

## Food Safety & Foodborne Diseases

### 1. Food Spoilage

#### A. Food Classification

##### i. Highly Perishable Foods

- Fish
- Meat
- Milk
- Many Fruits and Vegetables

##### ii. Semi-Perishable Foods

- Potatoes
- Some Apples
- Some Nuts

##### iii. Stable or Nonperishable

- Flour
- Rice
- Dry Beans

B. Variables

- i. Water
- ii. pH
- iii. Physical Structure

Jack in the Box Incident

- iv. Temperature

- iv. Oxygen

- a. Marinated Meat Incident

- b. Chickenpot pie incident

- v. Bacterial Growth Rate

- a. Geometric Growth Rate

- Generation Time

\* Escherichia coli

= 20 minutes

\* Staphylococcus aureus = 30 minutes

\* Factors Involved

Temperature

Nutrients Available

Time	Number
0	1
0.5 hr	2
1.0 hr	4
1.5 hr	8
2.0 hr	16
2.5 hr	32
3.0 hr	64
3.5 hr	128
4.0 hr	256
4.5 hr	512
5.0 hr	1,024
5.5 hr	2,048
6.0 hr	4,096
6.0 hr	8,192
7.5 hr	16,384
7.0 hr	32,768
8.5 hr	65,536
9.0 hr	131,072
0.5 hr	262,144
10.0 hr	524,288
10.5 hr	1,048,576
11.0 hr	2,097,152
11.5 hr	4,194,304
12.0 hr	8,388,608

2. Food Preservation (non-chemical)

A. Heat

- Clostridium botulinum
- Clostridium tetani

B. Moist Heat

i. Home Canning

C. Pasteurization

i. Methods

- a. Traditional Method – 62.7°C for 30 minutes
- b. Flash Pasteurization – 71.6 for 15 to 17 seconds

- Grade A Pasteurized Milk

< 20,000 total bacteria per ml

<10 coliform bacteria per ml – high numbers may

suggest possible fecal contamination.

- Grade B Pasteurized Milk

< 1 million bacteria per ml

< 10 coliform bacteria per ml

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- D. pH
  
- E. Osmotic Pressure
  
- F. Radiation
  - i. Microwave Radiation
  - ii. Ionizing Radiation
  
- G. Low Temperatures
  - *Clostridium botulism*
  
  - Suchi
  
- H. Freezing

3. Food Preservation (Chemical)

A. Specific Chemicals

i. Acids

ii. Anticaking Agents

a. calcium silicate

Ammonium citrate

Magnesium Stearate

Silicon Dioxide

iii. Antimicrobial Agents

- Sodium Benzoate
- Sorbinc Acid (fungal i.e. mold)
- Calcium propionate
- Sulfur dioxide

4. Pathogen of Meat

A. *Escherichia coli*

- Jack in the box story
- i. *E. coli* Strains
  - a. ETEC (Enterotoxigenic *E. coli*)
    - Toxins
    - Colonizing Factors
  - ii. EHEC (Enterohemorrhagic *E. coli*)
    - a. General Information
      - Toxins

5. Poultry and Eggs

A Salmonellosis (*Salmonella* sp. )

- i. General Information
  - a. Characteristics
  - b. Reservoir
- ii. Pathogenesis
- iii. Control
- iv. Symptoms

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### 6. MILK

#### A. Listeriosis

- i. General Information
- ii. Reservoir
- ii. Diseases
  - a. Listeriosis
  - b. Meningitis
  - c. Still birth

### 7. WATER – Shellfish

#### A. Dinoflagellates

### 8. Organisms of Diseases via. Preformed Bacterial Toxins

#### A. Staphylococcus aureus

- Carriers
- Toxin

B Botulism (*Clostridium botulinum*)

i General Information

ii. Diseases

a. Botulism

- Endospores

b. Infant Botulism

9. Non-bacterial PARASITES

D. Giardiasis

i. Disease

a. Giardiasis

E. Toxoplasmosis

i. Introduction

ii. Stages:

a. Acute (recently acquired)

b. Chronic (latent)



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- iii. Forms:
  - a. Asexual invasive form
  - b. Tissue cysts - occurs in chronic form
  - c. Oocyst - form in digestive tract of cats. In cats is where the sexual cycle occurs.
- iv. Life Cycle
- iv. Treatment and Prevention
  - a. AIDS patients
  - b. Immunocompromized Patients and Pregnant Women
  - c. Prevention

## 10. Parasitic (Multicellular Eucharitotic) Diseases of the Digestive Tract

- A. Beef Tapeworm
  - i. General Information
    - a. Definitive Host
    - b. Intermediate Host
  - ii. Life Cycle
  - iii. Disease
    - a. Symptoms

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b. Psychological Distress

c. Control

B. Pork Tapeworm

i. General Information

a. Definitive Host

b. Intermediate Host

i. Disease

a. Cysticercosis

C. Trichinosis

i. Life Cycle

ii. Disease

a. Trichinosis