CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36469

Project Title

Antimicrobial Properties of the Natural Flora Found in Stingray Mucus

Abstract

Objectives/Goals

Better show the effect mucus has on bacterial growth
Purify isolate cultures of bacteria found in mucus
Extract bacterial DNA and obtain genotypic sequencing

Methods/Materials

Mucus was collected from stingrays at the Fresno Chaffee zoo. The mucus was then centrifuged and resuspended in a tbs solution to help purify the sample. Then using various methods provided within microbiology studies and by mentors at the California State University, Fresno various tests were conducted. These include minimum inhibitory concentration testing, disc diffusion assays, and single colony isolation.

Results

Partial inhibition of B. subtilis growth was observed in disc diffusion array.
The MIC was successfully found and inhibition was shown in all 6 liquid cultures.
To measure physical indiscriminate growth optical density(OD) of cultures was taken. These densities show a definite increase in bacteria present over stock cultures especially as mucus concentration increased. The stock cultures of P. fluorescens and P. aeruginosa when subjected to various concentrations of mucus showed a definite stress through the secretion of a metabolite which appeared green. Pure cultures isolation was achieved. This is the next crucial step in continuing the research of the natural flora of the Cownose Ray.

Conclusions/Discussion

Partial inhibition of B. subtilis growth was observed in disc diffusion array. Other cultures showed minimal inhibition in response to stingray mucus in concentrations initially tested. It is possible that inhibition could be observed following treatment with a higher concentration of mucus. Initially, the minimum inhibitory concentration (MIC) assay showed the mucus to be effective against stock culture growth at higher concentrations. The OD is showing the death of the stock culture while the natural bacteria remain.
e stock cultures of P. fluorescens and P. aeruginosa when subjected to various concentrations of mucus showed a definite stress through the secretion of a metabolite which appeared green. A biofilm after a day also started to form suggesting the death of bacteria. Pure cultures isolation was achieved. This is the next crucial step in continuing the research of the natural flora of the Cownose Ray. Further methodology will be used for DNA extraction and analysis of these cultures.

Summary Statement

Identifying the source of the Cownose Ray's ability to fend off and prevent bacterial infection and disease.

Help Received

Used laboratory facilities and equipment at California State University Fresno under the direction of Dr. Brian Tsukimura, Ph.d Laboratory procedures and methods were advised on by Andrew Strankman
Mucus Collection procedure was advised by Dr. Lewis Wright D.V.M at the Fresno Chaffee Zoo

Preliminary