

# Making biobased plastic

What effect does varying the percentage of glycerin have on the properties of bio-based plastics?

Bio-based plastics are fully or partially made from biological resources, rather than petroleum-based raw materials. They are not necessarily biodegradable or compostable. They have been made from many different raw materials, which include corn starch, borax, vegetable fats and oils, straw, wood chips, sawdust, recycled food waste and other materials. The objective of this activity is to develop an inexpensive, durable bio-based plastic made from the glycerin byproduct of biodiesel.

## Materials

- silicone ice cube tray
- glycerin
- serological pipettes or graduated cylinders
- electronic balance
- weigh boats
- hot plates
- stir sticks/scoopula
- gelatin
- vinegar
- 150ml or 250 ml beaker
- natural dyes (tumeric, beet, spirulina, mica powders or liquid food dyes, soap dyes)

## Procedure

### Part 1: Make Bioplastic

1. In a 150 or 250mL beaker, add the appropriate amounts of chemicals to make bioplastic samples using the measurements in **Table 1** below. **Check off items as you add them.**
2. Place the flask on a hot plate and heat until **just boiling** while stirring constantly to avoid burning. **Hot plate setting should be medium-high.**
3. Add in 0.5g or 0.5mL of natural dye to solution before pouring into trays.
4. Label the outside of the silicone tray with the correct sample number. You need 3 trials for each sample.
5. Pour 3 mL of bio-plastic solution into the appropriate labeled section of the tray. Repeat steps 1-5 for each sample number.
6. Allow to sit to dry out for several days. **Check your sample each day to see if it is dry enough to test.**
7. Complete product testing and draw final conclusions.

Table 1. Bioplastic reagent measurements.				
Sample Number	Gelatin Amount (Substrate)	Distilled Water	Vinegar	Glycerin
1	4.5 g	30 mL	3 mL	1.0 mL
2	4.5 g	30 mL	3 mL	3.0 mL
3	4.5 g	30 mL	3 mL	7.0 mL

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