

STUDENT ACTIVITY GUIDE

Effect of Refrigerated Storage on Color Formation in French Fries

Very few people enjoy eating dark potato chips and French fries, not only because of the bad appearance but also because of the burned flavor. Potato processors are very conscious of this fact and try to ensure that their products are not overcooked. The burned flavor and dark-brown color are a result of complex chemical reactions between protein (amines) and certain types of sugars (reducing sugars), both of which are contained in potatoes.

In this experiment, you will examine the factors—starch–sugar conversion and Maillard reaction—which influence color and flavor development in fried potato products.

MATERIALS REQUIRED

White baking potatoes
Potato peelers
Knives
Cutting board
Cooking oil
Deep-fat fryer
Paper towels
Salt

EXPERIMENTAL PROCEDURE

1. Your teacher will provide you with two potatoes which have been stored for about two weeks—one stored under refrigeration, the other at room temperature.
2. Peel the potato stored at room temperature and slice it into French fry strips.
3. Fry the strips in oil at 375°F for 8–10 min until they are golden brown, then place them on a paper towel to drain.
4. Get the cold-stored potato from the refrigerator and repeat steps 2–3, making sure to cut the strips to the same size as the room-temperature strips and fry them immediately and for exactly the same length of time.
5. Compare the color of the fries made from the two potatoes.

6. Salt the fries lightly, if desired, and compare the flavor and, if possible, the texture of the fries made from the two potatoes.
7. Enter your observations in the table provided.
8. If a suitable slicer is available, you can prepare potato chips following steps 2–6. The appropriate frying time will depend on the thickness of the slices. The slice thickness and frying times should be the same for both potato samples. Then you can compare the color, flavor, and texture of the chips made from the refrigerated and nonrefrigerated potatoes.

QUESTIONS

1. What can you conclude about the effect of storage conditions on the sensory properties of the French fries?
2. Which storage condition resulted in French fries that are light in color with no burned flavor?
3. Why did one batch of French fries turn out lighter than the other?

DATA TABLE

Sensory Data

	Refrigerated	Not refrigerated
Color		
Flavor		
Texture		