The Effect of Light Exposure Time on the Bioluminescent Glow Produced by Marine Dinoflagellates

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Dinoflagellates are one of the many marine organisms that perform bioluminescent processes. There are many factors that could affect the light that they produce, including temperature, salinity, and length of light exposure. The hypothesis that dinoflagellates receiving 12 hours of light each day would glow the brightest was tested using dark boxes and light timers. Each jar of dinoflagellates was placed inside a dark box to allow absolute control over when they received light. Timers connected to the lights inside of the boxes would turn on the light during the hours associated with each jar. During the night the jars were shaken and photographed to digitally analyze and compare luminosity. Data was further analyzed using an ANOVA test. Compared to the other sets (the closest had a mean of 100.47, n=10), Set D which had 16 hours of light each day had the greatest average luminosity (113.47, n=10, $p<1e-13$). Set D had a lower average maximum (58.30) compared to other sets (165.9, 167.4, and 172.00). Set F, which had 24 hours of light, had a visibly higher number of dinoflagellates than the others while Set C, which had 4 hours of light, had a visibly lower number of dinoflagellates. This study shows that dinoflagellates receiving 16 hours of light glow brighter than dinoflagellates with any other length of exposure. This shows that having neither too much nor too little light exposure is vital to dinoflagellates' bioluminescence. Perhaps this is due to balance in biological processes.

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