Algaculture & Biofuels
Making Algae Beads

Materials:

- ✓ Algae culture (decanted)
- ✓ 2% (by mass) Sodium Alginate solution
- ✓ 3% (by mass) Calcium Chloride solution
- ✓ 2 test tubes, with caps
- ✓ 2 small beakers or other glass or plastic containers
- ✓ Plastic spoon
- ✓ Wash bottle filled with distilled water
- ✓ Pipette

Description: In this lesson, you'll learn about algaculture and biofuels. Algae are tiny aquatic plants which grow in both fresh and salt water. You have probably seen algae forming in still water (such as a pond, fish tank, bird bath, or unused swimming pool) as pond scum or as a greenish coloring in the water. Some algae species grow as filaments, or fine hair-like structures, which bunch together and form pond scum. Other algae species, called microalgae, are microscopic, single-celled organisms which can only be seen under a microscope, or with the naked eye as a discoloration in the water. Algae can come in a variety of colors, but you've most likely seen green-colored algae. Algae might seem like a nuisance when it is in a fish tank or swimming pool, but these tiny plants may hold the key to a major contemporary problem.

Many engineers and scientists believe that algae can be grown and harvested in order to make sustainable fuel for cars, trucks, and other uses in place of increasingly expensive and environmentally harmful fossil fuels. This is because algae cells, like other plants and animals, store energy in lipid molecules, which are similar to the hydrocarbons found in fossil fuels. The process of growing and harvesting algae is called algaculture (not to be confused with agriculture). Fuels derived from living things like algae are called biofuels. In this activity, you'll create gelatinous algae beads which we will use later in this lesson for some pretty cool experiments.

Procedure:

1. Using a pipette, carefully remove as much of the supernatant (water) as possible from your sample of algae, leaving only an algae slurry at the bottom of your sample beaker. Be extremely careful not to agitate the liquid in the beaker so that the algae remains separate from the water.
2. Fill another small beaker or other small container with approximately 1 inch of 3% calcium chloride solution
3. Pour your algae slurry (about 5 mL) into a test tube. Scrape your beaker with the spoon to get as much of it as possible in the test tube.
4. Add 2.5 mL of 2% sodium alginate solution to the test tube

5. Firmly place the cap on the tube, place your thumb over the cap, and vigorously shake the tube for 1-2 minutes
6. Open the tube, and use your pipette to collect some of the algae mixture
7. Hold the pipette over the container of calcium chloride solution
8. Gently press the bulb on the pipette to release a drop of the algae mixture so that it falls into the calcium chloride solution
9. Congratulations! You have made your first algae bead! As the algae mixture drops into the calcium chloride solution, the drop will harden into a gelatinous substance similar to Jell-O, and the algae will be immobilized inside.
10. Continue slowly dripping the algae mixture into the calcium chloride solution to form algae beads. You should be able to make approximately 100 beads.
11. When you run out of algae mixture, collect your beads with the plastic spoon and transfer them to the second beaker or container.
12. Rinse the beads using the wash bottle and distilled water
13. Use the plastic spoon to transfer the beads to your second test tube. Fill the tube with distilled water, cap it securely, and set it in a well-lighted area. You may want to put a piece of tape on your tube and write your group name or number on it.