

The Acidity Levels of Certain Types of Sodas

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Abstract

Soda has been considered to be a popular drink among many households but holds many harmful properties that can be detrimental to the body. The high acidity content in the sodas can lead to major teeth decay. Using pH paper, the acidity levels of 5 different popular sodas were determined, with Coca-Cola being the most acidic. This lab will show how acidic some of the most popular sodas and how they relate to the decay of tooth enamel.

Introduction

Most people in their lives have drank some sort of soda due to its easy accessibility. Much of the research has proven different types of soda can have very detrimental effects on the body. There is countless research showing the harmful effects on the body due to drinking soda, but many still choose to drink it. Many are not aware of the specific damaging qualities soda can have on the body, especially the teeth. Tooth enamel dissolves at a pH level of 5.5, with most common sodas below that.[2] Even though extensive damage will not be caused due to moderate drinking, avid soda drinkers can experience serious decay of tooth enamel.[1] In this experiment, the purpose is to test 5 different types of soda to see which soda has the highest acidity. It is hypothesized that the most common soda, Coca-Cola, will be the most acidic. It is believed that Coca-Cola will be the most acidic because the intended way of drinking the soda is to drink it with ice, which dilutes the drink itself.

Materials

- 12 oz Coca-Cola Can (1)
- 12 oz Pepsi (1)
- 12 oz Sprite (1)
- 12 oz Coke Zero (1)
- 12 oz Fanta Orange (1)
- pH strips (5)
- 9 oz Plastic Cups (5)
- Timer (1)
- Marker (1)

Methods

Create the set up by laying out the cups and soda on the table. Cut five strips of pH paper. Label each cup by writing with a marker in which soda will be present in that specific cup. Repeat with all the cups. Start by setting the timer to 30 seconds and open one of the cans. As soon as the can is opened, start the timer and pour half of the soda into the cup. Grab one strip of pH paper and dip it into the soda as soon as the timer stops. This is to make sure that each soda's pH level is tested after 30 seconds of opening the can so that certain variables remain constant. Take out the pH strip and, by looking at the corresponding color on the paper, determine the pH level. Record the data and repeat the same process with the remaining 4 cans of sodas.

Results

Table 1 pH Levels of Sodas

Soda Type	pH Level
Coca-Cola	2.52
Sprite	3.29
Fanta Orange	2.73
Coke Zero	3.18
Pepsi	2.53

Discussion

The hypothesis discussed earlier was supported. This could be because many sodas use phosphoric acid to give the tart taste, increasing their acidity level. The phosphoric acid contributes to the acidity level, as well as the CO₂ to a lesser degree. Flat soda when tested is slightly less acidic than carbonated soda because much of the CO₂ is depleted. Even though Coca-Cola came to be the most acidic, it was only more acidic than Pepsi by a slim margin. Because the two have very similar tastes, it would be assumed that the two companies use a similar amount of phosphoric acid. It was surprising that Fanta Orange and Sprite were not as acidic as Coca-Cola and Pepsi. Considering that the two sodas are flavored after acidic fruits, it would be expected for them to be even more acidic. A potential reason as to why the two are not as acidic as Pepsi and Coca-Cola is that Sprite and Fanta contain artificial flavoring to simulate fruitier flavors, thus not relying on phosphoric acid for taste. Lastly, Coke Zero was the second least acidic. This could be explained by the lower intensity of the flavor when compared

to the original. Because phosphoric acid is used to create a tart taste, Coke Zero is not as intense when it comes to flavoring. This is a potential explanation to Coke Zero's high pH level. Even though all these beverages have varying pH levels, they are still lower than the pH level at which the tooth enamel begins to decay. Limiting these drinks at an early age can lower people's tendency to drink them so often, resulting in healthier teeth.

Reference

1. "Acids in Popular Sodas Erode Tooth Enamel." LiveScience. Purch. Accessed October 29, 2019. <https://www.livescience.com/7198-acids-popular-sodas-erode-tooth-enamel.html>.
2. "PH Values Of Common Drinks." Robert B. Shelton, DDS MAGD Dentist Longview Texas. Accessed October 29, 2019. <https://www.sheltondentistry.com/patient-information/ph-values-common-drinks/>.