



GREEN-EDU Learning Activity

Title: How to make cheese

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Summary Students will learn how to make a simple cheese using kitchen utensils and household ingredients i.

Lesson plan summary

Subject	Green Biotechnology
Topic	Biotechnology
Age of students	12-15
Preparation time	45Minutes
Teaching time	2 periods 45 minutes
Online teaching material (links for online material)	
Offline teaching material	<ul style="list-style-type: none"> • Milk • Saucepan • Stove or hot plate • Oven mitts • Vinegar • Colander • Cheesecloth • String • Plastic cups • Salt and herbs (optional)

Aim of the lesson

By the end of this lesson students will:



- 1) learn how to make a simple cheese using kitchen utensils and household ingredients.
- 2) discover the chemical reaction that occurs when an acid, vinegar, is mixed with a milk protein and how this chemical reaction separates the milk into curds and whey
- 3) use their five senses to observe and describe the physical properties of their cheese

Trends

STE(A)M Learning / Collaborative Learning etc.



Activities

Describe here in detail all the activities during the lesson and the time they require. Remember, that your lesson plan needs to revolve around the topic of bioeconomy.

Name of activity	Procedure	Time
Introduction	<p>Vocabulary</p> <p>Whey: liquid portion of milk containing water, sugar, minerals and proteins.</p> <p>Curd: solid custard-like state of milk containing protein and fat.</p> <p>Coagulation: the process of converting a liquid into a semi-solid mass.</p> <p>Colloid: a suspension of small particles dispersed in another substance Before starting, make sure each student's work area, cooking utensils and equipment are clean. Review the importance of following proper safety guidelines for handling kitchen equipment and utensils.</p>	5 min
What to do	<p>Have students rinse out a saucepan with water to prevent the milk from sticking, and then pour one pint of milk into a saucepan.</p> <p>Slowly heat up the milk on the stove until it is just about to boil. At that point, students will see very small bubbles forming around the edge of the milk, where it meets the saucepan's sides. Remove the saucepan from the heat.</p> <p>3. Slowly stir in one tablespoon of vinegar and continue to stir the milk. Ask students to describe what happens as they continue to stir. Tell students that the white stringy solids are the curds and the greenish liquid is the whey. Why is the milk separating into curds and whey? Based on the video, which part of the separated milk is used to make cheese?</p> <p>4. Have students line the colander with a cheesecloth and place it over a sink or bowl. Pour the contents of the saucepan onto the cheesecloth. What happens to the whey? Why do they think it is necessary to drain from the curd?</p> <p>5. Have students gather up the corners of the cheesecloth and tie the corners together with the string. Leave the curds for about one hour, so that they completely drain.</p> <p>6. After an hour has passed, have students scoop the curds into a plastic cup. Ask students to use their five senses to observe and describe the curds (texture, smell, taste, etc). Have students mix small portions of salt or herbs into the curds to add flavor (optional).</p>	40min



What's happening	<p>Topics for discussions</p> <p>Milk is a colloid mixture consisting mostly of water with small, suspended particles in it. These small particles are called milk solids. They consist of proteins, minerals, sugar, fat, and vitamins. In order to make cheese, the milk solids need to coagulate to form the curd. One method of inducing coagulation is to add an acid, such as vinegar, to milk. Vinegar contains hydrogen atoms with a positive charge. Since opposite charges attract, the positively charged hydrogen atoms in the vinegar are attracted to the negatively charged protein molecules. The attraction between these molecules causes them to clump together into a semi-solid mass, which is curd. Most of the milk solids remains with the curd while the rest is released in the whey.</p> <p>Cheese-makers use alternative sources to coagulate milk including bacteria or an enzyme called rennet. (Rennet is what causes junket to thicken.) After making the curds, many cheeses are flavored by adding salt, herbs, mold or bacteria.</p> <p>Milk is a colloid mixture consisting mostly of water with small, suspended particles in it. These small particles are called milk solids. They consist of proteins, minerals, sugar, fat, and vitamins. In order to make cheese, the milk solids need to coagulate to form the curd. One method of inducing coagulation is to add an acid, such as vinegar, to milk. Vinegar contains hydrogen atoms with a positive charge. Since opposite charges attract, the positively charged hydrogen atoms in the vinegar are attracted to the negatively charged protein molecules. The attraction between these molecules causes them to clump together into a semi-solid mass, which is curd. Most of the milk solids remains with the curd while the rest is released in the whey.</p> <p>Cheese-makers use alternative sources to coagulate milk including bacteria or an enzyme called rennet. (Rennet is what causes junket to thicken.) After making the curds, many cheeses are flavored by adding salt, herbs, mold or bacteria.</p>	45min
Extended activities	Experiment with variations in your cheese recipe by using different types of milks and seasonings, or by substituting the vinegar with lemon juice. Have students create a	Xmin
		Xmin
		Xmin



Assessment

Describe here the assessment method of the lesson, if any. For example, if you plan on assessing your students with a quiz, include here questions and answer options with color-coding the correct answers.