CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

Nora Thompson

Project Number

J2120

Project Title

Lights of the Sea

Abstract

Objectives

Dinoflagellates are bioluminescent planktons that float near the ocean's surface and flash brightly when disturbed to scare or distract predators. This project examined how four common chemical mixtures affected the lifespan and glow of the dinoflagellates.

Methods

Dinoflagellates (Pyrocystis Fusiformis), distilled water, white vinegar, motor oil, RoundUp weed killer, Dawn ultra dish soap. Dinoflagellates with small portions of pollutants added were exposed to indirect sunlight during the daytime and disturbed at nighttime to prompt them to flash. Three judges assigned a brightness score based on a scale of 0 to 5. This was repeated daily until no flashes were seen (assumed dead).

Results

Untreated controls had the longest lifespan (33 days) while dish soaps and weed killer high had the shortest lifespan (2 days). The highest average brightness occurred in dish soap high and low (2.8 and 2.4) and weed killer high (2.5). Control had an average brightness of 1.5 while the vinegar high group was the dimmest at 0.9.

Conclusions

The results demonstrated that pollutants contributed to a decreased lifespan. Based on the Lethal Dose 50 value, the effect of dish soap should have been weak in the dinoflagellates, but it was actually the most harmful, killing them within two days. As for brightness, pollutants did not apparently make the dinoflagellates dimmer. All except the high concentration of vinegar had a higher average brightness level. These results showed how sensitive marine life can be to common chemical pollutants.

Summary Statement

I discovered that these pollutants shortened the lifespan and for the most part, increased the brightness level of the bioluminescent dinoflagellates.

Help Received

Throughout the observation period, I had two assistants in addition to myself, judging the brightness of the dinoflagellates' flashes.