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Investigating the effect of sugar concentration on yeast fermentation

Experiment sheet (for the teacher)

The students will investigate the effect of sugar concentration on yeast fermentation at the same temperature.

Materials

7 g of dry yeast (7g of dry yeast is about 3 flat tablespoons of yeast)

35 g of sugar (5 g sugar is about 1 sharp tablespoon of sugar)

70-80 ml water (at room temperature)

Measuring cylinder

Weighing scale

2 containers (1 for the yeast solution and 1 for the sugar solution)

2 spoons (for stirring the solutions)

Pipettes (for adding drops of sugar solution) - can also be used for adding the yeast solution

1 big container filled with warm water

Test tubes (5 per group of students)

Stand for test tubes

Ruler

Timer

Permanent marker

Set up (preparation done by the teacher before the class - the amounts below are for 1 group of 3-4 children)

1. Prepare 70 ml of 10% yeast solution as follows:
   Place 7 g of yeast in a container and add 70 ml of water (room temperature). Stir the yeast until melted (take all the time you need until all yeast is dissolved).
2. Prepare 20 ml of a 35% sucrose solution.
   Place 35 g of sugar in a container and add 100 ml of water. Stir well until all sugar is dissolved.
3. Make copies of the activity sheet 2 (1 for each student)

4. Assemble the materials for each group: 70 ml of yeast solution, 100 ml of sugar solution, 5 test tubes, 1 test tube stand, 1-2 pipettes, ruler, timer, permanent marker, activity sheet 2.
5. Below, there are some pictures taken after carrying out the experiment.
   What is it expected to happen while the test tubes lay in warm water for 10 min? After 10 min, there should be no foaming in test tube 1. There should be foaming in the rest of the test tubes but test tube 3 should have the highest foam. In test tubes 4 and 5, the foam is not expected to be higher compared to test tube 3 (might even be a bit lower compared to test tube 3). The reason is because as ethanol concentration increases (due to fermentation) it causes water stress on the yeast cells and this ultimately has an effect on the rate of fermentation.

Placing the test tubes in a container with warm water

After 10 min in warm water