**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_ Bioplastics Lab 2: Starches & Additives**

**Learning Target:** I can explain how the source of starch and type of additive affect the properties of a bioplastic.

**Materials:**

* Starches: corn, potato, tapioca
* Additives: glycerol, calcium carbonate, glue
* Dyes: a selection of food dyes will be available

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| --- | --- | --- |
| **Student Team** | **Starch Used** | **Additive** |
| 1 | Potato | Glycerol |
| 2 | Tapioca | Glycerol |
| 3 | Corn | Calcium carbonate |
| 4 | Corn | Glue |
| 5 | Tapioca | Calcium carbonate |
| 6 | Tapioca | Glue |
| 7 | Potato | Calcium carbonate |
| 8 | Potato | Glue |

**Procedure:**

Each lab team will test a combination of starch type and additive. Some lab groups will be temporarily reorganized to make sure all experiments are covered. Each student will produce a sample of bioplastic.

We will use the general procedure from Trial 2 in Lab 1 to make the bioplastic—*modified for your starch and additive*. You may choose which food dye to use.

🡪 Make a flowchart of your procedure in your lab notebook specifying which starch, additive, and food dye you are using.

1. Wear safety goggles and lab aprons.
2. Add 33.0 mL of distilled water to a 100 mL beaker.
3. Add 3.10 g of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ starch to the beaker.
4. Add 1.2 mL or g of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ additive. You may need to use drops of glue rather than mL. 20-25 drops should be sufficient.
5. Measure 5.0 mL of 0.1 M HCl, and add it to the mixture in the beaker. Stir with a glass stirring rod or wooden stick to thoroughly mix.
6. Slowly heat to a gentle boil on a hot plate. **DO NOT BOIL VIGOROUSLY**. Heat for 5-10 minutes, stirring occasionally.
7. While waiting for the mixture to heat, use labeling tape to label the side of a plastic petri dish with your period, lab station, initials, and your combination of **starch + additive + dye**.
8. Measure 5.0 mL of 0.1 M NaOH and stir into the beaker. Confirm that the mixture is basic by testing with pH paper OR by adding 3 drops of your choice of indicator. If it is not basic, continue to add NaOH in 1 mL increments until it is basic. Make a note of the total volume of NaOH you add.
9. Pour your sample into the labeled petri dish.
10. Stir again with a stirring rod to remove air bubbles.
11. Allow all samples to dry on the lab counter Do not disturb your sample or other teams’ samples until completely dry.