



MAKING HOMEMADE CHEESE

and Observing Protein Denaturation

Name: _____

Date: _____

Age/Grade: _____

EXPERIMENT QUESTION: How does heat and acid cause proteins in milk to denature and form cheese?

SHORT ANSWER: _____



BACKGROUND

Milk contains proteins, mainly casein. When milk is heated and an acid is added, the shape of the casein proteins changes (denatures). Denatured proteins clump together (coagulate) and separate from the liquid (whey), forming curds. This is the basis for making cheese!

Key Idea:

Protein denaturation is a change in the shape of a protein caused by heat, acid, or other factors. The protein does not break apart, but its function and structure change.



PROCEDURE

1. Pour the milk into the large pot.
2. Heat the milk over medium heat, stirring often, until it reaches about 185°F (85°C) or just before boiling. (Optional: Use a thermometer.)
3. Remove from heat.
4. Add the vinegar (or lemon juice) and stir gently for 30 seconds.
5. Let it sit undisturbed for 5-10 minutes. You should see the milk curdle, with curds (solid) separating from whey (liquid).
6. Place the cheesecloth over the colander and set it over the large bowl.
7. Slowly pour the curdled milk into the cheesecloth to separate the curds from the whey.
8. Rinse the curds gently with cool water (optional) and add salt if desired.
9. Gather the cheesecloth and squeeze gently to remove extra whey. Your homemade cheese is ready!



SAFETY FIRST!

- Use adult supervision when heating milk and handling hot pots.
- Do not leave the stove unattended.
- Pot and milk will be hot!



ANALYSIS & CONCLUSION

1. What caused the proteins in the milk to denature in this experiment?

2. How did the denatured proteins change (what did you observe)?

3. How does this process relate to making other foods (e.g., yogurt, scrambled eggs)?

4. What could you change in this experiment? What would you like to try next time?



MATERIALS

- 1 gallon (4 cups) whole milk (not ultra-pasteurized)
- 1/4 cup white vinegar or lemon juice
- 1/2 teaspoon salt (optional)
- Large pot
- Stirring spoon
- Measuring cups and spoons
- Cheesecloth or clean thin dish towel
- Colander
- Large bowl
- Heat-safe thermometer (optional)
- Timer



OBSERVATIONS

1. Before adding acid, describe the appearance of the milk.

2. After heating and adding acid, describe what happened.

3. Describe the curds.

4. Describe the whey.

5. Record the temperature of the milk just before removing from heat (if measured). _____ °F / _____ °C



VOCABULARY

Protein: A large molecule made of amino acids. Important for structure and function in living things.

Denaturation: A change in the shape of a protein that affects its properties.

Coagulation: The clumping of proteins into a solid or semi-solid mass.

Curd: The solid part that separates from the liquid when milk curdles.

Whey: The liquid left after the curds are removed.



HOMESCHOOL TIP: Try different acids (lemon juice vs. vinegar), temperatures, or add herbs and spices to customize your cheese!