Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Enzymes: Meat Tenderizer

**Purpose**

The purpose of this exercise is to evaluate the effect of enzymes on meat.[[1]](#endnote-1)

**Procedure:**

 **Materials**

1. Meat samples (beef)
2. Tenderizer - dry
3. Scissors/knife
4. Paper towels or plates
5. Container to boil water
6. Water
7. Incubator (capable of holding temperature at 32˚ C / 90˚F)

**Sequence of Steps**

1. Cut fibrous meat into four one inch cubes.
2. Place each cube on a separate towel/plate.
3. Sprinkle three of the cubes with equal amounts of the tenderizer, which contains a protein-splitting enzyme called papain.
4. Label the samples as follows:

|  |  |
| --- | --- |
| **Refrigerator**  | **Room Temperature**  |
| **Incubator at 32˚ C** | **Boiled Mixture** |

1. According to their labels, place one cube in the refrigerator, leave one at room temperature, and place one in an incubator at 32˚C.
2. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()For the fourth cube, place the same amount of meat tenderizer and a few tablespoons of water in a container. Boil the mixture for three minutes. Pour the boiled mixture on the meat.
3. After at least three hours, observe the texture of the four meat samples and record observations.

**![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()**

 **Observations**

1. Illustrate your observations after the samples have set for at least 3 hours.

 **Refrigerator Room Temperature**

 **Incubator at 32˚ C Boiled Mixture**

2. Describe, using complete sentences, your observations. Compare and contrast the samples.

3. Explain your observations. Why do you think this happened?

4. Define enzyme:

5. Identify at least two ways enzymes can be beneficial to agricultural producers or processers.

6. Identify at least two ways enzymes can be detrimental (harmful) to agricultural producers or processers.

7. What factors can slow or speed up the activities of enzymes?

1. Mendes, Laura (2008). Meat Tenderizer, Lab. *St. Helena High School Agriculture Department*. [↑](#endnote-ref-1)