Observing the Surface of a Mentos

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Summary:

In our experiment we observed the surface of a mentos using a high powered microscope and a camera adapter that attached to it to project the images that were under the microscope into a form that can be seen by more than one person at a time. We were trying to see what causes the eruption between the Diet Coke and the mentos by closely looking at the surface to see what imperfections there were. In the end we observed that when the mentos is exposed to the soda the cracks and fissures cause the CO_2 to form a bubble which then dissolves the rough outer coating of the mentos. We believe this is due to what is called nucleation sites[v].

Introduction:

We only found a handful of experiments that had significant information and proof to back it up. One of them being the experiments done by Dr. Tonya Coffey, she and her team had done many experiments to figure out why the eruptions occur. To the naked eye the surface of the mentos candy is smooth but under a microscope the surface looks coarse. The coarse bumps are called nucleation site, each tiny nucleation site become a place where a bubble of CO_2 gas can form and rapidly rise out of the soda. Multiply the one nucleation site by the many found on the mentos and you get thousands of bubbles forming continuously until the soda dissolves the outer layer and the mentos becomes smooth.[v] In Steve Spangler's experiment he explains what happens when the mentos interacts with the diet coke. He says that as the mentos descends into the soda the CO_2 gas fill the fissures in the candy and the bubbles formed carries the liquid up and out of the bottle.[v] Another experiment was done by the popular television group, Mythbusters, in which they identified the ingredients in the mentos and in the soda. After they had acquired these ingredients they tested each to see which would cause the eruption. They came up with; the CO_2 gas and the aspartame in the soda (artificial sweetener), and the gelatin and gum arabic in the mentos, they concluded that these were the main ingredients in the reaction.[v] All of the previous experiment stated were valid and are proof of nucleation sites.

Experimental Section:

In our experiment we observed the surface of a mentos by using a simple microscope. We started off by placing the mentos candy onto the slide. We had an external light source such as lamp, or in our case, a flash light, because the mentos candy was too thick for the microscope light to show through. We started on 40x magnification just to get the mentos in focus. Once we had this done we changed the magnification to 100x, from here we focused the image and attached the electronic camera adapter to the microscope. With this, we

projected the images to a larger screen and then took pictures of the image seen. We used a normal digital camera and uploaded the photos to a computer. Using a disposable pipette, we added 2 drops to the mentos, waited for the small reaction to occur, then refocused the microscope and took pictures of the result.

Materials:

- A pack of Mentos candy
- Access to a microscope
- Access to an attachable electronic camera adapter
- One 1L bottle of diet coke
- One 12oz of diet coke
- Camera (preferably digital)
- Disposable pipette
- Lamp or flash light
- Balloon
- Adult supervision Procedure:

1. Gather materials

2. Open pack of mentos and place one mentos under the microscope and start at a low 40x magnification, get the image into focus.

3. Once the image is in focus move up to 100x magnification and again check to make sure the image is in focus.

4. Attach the electronic camera adapter to the microscope and connect it to a projector or a television screen.

5. Using a digital camera, take 2-4 pictures of the images shown on the screen.

6. Once done, use a pipette and fill it with diet coke.

7. Drop two drops of the diet coke onto the mentos and watch the physical reaction take place.

8. Record observations.

9. Once the reaction is over, dab dry the mentos with a paper towel and put back onto slide.

10. Take off the camera adopter.

11. Refocus the image by hand by using the 40x magnification until what is seen is half of the mentos that was affected by the soda and half that wasn't.

12. Refocus with the 100x magnification.

13. Reattach the camera adopter.

14. Using the digital camera take 2-4 pictures of the images shown on the screen.

15. Record Observations.

Conclusion:

After conducting our experiment we have concluded that the cause of the eruption is the CO_2 filling the cracks and fissures which forms bubbles. These bubbles end up rapidly ascending upward and carrying the soda molecules with it forming the eruption that is so famously known. When the reaction has occurred the soda ends up dissolving the rough surface of the mentos down to a smooth area in which the reaction cannot again because there are no more cracks and fissures for the CO_2 gas to form a bubble. As a follow up experiment, someone repeating this experiment can take a 1L bottle of soda and attach a balloon tit e top and then agitate the soda until all of the CO_2 gas has escaped from the bottle and it becomes "flat". The when you drop the mentos into the bottle no reaction occurs, therefore the CO_2 gas is the main factor in the reaction. For further reading please refer to the references cited below.