

ABSTRACT

My experiment was: what is the effect of fossil fuels and biofuels on plant growth after an oil spill in a marine environment? The hypotheses I made were partially correct. My hypotheses were that Biodiesel would come in 1st because it had the least effect in my project last year, testing oil spills on impatiens. I thought that Gasoline would come in 2nd because it affected the plants, but they still survived. I thought Ethanol would do the worst because even though it is a biofuel, it killed the plants last year.

I setup 12 ocean-like environments and used *Caulerpa taxifolia*. I used air pumps to aerate each aquarium. I ran the experiment indoors to maintain the temperature and light consistently. I allowed the aquariums to stabilize before injecting the fuels. I injected Biodiesel, Ethanol, and Gasoline using a syringe, observed daily, and tested the pH every 3 days, for 22 days.

The Gasoline environment had the least cloudy water; the plants were disintegrating and had shrinking pinnules, but were dark green. The Gasoline plants became negligible in weight. The Biodiesel environment had the cloudiest water, the plants were milky white and pale green, had the least shrinking of the pinnules, and were very mushy. But, the total weight increased to 80 grams, 10 grams more than the Control plants. Ethanol was dark green and pale green, had cloudy water, shrinking pinnules, watery, and grew slightly at 40 grams.

Biodiesel came in 1st place because the plants grew the most. I believe it was milky white because of an additive in Biodiesel called lye, which is used in some soaps. Ethanol surprisingly came in 2nd, unlike last year where it came in last for soil pollution. Gasoline came in 3rd because the plants had almost disintegrated. I believe all 3 would have done better in a real ocean environment, because waves would have washed some of the fuel away from the plants and dispersed it into the water, and they would have been able to start growing again. It is very interesting that the *Caulerpa* absorbed so much of the Gasoline and Ethanol from the surrounding water. Because of this and given that *Caulerpa* is a fast-growing and invasive algae, it could be used to cleanup after an oil spill.

If I were to do this project again, I would use a grow light to make the light source more natural, because that may help the plants to recover better. I would also like to simulate the cycling of ocean water better which would clean the fuel from the plants and more evenly distribute it. I believe this would also help the plants recover.