

What drinks affect teeth the most

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Hypothesis:

If teeth are exposed to certain beverages over a long enough period of time then those with high sugar and acidity levels will have serious negative effects. I believe that Coke will have the most catastrophic effect on the tooth because it has the highest amount of sugar and acidity level of the five beverages in this experiment.

Reason for hypothesis:

I feel that Coke would do the most damage because in one 12oz can there are 39g of sugar and a pH level of 2.4.

Materials list:

- 15 plastic cups
- 15 eggs with white shells (eggs used to represent teeth which were not available because of the pandemic)
- half a cup of orange juice 3x
- half a cup of Red Bull 3x
- half a cup of water 3x
- half a cup of red Gatorade 3x
- half a cup of Coke 3x
- labels marking 3 samples per beverage
- spoons (may vary)
- gloves
- protective glasses/ goggles
- pad of paper
- pen

In history during the middle ages it was believed that kissing a donkey was a toothache reliever. Throughout time and with a lot of research, there are more pleasant methods to use that don't require a donkey.

Eggshells have a similar make-up to tooth enamel, making them act similarly with other foods and drinks. This can help people understand what stains tooth enamel. When people brush an eggshell with fluoridated toothpaste, it strengthens the shell and protects it from acid, just like it does for people's tooth enamel.

Sugar in soda combines with bacteria in the mouth to form acid, which attacks the teeth. Diet soda contains its own acid, which also can damage teeth. Each attack on teeth lasts about 20 minutes and starts over with every sip of soda people take. These acid attacks weaken tooth enamel.

Like any drink that isn't water, coffee can cause bacteria to grow in the mouth which can lead to tooth and enamel erosion. This can cause people's teeth to become thin and brittle. Coffee can also cause bad breath, or halitosis, because it sticks to the tongue.

Tea contains tannin, a yellow or brownish substance found in plants that gives tea its color. It can also stain the teeth. To help reduce this, brush teeth or rinse the mouth after drinking tea. Sweet or acidic add-ins to tea or coffee can erode teeth and make people more prone to cavities.

Wine, both red and white, is highly acidic. This acid can deteriorate tooth enamel and cause teeth to look yellow. Without protective enamel, teeth are also at risk for bacteria and decay.

The acid in sports drinks makes people's teeth more vulnerable to bacteria, which feeds off the excess sugar in these drinks. Bacteria can then sneak into the cracks of tooth enamel and cause tooth decay. Untreated tooth decay can lead to cavities, gum disease or even periodontal disease.

Citric juice from fruits like grapefruits, oranges, and lemons are loaded with acids that wear down tooth enamel. When the fruits are concentrated down into juice, drinking it exposes the teeth to more damaging amounts of acidity. In fact, research has found that orange juice has the capacity to decrease enamel hardness by 84%.

Human teeth are made up of four different types of tissue: pulp, dentin, enamel, and cementum. The pulp is the innermost portion of the tooth and consists of connective tissue, nerves, and blood vessels, which nourish the tooth.

Tooth development is the process by which teeth form from embryonic cells, grow, and erupt into the mouth. For human teeth to have a healthy oral environment, all parts of the tooth must develop during appropriate stages of fetal development. The primary teeth begin while the baby is in the womb. At about five weeks' gestation, the first buds of primary teeth appear in the baby's jaws. 20 primary teeth are developed in the gums at birth.

The hardest substance in the body is called the tooth enamel. Tooth enamel is the final white layer on the tooth that protects teeth from hurting or cracking. Most drinks affect it in a

negative way. After the tooth enamel is destroyed or eroded down to nothing there is no way of bringing it back. In some cases the tooth can have a crown put on it to protect it from any future decay.

The bacteria in the mouth accumulate and combine with the sugar in food to make acids. Acids attack the tooth causing cavities, gum disease, tooth decay, which can lead to disease or other problems that spread to other parts of the body.

Heart disease can be increased by having a gum disease. Bad dental health makes it more likely for the risk of a bacterial infection in the bloodstream. This can affect the heart valves.

Dentists use a two-digit numbering system. So the upper right teeth begin with the number “1”, the upper left teeth begin with the number “2”, the lower left teeth begin with the number “3”, and the lower right teeth begin with the number “4”.

Top Left

Top Right

Bottom left

Bottom right

(https://en.wikipedia.org/wiki/Universal_Numbering_System)

William Nebergall invented the toothpaste called fluoride toothpaste. When people brush their teeth, it helps remove food and plaque, a sticky white film that forms on people's teeth and contains bacteria. After people eat a meal or snack that contains sugar, the bacteria in plaque produce acids that attack tooth enamel. Toothpaste was invented during the Egyptians 5,000 B.C.

to 4 A. D. The toothbrush was invented in 3,00 B. C.it was called the chew stick.

<https://www.loc.gov/everyday-mysteries/item/who-invented-the-toothbrush-and-when-was-it-invented/#:~:text=The%20toothbrush%20as%20we%20know,were%20rubbed%20against%20the%20teeth.>

The top two leading toothpaste producers are:

“1. Colgate

Colgate is a great toothpaste to fight against plaque. The toothpaste fights plaque for up to 12 hours. The formula is very effective at fighting gingivitis, gingivitis is a mild gum disease in the mouth. Best of all, there are different types of Colgate Total that provide the same plaque-fighting ability while accomplishing other things. The Advance Whitening whitens, Daily Repair fixes damage to your teeth, and Deep Clean deep cleans teeth. (Dan, 2017)

(<https://ericssondental.com/top-toothpastes-dentists-recommend/>)

2. Crest Pro-Health

“One of the only toothpastes accepted by the ADA (American Dental Association) in six

categories, Crest Pro-Health, does it all. In addition to whitening teeth, it reduces sensitivity, prevents cavities, fights plaque, prevents gingivitis, and combats bad breath. For all-around oral hygiene, this toothpaste is a winner.” (Dan, 2017)

(<https://ericssondental.com/top-toothpastes-dentists-recommend/>)

Procedure Diagram

1. Take 15 clear plastic cups and label each cup with the name of drink and have 3 samples per beverage
2. Put a white shelled egg into every individual cup (the egg shells represent teeth which were not available because of the pandemic)
3. Pour 4oz of each beverage into every cup
4. Record what happens at day 1, 3, 5 and 7 to the egg shell
5. Lift egg out of the cup carefully with a spoon and record any changes you see on the shell

Conclusion:

- Water had no effect
- Coke had the highest sugar level and was the most acidic
- Orange Juice had nearly no effect
- Gatorade and Coke had the most color change
- Red Bull had the worst overall effect

My findings are important because it helps people figure out what drinks to look out for. My results may convince someone to avoid a drink with too much sugar or acid and choose water instead. Choosing beverages like natural juice or water would help keep your teeth healthy, strong and white.

My findings could help other scientists by teaching them what the worst drink does in comparison to water or a natural juice. My study would provide a good guideline if a scientist wanted to carry out a study over a longer period of time.

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