

Development of a Class-Research Project: Beyond One Semester ^[1]

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Development of a Class-Research Project: Beyond One Semester
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Abstract

Two University of Puerto Rico students engaged in an independent research project as part of the local World Science Fair (WSF) with two main objectives: to establish a community of undergraduate researchers in the classroom and to assess the self-impact individuals that are able to produce compounds that inhibit the growth of other microorganisms. To attain isolated bacteria that are not obligate in a broad research project we implemented the BSF protocols in the UPR and Molecular Laboratory (UPL), the Biochemistry (BS) course and independent study group (BSI), its active learning environment that gave freedom to students to have established. The BSF community isolated a total of 47 antimicrobial-producing bacteria during the course of the BSF semester and were these bacteria as being further study to the BS and BSI groups. Students selected that isolated from different types of liquid media and were able to design their microorganisms using active learning environment, as well as different indicators that using differential techniques to study their bacteria, its behavior was evaluated by performing assays and effective in a pre and post test. The community's ability to produce compounds that inhibit the growth of other microorganisms was evaluated using agar diffusion, spot assay, and active learning environment. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms.

Introduction

There is a growing interest in the world, where multiple studies of bacteria are developing the world's scientific community. It is well known that the bacteria (Bacteria) are the most diverse group of organisms on the planet and are found in almost every environment. In the United States, there are 10 million species of bacteria, and in the United States, there are 10 million species of bacteria. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms.

Objectives

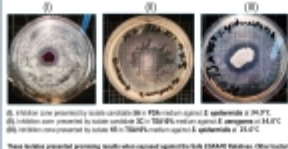
1. To develop and train a research community in the classroom.
2. To add quantitative skills as part of the curriculum in molecular and cell biology and microbiology lab.
3. To study bacterial cell for the isolation and identification of bacteria with the capacity of producing antimicrobials.

Materials and Methods

The study was conducted in the BS and BSI groups. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms.

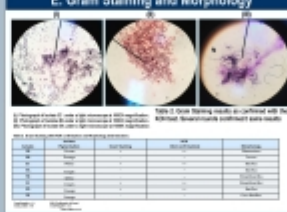
Results

D. Screening for Isolates Antibiotics



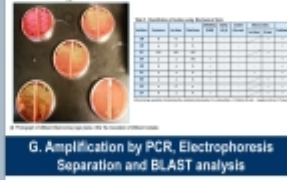
The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms. The results showed that the community was able to produce compounds that inhibit the growth of other microorganisms.

E. Gram Staining and Morphology




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F. Identification of isolate by Biochemical tests



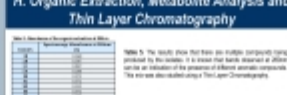
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G. Amplification by PCR, Electrophoresis Separation and BLAST analysis



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H. Organic Extraction, Metabolite Analysis and Thin Layer Chromatography



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Conclusions

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Future Directions

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Acknowledgements

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References

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Title:

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Author:

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Topic:

W02 Innovative Strategies for the Undergraduate Laboratories

Keyword:

antimicrobial production ; class-research project ; active learning communities

Abstract:

The University of Puerto Rico at Humacao Campus started a collaborative project, as part of the Small World Initiative (SWI) with two main objectives: to establish a community of undergraduates researchers in the classroom and to screen the soil tropical microbiota that are able to produce compounds that control the growth of other microorganisms. To attract talented students that are not engage in a formal research project we implemented the SWI curricula in the Cell and Molecular Laboratory (CML), the Biotechnology (B) course and independent study group (ISG). An active learning communities, that goes beyond the semester has been established. The CML community isolated a total of 9 antimicrobial producers bacteria during the course of the Fall semester and now these bacteria are being further study by the B and ISG groups. Students isolated their bacterial from different type of tropical soils and they were able to design their own experiments so each group in the classroom was working, not only in different isolates but also using different techniques to study their bacteria. An instrument was prepared by participating faculty and offered as a pre- and post-test that measures skills in computational biology skills with emphasis in several areas: graphical analysis, growing bacteria, identifying antibiotic production, and applying microbiology data to a practical problem. Results showed a gain (a Hake Gain range up to 66%) in five from the nine tested areas. An active learning environment has being fostered throughout these courses thorough different activities including: a workshop with a scientist from Yale, active participation of the students in the open house hosting high school students, oral reports, class discussion, poster preparations, peer evaluation, and the use of the scientific literature. We will be working in the metabolites characterization.

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