Lab Activity: How Can You Test for Bacteria in Food?

Teacher Resource

Curricular Links: SBI 3U/3C
Time: 45 minutes
Skills: predicting, experimenting, controlling variables, interpreting data.

Suggested Answers:

Keywords:

Prokaryotic *is a single-celled organism that lacks a membrane-bound nucleus, or any other membrane-bound organelles.*
Control *the part of an experiment designed to check the results of another experiment by removing the variables.*
Indicator *any substance that gives a visible sign, usually by a colour change, of the presence or absence of another chemical.*
Respiration *the cellular process in living organisms that consumes oxygen and produces carbon dioxide.*

Table 1 – Test for Bacteria in Food*

Test tube #	Dairy product	Colour at start	Colour at end of class	Colour after 1 day	CO_2 present?	Bacteria present?
1	Water (control)	*Blue*	*Blue*	*Blue*	*No*	*no*
2	Milk	*Blue*	*Blue*	*Blue or blue-green*	*No/Yes*	*Very little, if any*
3	Yogurt	*Blue*	*Blue-green*	*Yellow*	*Yes*	*Yes*
4	Sour cream	Blue	*Blue-green*	*Yellow*	*Yes*	*Yes*
5	Cottage cream	Blue	*Blue-green*	*Yellow*	*Yes*	*Yes*
6	Butter	Blue	*Blue-green*	*yellow*	*Yes*	*Yes*

** Answers may vary*

Questions

1. What was the purpose of using water in test tube 1?

Test tube 1 served as a control. A control is the portion of the lab not experimented on. It is used to ensure that the data are reliable, and that the changes that occurred in the other test tubes were caused by altering the conditions.

2. In which test tubes was colour changed detected one day later?

Tests tubes 3, 4, 5, 6

3. What is your proof that bacteria are present in these test tubes?

The chemical indicator (Bromthymol blue) changed colour. The bacteria are respiring creating carbon dioxide. Carbon dioxide when present in a liquid will typically alter its pH causing the indicator to detect this change by changing colour.

4. Are bacteria helpful or harmful?

**Answers may vary*
Students will typically outline that certain types of bacteria are used in a good way, to make yogurt and other dairy products and are part of the sewage treatment process. They are also used to make medicines and are part of biotechnology. Others will highlight the fact they can also cause infections and deadly illnesses like anthrax, cholera and tuberculosis.

5. *Literacy connection – RAW MILK or PASTEURIZED MILK?*

What do you think? Make a list of pros and cons of drinking raw or pasteurized milk. Conclude with a statement that outlines your choice.
**Answers may vary*

Pasteurized Milk	
Pros • *Kills harmful bacteria*	*Cons* • *Changes the structure of the milk, destroying vital nutrients such as calcium and iodine.*

Raw Milk	
Pros • *Maintains "good bacteria" that can aid in digestion and overall health* • *Provides essential nutrients by maintaining the structure of milk.*	*Cons* • *Raw milk can carry dangerous bacteria such as Salmonella, E. coli, and Listeria, which are responsible for causing numerous illnesses.*