CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

Rebecca C. Almader

Project Number

J2001

Project Title

The Mystery Behind Painkillers: Determining the Adverse Effects of Over-the-Counter Anti-inflammatories on Stomach Acid

Abstract

Objectives/Goals

The purpose of this project was to investigate if the traditional over-the-counter painkillers affect the stomach acid and health of an individual in the future. Over-the-counter painkillers serve many purposes throughout one's daily life, causing overusage. Due to the fact that the artificial stomach acid took longer each time to dissolve the pill, the chemicals in the pill will affect the acid in a negative way. The pills diluted the stomach acid causing the acid to decrease in acidification levels. Even if advertisements say that the pills are beneficial, the secret behind the pills is shown in this project.

Methods/Materials

First, research was done to investigate the main chemicals in an average human stomach. The next step of this project was to create an artificial stomach out of hydrochloric acid, water, table salt, and potassium chloride. These materials were measured to an exact rate using teaspoons and tablespoons and placed in four different glass jars. Then, each different type of pill out of Aleve, Advil, Aspirin and Tylenol was placed in the jars. A timer was used to track how long each pill took to dissolve and a document was used to track the times given. The dosage of each jar was kept at a constant rate when it was added each time. This was tested seven times, one test for each day of the week.

Results

After investigating the results, the stomach acid had a harder time to dissolve a pill after the first test. This is because of the chemical build up from the pills affected the stomach acid in a negative way causing the hydrochloric acid to dilute making the time to increase. The pills with the powder texture dissolved faster than the pills that were gel caps. This is because the acid had to enter the interior of the gel caps while the powder texture pills have a very thin layer.

Conclusions/Discussion

Painkillers are not as good as one might think. The pill might decrease pain and problems in your body but can lead to more severe problems. The chances are that the over-the-counter pills dilute one's stomach acid creating the stomach to have less hydrochloric acid. Hydrochloric acid is the main acid in an average human stomach and it is there to help process food that enters the body. The leading advertisements do not always say what the long term side effects and according to this project, over-the-counter pills may cause digestion problems and much more.

Summary Statement

As measured by time, I was able to prove that over-the-counter painkilling pills can lead to severe problems in the future based on the dilution of stomach acids.

Help Received

In order to be succesful for the science fair of 2017, I had my science fair teacher explain to me the chemical reactions that occur when a pill has contact to the human stomach acid. I also had a proffesional contact from the local hospital explain to me what she reccomends her patience to take whe is comes to