Pineapple Enzymes
Investigation #8

Description
Everyone loves Jell-O, right? But some fruits don’t play nicely with gelatin! Let’s find out!

Materials
• Stove
• Liquid measuring cup
• Water
• Large pot
• Gelatin mix
• Spoons
• Apples
• Blueberries
• Oranges
• Raspberries
• Strawberries
• Pineapple
• Kiwi
• Cutting board
• Eight 12-ounce plastic cups
• Refrigerator
• Marker
Procedure

1) Cut each of the larger fruits, the apple, orange, pineapple, and kiwi, into small pieces. Make sure to clean the knife and cutting board between each type of fruit. Then put each kind of fruit into a separate cup.

2) Add blueberries to one cup and raspberries to another.

3) The fruits should fill only about \(\frac{1}{4}\) of the cup.

4) On the stove, follow directions on the box to make the gelatin. Then pour the liquid gelatin into each of the fruit cups. The final cup should be full of gelatin alone.

5) Place all the cups in the refrigerator to let the gelatin set up for 1-2 hours.

6) What do you notice about the gelatin cups?

My Results
Explanation
While most of the cups firmed up into the dessert many of us know and love, the ones with pineapple and kiwi did not. Gelatin is made of collagen proteins that are long and flexible, like wet spaghetti noodles that tangle together. These collagen proteins make the gelatin firmer when the gelatin sets up. When the gelatin solidifies, some of the water, sugar, and flavors get trapped in little pockets created by the tangled proteins, and that tangled structure surrounds and holds the fruit as well.

However, the gelatin with pineapple or kiwi does not firm up. Those cups remain runny. This is because some fruits have enzymes that break other proteins. These protease enzymes cut the collagen proteins apart, so the long strand-like proteins are too small to tangle or create little pockets of water, sugar, and flavor. The gelatin never sets up. For this reason, fruits that have proteases should not be used in gelatins. The list includes pineapples, kiwi, mango, papaya, guava, figs, and ginger root.

For inquiring minds:
“Protease” is pronounced Pro’ tee ayz.
And “Proteases” is pronounced Pro’ tee ayz iz!

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