



# Moorea, Problematic or Not?

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## Abstract

The purpose of this project was to extract compounds from cyanobacteria *Moorea* sp. from American Samoa and test their toxicity on brine shrimp and cancer cells. Cyanobacteria are microorganisms that contain chlorophyll and are capable of conducting photosynthesis. Nine fractions were produced from the cyanobacteria and used to test their toxicity on brine shrimp and cancer cells. The compounds were found nontoxic and created little to no harm on the brine shrimp and cancer cells. Fractions G and H were later used to see what compounds could be found in the cyanobacteria. Six compounds were discovered that can potentially be found in the cyanobacteria used in this research.

## Introduction

*Moorea* sp. is a species of cyanobacteria that grow in tropical oceans. The species of cyanobacteria increases everyday due to overfishing and pollution. They thrive from nitrogen and human waste that flow to the ocean due to rain and ocean runoff, increasing their population and decreasing the amount of oxygen in the water. Cyanobacteria are now being considered as toxic to the environment. To answer this question, this research used cyanobacteria from American Samoa on brine shrimp and cancer cells to help give us a better understanding of how toxic cyanobacteria is on living organisms.

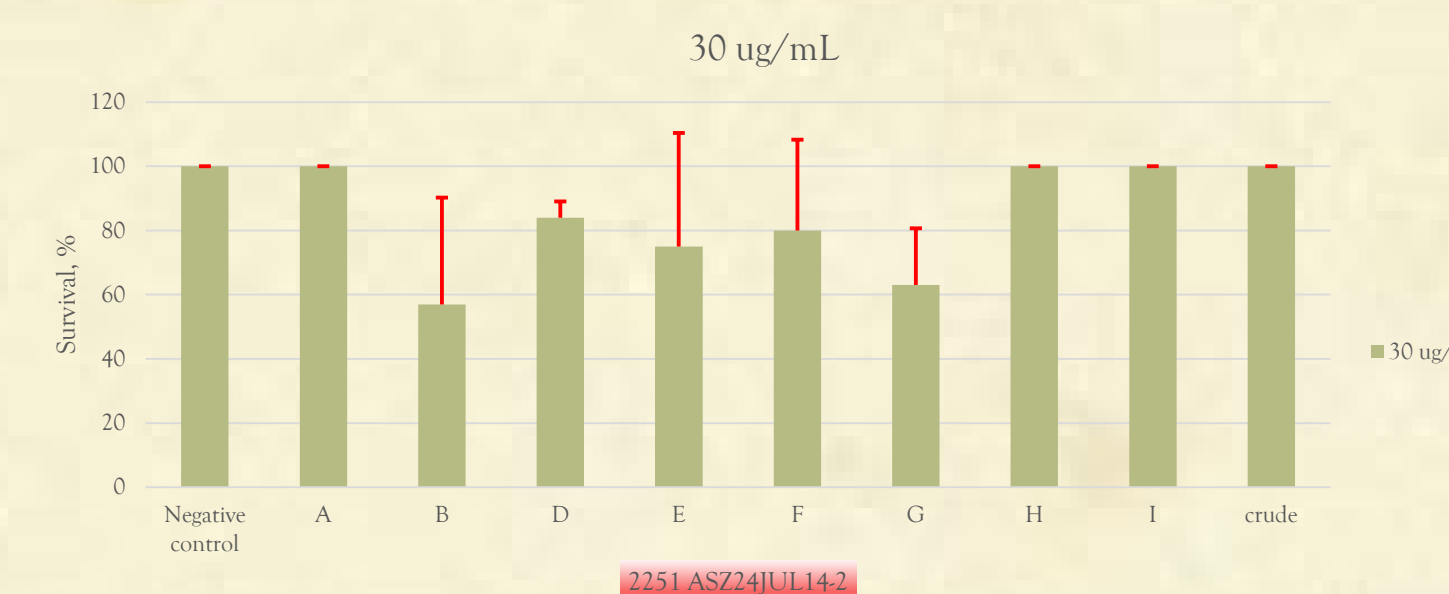


## Brine Shrimp Assay



	M1	M2	Average death	Error	Average survival M1, %
30 ug/mL	30	30	30	30	
MeOH	0	0	0.00	0.00	100
A	0	0	0.00	0.00	100
B	0.2	0.67	0.44	0.33	57
D	0.13	0.20	0.16	0.05	84
E	0.50	0.00	0.25	0.35	75
F	0.00	0.40	0.20	0.28	70
G	0.25	0.50	0.38	0.18	38
H	0.00	0.00	0.00	0.00	100
I	0.00	0.00	0.00	0.00	100
crude	0.00	0.00	0.00	0.00	100

The ten fractions including the crude had little affect on the brine shrimp's health. There was little death found in each of the wells showing that the compounds toxicity level were small at 30 ug/mL. Despite having a small amount of death, there were large percent errors found. The leading cause of the large percent error is most likely because of the population of brine shrimps was larger than others.



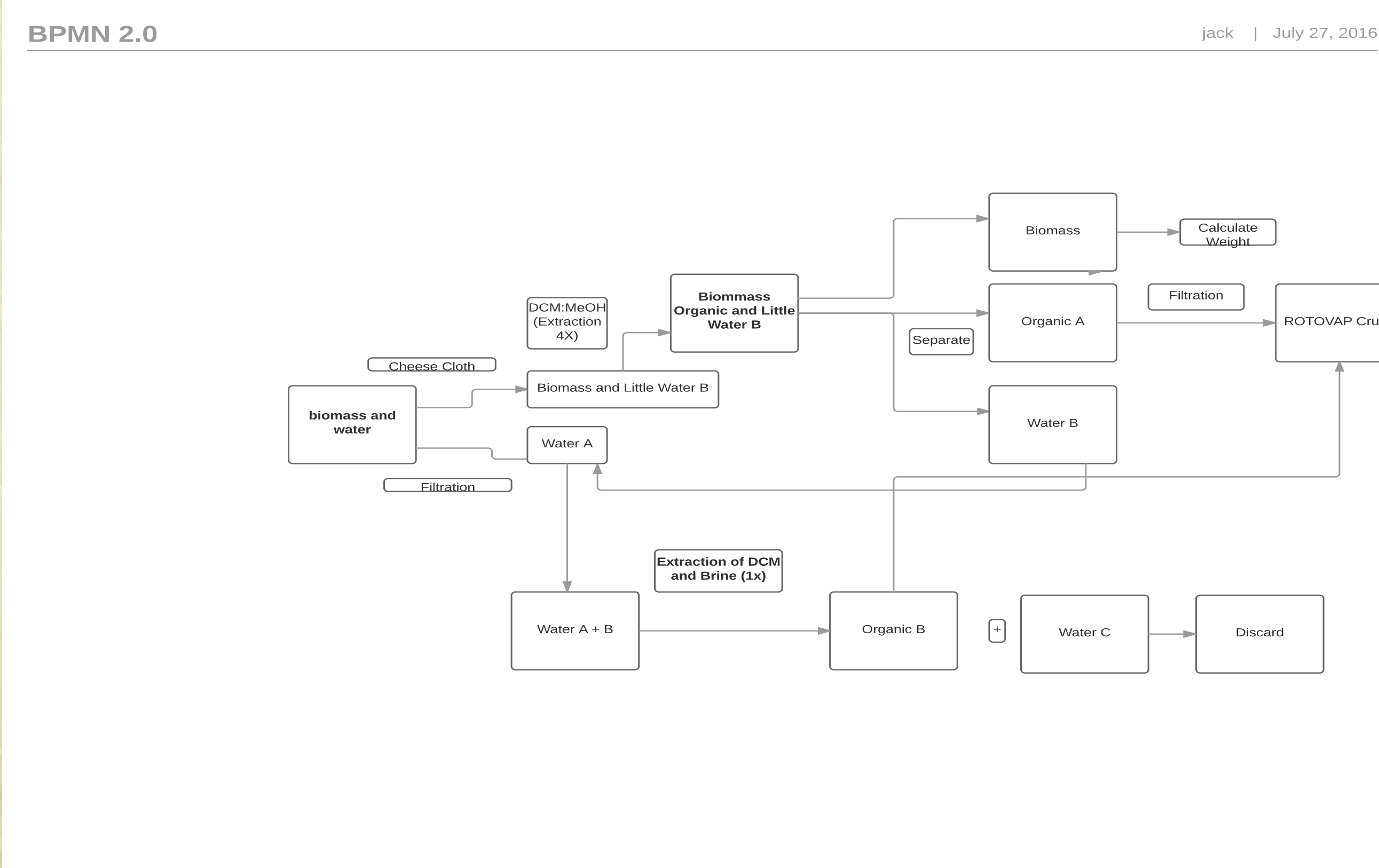
## Example LC-MS Results



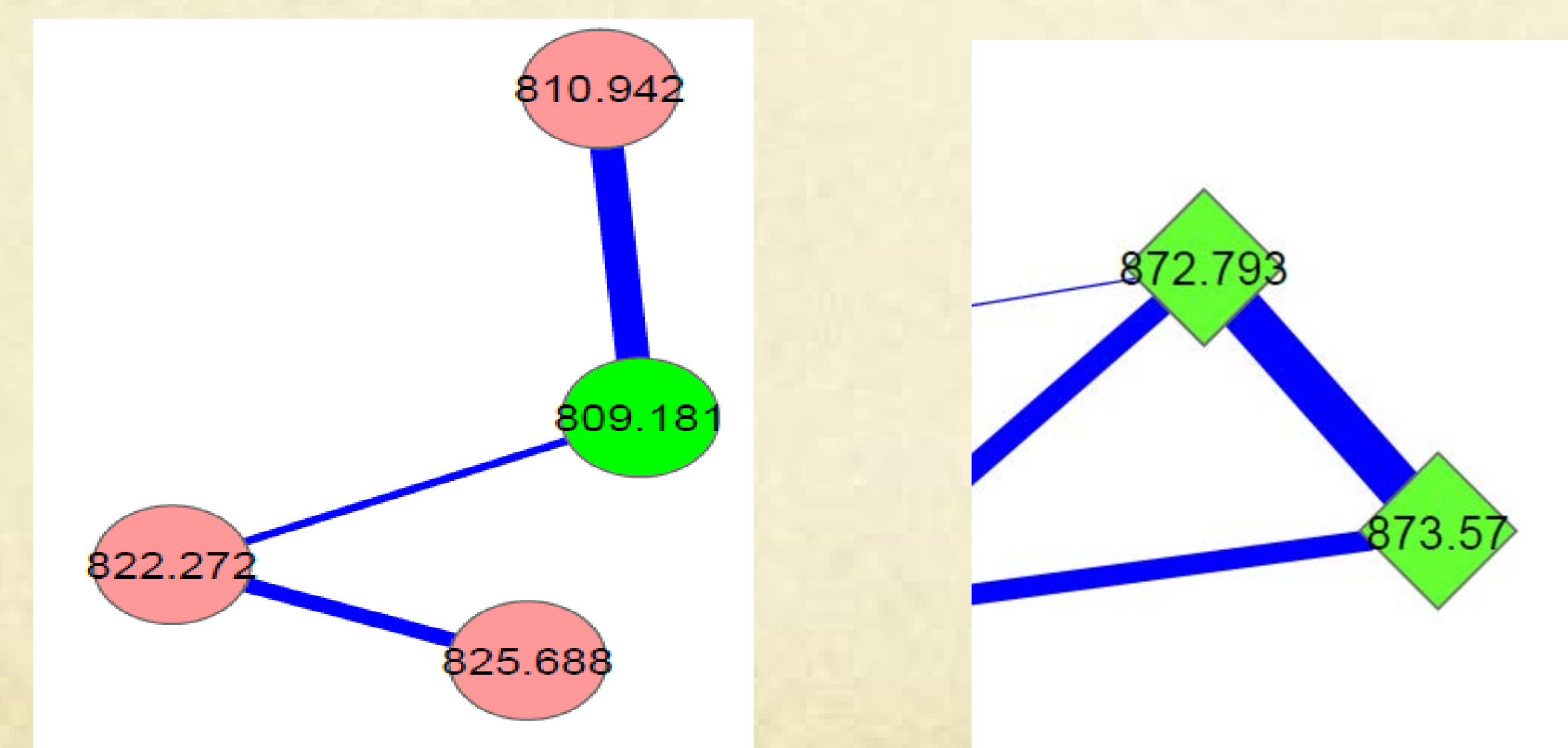
## Discussion and Conclusions

All the fractions were ineffective towards all organisms used in this research. Despite how the fractions had little effect on the organisms, this unsuccessful testing hopefully provides other researchers on what to do to succeed. I gained a lot from taking part in lab work from rotovaping to determining what compounds exist in molecular networks. This learning experience has not only been a great opportunity, but has also further motivated me to do research in marine biology.

## Methods



## Molecular Network



There were multiple compounds that were found from the fractions. The molecules that contained a mass of 872.793 and 873.57 are pheophytin, a chemical compound that is commonly found in cyanobacteria. The other molecule was unable to be identified directly but is most likely pitipeptolide A because not only is it commonly found in cyanobacteria, but also can be found close to American Samoa.

## References

1- Engene N. et al *Moorea producens* gen. nov., sp. nov. and *Moorea bouillonii* comb. nov., tropical marine cyanobacteria rich in bioactive secondary metabolites *National Institute of Health Institute* 2012 May; 62(Pt 5): 1171-1178. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3542135/>

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