

Recycling Paper

Introduction

Producing paper from wood is an extensive and expensive process that uses up natural resources and pollutes the air with industrial wastes. By developing new and better methods for making and reusing some paper products, we can reduce our impact on the environment. About 30% of the total paper produced in the United States is recycled, which is a lot when you consider that each person in our country consumes an average of 800 lbs. of paper per year!



In this lab, you will recycle paper using a simple process involving discarded paper, water and cornstarch. The cornstarch helps reconnect the polysaccharides and strengthen the paper. When the paper and cornstarch mixture dries, water is removed and hydrogen bonds are formed between the cellulose fibers. This results in strongly bonded chains of fiber polymers, otherwise known as paper! This activity will take 2 days.

Materials

bleach
cornstarch

paper

Equipment

beaker, 1000-mL
electric mixer or blender
felt
squeegee

teaspoon
wash basin
wire screen

Safety Considerations

- Bleach will stain clothing; you may want to wear a lab apron to protect your clothes.
- Sometimes chemicals from previous labs still remain in glassware and on other lab equipment; wash all lab equipment before and after performing this lab.
- Wash your hands thoroughly after completing this lab.

Procedure

1. Obtain 3-5 sheets of used paper; rip them into small shreds and collect them in a 1000-mL beaker.
2. Add about 250 mL of tap water and about 50 mL of bleach to the beaker.
3. Allow the mixture to sit for a few minutes until the paper becomes soggy.
4. Carefully pour off the bleach and water into the sink and rinse the paper twice with additional water.
5. Add 200 mL of tap water to the beaker and use an electric hand mixer to mix the paper until it forms a thick mush.
6. Add 2 tsps (about 10 g) of cornstarch or flour to the beaker and blend the paper mush until it is smooth and soupy.
7. Fill a wash basin about one-third full with tap water and place a wire screen in the middle, screen side up.
8. Add the paper mush to the basin and spread it around in the water, collecting as much as possible over the screen.
9. Slowly lift the wire screen out of the basin so that as much paper as possible collects on the screen. Spread the paper mush evenly and thinly using your fingers.

10. Lay a sheet of thick felt over the screen, and slowly turn the screen upside down so that the paper mush is now on the bottom.
11. Use a squeegee to push the excess water out of the paper and onto the felt.
12. Slowly peel the felt and paper off of the screen so that there is no paper left on the screen.
13. Place another piece of felt on top of the paper and use the squeegee again to try to squeeze out as much water as possible.
14. Remove the top layer of felt and allow your recycled paper to dry overnight.
15. After the paper has dried, attach a small piece of it to this lab paper using a stapler or glue.

Clean-up

1. Dispose of any leftover paper in the trash, NOT THE SINK!
2. Clean all used lab equipment with soap, water and a test tube brush.
3. Return all equipment to its proper location.
4. Wipe down your lab area and wash your hands before leaving the lab.

Questions

1. How does your recycled paper compare with regular, commercial paper?

2. Do you think this process is practical on a large scale? Why or why not?

3. What are two reasons that recycling paper is good for the environment?

4. Why do you think using bleach in this process is important?

5. List one way you could change this lab and describe how your results might be different.
