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Get Wet Report

This image was captured to do my Get Wet assignment. The purpose of this assignment was to create a picture or video of any fluid and demonstrate the phenomenon that is being observed. I have seen a project once, where Mentos were dropped into a Diet Coke which caused all the carbon dioxide to squeeze into the liquid and make a fountain. Therefore, in this image, I was trying to drop a piece of Mentos mint into tonic water and capture the reaction that would happen. To get this image taken, I had help from my friend Dawood Ahmad who let me borrow his Samsung Galaxy S9, which has advanced camera features. Also, he provided me with some tools such as a glass, and a table to do the experiment.

In this experiment, I chose to work with tonic water as my fluid and Mentos mint as my reactant. Once the Mentos mint was added into the glass and hit the surface of the tonic water, bubbles started to form all over its surface and quickly rise to the surface of the water. The reason why Mentos form bubbles is because of the tiny pits on their surface which act as nucleation sites. Those sites are the perfect places for carbon dioxide to react with and form bubbles [1]. Another reason is that on the surface of the Mentos, there are surfactants that reduce the surface tension of the tonic water and allow bubbles to form as they sink into the bottom of the water [2]. Now what makes the bubbles rise to the surface is that their densities are less than the density of the tonic water. To demonstrate that, the tonic water has a density of $1050 \frac{kg}{m^3}$, and the carbon dioxide gas has a density of $1.98 \frac{kg}{m^3}$, which means that they are lighter than the tonic water and hence they rise. Moreover, this reaction happened as soon as the Mentos hit the

surface of the water as mentioned earlier. It took milliseconds for the bubbles to form and rise which made capturing the bubbles a little bit harder than I anticipated. Below is a schematic showing the setup I used to capture this image.

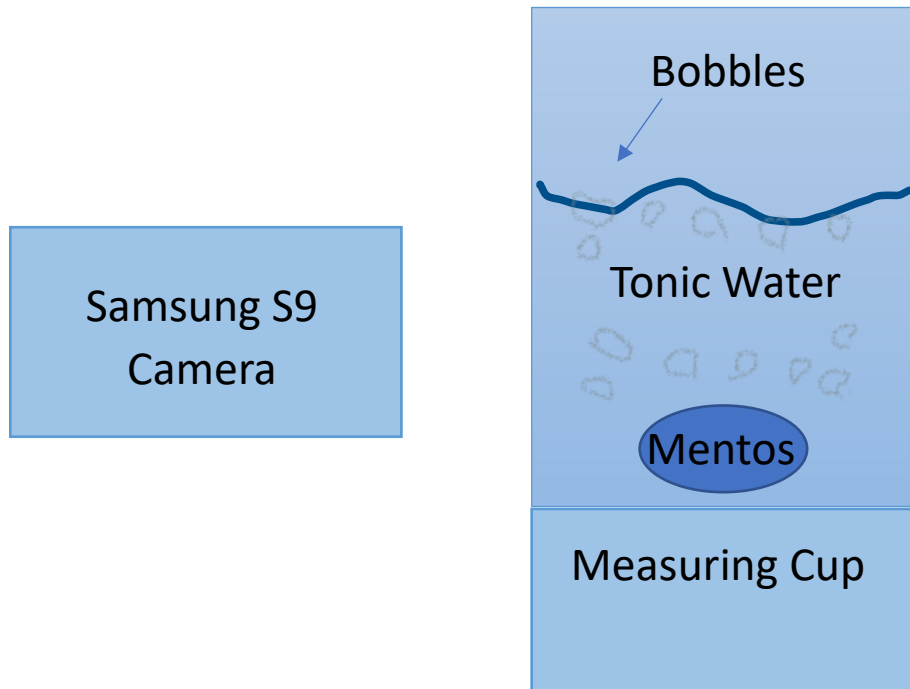


Figure 1. Schematics of the setup and camera position.

The setup and details behind creating this image were as follows: I used a glass containing an approximate of $\frac{1}{4}$ cup of Canada Dry Tonic Water. Behind the glass, a black cardboard was placed to isolate the glass and its surrounding environment. The water glass was placed over a large measuring cup to isolate it from the bottom surroundings. Inside the measuring cup, I placed an iPhone with the flashlight on facing up to provide the lightening needed to capture the bubbles. Once everything was ready, I added a Mentos mint to the glass, and as soon as bubbles started to form, I took the picture with the camera flash off.

The glass I used was 6 inches in height, and 14 oz in volume. It was placed an approximate distance of 2.5 cm away from the phone's camera. This image was captured using

the Samsung Galaxy S9. The rear camera effective pixels of this phone are 12 megapixels, the focal length is 26 mm, and the aperture is 1.5. However, as I captured this image, I adjusted the settings along the way to give me the results I wanted. The settings were as follows, the exposure was set to 1/60, the focal length was equal to 4 mm, the aperture was F/1.5, and the ISO was 50. The width and height were 4032 and 3024 respectively. All editing was done through an application named Darktable. The highlight was increased to brighten the white-colored bubbles. Also, the black level correction was increased to darken the black sides of the photo. Finally, this editing gave me a nice black and white image.



Figure 2. Shows the original version.



Figure 3. Shows the edited version using Darktable.

This image reveals the bubbles as they form due to the reaction of the Mentos mint with the carbon dioxide gas. What I like about this image and the whole experiment is how bubbles start to form immediately once the Mentos mint is dropped. I was a little bit disappointed that the mixing of Mentos and tonic water did not result in an erupting fountain. Regarding this image, I was hoping to capture the bubbles more vividly as some of the bubbles in this image look like small dots or a reflection of the flashlight. On the other hand, the big bubbles on the top of the surface look well-formed. For future improvements, I could increase the shutter speed to get a better image that shows clearer bubbles. Also, I could take a video instead of just a picture because it would be an exciting experiment to watch how bubbles form and react to carbon dioxide. Also, having it in slow motion might be an interesting idea as well.

References

Dilthey, M. R. (2019, March 2). Why Does Soda Explode When You Add Mentos? Retrieved from <https://sciencing.com/soda-explode-add-mentos-6384720.html>.

Mentos Geyser Experiment: Experiments: Steve Spangler Science. (n.d.). Retrieved from <https://www.stevespanglerscience.com/lab/experiments/original-mentos-diet-coke-geyser/>