Killed by Sweetness

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Bacteria in the mouth if not controlled can lead to tooth decay. One cause of tooth decay is fermentation of sugars like glucose, fructose, and sucrose. Millions of dollars are spent yearly on dental services to repair and prevent tooth decay. Products that help prevent tooth decay are found in toothpaste, gums, and mouth washes. These products contain xylitol thought to be a decay fighting ingredient. Xylitol is a sweet crystalline alcohol obtained from xylose, found in trees and fruits. The purpose of this project is to determine if xylitol can reduce growth of cavity forming bacteria. It was hypothesized that xylitol would reduce bacterial growth. Cultures were made using Streptococcus salivarius, Streptococcus mutans, with Tryptic Soy Broth as the media and the sugars: xylitol, sucrose, glucose. This experiment showed both bacteria grew better in the media with sucrose and glucose compared to the control and xylitol. An additional experiment with fluoride used to strengthen enamel and reduce tooth decay. Cultures were incubated, observed for growth, measured using a spectrophotometer. A third experiment, used fermentation chambers to measure C02 in (PPM), with a Neulog sensor. Results showed bacteria grew in all three sugars. Glucose produced the greatest growth, then sucrose with moderate growth, and xylitol the least. Although bacteria grew in the xylitol media, it was questionable if the bacteria used the sugar or the TSB as an energy source. Results of experiment with sodium fluoride showed Streptococcus salivarius were able to utilize glucose more efficiently at 39 hours with an increased absorbance of 0.16, while Streptococcus mutans utilized sucrose more efficiently showing an increased absorbance of 0.12 at 39 hours compared to the control.

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