REFERENCES


COURSE CONTRACT

- Come on time
- Silent your cell phone
- Manage your tasks & assignment
- Actively participate, Think creatively
- Read, Read more and more
- No plagiarism

DOWNLOAD COURSE

- https://nurhidayat.lecture.ub.ac.id
- http://lsihub.lecture.ub.ac.id/biologi/
- https://e-tp.ub.ac.id

Mikrobiologi Pangan dan Industri
TPI 4122/3 (2-1)

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Brawijaya University

2014
http://e-tp.ub.ac.id
Score Grading

- Assignment 10%
- Practicum 30%
- Midterm Test 30%
- Final Test 30%

<table>
<thead>
<tr>
<th>Range</th>
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Cheating students will be punished with “E” grade

COURSE TOPICS

<table>
<thead>
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<th>Week</th>
<th>Topics</th>
<th>Lecturer</th>
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<tr>
<td>1</td>
<td>Introduction (Course Contract)</td>
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<td>2</td>
<td>Faktor-faktor yang mempengaruhi petumbuhan mikroba</td>
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<td>3</td>
<td>Indicators in Food Microbiology</td>
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<td>4</td>
<td>Food Preservation</td>
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<td>Foodborne diseases</td>
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<td>6</td>
<td>Food borne intoxications</td>
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<td>Fungal intoxications</td>
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<table>
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<th>Week</th>
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<td>8</td>
<td>Tempeh fermentation</td>
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<td>14</td>
<td>Product Development</td>
<td>WJT</td>
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Final Test (UAS)
The fine line between fermenting and spoiling

- What does the microbe grow on?
- Which microbe grows on it (what is its end product?)

Which microbes grow in food, and why?

- Intrinsic factors
  - Nutrient content
  - Water content (osmotolerance)
  - pH (acid conditions may inhibit growth of harmful microbes)
- Extrinsic factors
  - Temperature
  - Oxygen availability

Microbes and food production

Fermented milk products
- Lactic acid bacteria ferment the lactose in milk
- Acid environment inhibits growth of other microbes
- Starter cultures are often used
Yeast produce different fermentation products

- Ethanol and carbon dioxide
- Alcoholic beverages
- Bread

Distinguishing features of alcoholic fermentation

- What is fermented?
  - Fruit (wine)
  - Rice (sake)
  - Grains (beer, spirits)

- How is the product finished?
  - Spirits are distilled
  - Beer and wine are filtered

Fermentation has enhanced and preserved food for centuries

- By bacteria, yeasts and molds
- In absence of oxygen
- Acids and alcohols are produced

Molds are used in food production, too

- By bacteria, yeasts and molds
- In absence of oxygen
- Acids and alcohols are produced
Food spoilage

- End products are obnoxious
- Sometimes harmful
- Bacteria tend to spoil moist foods; fungi dry or acidic foods

Diseases transmitted in food

- Toxins
  - Staph toxin is heat-stable; botulism toxin is not
- Invasive bacteria
  - Cook thoroughly
  - Avoid cross-contamination

Food preservation

- Pre-industrial
  - Drying
  - Pickling (salting)
  - Canning
- Mass production
  - Pastuerization
  - Preservatives
  - Freezing (freeze-drying)
  - Irradiation

Summary

- Microbes eat the same foods we do!
- Controlled microbial growth can enhance our diets and help preserve foods
- Metabolism of some microbes leads to spoilage of foods
- Some microbes in food are pathogens
- Minimizing microbial contamination of food is a priority