to clarify bottled juices.
- **Streptokinase** (from *Streptococcus*) as clot buster in patients with myocardial infraction (heart attack).
- **Cyclosporin A**– an immuno-suppressant used in organ transplant patients (produced by ***Trichoderma polysporum***)
- **Statins** produced by yeast ***Monascus purpureus*** used as blood, cholesterol lowering agent.

Microbes in sewage Treatment :-

*Why treatment necessary ?*

- *Major component of waste water, human excreta.*
- *Waste water sewage.*
- *Cannot be disposed directly into rivers and streams.*