

PRODUCTION OF COCONUT COIR HOUSE THERMAL INSULATOR

Research Study

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*Production of coconut coir house thermal
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ABSTRACT

ATANGAN, LEE ANDREW C., LIM, EMMANUEL FREY J., MOJICA, VIR JASSIM C., Production of Coconut Coir House Thermal Insulator. Research Study (General Science Curriculum) Science High School, College of Education, Cavite State University, Indang, Cavite, May 2017. Adviser: Engr. Renato B. Cubilla

The study entitled “Production of Coconut Coir House Thermal Insulator” was done at 519 A. Mojica St. Indang, Cavite from October to December 2016.

Knowing that coconut coir is just a waste material, the researchers aimed to enhance one of its properties, its insulation, for it to be utilized in a way that it will be efficient. The study was conducted to determine the characteristics of coconut coir house insulator, and the difference of Coconut coir thermal insulator from other commercial thermal insulator for building. The cost of production of coconut coir house thermal insulator was also determined. The most appropriate thickness of coconut coir comparable to commercial thermal insulator were determined.

Different tests were performed in evaluating the insulation properties of the innovated product. These tests include heat resistance test, water absorption test and flame test. The performance of the product as insulator with different thickness was also determined in the study. Two replications of each treatment were prepared. The following treatments are: T_0 – No thermal insulator, T_1 – 10 mm commercial house thermal insulator, T_2 – 5 mm thick coconut coir mat, T_3 – 7 mm thick coconut coir mat, and T_4 – 10 mm thick coconut coir mat.

T_4 a coconut coir insulator with a thickness of 10 mm had the highest absorption capacity with 431.82 percent and was considered as the best treatment in terms of water

absorption capacity. The thickness affected the flammability of the insulators. The aluminum foil used was also a factor on delaying the burning of the coconut coir insulator. T₄ was the best treatment in terms of flammability for it was the treatment where the fire appeared the last at 1 minute 43 seconds. T₄ was the best treatment in terms of durability; water absorption capacity and flammability. T₂ was the treatment with the highest percentage of heat reduction at 17.76 percent. There was no significant difference between the heat reductions of T₀, T₁, T₂, and T₃. The only treatment significantly different in terms of heat reduction was T₄. The coconut coir house thermal insulator was proven to be as effective as the commercial insulator. An insulator made of plastic, a standard of quality performance for an insulator on this study, is of the same quality as the coconut coir thermal insulator as long as its thickness does not exceed 10 mm. With the result of test and with regards to the acceptability of the coconut coir house thermal insulator in terms of heat insulation performance, coconut coir can be used to make an insulator as effective as the ones being sold commercially.

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INTRODUCTION

Different parts of coconut are used in so many ways which is vital to human's everyday life. Despite that, there are still parts that are considered a waste, parts that are not being utilized. Coconut coir is one of the unutilized parts of coconut coir. Coir is the natural fiber extracted from the husk of coconut. Coir is the fibrous material found between the hard, internal shell and the outer coat of a coconut and is a natural thermal insulator. Thermal insulators are essential in terms of making structures conducive for people to live in and a nice place to work on. Thermal insulators are commonly attached on the roofing system of the house. Knowing these facts, enhancing its insulating capabilities may lead to producing a thermal insulator better than ones sold commercially. This experimental study aimed to develop a thermal insulator by using recyclable materials namely; the coconut coir and used polypropylene plastic bags. This study leads to the assumption that a material which has low thermal conductivity, low flammability, and a high capacity to absorb moisture is an ideal insulator.