Objectives

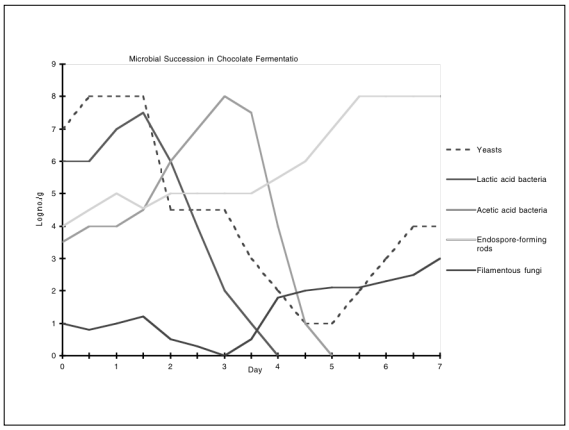
1. Define the following terms: applied microbiology, biotechnology, fermentation.
2. List the microorganisms most commonly used in industrial processes.
3. Describe the source(s) of microbes in natural fermentations.
4. List an example of each of the following types of cultures: pure culture, succession, consortia.
5. Identify an advantage and disadvantage of each of the following: continuous culture; batch fermentation; solid-state fermentation; immobilized cells.
6. List 10 microbial products.

Definitions

- Industrial Microbiology
- Biotechnology
- Fermentation

World History

- 20,000+ years ago
- 1502
- 1620
- 1849
- 1912
- 1914
- 1939
- Now



Lager:

Starch —(Germinate / Malting)→ Glucose + Maltose —(○)→

Ale:

Starch —(Germinate / Malting)→ Glucose + Maltose —(○)→

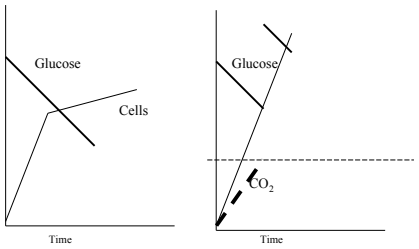
Succession

Sucrose —(○)→ Ethyl alcohol + CO_2 —(▭)→ Acetic acid

Consortium

Malic acid —(▭)→ Lactic acid

- Primary metabolite
- Secondary metabolite
- Batch fermentation
- Continuous culture
- Fed-batch fermentation
- Solid-state fermentation

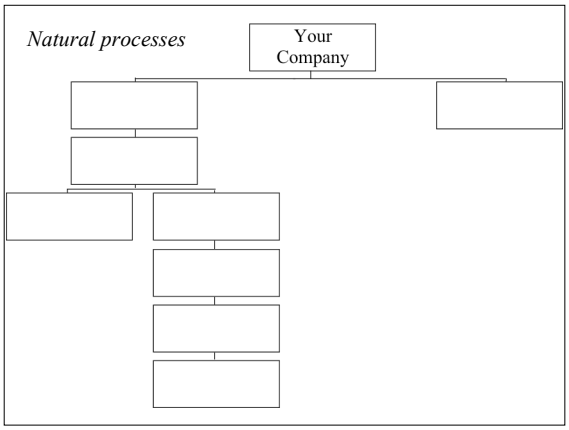


Blue Jeans

- Cotton
- Bleaching
- Sizing
- Dyeing
- Washing

Designer Jeans

- *Gossypeum*
- Chlorine
- Starch
- *Indigofera*
- Soap, water, washing machine



Products

Products Whole Cells

A Problem

- Hot water is $.
- Detergents don't remove grease in cold water.
- Detergents biodegrade slowly.
- How can you improve laundry products?