

Classroom Chemistry – Milk Makes Me Sick

The majority of adults cannot digest lactose which is milk sugar.

Materials:

- Regular milk
- Lactaid milk
- Small glasses
- Lactase drops - drug store
- Glucose test strips - drug store
- 2% Glucose - drug store (2 g of glucose in 100 ml water)



Procedure: (Remember to have your parent's permission and have them watch and help you.)

- Dip a glucose test strip into the glucose solution (positive control) and another one into water (negative control) and note any colour changes.
- Pour a small amount of milk and Lactaid milk into two glasses and test each for glucose.
- Put one Lactase drop into each of the two milks. Warm each glass of milk (and help mix the drop into the milk) by holding the glass so your palm touches the glass and then swirling the milk.
- Test the two milks for glucose. If both results are negative. Add another drop of Lactase and repeat.
- Test the Lactase drops for glucose.

What's happening?

Lactase is an enzyme that breaks down lactose (milk sugar) into glucose and galactose which people can digest. The gene that produced lactase gets turned off in many people as they mature. The vast majority of the world's peoples are lactose malabsorbers (lactose intolerant). All Inuit and American Indians, most sub-Saharan African peoples, Mediterranean and Near Eastern groups, Indian, Southeastern and East Asian descent, and Pacific groups contain the majority of lactose malabsorber. However in most Northern European and certain ethnic groups who rely on dairy products from their herds to survive, the lactase gene remains turned on.

If your lactase gene turns off you cannot digest the lactose molecule, which is quite large. It then passes into your intestine where osmosis causes water molecules to enter your intestine causing diarrhoea. The large lactose molecule becomes a source of food for the bacteria in your intestine and the by-product of their consumption of this milk sugar is gas. Sometimes this accumulation gas in the intestine can be quite painful.

Extension:

Why did you test the Lactase drops for glucose?

Try to find out why people evolved to be lactose intolerant and why some are lactose tolerant.

This activity is based on our "Classroom Chemistry" kit that is currently under development. The source for this lab is: http://www.exploratorium.edu/snacks/milk_makes-me_sick/index.html. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom speaker or allow your business as a field trip location.



Future Event: Praxis sets up the Science Kits used in the Summer Camps for Kids hosted by Medicine Hat College. <http://www.praxismh.ca/MHCsummercamp.html>.

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