Should Food Have Bacteria?

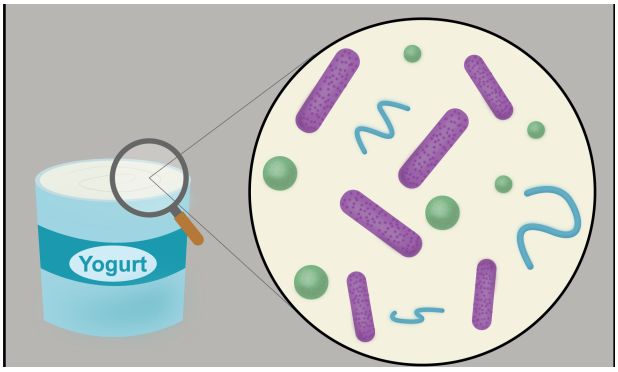
Introduction

Certain types of bacteria are known to make humans sick, including through food. For centuries, humans have tried to find safe and effective ways to preserve food, so it won't spoil. Is all bacteria harmful or can some bacteria be used to prevent food spoiling?

Prompt 1

In this task, you will be looking at food ecosystems. Typically, when we talk about ecosystems, we picture outdoor environments where plants and animals interact with nonliving components like rocks, water, and sunlight. However, ecosystems also exist within food! This is primarily due to the presence of various types of living bacteria. In Figure 1 below, you can see the ecosystem within yogurt (the zoom in circle).

Figure 1. Ecosystem in Yogurt



Describe what you see in the circle. What do you think these shapes represent?

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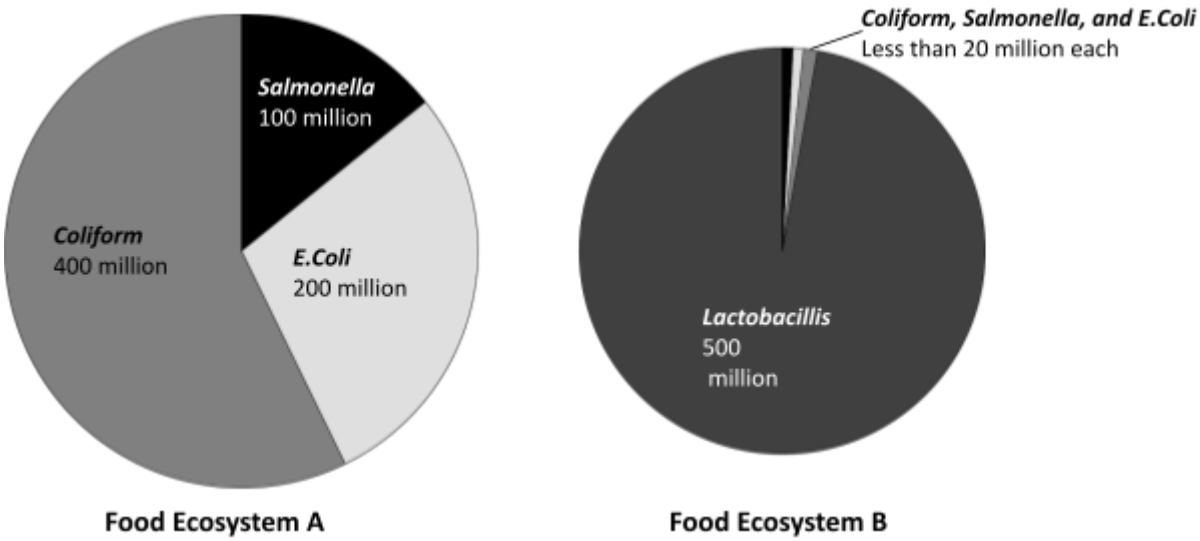
Prompt 2

Investigate two yogurt food ecosystems that contain different bacteria to figure out which bacteria are harmful. The data in Chart 1 below represents populations of different bacteria in two different food ecosystems.

Chart 1. Number of Each Bacteria Present in Food Ecosystem A and B



a. Use Chart 1 to describe how the bacteria are different in Food Ecosystem A and B.

A group of people consumed Food Ecosystem A and a different group of people consumed food Ecosystem B. Look at Chart 2 below to see the severity of negative symptoms people experienced after eating each food.

Chart 2. Digestive Symptoms From Consuming Food Ecosystem A and B

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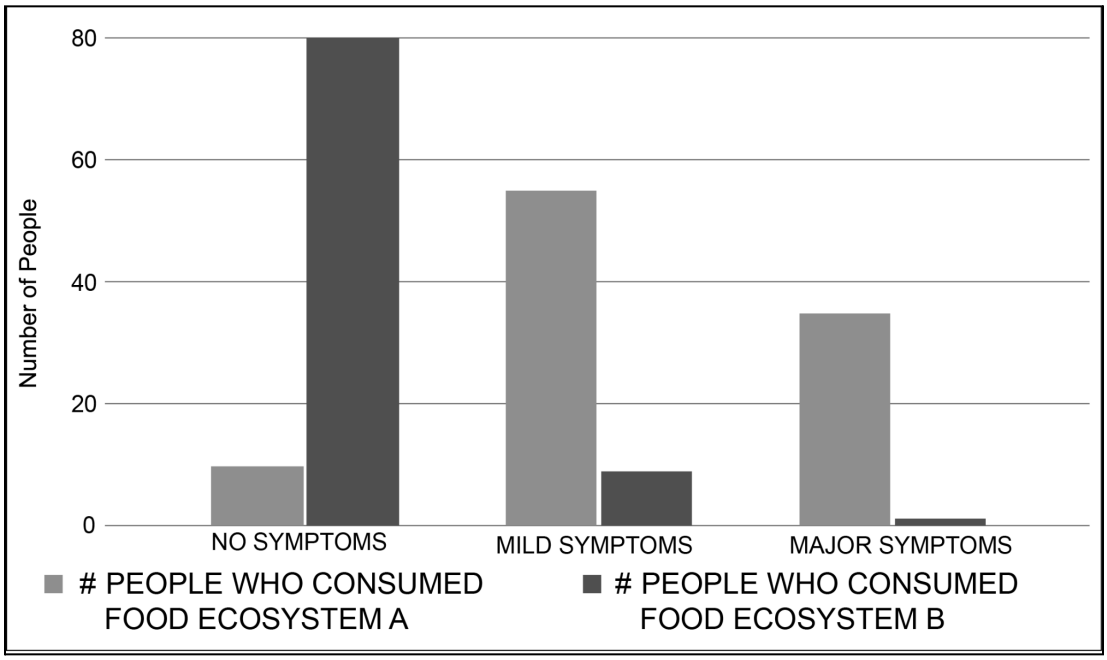

b. Use Chart 2 to describe how the symptoms were different for people who ate Food from Ecosystem A and B.

c. Which bacteria seems to be the least harmful? Use data from the charts to support your claim.

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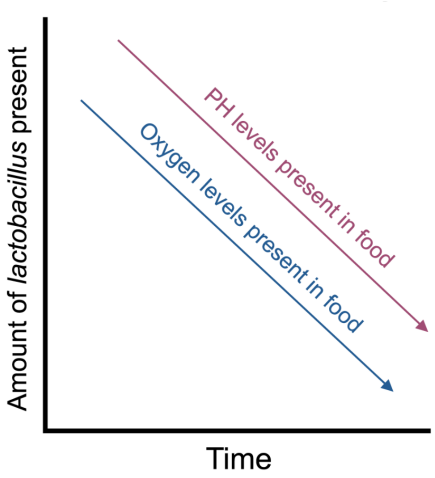
Prompt 3

Now that you know which bacteria is not harmful, let's investigate whether this bacteria can also prevent harmful bacteria from forming in food. Look at Chart 3 below to see how this bacteria affects the food ecosystem.

Chart 3. How *Lactobacillus* Affects the Food Ecosystem



a. Use Chart 3 to describe two ways *lactobacillus* affects the food ecosystem.

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Many bacteria require certain pH and oxygen levels in their food ecosystem to survive, as shown in Chart 4 and Chart 5 below.

Chart 4. Preferred Oxygen Level for Each Bacteria

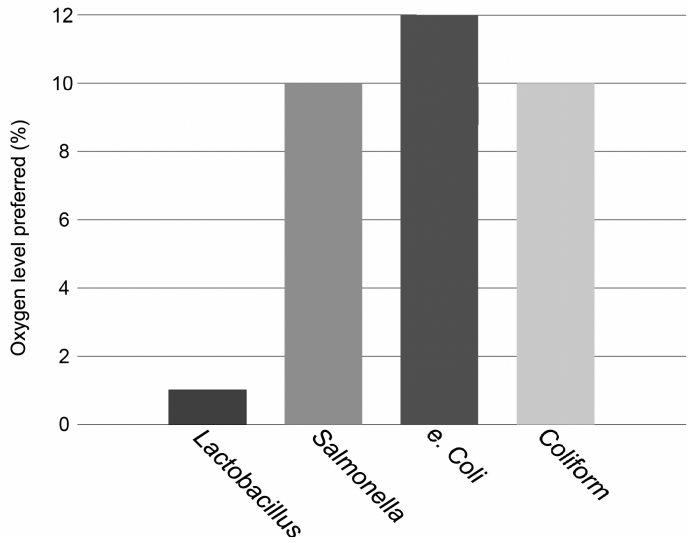
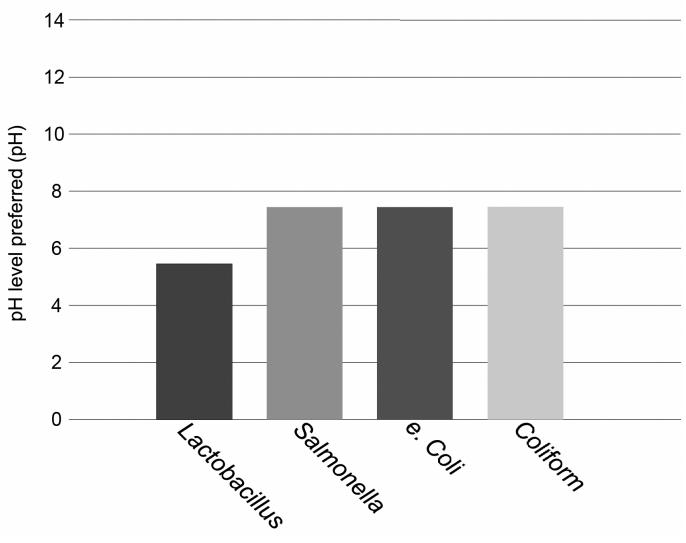


Chart 5. Preferred pH Level for Each Bacteria



b. Use Charts 4 and 5 to describe the differences in the oxygen and pH levels that each bacteria prefers.

c. If *lactobacillus* is in the food ecosystem, how does it affect the ability of other bacteria to survive (ie. Coliform, e. Coli, Salmonella)?

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Prompt 4

Make a claim: should humans add *lactobacillus* to foods, such as yogurt or cheese, to prevent other bacteria from spoiling food? Include the following in your argument:

- ☐ A claim for whether to use *lactobacillus* to prevent other bacteria from spoiling food
- ☐ How *lactobacillus* impacts the environment and availability of resources for other bacteria (*supported with specific evidence from charts)*
- ☐ How and why l*actobacillus* might impact the populations of other bacteria within an ecosystem (*supported with specific evidence from charts)*

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