CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J2002

Project Title
Dissolution Resolution: How Do Beverages Affect the Speed of Dissolution of Pain Relievers?

Abstract

Objectives/Goals
I conducted this experiment to test the relative speed of dissolution of pain reliever tablets in simulated stomach fluid with different beverages. I tested two pain relievers, Tylenol and Advil, and three beverages (water, apple juice, and 7-UP).

Methods/Materials
I made simulated stomach fluid by combining 150 milliliters of water and 75 milliliters of hydrochloric acid. I split the pain reliever tablets in half, placed a half tablet in the fluid, and measured how long it took to dissolve. I conducted six trials. Then I made more simulated stomach fluid to which I added 150 milliliters of water. I placed a half tablet in the fluid and measured how long it took to dissolve. I conducted six trials. I repeated this process with apple juice and 7-UP.

Results
The Tylenol tablets dissolved faster than the Advil tablets with every beverage tested. For the most part, pure simulated stomach fluid, without any added beverage, most quickly dissolved both pain relievers. Generally, of the beverages tested, water provided the most efficient way to dissolve the tablets. As to the next best beverage, the Tylenol tablets dissolved quickly in 7-UP, while the Advil tablets dissolved quickly in apple juice.

Conclusions/Discussion
When taking Tylenol or Advil, I recommend doing so with a glass of water rather than with any other beverage. The results validate my hypothesis that the Tylenol would dissolve faster than the Advil, but reject my hypothesis that the pain relievers would dissolve fastest in apple juice.

Summary Statement
I tested the speed of dissolution of Tylenol and Advil when placed in simulated stomach fluid combined with one of three beverages: water, apple juice, and 7-UP.

Help Received
I received guidance from my teacher throughout the process. Also, I received help from my parents in purchasing the materials and in using the hydrochloric acid.