BIO 201 Lab 10 Experiments 19 & 20 Results

Professor Diane Hilker

Overview

I. Exp. 19: Water Analysis for Fecal Contamination

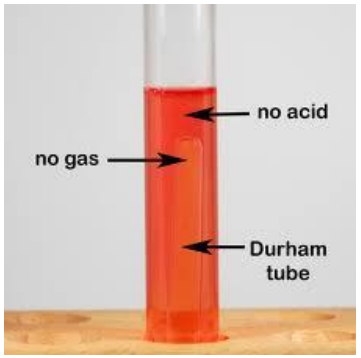
II. Exp. 20: Quantitative Analysis of H_2O

I. Exp. 19: Water Analysis for Feces

- **Purpose:** To learn & perform the 3 stage standard H_2O analysis test for fecal contamination
- **Waterborne Diseases:** *E. coli*, HAV, Polio, *Shigella, Giardia*, *Salmonella*
- **Fecal Indicator:** *E. coli*
- **Chlorine kills:** Gram negative bacteria, viruses and some Gram pos. & protozoa
- **Normal Flora Chlorinated H_2O:** non-pathogenic Gram pos. saprophytes

I. Exp. 19: Water Analysis for Feces

3 Tests Performed



I. Presumptive Test

- **PRLB Tube**–Phenol Red Lactose Broth with a Durham Tube

- **3 Reactions:**
  - *1. Red/orange with or without gas
  - *2. Yellow without gas
  - **3. Yellow with gas: lactose fermenter

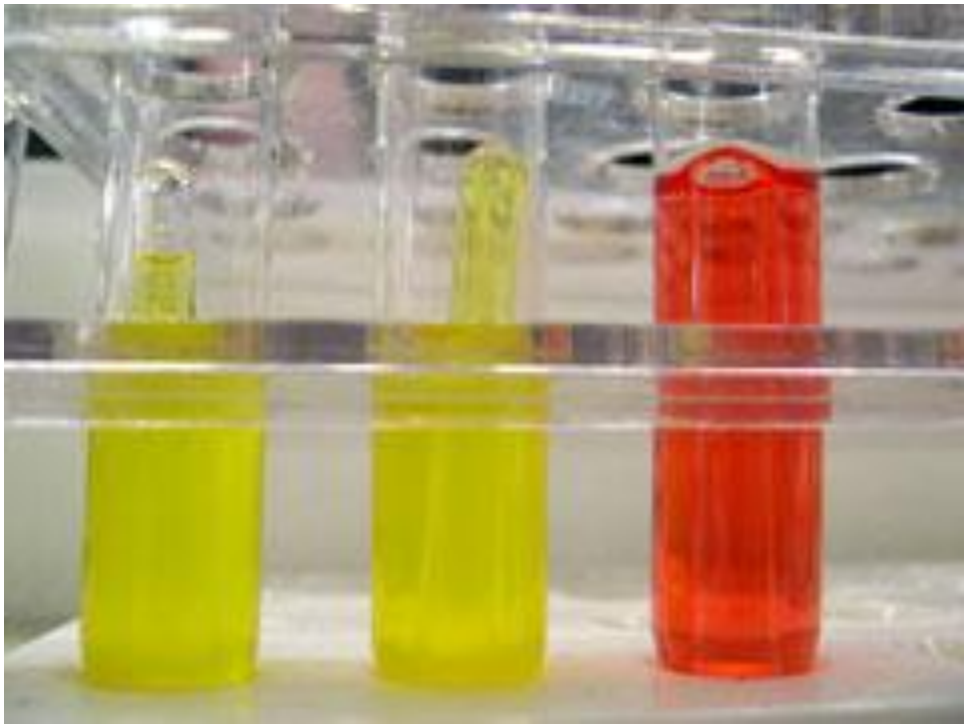
- *Potable or drinkable
- **More testing necessary

I. Exp. 19: Water Analysis for Feces

3 Tests Performed

I. Presumptive Test

- 3 Reactions



I. Exp. 19: Water Analysis for Feces

3 Tests Performed

I. Presumptive Test

- Yellow with Gas–3 possible microbes
  1. *E. coli*: Gram neg. rod

  2. *Enterobacter*: Gram neg. rod

  3. *Clostridium*: Gram pos. rod

I. Exp. 19: Water Analysis for Feces

3 Tests Performed

II. Confirmed Test

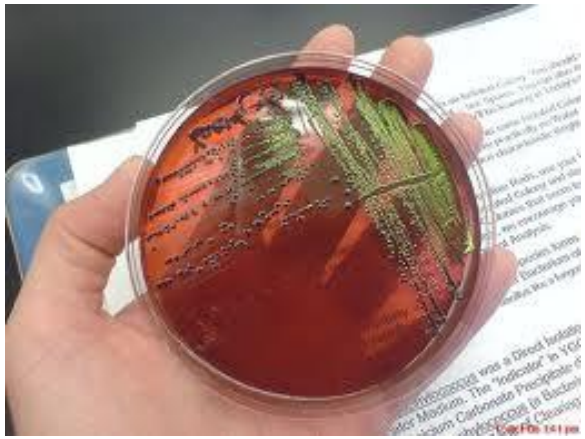
- Test a tube that is yellow with gas to see which microbe is present
- **EMB Plate:** Eosin Methylene Blue
  - Inhibit Gram pos.
  - Allow certain Gram neg. lactose fermenters to grow
- Do a T-Streak, 24 hrs. at 37°C

I. Exp. 19: Water Analysis for Feces

3 Tests Performed

II. Confirmed Test

- **3 Possible Observations on EMB**
  1. No Growth: *Clostridium* 
  2. Growth: Beige colony-*Enterobacter* 
  3. Growth: Green Metallic Sheen-*E. coli* 



I. Exp. 19: Water Analysis for Feces

3 Tests Performed

III. Completed Test

- Take the green metallic sheen colony and do the following:
  1. **Repeat PRLB**: yellow with gas
  2. Grow on Nutrient Agar
     - Do a **Gram Stain**: Gram neg. rod

Confirms that E. coli is present!

I. Exp. 19: Water Analysis for Feces

- Follow Instructor's Directions

Overview

I. Exp. 19: Water Analysis for Fecal Contamination

II. Exp. 20: Quantitative Analysis of H_2O

II. Exp. 20: Quantitative Analysis of Water

- **Purpose:** To test the hypothesis that potable H_2O may still contain bacteria & is safe to drink. To compare the number of bacteria in tap vs. well H_2O.
- **Is Chlorinated water sterile?**
- **What microbes would be present?**
- **Which sample should have more microbes, well or tap water?**
- **Follow Instructor's Directions**

BIO 201 Lab 10
Experiment 22

Professor Diane Hilker

Overview

I. Exp. 22: Oral Flora

I. Exp. 22: Oral Flora

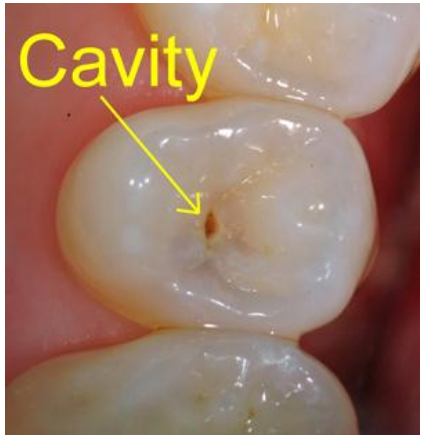
- **Purpose:** To examine different types of microbes in the mouth and to determine how effective mouthwash is in reducing these microbes

- Many different types of normal flora
- Commensal relationship with us
- Potentially can cause problems

I. Exp. 22: Oral Flora

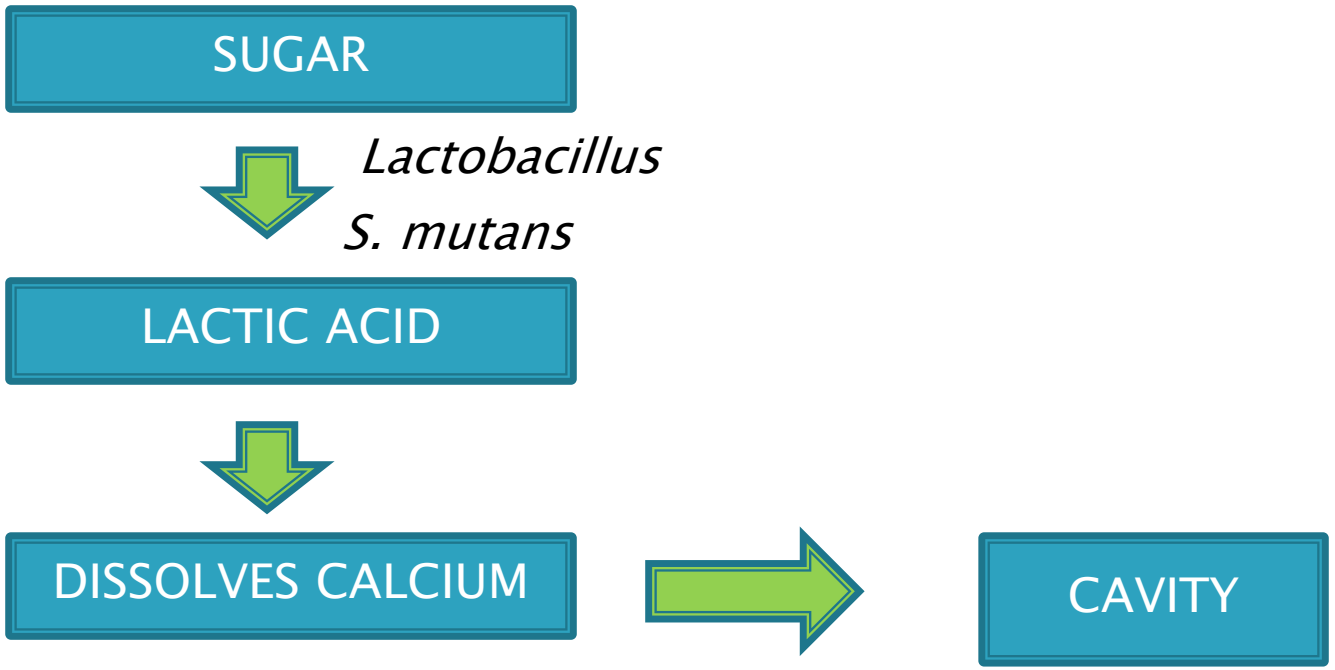
- **4 Types of Commensals**
  1. *Candida albicans*: Thrush

  2. *Lactobacillus*: Cavities
  3. *S. mutans*: Cavities



I. Exp. 22: Oral Flora

- Cavities



I. Exp. 22: Oral Flora

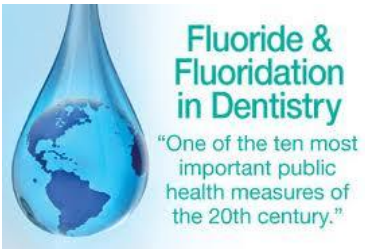
- How to prevent cavities?
  - Reduce sugary foods

  - Brush teeth to reduce *Lactobacillus & S. mutans*

  - Floss

  - Visit your dentist

I. Exp. 22: Oral Flora



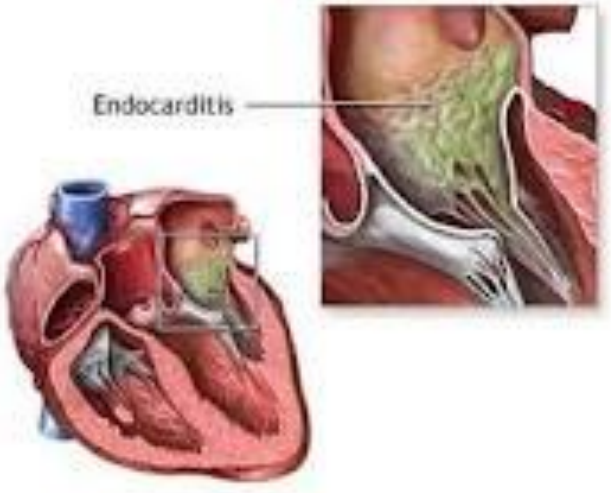
- How to prevent cavities?
  - Use of fluoride in drinking water, toothpaste, mouthwash vitamins & fluoride treatments for children

    - Fluoride attaches to Calcium to form CaF_2
    - More difficult for lactic acid to dissolve Ca^{++} when bound to fluoride

I. Exp. 22: Oral Flora

- **4 Types of Commensals**

  4. Streptococcus Viridans Group: includes *S. mitis* & *S. salivarus*
     - If these microbes get into the blood and there is a weakness of the heart (pacemaker, mitral valve prolapse, by-pass surgery), they can cause **SBE** or **Subacute Bacterial Endocarditis**



I. Exp. 22: Oral Flora

- To prevent SBE if you are at a high risk, take an antibiotic prior to visiting the dentist (prophylactic measure)

I. Exp. 22: Oral Flora

- Follow Instructor's Directions