

The study of the efficiency of electrical energy production of biobatteries from chitosan and charcoal.

Amy Vivien Needham¹ , Namassaya Bootsara¹ , Onnicha Soofon¹

Kanchana Thongjob² , Thanaphon Ounwises² , Piyada Suwannajit³

¹student of Chumpholphonphisai School , *E-mail: morrorkki@gmail.com*

²Chumpholphonphisai School

Abstract

The purposes of the study were 1) to study a production of chitosan from crab shells, 2) to study the right ratio of chitosan for bio-battery from chitosan and charcoal and 3) to study the efficiency of bio-battery from chitosan and charcoal. Chitosan was obtained by took 50 grams of crab shells, wash and sun-dry. Then boil in 50% NaOH solution for 2 hours. Then soak in HCl solution concentration 2 milliliter for 5 hours, wash and sun-dry to get chitin. Then boil the chitin in 50% NaOH solution for 3 hours then crush it thoroughly to get a chitosan powder to study qualities and create biological electrolytes by mix with water in each ratio (1:1, 1:2, 1:3, 1:4, 1:5) in a volume of 80 milliliter. Then find the mean and best value, then create a battery by take a crushed charcoal then overlay the copper size 2.8x3.5 centimeter with power epoxy glue Intermediate with cotton pads 1.5 centimeter thick. Then dipped into electrolyte solution from chitosan in a ratio of 1:4 (chitosan:water) and take aluminum size 2.8x3.5 centimeter attached to the other side. Wrapped with cling film to prevent electrolyte from the leaked, total of 6 cells and connect to 6 wires, put it in a box with 6 compartments. Then connect the wires of all 6 cells together to form 1 battery (the electric potential and electric current depend on how tight the cells are packed.) then close the box and leave it charged for 1-2 hours to measure electric potential and electric current with a digital multimeter.

It was shown that 1) Chitosan from crab shells is obtained as a coarse powder and white-gray powder 2) When the obtained chitosan powder was studied to find the ratio from 1:1-1:5, it was found that the ratio 1:4 was the best ratio. When all 6 cells were measured, the electric potential was 7.2 volts and the electric current was 0.33 ampere and it was no corrosion then it was shows that chitosan ratio of 1:4 is the best ratio and can be used as an electrolyte. 3) When studied the efficiency of the 6-cell batteries connect with mini LED lights and mini three-blade propeller, it was found that when connected to mini LED light for 1 hour, electric potential went from 7.2 volts to 4.3 volts, electric current went from 0.33 ampere to 0.02 ampere and when connect to mini three-blade propeller for 1 hour, electric potential went from 7.2 volts to 0.4 volts, electric current went from 0.33 ampere to 0.00 ampere

Keywords : Chitosan, Electric potential, Electric current