

Experiment 3

Making A Natural pH Indicator

Materials

- ❑ 1 head of red cabbage, sliced
- ❑ stainless steel or enamel pan or microwaveable casserole dish
- ❑ 1 quart water
- ❑ stove, microwave, or hotplate
- ❑ 1/2 teaspoon white vinegar
- ❑ 1/2 teaspoon ammonia
- ❑ 1 teaspoon clear, carbonated beverage, like seltzer water or lemon-lime drinks
- ❑ 3 small clear cups or beakers
- ❑ 3 clean stirring spoons
- ❑ measuring cups and spoons (1 quart, 1/4 cup, 1/2 and 1 teaspoon)
- ❑ notebook and pencil

Instructions

- 1 Boil sliced cabbage in 1 quart of water in a covered pan for 30 minutes or microwave for 10 minutes. (Don't let the water boil away.)
- 2 Let cool before removing the cabbage.
- 3 Label 3 cups "ammonia," "vinegar," and "beverage."
- 4 Pour about 1/4 cup of cabbage juice into each cup.

- 5  What color do you think the cabbage juice will turn when you add ammonia? What about when you add vinegar or the beverage? Take a moment to write down your hypotheses.
- 6 Add 1/2 teaspoon ammonia to the cup labeled "ammonia" and stir with a clean spoon.
- 7 Add 1/2 teaspoon vinegar to the cup labeled "vinegar" and stir with a clean spoon.
- 8 Add 1 teaspoon clear non-cola to the last cup and stir with a clean spoon.
- 9 Record and observe what happens to the color of the liquid in each cup.
- 10 After answering the first two questions for this experiment, pour the contents of the vinegar cup into the ammonia cup.

Questions

1. What color change took place when you added vinegar to the cabbage juice? Why?
2. Did the ammonia turn the cabbage juice pH indicator red or blue? Why?
3. If you were to gradually add vinegar to the cup containing the ammonia and cabbage juice, what do you think would happen to the color of the indicator? Try it, stirring constantly.
4. Is the non-cola soft drink acidic or basic?
5. Were your hypotheses correct?

In this experiment, you will make your own pH indicator from red cabbage. Red cabbage contains a chemical that turns from its natural deep purple color to red in acids and blue in bases. Litmus paper, another natural pH indicator, also turns red in acids and blue in bases.





United States Environmental Protection Agency

Office of Air and Radiation

Office of Atmospheric Programs

Clean Air Markets Division (6204J)

1200 Pennsylvania Ave., NW

Washington, D.C. 20460

EPA 430-F-08-002

April 2008