

FACTORS AFFECTING BACTERIAL GROWTH

Purpose:

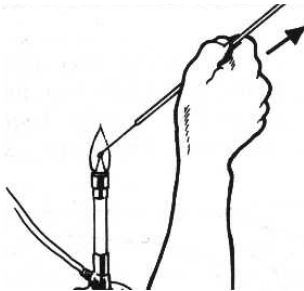
Bacteria can grow in a variety of conditions, but what can stimulate the best bacterial growth? Choose one factor that may affect bacterial growth. Design an experiment for this investigation.

Background:

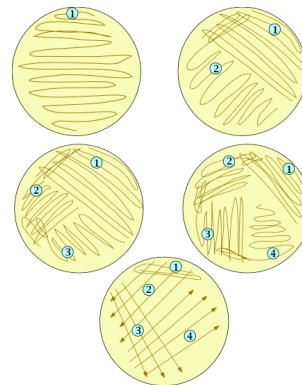
The bacteria we will be using is *E. coli*. Bacteria in labs are grown in culture plates. We prepare the culture plates by adding sterile agar, a nutrient median, for the bacteria to grow. The agar will solidify in the petri dishes once it has been cooled.

We then spread the bacteria on the plate using a sterilized inoculation loop. To sterilize the inoculation loop, we run the tube across a flame three or four times. Once the tube is cooled down, the loop is dipped into the bacteria stock. The loop is then spread gently over the culture plate in a zig-zag motion. Only open the lid of the plate enough to inoculate the sample to avoid contamination. Examine the diagram below to observe some of the technique used.

Sterilizing Inoculation loop



Various techniques used to streak plates



To count bacteria, draw four quadrants on your plate. Count the number of colonies in one quadrant and multiply by four.

WARNING!

It is important to be as sterile as possible for this experiment for the benefit of obtaining usable results. More importantly, it is for your safety. Wash all surfaces and your hands before and after the lab. Although we are using a low risk version of *E. coli*, it is still best to exercise caution.

Pre-Lab Questions: Hypothesis AND Design

1. What independent variable are you investigating? What is the dependent variable?
2. Write down your hypothesis for the experiment. Explain your reasoning.
3. List some of the control variables for your experiment.
4. Write a step-by-step procedure for your investigation. Make sure you take into account the control variables and have at least three different experimental groups and one controlled group.

Lab Write-up

Purpose: (1)

Hypothesis: (2)

Hypothesis should show a cause and effect relationship. Explain your reasoning

Materials: (1)

A list of materials. Maximum two columns are used

Procedure: (4)

Re-write your procedure in paragraph form. Write in past passive tense. Include all details including any changes to your original design

Observations:

- Data Table (1)
- Graphs (4) are always on graph paper or computer generated. There should be a title, axis labels, appropriate scales, and a legend if needed. The graph should compare the results of all of the experimental groups
- Qualitative Observations (1)

Analysis: (10)

In full sentences, analyze your experiment. Include the following in your analysis:

- The results of your experiment
- Compare your results to your hypothesis
- Reasoning behind the results - make connections to what was taught in class/prior knowledge/internet searches/use your brain ☺
- Analyze your experimental design - what was good, what would you improve, sources of error
- What is a follow up experiment that you would conduct based on your results?
- What is the significance of the experiment? Explain some real life uses for the results

Conclusion: (1)

- Summarize the results of your experiment.

TOTAL VALUE: 25 MARKS