

Color Changing Potions and Fungus Breath

During our next episode of HuskyBites, we are going to be conducting some experiments! These are activities that you can do at home and they are suitable for the entire family. (My 4-year-old really enjoyed these activities even though she doesn't really understand the science behind them.) If you want to follow along, please collect the following supplies so that you can participate in the experiment. Note that I will be condensing some steps like they do in cooking shows to save time, so you may not be able to keep up entirely. That's ok.

Note that most of the ingredients are non-hazardous (with the exception of ammonia and bleach). However, these are not necessary for the experiment and you can leave them out when you do this at home.

SAFETY

- Use caution when working with knives. Always use a chopping board and cut away from yourself. Young children may require assistance with this process.
- Always keep the lid on your blender closed when operating. This prevents major messes from blender contents spraying around your house, and prevents you from sticking a hand inside the blender, which could cause injury.
- Most potion ingredients are entirely safe to work with. The exceptions are cleaning ammonia and bleach (if you choose to do a follow-up experiment). Both of these chemicals are highly corrosive. Wear gloves and eye protection when working with them. UNDER NO CIRCUMSTANCES should you mix bleach and ammonia. This will form toxic chlorine gas. I recommend you only use one of these at a time to prevent small hands from mixing them inadvertently. These should be handled by adults or children who are old enough to use them carefully.

COLOR-CHANGING POTIONS

Supplies

- Red Cabbage (1/8 of a head)
- Knife
- Cutting board
- 2 c. Hot water
- Blender
- Fine Mesh Strainer
- Large container (I used a 2 cup Pyrex glass measuring cup)
- Liquids to Test
 - Tap Water
 - White Vinegar

- Baking Soda Water
- Lemon-Lime Soda
- Cleaning Ammonia ← adults handle this one with gloves
- 5x (or more) - small transparent and colorless containers such as test tubes, small glass jars, small glasses, or small bowls (bowls could also be white)
- Pipettes, syringes, or spoons to transfer liquids
- Paper towels
- Cookie sheet

Procedure

1. Cut and transfer 1/8th of a head of cabbage to a blender.
2. Add 2 c. of hot water to the blender.
3. Blend on high for ~1-2 minutes or until largely disintegrated.
4. Place a large mesh strainer over the glass measuring cup (or other pyrex glass container).
5. Transfer the pulp to the mesh strainer and collect the liquid.
6. Transfer an equal volume of each of the test liquids to separate small containers.
7. Transfer an equal volume of the cabbage liquid to each of the test liquids.

Questions: Color-Changing Potions

- How is the color different for each of the liquids?
- How would you organize these liquids by color?
- What other liquids could you test at home that we didn't evaluate here?
 - Lemon juice
 - Milk
 - Hand soap
 - Rubbing alcohol
 - Dilute Bleach solution (1 part bleach:20 parts water) ← adults handle this one with gloves. DO NOT MIX WITH ammonia!!!

Engineering Application: DIY Indicator paper

1. Soak some paper towels in the cabbage liquid.
2. Place on the cookie sheet and allow to dry.
3. Try dipping the dry paper in the test liquids or putting a small amount on the paper.

Questions: Indicator paper

- What are some advantages to using paper vs. a liquid indicator and vice-versa?

COLLECTING FUNGUS BREATH

Supplies

- 6 - empty water bottles (must be colorless and transparent)
- 6 – 9-12” balloons
- Dried baker’s yeast
- White sugar
- Warm tap water
- White vinegar
- Liquid measuring cup
- Measuring teaspoon
- Funnels

Procedure

1. Warm up ~3 cups of white vinegar in the microwave or on the stove. Heat until lukewarm.
2. Transfer 2 tsp of white sugar and 2 tsp of dried yeast to each of the six empty water bottles.
3. Transfer the following liquids to the bottles:
 - a. 2x – 1 cup of warm tap water
 - b. 2x – ½ cup of warm tap water and ½ cup of warm white vinegar
 - c. 2x – 1 cup of warm vinegar
4. Cap bottles and shake vigorously to mix.
5. Place colored balloons over each bottle (use a different color for the different liquids in step 3).
6. Monitor the inflation of the balloons over time.

Questions

- Which bottles (and liquids) inflated the most rapidly and which inflated the most?
- Which of these liquids should be the most acidic based on what we learned from the color-changing potions?
- Does this indicate anything about how yeast responds to pH/acidity?

Concept and experiments are based on the following websites:

Brewer, S. Acids and Bases Experiment Exploring pH Levels. STEAM Powered Family. Published: 24 Apr 2018. Accessed: 22 May 2020. <https://www.steampoweredfamily.com/activities/acids-bases-ph-chemistry-experiment/>

Harding S. 21 of the Best Science Experiments for Harry Potter Fans. Rediscovered Families: Parenting from the Heart. Accessed: 22 May 2020. <https://rediscoveredfamilies.com/harry-potter-science/>

McClure, S. Sugar & Yeast Balloon Experiment. Happy Brown House. Published: 5 Feb 2018. Accessed: 22 May 2020. <https://happybrownhouse.com/sugar-yeast-balloon-experiment/>