Chapter 10 - Food and beverage biotechnology

10.1 Introduction
- A.Availability & size
- B.Biotechnology role
  - 1.additional considerations
- C.Differences from pharmaceutical industry
- D.Anticipated impact of biotechnology
  - 1.agronomic
  - 2.non-agronomic

10.2 Food and beverage fermentations
- 1.result
- 2.examples of fermented foods
- 3.purposes
- 4.historical
- 5.groups
- 6.biotech revenues

A.Alcoholic beverages
- 1.geography
- 2.improvement objectives
- 3.starting material
- 4.product characteristics
- 5.distillation
- 6.organism

B.Wine
- 1.red wine
- 2.white wines
- 3.rose
- 4.dry
- 5.sweet
- 6.process
- 7.alcohol content

C.Beer
- 1.historical
- 2.definition
- 3.bacterial growth
- 4.steps in production
  - a.malting
  - b.mashing
    - 1)wort
  - c.fermentation
  - d.maturation & finishing
- 5.alcohol content
- 6.India & Asia
- 7.Africa

D.Spirits
- 1.definition
- 2.potable spirits
- 3.maturation

E.Coffee, tea, cocoa

F.Dairy products
1.importance
2.origin
3.process overview
4.beneficial changes in milk
5.cheese
a.whey
b.rennet
1)chymosin
c.production process
6.yogurt
G.Microbial growth in the intestine
1.probiotics
a.aim
H.Vegetable fermentations
1.cabbage
I. Cereal
1.bread
a.process
b.biotech involvement
1)objectives
c.organisms
1)sour dough bread
2)India
3)Asia
2.legume
a.tempeh
b.soybean fermentation
1)phases
a)koji
b)moromi
c)maturation

10.3 Microorganisms as food
1.Single Cell Protein (SCP)
A.SCP derived from high-energy sources
B.SCP from waste organic materials
1.Quorn™ myco-protein
a.criteria
b.filamentous fungi
c.bioreactors
d.process
e.marketing
2.mushroom production
a.substrate
b.mushrooms grown for food
1)Agaricus bisporus
a)how grown
-flushes
2)Lentinula edodes
a)substrate
b)Process
3)Pleurotus

10.4 Enzymes and food processing
- A.examples
- B.new

10.5 Amino acids, vitamins and sweeteners
- A.Amino acids
  - 1.markets
  - 2.large scale examples
  - 3.chemical synthesis
  - 4.source of organisms
- B.Vitamins
- C.Sweeteners
  - 1.corn starch
  - 2.artificial
    - a.saccharin
    - b.aspartame
    - c.thaumatin

10.6 Organic acids and polysaccharides
- A.Acids
  - 1.citric acid
  - 2.lactic acid
- B.Polysaccharides
  - 1.uses

10.7 Rapid diagnostics
- A.ELISA

10.8 Bioprocess technology
- A.Improvements

10.9 Public acceptance and safety of new biotechnology foods
- A.change considerations
- B.Biotech input