

Preparing Soap

Introduction

Earliest recorded evidence of the production of soap-like materials dates back to around 2800 BC in ancient Babylon. However, even as recently as 1850, bathing regularly was not a common practice! Homemade soaps were harsh, and commercial soaps were expensive. Now, soap is produced on a massive scale thanks to synthetic ingredients, selling over \$1.6 billion worth of liquid and bar soap in 2007.



In this lab, you will prepare soap using a similar procedure that was used for early soaps. Instead of animal fats, you will use vegetable shortening; instead of using ashes from a fire, you will use sodium hydroxide. Ethyl alcohol is used as a catalyst to speed up the process so that the reaction can take place at a lower temperature. This activity will take 1-3 days.

Materials

ethyl alcohol	scented oil
paper cups	sodium hydroxide, 6M [NaOH]
pH paper	vegetable shortening or lard

Equipment

beakers, 100-mL (2)	stirring rod
graduated cylinder, 10-mL	thermometer
hotplate	

Safety Considerations

- Sodium hydroxide is toxic and damaging to the eyes and skin; you must wear goggles and gloves for the entire lab.
- 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 20 grams (about 20 mL) of solid fat and place it in a 100-mL beaker
2. Using a hotplate, gently heat the solid fat until it has melted. Once it had melted, remove it from the hotplate and set it aside.
3. Carefully combine 10 mL of 6 M sodium hydroxide and 10 mL of ethyl alcohol in a second 100-mL beaker.
4. Using a hotplate, gently heat the second beaker to about 35°C.
5. Once the melted fat has cooled to about 45°C, slowly pour the sodium hydroxide solution (second beaker) into the melted fat (first beaker) while stirring constantly with a stirring rod.
6. Stir the combined ingredients until the saponification reaction is complete. This process should take around 5-10 minutes.
7. If you would like to add a scent to your soap, add about 5 drops of a scented essential oil at this time. Mix it in well!
8. Pour the soap slowly into a paper cup, which will serve as your mold.
9. Label your cup with your name and allow the soap to set for 1-3 days.
10. After the soap has solidified, test its pH using pH paper. Note the color of the paper and

its corresponding pH value.

Clean-up

1. Dispose of any leftover solutions in the sink. Flush with lots of water!
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. Test your soap product by using it to wash your hands. How well does it work?

2. What was the pH of your soap? Was it acidic, basic (alkaline) or neutral?

3. There are some obvious differences between your soap and soap you can buy at the store. What are two reasons that commercial soap is different from your soap?

4. Sodium hydroxide (lye) is used as a drain cleaner to remove clogs made of grease and hair. Based on how sodium hydroxide turns fat into soap, how do you think it works to clear drains?

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