CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
S1808

Project Title
Antibacterial Properties of Chitosan Nanoparticles Encapsulated by Cocos nucifera-derived Peptides

Abstract

Objectives/Goals
This study sought to identify the potential of a novel biocide system consisting of chitosan nanoparticles encapsulated by the peptides found in green coconut water (GCW).

Methods/Materials
Through ionotropic gelation, chitosan nanoparticles were formed and mixed with filtered green coconut water (GCW) to promote encapsulation. The physiochemical properties of the biocides were analyzed through zeta potential and particle sizing analyses. A bacterial bioassay was conducted to determine the antibacterial properties of the combined biocides against Pseudomonas putida, a surrogate environmental bacteria strain.

Results
The biocide system was shown to be less effective against P. putida when compared to the antibacterial activity of chitosan nanoparticles, but more bactericidal in comparison to the GCW peptides.

Conclusions/Discussion
Chitosan nanoparticles were re-asserted as efficient dose-dependent biocides while the absence of antimicrobial activity from the GCW peptides suggested the need for purification and isolation of the peptides. Thus, the novel composite of the GCW peptides and the chitosan nanoparticles did not significantly enhance the antibacterial properties of the individual bactericides as hypothesized.

Summary Statement
This research explored the potential of a biodegradable and easily implemented novel antibacterial agent created through the combination of peptides derived from green coconut water and chitosan nanoparticles.

Help Received
Used lab equipment at UCLA under supervision of Catalina Marambio-Jones