

Sugar & Yeast



Food Science

Sugar

Yeast

Fermentation

Science Film Festival Films

▶ **nine-and-a-half at Planet School: Sugar-free Sweets – Snacking with no End?**

Learning Goals

- To describe the properties and affects of yeast.
- To understand that the reaction of yeast with sugar will produce carbon dioxide.
- To understand that every organism needs sugar to survive and to generate energy (some organism don't need oxygen, but still need sugar).
- To understand that sugar produces energy, but that we need to control the quantity of sugar that we absorb into the body. People should be eating healthier with foods that contain less sugar.

Explanation of Scientific Principles

Yeast is a single-cell microorganism. The yeast in the bread that we eat every day is prebiotic, it is not the powder (for example baking soda or baking powder) like people sometimes think. Sugar is nutrition for yeast, it consumes it and produces CO₂. Yeasts produces enzymes that react with sugar. The yeasts, like most fungi, respire oxygen (aerobic respiration), but in the absence of air they derive energy by fermenting sugars and carbohydrates to produce ethanol and carbon dioxide.

Yeast fermentations have for millennia provided us with a variety of biotech products, like wine, beer, vitamins, and recently also with pharmaceutically active heterologous products and biofuels. A central biochemical activity in the yeast cell is the metabolism of carbon compounds, providing energy for the whole cell, and precursors for any of the final fermentation products.

Explanation of Connection to the Film

In the film, sugar is covered with many interesting facts, such as that there is more than one kind of sugar. Some types of sugar are good for our health, but other types can be harmful to us. However, the film shows that sugar is energy for every organism and it is important for the process of transforming food into energy. The presenter did an experiment to show us how bacteria "eat" sugar to then produce energy. This experiment with yeast, demonstrates the same principle as the one in the film.

Materials

- teaspoon of baker's yeast
- 10 teaspoons of sugar
- 4 glasses or glass bottles
- 4 balloon
- Water

Preparation

- 1) Pour yeast in half of the glass water.
- 2) Pour about 3 teaspoons sugar into the solution.
- 3) Place the balloon on the edge of the glass and wait about 8 minutes to see the result.
- 4) While awaiting the result, the facilitator can conduct the following activities:
 - a) Prepare 10-20 bags of sugar (each bag containing 10 g of sugar) and the labels from various soft drinks (Coke, Fanta, juices, water)
 - b) Arrange the quantity of sugar by reading the information on the label (or you can use the content from the chart below)

➔ web.archive.org/web/20090226151906/http://www.yeastgenome.org/VL-what_are_yeast.html

➔ www.youtube.com/watch?v=qoxY0z8ukUQ

➔ www.neeldentistry.com/progress/how-much-sugar-is-in-your-drink/attachment/how-much-sugar-in-drinks/

➔ www.rethinksugarydrink.org.au/how-much-sugar

Sugar & Yeast

rethink sugary drink

≡ Main Menu

How much sugar is in ...?

Drink	Serving size	Sugar per serve (g)	Sugar per serve (tsp)	Sugar per 100mL (g)	Sugar per 100mL (tsp)
Soft drinks					
Solo	600mL	69	17.3	11.5	2.9
Coca Cola	600mL	64	16.0	10.6	2.7
Sprite	600mL	52	13.0	8.6	2.2
Fanta	375mL	41	10.3	10.9	2.7
Bundaberg: Ginger Beer	375mL	40.5	10.1	10.8	2.7
Coca Cola	375mL	40	10.0	10.6	2.7
Energy drinks					
Rockstar: Super Sours Energy Drink	500mL	67	16.8	13	3.3
V Energy Drink	500mL	53	13.3	10.6	2.7
Mother	500mL	51	12.8	10.1	2.5
Red Bull	250mL	27	6.8	11	2.8
Sports drinks					
Gatorade: Fierce Grape flavour	600mL	36	9.0	5.5	1.4
Gatorade: Tropical	600mL	36	9.0	6	1.5
Powerade: Mountain Blast flavour	600mL	35	8.8	5.8	1.5
Powerade: Lemon lime	600mL	35	8.8	5.8	1.5
Other drinks					
Lipton Ice Tea: Peach flavour	500mL	26.4	6.6	5.3	1.3
Glacier Vitamin water: kiwi strawberry flavour	500mL	22	5.5	4.3	1.1