

GLOW WITH THE FLOW: HOW TEMPERATURE AFFECTS BIOLUMINESCENCE

Q1: Research Question

How does water temperature affect the brightness of bioluminescent algae (dinoflagellates)?

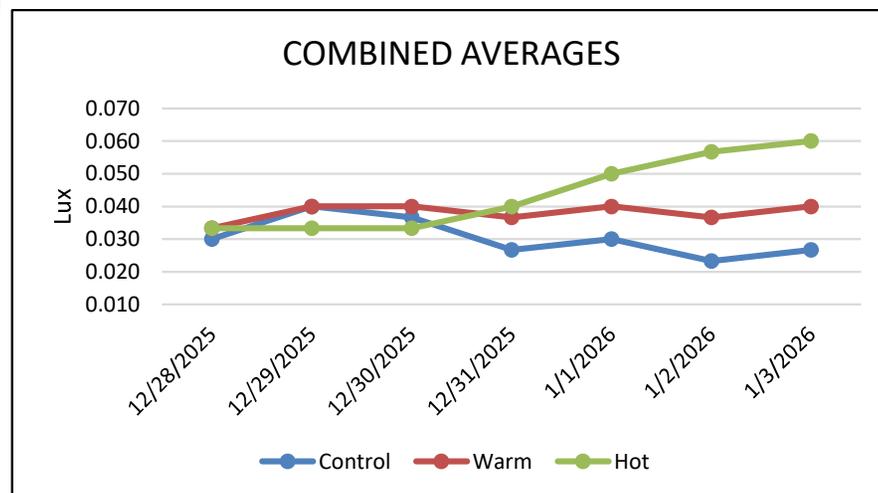
Bioluminescent algae glow when disturbed because of a chemical reaction involving luciferin, oxygen, and the enzyme luciferase. Ocean temperatures are increasing, so understanding how warming affects marine organisms is important.

Hypothesis: If water temperature increases, then the algae will glow more brightly.

Q2: Methodology

Nine identical vials were filled with equal amounts (10 mL) of bioluminescent algae. Three vials were placed in each temperature group: Control: 21°C, Warm: 23°C, & Hot: 26°C. Vials were kept sealed and tested daily at 8:00 PM in a dark room. A clear plastic tube ensured consistent disturbance and distance. A metronome controlled measurement time. A digital light meter recorded the brightest glow in lux. Data was collected for one week and averaged.

Q3: Data Analysis & Results



Q4: Interpretation & Conclusions

The hypothesis was supported — higher temperature increased brightness over time. The change was gradual because living organisms need time to adjust. Warmer temperatures increase molecular movement, allowing the bioluminescence reaction to occur more often. This research suggests bioluminescent algae could help indicate changing ocean temperatures. Future studies could test more temperatures or longer time periods.