BIO 201 Lab 7
Experiments 9, 10, 11 & 12
Results

Professor Diane Hilker

Overview

I. Exp. 9: The Effect of pH on Growth of Microbes

II. Exp. 10: The Effect of Osmotic Pressure on Microbes

III. Exp. 11: The Effect of Ultraviolet Light on Bacteria

IV. Exp. 12: Oxygen Requirements for Growth of Microbes

I. Exp. 9: pH & Growth

- Purpose: To determine the effects of pH on certain microorganisms.
  - **Acidophile**: microbes that grow at a low pH (less that pH 7)
  - **Alkalophile**: microbes that grow at a high pH (greater that pH 7)
  - Most bacteria prefer a neutral pH (pH 7)
  - Most fungi prefer an acidic pH

I. Exp. 9: pH & Growth

- Food is preserved with low pH solutions
  - Vinegar
  - Lemon Juice
  - Tomato Sauce

I. Exp. 9: pH & Growth

- Certain diseases are treated or prevented by lowering pH
  - **Urinary Tract Infections: Cranberry Juice**
  - **Vaginitis: vinegar douches**
  - **Swimmer's ear (Otitis externa): vinegar/rubbing alcohol ear drops**
    - **Pseudomonas sp.**

I. Exp. 9: pH & Growth

- Fill in Table 3 with +'s and -'s
- Which microbe is an acidophile?
- Which microbe is an alkalophile?

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II. Exp. 10: Osmotic Pressure & Growth

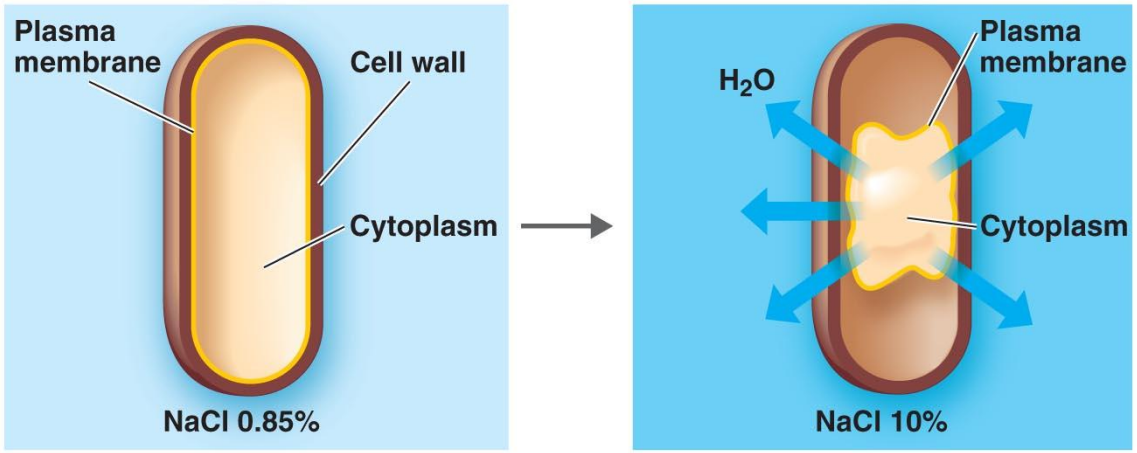
- Purpose: To determine the salt tolerance of different microorganisms.

- Refer to Unit 4 Lecture Notes
  - What is Osmotic Pressure?
  - What moves across the semi-permeable membrane, the solvent or solute?

II. Exp. 10: Osmotic Pressure & Growth

- **Isotonic:** no movement of H_2O in or out of the cell
- **Hypotonic**: H_2O enters the cell
  - Cell will swell and then burst
- **Hypertonic:** H_2O leaves the cell
  - Cell shrinks–cell membrane pulls away from the cell wall
  - Bacteriostatic state created

II. Exp. 10: Osmotic Pressure & Growth



(a) Normal cell in isotonic solution. Under these conditions, the solute concentration in the cell is equivalent to a solute concentration of 0.85% sodium chloride (NaCl). See Figure 4.18.

(b) Plasmolyzed cell in hypertonic solution. If the concentration of solutes such as NaCl is higher in the surrounding medium than in the cell (the environment is hypertonic), water tends to leave the cell. Growth of the cell is inhibited.

II. Exp. 10: Osmotic Pressure & Growth

- **Osmophiles:** love hypertonic solutions
  - **Halophile:** loves salt
    - Found in the oceans and on skin

  - **Saccharophile:** loves sugars or carbohydrates

II. Exp. 10: Osmotic Pressure & Growth

- Fill in Table 4 with +'s and -'s
- Which microbe is a halophile?

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III. Exp. 11: UV Light

- **Purpose: To determine the effects of UV light on certain microorganisms.**
  - Prevents replication and function of DNA
  - **Limited uses:** can't penetrate surfaces
  - **Used to sterilize:**
    - Surfaces such as tabletops, instruments, and goggles
    - Atmosphere of enclosed areas like operating rooms
  - Protect eyes

III. Exp. 11: UV Light

- Fill in Table 5 with +'s and -'s
- Which microbe requires longer periods of time to eliminate it? Why?

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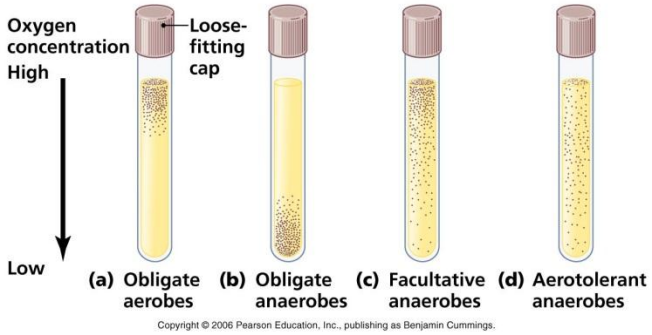
IV. Exp. 12: Oxygen Requirements for Growth of Microbes

IV. Exp. 12: O_2 Requirements for Growth

- **Purpose: To determine the effects of oxygen on the growth of certain microorganisms.**
- Refer to Unit 4 Lecture Notes



- **Aerobes**: require O_2 for growth
- **Anaerobes**: killed in the presence of O_2
- **Facultative**: can grow in the presence or absence of O_2

IV. Exp. 12: O_2 Requirements for Growth

- **2 Culture Media Tubes Used:**
  - Fluid Thioglycollate Broth
  - Brewers Anaerobic Agar Deep

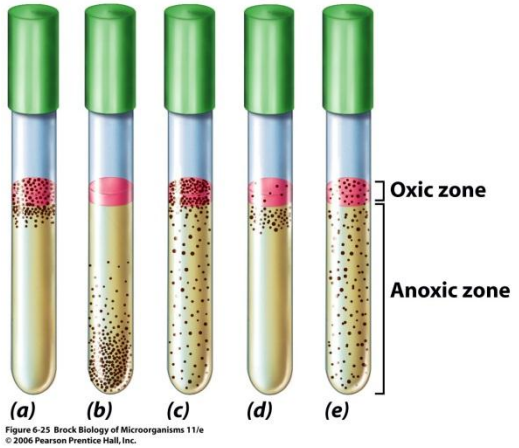


Figure 6-25 Brock Biology of Microorganisms 11/e
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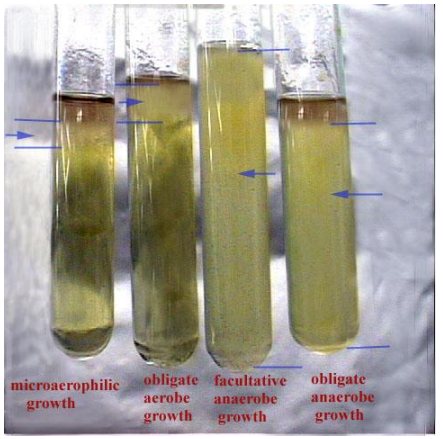
- **2 Chemicals Found in the Tubes:**
  - **Thioglycollate:** removes O_2
  - **Resazurin:** O_2 Indicator
    - **O_2 Present:** pink/purple color
    - **No O_2:** colorless



IV. Exp. 12: O_2 Requirements for Growth

- Fill in Table 6 with +'s and -'s
- Which microbes are aerobes, anaerobes or facultative?
- What does a hyperbaric chamber do and what type of microbes would be eliminated by this device?

BIO 201 Lab 7-New Exp. Experiments 23, 24 & 25

Professor Diane Hilker

Overview

I. Exp. 23: Transformation of *E. coli* –discussed last

II. Exp. 24: Passive Agglutination with Latex Beads

III. Exp. 25: Parasitology

Overview

I. Exp. 23: Transformation of *E. coli* –discussed last

II. **Exp. 24: Passive Agglutination with Latex Beads**

III. Exp. 25: Parasitology

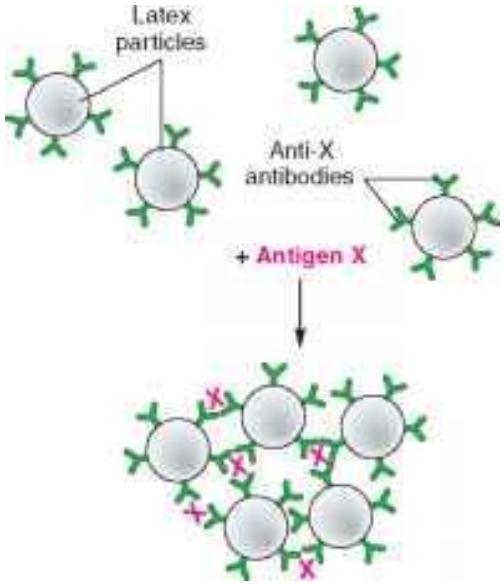
II. Exp. 24: *Agglutination with Latex Beads*

- Purpose: To perform an agglutination procedure and to determine what species of *Staphylococcus* is present on a petri plate
- Immunology Experiment: Antigens and Antibodies
- Staphaurex ^{R} Test Kit:

  S. aureus vs. *S. epidermidis*

II. Exp. 24: *Agglutination with Latex Beads*

- Antibodies on beads will recognize
  S. aureus only
- **Positive Reaction:**
  - Agglutination or clumping
  - *S. aureus* present on plate
- **Negative Reaction:**
  - No agglutination or smooth appearance
  - Not *S. aureus*
  - *S. epidermidis* present on plate
- **Demonstration by instructor**



Overview

I. Exp. 23: Transformation of *E. coli* –discussed last

II. Exp. 24: Passive Agglutination with Latex Beads

III. Exp. 25: Parasitology

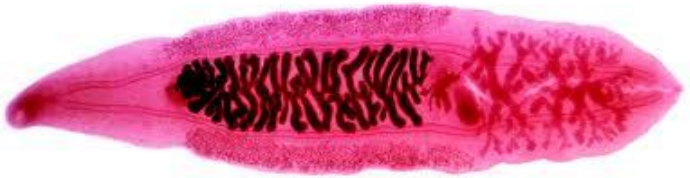
III. Exp. 25: Parasitology

- Purpose: To be able to observe different types of helminths
- Observe Preserved Specimens
- Observe Prepared Slides: Scan Power/Clean Slide
- Observe a Live Worm: Vinegar Eels

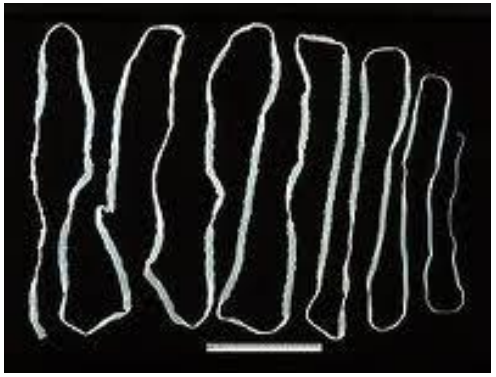
- 2 Types of Worms:
  - Platyhelminths: Flatworms
    - Tremodes or flukes
    - Cestodes
  - Nematodes: Roundworms

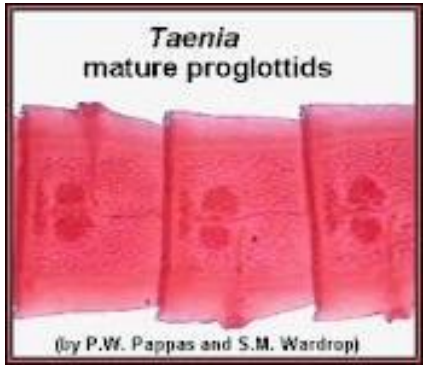
III. Exp. 25: Parasitology

- **Platyhelminths**
  1. *Clonorchis*: fluke



  2. *Taenia sp.:* tapeworm
     a. **Scolex**: head
     b. **Proglottids**: segments (male & female organs)

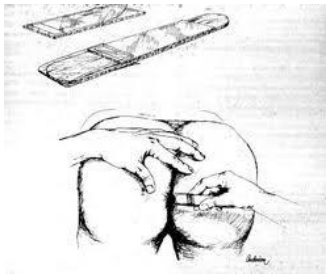




III. Exp. 25: Parasitology

- **Nematodes**

  3. *Enterobius*: pinworm

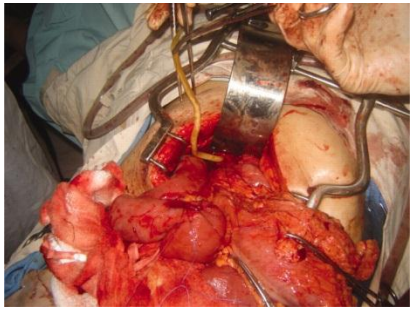


  4. *Necator*: hookworm

III. Exp. 25: Parasitology

- **Nematodes**

*5. **Ascaris:***



6. ***Trichinella sp.**:* muscle biopsy

III. Exp. 25: Parasitology

- **Nematodes: Live Worm**
  7. **Vinegar eels**: *Turbatrix aceti*

- Non-pathogenic
- Need a low pH
- Found on fermented apples and non-pasteurized vinegar

Overview

I. Exp. 23: Transformation of *E. coli*

II. Exp. 24: Passive Agglutination with Latex Beads

III. Exp. 25: Parasitology

I. Exp. 23: Transformation of *E. coli*

- Purpose: To genetically transform *E. coli* so that it is resistant to the antibiotic ampicillin
- Groups of 2-3 students
- Materials Needed/group
- Follow procedure in Lab Manual
- Theory to be discussed in the next lab