



Chapter 13: Quick Activities

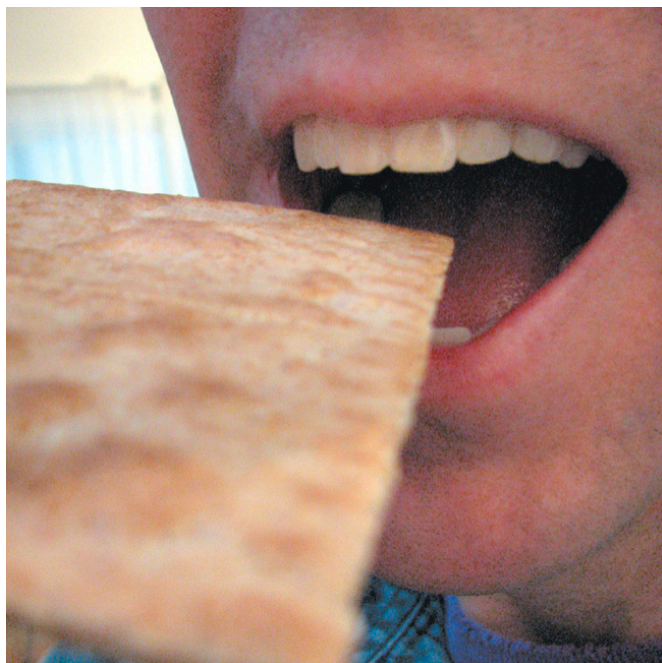
Nutrients of Life

Sweet Enzymes

Look at a soda cracker and contemplate eating it. If you're hungry, this should help to stimulate your salivary glands to produce extra enzyme-containing saliva. Use salt-free or low-salt crackers with no additive flavorings, if available.

PROCEDURE

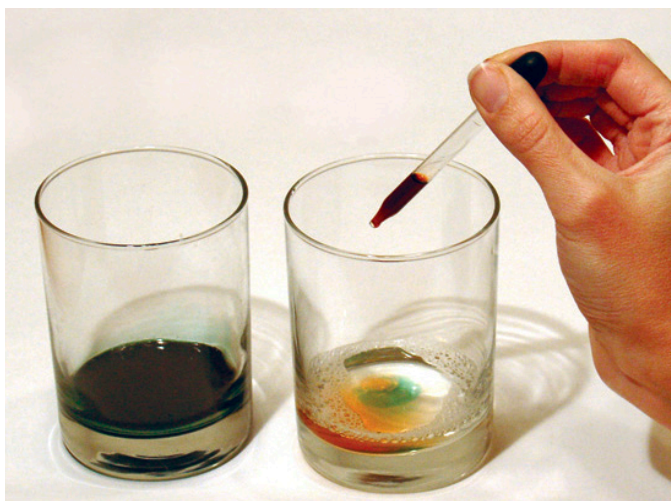
1. Place the cracker in your mouth and start chewing for as long as possible without swallowing.
2. Note any apparent change in sweetness.



ANALYZE AND CONCLUDE

1. An enzyme is a large biomolecule that helps to speed up chemical reactions. In other words, it is a catalyst for biomolecular reactions, such as the breaking down of food molecules. Enzymes in your saliva work to break down complex starch molecules, which have little flavor, into simple carbohydrate molecules, which are sweet. Did you notice that the cracker tasted sweeter the longer it was in your mouth?
2. If crackers get more sweet the longer they stay within your mouth, then why does chewing gum gets less sweet?
3. Rice candies are popular in Asian cultures. What do you suppose is done to the rice to convert it to a "candy"?
4. Why is it important to chew your food thoroughly before swallowing it?





Spit In Blue

To each of two drinking glasses, add a teaspoon of potato broth, which you can make by boiling a few slices of potato to mushiness in about a cup of water. Add a tablespoon of fresh water to each glass to dilute the broth. Collect a good volume of saliva in your mouth and gracefully spit into one of the glasses. Swirl to mix. After a few minutes, add a drop of iodine solution (available from stores as a disinfectant) to each glass. Iodine forms a dark blue complex with starch. The intensity of the color of the solution is proportional to the amount of starch present. Did one solution turn darker than the other? Why or why not?

Light Butter

Obtain several different brands of "light" butter or margarine spreads. Place about the same volume of each sample in a test tube or narrow glass. Add enough so that, when melted, the liquid will be at least 2 cm deep. Label each test tube with the brand it contains. Melt all samples in a microwave oven. (Watch carefully because this doesn't take long.) How many layers do you see form in each test tube? Which is more dense: water or fat? Which brand contains the most water? What happens when you cool the test tubes in the refrigerator? Which sample do you suppose contains the greatest proportion of saturated fats?





Author Responses to Quick Activities

Sweet Enzymes

1. The cracker should become sweeter after being in your mouth for a long while.
2. With the cracker, the sweet monosaccharides are being created from an abundant supply of complex carbohydrates. Chewing gum, by contrast, contains some sweetener, typically sucrose, that dissolves in your saliva and then slips into your stomach as you swallow that saliva. There is only so much sweetener within the gum, which means that it is soon depleted.
3. The rice is cooked with catalysts, such as enzymes or phosphate salts, to break down the starch of the rice into sugar molecules. Interestingly, the molecules of artificial sweeteners tend to be about the size of sugar molecules, which are small compared to larger starch molecules.
4. We should thoroughly chew our food to give the enzymes in our mouths the chance to do what they are designed to do. The mechanical breakdown of the food by our chewing is also essential for efficient digestion (and so that you don't choke upon swallowing).

Spit In Blue

Saliva contains the enzyme amylase, which breaks down starch into glucose. The solution containing the saliva should have less starch (and more glucose). The saliva-containing solution, therefore, be lighter blue than the starch solution.

Here are some questions relating to this activity. Enzymes such as amylase are destroyed by heat—how could you confirm this experimentally? If you boil one starch solution for only a few minutes and a second starch solution for about 30 minutes, which will be light blue and which will be dark blue when you add iodine? Many instant Cream of Wheat cereals contain papain, an enzyme related to amylase. Can it be said that these instant cereals are being digested before reaching your mouth?

Light Butter

Two layers should form. The bottom layer is the denser water and the top layer is the fat. With the chilled lipid layers, you can assume that, in general, the more solid the sample, the higher its proportion of saturated fats.

As you should have discovered from this activity, the "light" brands of spread contain fewer calories simply because they contain a greater proportion of water. Rather than water, some brands whip air into the spread. Either way, the net result is fewer lipid molecules per serving, which for saturated fats is not too bad a deal. Note that many of the "light" brands are labeled "for spread purposes only, not for cooking." One of the reasons for this is the excess amount of water they contain.

