

Lily Pelton
Fall 2021 Image 3
ATLS 4151: Flow Visualization
2 December 2021



Edited Photo



Original Photo

I. Introduction

The purpose of this image was to show the science of hand sanitizer being flammable. I wanted to exemplify this feature of hand sanitizer in an interesting and visually pleasing way. I also originally wanted to make the flame of the lit hand sanitizer a cool different color so I tried putting purple acrylic paint on the spoon first, then a layer of sanitizer over that. Unfortunately that did not change anything and I found out that really only powdered magnesium and aluminum can affect the color of a flame, which I do not have access to anyway.

II. Flow Apparatus

As we all know, alcohol is flammable, which is the ingredient that allows hand sanitizer to be lit on fire. Ethyl alcohol, the active ingredient in hand sanitizer, has a flash point of 55 degrees fahrenheit which makes it a flammable liquid. The vapor produced by the evaporation of the liquid is what burns, not the liquid itself. At 55 degrees and higher ethyl alcohol's vapors form into an ignitable mixture with the air near the liquid. An ignitable mixture implies that the vapors are in the flammable range, which is the ratio of vapor in air between the limits of explosiveness. This image exemplifies the flame created by ethyl alcohol being burned.

III. Visualization Technique

For this picture, as mentioned before, I put purple acrylic paint in a spoon and layered regular hand sanitizer on top of the paint (which ended up being useless). I had my friend hold the spoon in front of our black trash can, ready with the lighter. When I positioned my camera correctly, she lit the hand sanitizer on fire and I took several pictures. No flash was used, just very little light from a window several feet away.

III. Photographic Technique

I took this photo in front of my black trash can in my kitchen for a solid dark background. I used my Canon EOS Rebel T6 camera with the regular lens. The picture was taken with an aperture of f/8.0, shutter speed of 1/30, and ISO of 3200. I used manual focus and positioned the camera a few centimeters away from the spoon while my friend held and lit the hand sanitizer on fire. I used Lightroom to edit the final product slightly, mainly just increasing the lights of the photo and a little increase in vibrance and saturation to make the colors pop.

IV. Final Results

I am really happy with how this photo came out and how the flame was captured. As mentioned before I think it would have been cool to be able to play around with the color of the flame, I just didn't have the resources to do so. I like how this is similar to my very first project of the cinnamon and agave in a spoon and just the image of different phenomena being held in a small and innocent eating spoon. I am also really pleased with how well the black trash can worked as a solid background. It looks almost like it was taken in a studio.

References

Fire, Frank L., et al. "Ethyl Alcohol." *Fire Engineering*, 3 Sept. 2019, <https://www.fireengineering.com/leadership/ethyl-alcohol/>