CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36859

Project Title

Infrared Irradiation of Calcium Hydroxyapatite to Remove Calcified Plaque

Abstract

Objectives/Goals

Test the ability of Calcium Hydroxyapatite, found in many calcification diseases, to convert infrared light to heat to break up calcified plaques.

Methods/Materials

Used infrared and deep purple light to test suspensions' ability to convert infrared light and deep purple light to heat insulted in a modified evacuated chamber. Solution had various concentrations of Calcium Hydroxyapatite in PBS and in DI water. Negative controls of pure solvent as well as positive controls of concentrated wetted and dry samples where tested. After those tests a calorimeter was used to quantify the heat conversion of the more effective light source. A resistor circuit in a bread board, LED, deep purple laser, a modified vacuum chamber, calorimeter, and temperature probe was used.

Results

The controls provided the clearest heating results for the first step. Infrared light was converted to heat through, Calcium Hydroxyapatite, more efficiently than the deep purple light was converted, as predicted. The heating was then quantified with a calorimeter in multiple trials.

Conclusions/Discussion

The Calcium Hydroxyapatite proved to be an effective source for converting infrared light to heat. With an infrared laser this conversion could be used to break up plaques effectively.

Summary Statement

Calcium Hydroxyapatite demostrates an ability to convert infrared light to heat for plaque removal.

Help Received

Donations from Thorlabs, Best Value Vacs, and Old Fashion Country Butchers. Safety and technical advice from Shane Dultz, Bill McGuigan, Greg Cauchon, Able Magana, Dr. Nikki Malhotra, and Timothy Hoag.