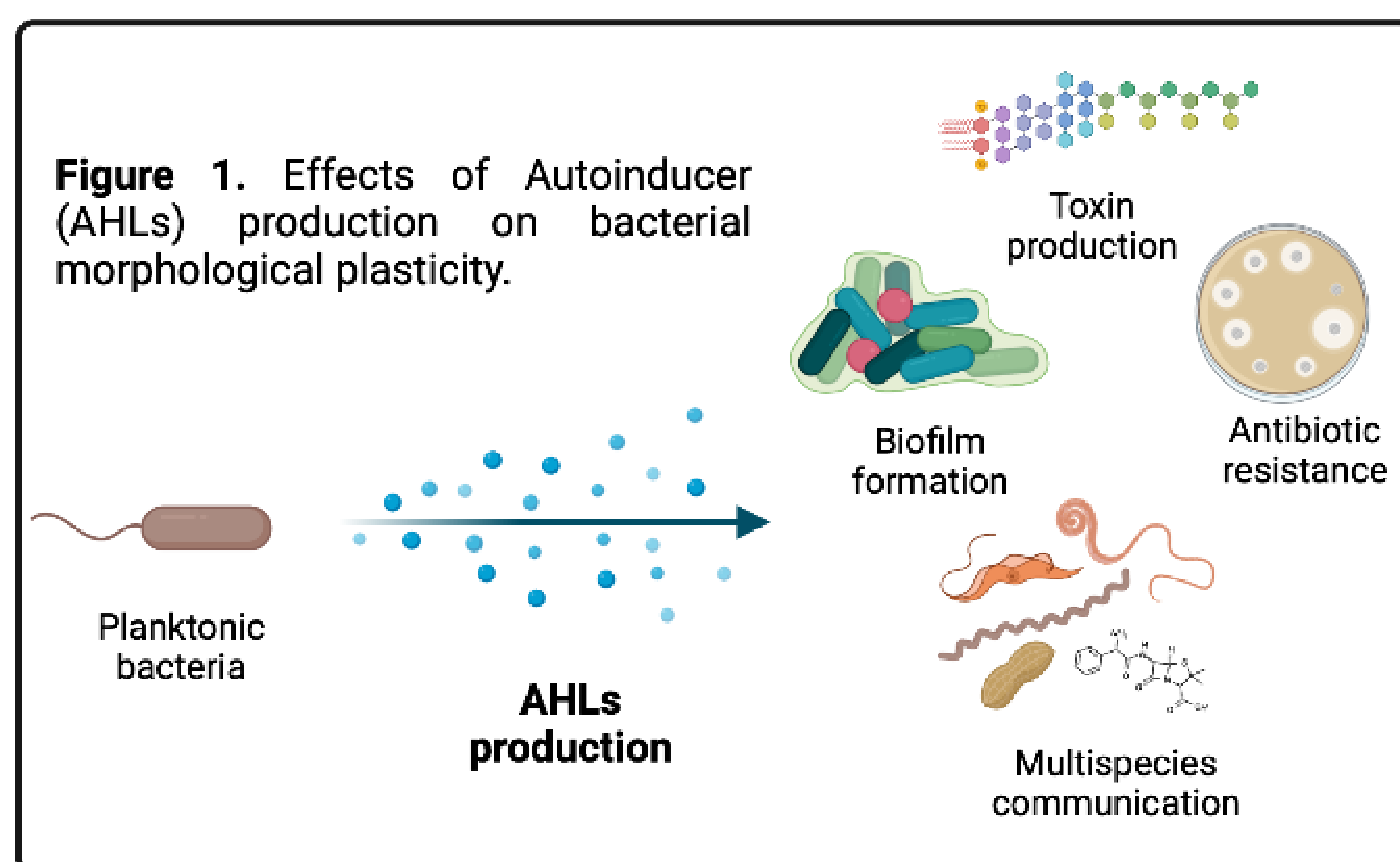


Paulina Slick, Maria Tobarra, Alba Chavez, Hugo Castillo

Department of Human Factors and Behavioral Neurobiology, Embry-Riddle Aeronautical University, Daytona Beach FL 32114

Introduction

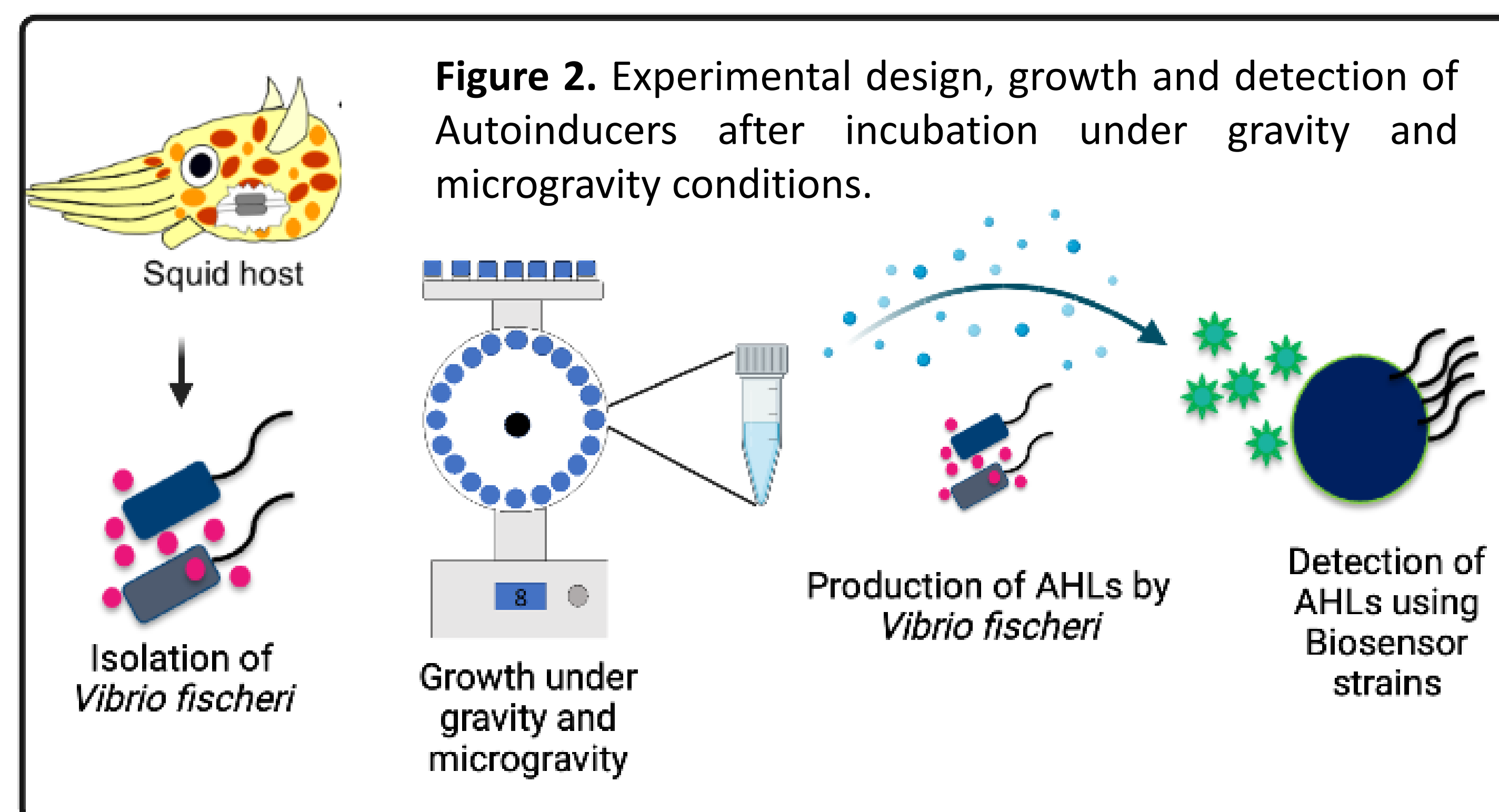
- Interbacterial communication takes place through a process known as Quorum Sensing or cell-cell communication, accomplished through the activation of small signaling molecules known as Autoinducers (acyl-homoserine lactones or AHLs).
- Quorum sensing controls many phenotypical aspects, including antibiotic resistance, biofilm formation and toxin production (Figure 1).



- Stressors (e.g., microgravity) have been proven to alter cell-cell communication.
- This study used *Vibrio fischeri*, a marine mutualistic bacterium, that infects Sepioid squids and monocentrid fishes and has been studied for its capacity to synthesize long and short chain AHLs and alter bacterial behavior and host colonization.

Methodology

- Hypothesis:** Simulated microgravity will change AHLs production in *Vibrio fischeri* bacteria.
- V. fischeri* was grown under simulated microgravity and gravity conditions using the EagleStat, a 2D clinostat device (Figure 2).
- The experiment consisted in incubating *V. fischeri* for 24 and 48 hours under gravity and microgravity.
- Autoinducer production was detected by measuring Luminescence and Fluorescence after activation of Biosensors in order to find effects on simulated microgravity on gene expression.



Results

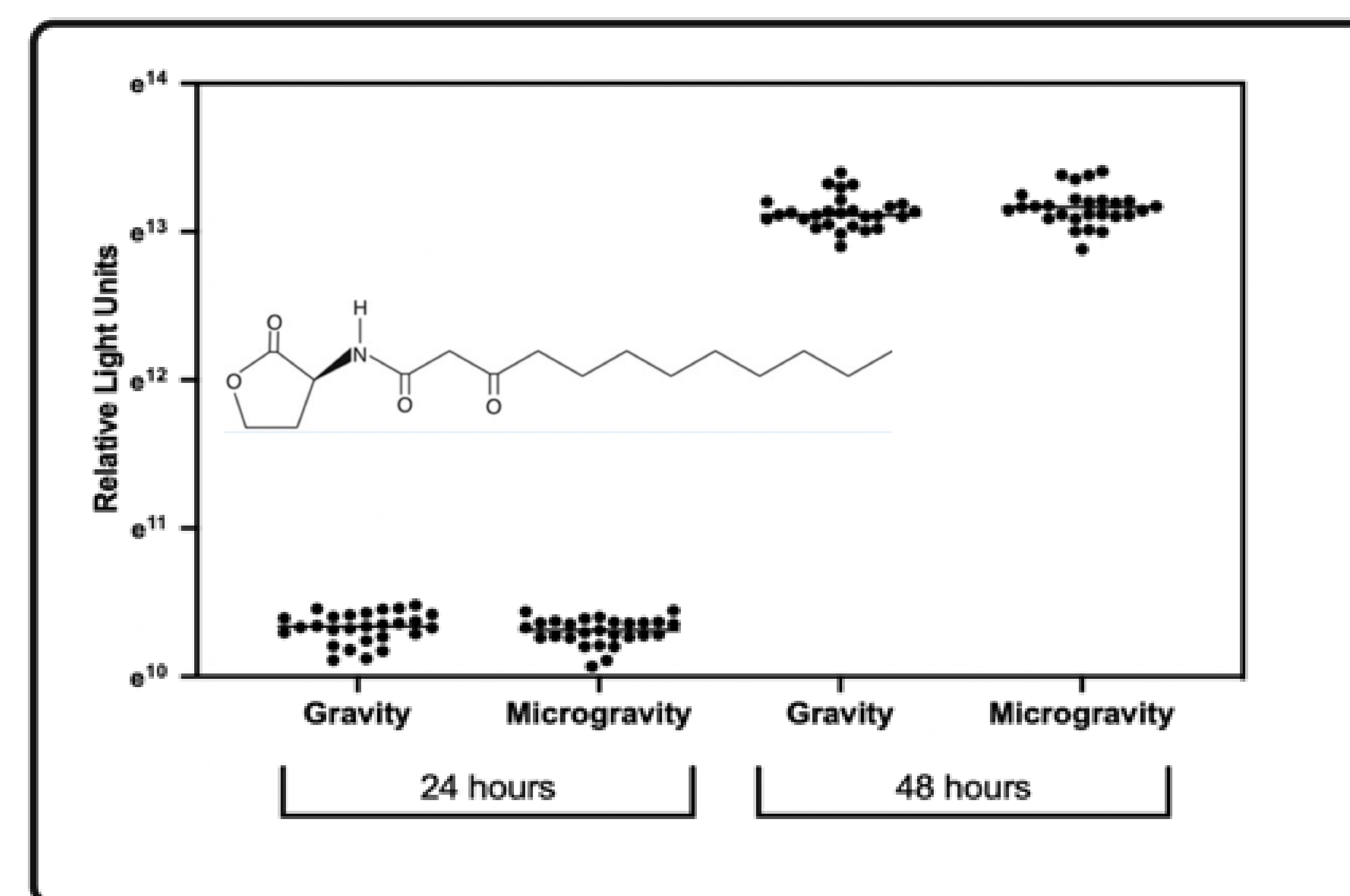


Figure 3. Relative Light Units measurements using *Vibrio harveii* modified with *lux* (Luciferin) operon promoter for detection of long chain (12 C) Autoinducer.

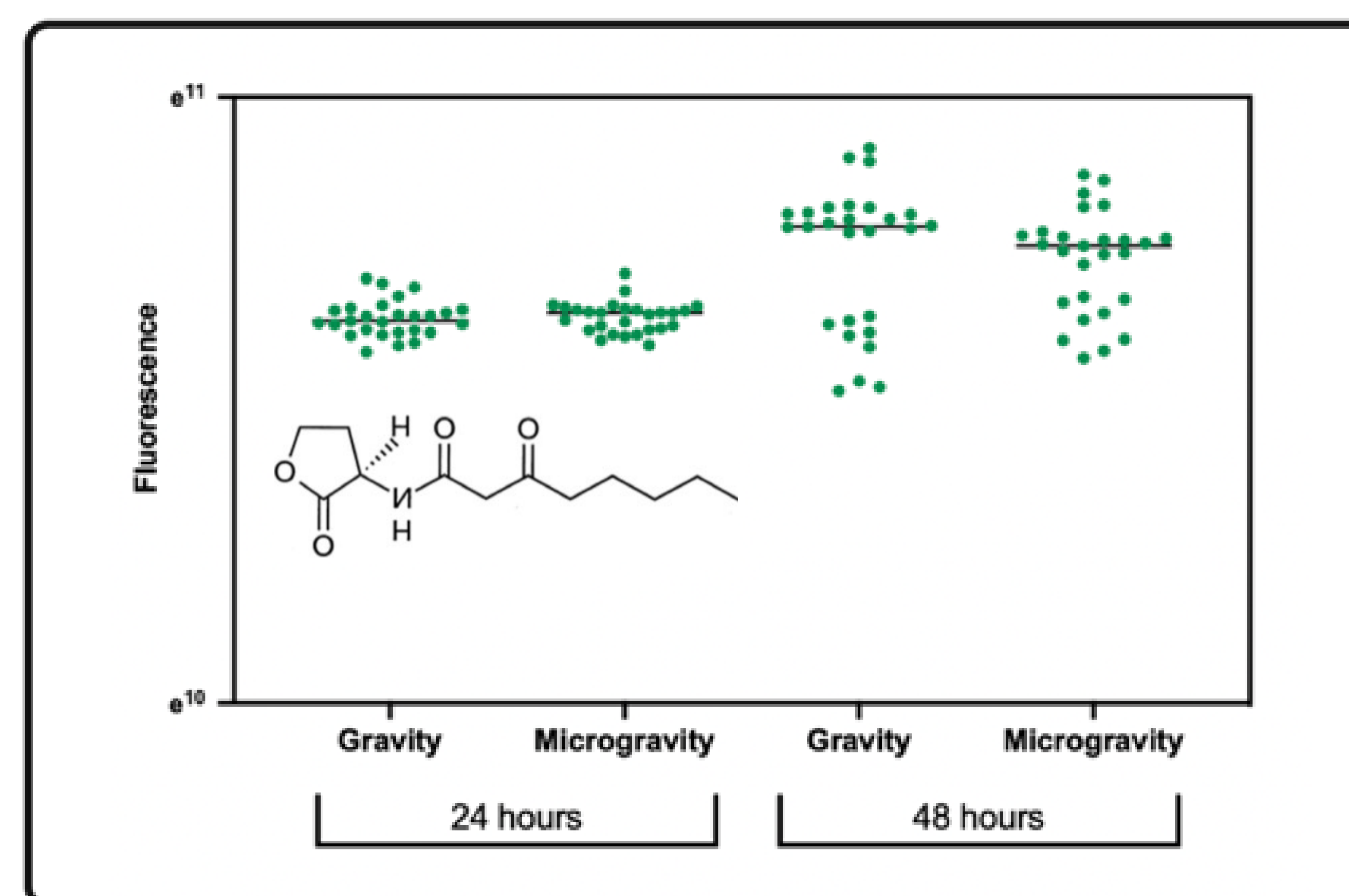


Figure 4. Fluorescence measurements using *Escherichia coli* modified with *gfp* (Green Fluorescent Protein) operon promoter for detection of medium chain (8 C) Autoinducer.

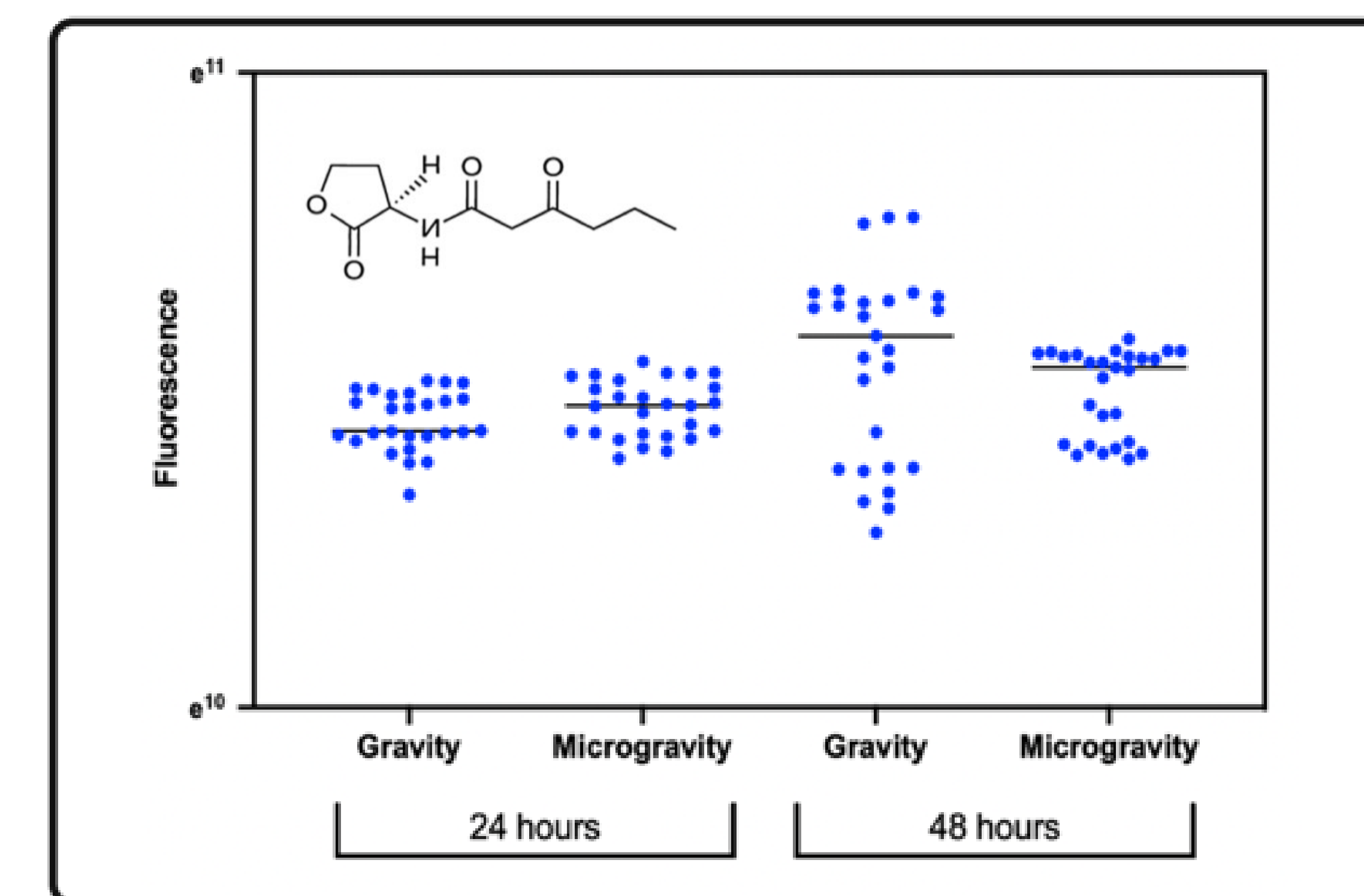


Figure 5. Fluorescence measurements using *Pseudomonas putida* modified with *gfp* (Green Fluorescent Protein) operon promoter for detection of short chain (6 C) Autoinducer.

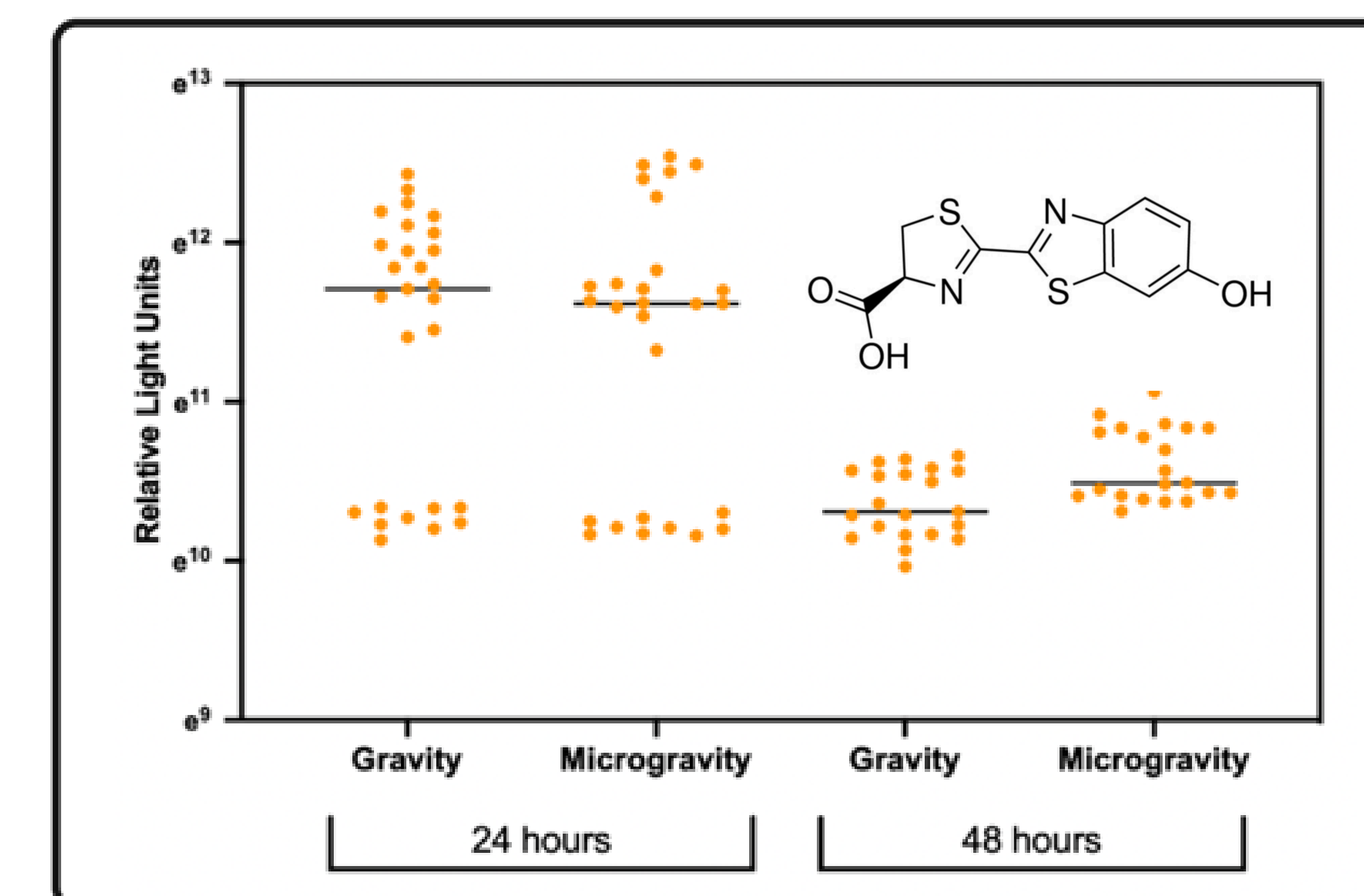
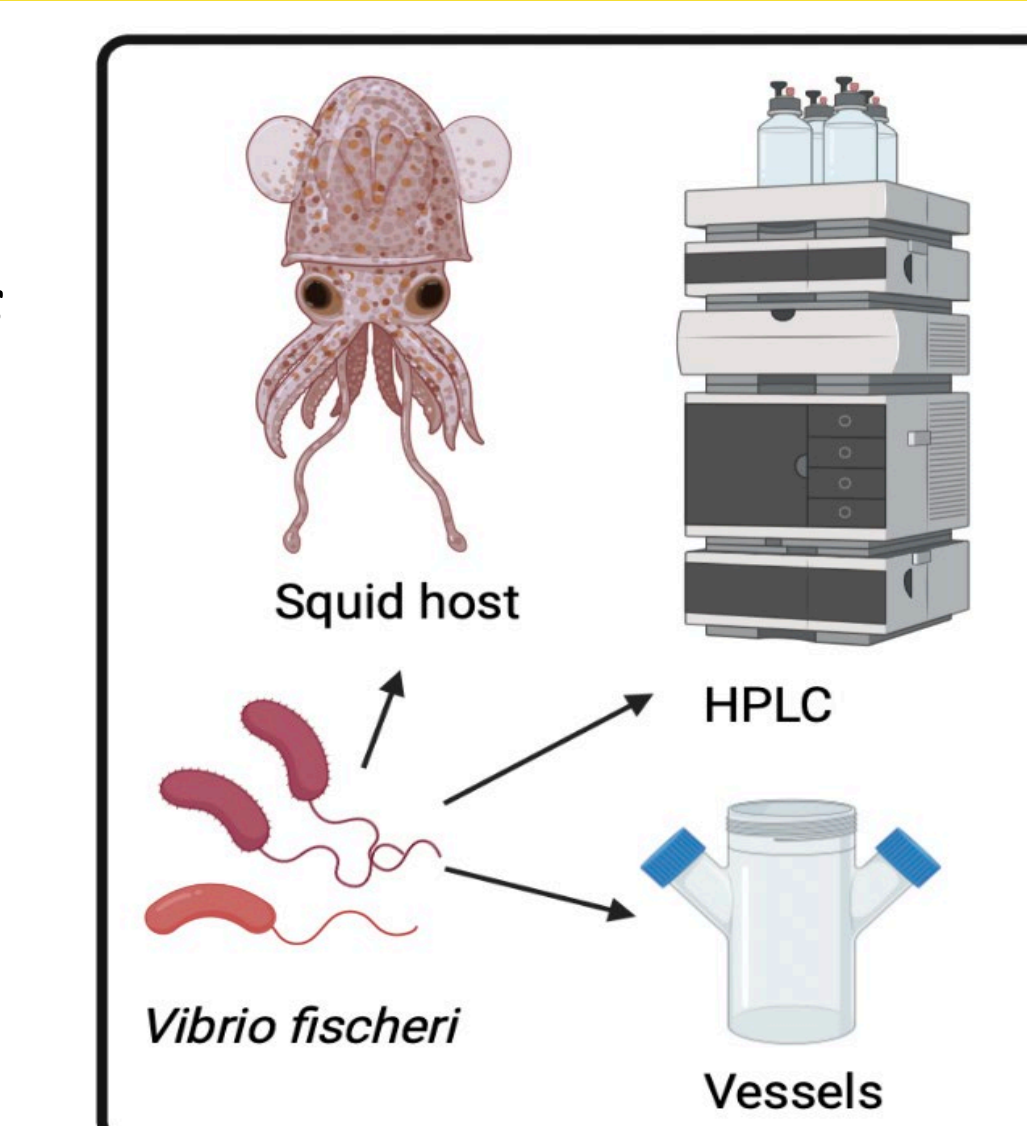


Figure 6. Relative Light Units measurements via luminescence for detection of Luciferin.

Future Work

- Host infection experiments.
- Chemical detection of Autoinducers using High Performance Chromatography analysis.
- Perform experiment using aerated vessels.



References

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