



## Curiosity Guide #204

### Digestive System

Accompanies Curious Crew, Season 2, Episode 4 (#204)

#### Acidic Digestion

Investigation #3

#### Description

Do you know the secrets of your stomach?

#### Materials

- 2 clear plastic cups
- 1 enteric-coated aspirin tablet
- 1 uncoated generic aspirin tablet
- 1 cup vinegar
- $\frac{1}{2}$  cup water
- 1.5 teaspoons baking soda
- Spoon
- Pinch of salt

#### Procedure

- 1) Pour vinegar into one cup. The vinegar is like the gastric acid that we have in our stomachs.
- 2) In the second cup, combine the baking soda and pinch of salt with the water. This mixture represents the alkaline bile that is used for digestion in our small intestines.
- 3) Stir the alkaline mixture.
- 4) Line the cups up side by side. You will test each of the aspirin tablets in the vinegar.
- 5) Predict what will happen when the two types of aspirin tablet are dropped into the vinegar stomach mixture.

- 6) Drop the two tablets into the vinegar together.
- 7) Did you notice that the uncoated tablet dissolves abruptly? This can cause stomach pain. The coated tablet does not dissolve very much. Why?
- 8) Using a spoon, remove the coated tablet from the vinegar right away.
- 9) Add the coated tablet to the alkaline solution. This is just like the process of material moving from the stomach to the small intestine.
- 10) What do you see?

### My Results and Observations

### Explanation

The stomach lining mixes in gastric acid and enzymes to help break down food into a mush called chyme. The gastric acid in the stomach contains hydrochloric acid, which makes the stomach an acidic space with a pH level of 1.5. Similar to what happened in the vinegar, an uncoated aspirin would quickly dissolve in the stomach. For some people with sensitive stomachs, the quickly-dissolved aspirin could cause discomfort. The enteric-coated tablet did not react to the vinegar, so it would not impact the person taking it.

While the stomach was acidic, the small intestine is alkaline in nature. The small intestine uses bile and other enzymes to extract the nutrients from the food. Bile is a yellow-green liquid that is made in the liver, stored in the gall bladder, and delivered into the small intestine along with other enzymes made in the pancreas and small intestine lining. Bile neutralizes the acidic nature of the chyme that came from the stomach. In this case, the combined baking soda, salt and water, which represents bile, effectively dissolved the enteric-coated tablet in the intestines. You should have seen bubbles forming on the capsule as it slowly began to dissolve.

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