



## Curiosity Guide #506

### Bioplastics

Accompanies Curious Crew, Season 5, Episode 6 (#506)

#### Potato Plastic

Investigation #5

#### Description

When is a potato not a potato? When it's a bioplastic!

#### Materials

- Safety goggles
- 8 medium-sized potatoes
- Grater
- Bowl
- Measuring cup
- Blender
- Water
- Strainer
- Clear beaker
- Glass rod
- Oven
- Vinegar
- Glycerin
- Measuring spoons
- Cooking pot
- Stove
- Food coloring
- Spoon
- Cookie sheet

## Procedure

1. Put on safety goggles.
2. With the grater, grate the potatoes into a bowl.
3. Place the grated potatoes into a blender.
4. Add 800 milliliters of water.
5. Grind the grated potatoes and water in the blender.
6. Add additional water if the mixture appears too dry.
7. Pour the liquid through a strainer into a clear beaker.
8. After five minutes, potato starch will settle to the bottom of the liquid.
9. Pour off the top liquid so that the starch remains in the bottom of the beaker.
10. Measure and add 100 milliliters of fresh water to rinse the starch.
11. Stir the mixture of potato starch and fresh water with a glass rod.
12. Let the starch settle out again, and then pour off the clean water.
13. Dry the starch out in an oven set at 200 degrees. You should now have a white powder.
14. In a cooking pot, measure and combine 1 tablespoon potato-starch powder with 7 tablespoons water, 2 teaspoons vinegar, and 2 teaspoons glycerin.
15. Heat this mixture on the stove, stirring continuously.
16. Stir in several drops of food coloring.
17. When the mixture thickens, remove from the heat. Spread the potato-starch mixture out to dry overnight on a cookie sheet.

## My Results

## Explanation

Potatoes contain a lot of starch, which is the white substance left in the pan after boiling potatoes or on your knife after cutting them. Starch is a natural polymer that plants make out of extra glucose. This natural polymer consists of long chains of molecules linked together.

The acetic acid in the vinegar helps the potato starch to dissolve. The glycerin is the plasticizer that creates space between the starch polymer chains so that the plastic is more flexible and won't be so rigid or brittle.

Finally, the water acts as a solvent. Try changing the quantities of different ingredients to see how different proportions affect the properties of the bioplastic.

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