



Classroom Activity

10 Big Question: How did life evolve on Earth?

Fermentation experiment

You can perform an easy fermentation in the classroom using apple juice. The comparisons are endless. Try comparing different concentrations of apple juice (using distilled water to dilute as required) or adding extra sugar. You may also choose to compare different incubation temperatures (e.g. 4°C, room temperature, 28°C, >40°C) or different amounts of dried yeast (e.g. ¼ of a teaspoon, half a teaspoon, one teaspoon). To keep it easy, stick to one treatment (e.g. apple juice concentration) and don't forget to include an appropriate control sample (i.e. one that has no treatment).

Materials

- > Glass conical flask (250 ml) for each treatment you wish to test
- > Rubber bungs with a single hole and plastic air locks or non-absorbent cotton wool (see options in procedure)
- > Preservative free apple juice
- > Measuring cylinder
- > Distilled water
- > A teaspoon
- > Dried baker's or brewer's yeast
- > Balance suitable for weighing flasks, sensitive to 0.1 g

Procedure

1. Using a measuring cylinder, pour 100 ml of apple juice into each flask.
2. Add one level teaspoon of dried yeast to each flask. Have one flask with NO added yeast as the control flask. Swirl the apple juice inside the flask to hydrate the dried yeast (note: the yeast will not dissolve).
3. To seal the flask either insert a plastic airlock into a rubber bung and then insert the bung into the opening of the flask or insert cotton wool into the opening of the flask.
4. If using the airlock system, add approximately 6 ml of distilled water into the airlock.
5. Use a balance to determine the weight of each flask and keep a record. Leave flasks at desired temperature(s) overnight.
6. Use a balance to re-weigh each flask after this incubation time and record. Repeat weighing at desired intervals.

Remember to label each flask with all of the conditions used and your name (e.g. 100% apple juice, 1 tsp yeast, 28°C). Record the weight of each flask at the beginning of the experiment and take note of the time (e.g. "t = 0" for the start). If the experiment is set up in the morning, re-weigh in the afternoon and then twice a day for another 1-2 days, also recording the number of hours since t = 0.

Analysis

Record your data in a spread sheet and draw a graph recording the weight loss over time for each flask. This weight loss is due to the carbon dioxide (CO₂) that is given off during fermentation. What effect did your treatment have on fermentation?

Here's our data: <http://sciences.adelaide.edu.au/schools-resources/docs/fermentation-experiment-data.xlsx>