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| |  | | --- | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |  | | --- | | h | | **conclusions** | |  | | The project didn’t turn out quite as I had planned or pictured in my head. Though there was some evidence of decay and breakdown, there was not nearly enough to be conclusive. When looking at color change, however, the data do support accepted theory. As I completed my project, I realized many things that would be crucial to obtaining good, usable results, these are outlined later and in the Recommendations section. | |  | | If we look at the data, it shows us these things: We expected every substance except water and milk to decay and breakdown the hydroxyapatite because they were acidic. Only the hydroxyapatite in Diet Coke and Vinegar showed signs of decay, which is mostly attributable to their lower pH when compared to other substances. In humans, milk helps bones and teeth get stronger because of its calcium contents. Although we could have expected the milk to have some effect on the hydroxyapatite, it did not, which can be explained by the blocks’ inanimate state. The color of the hydroxyapatite changed as we expected it to in the sodas and coffee. This could suggest one or both of two things. First, it could suggest that these substances will discolor teeth if teeth are exposed to great amounts for long periods of time. Or, it could mean that the porous hydroxyapatite blocks soaked up some of the substances and therefore changed color. Further testing is necessary. | |  | | Unfortunately, I think that the inconclusive results can be attributed to a poorly designed experiment. As I was conducting the experiment, I thought of several things that render these data almost useless. The first and most obvious being that hydroxyapatite blocks are not teeth. Although they are blocks of the main ingredient of teeth, they are not the same thing. Second, the human mouth is around 98� F, while the substances and the blocks were kept are room temperature, around 66� to 68� F. If the containers were constantly heated to 98� F, I think the results would be much more realistic. Third, no saliva was present. The fermentation of the substances by bacteria living in saliva is necessary for real tooth decay. All that happened to the blocks was breakdown because of the acidic substances. This is shown because neither the water nor the milk, the two non acidic substances, showed no breakdown or decay. The fourth and final reason, when humans consume such substances as were tested, they contact the teeth briefly. Teeth are not submerged in soda, for example, for several days at a time inside one’s mouth. | |  | | Before we write off these data as completely useless and the experiment as a waste of time, we must step back and look holistically. I think that even with its problems, the results can suggest that we investigate further in a certain direction. The data do show that acidic substances are bad for tooth enamel and that sodas, for whatever reason, cause tooth enamel to discolor. Further testing is obviously needed in both of these areas. In my introduction, I hinted that the results of this experiment could be used to create better versions of whitening gum or toothpaste that targeted certain types of food. The data don’t allow us to create such a gum, but again, they can point us in the right direction. | |  | | I don’t feel this project was a waste of time and I enjoyed doing it. I am most impressed with Berkeley Advanced Biomaterials and their ability and willingness to donate more than $300 worth of material to Amador for this project. I thank them as it would not have been possible without their generous support. | |  | | [**top/\**](#gjdgxs) | |