

1ST EDITION

E-EXTENDED
ABSTRACT

**INTERNATIONAL
AGROTECHNOLOGY
INNOVATION
SYMPOSIUM (i-AIS)**



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INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM (i-AIS)

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ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY

The Faculty of Plantation and Agrotechnology was established in 2010 at Universiti Teknologi MARA (UiTM). The mission of the faculty is to play the vital role of producing well-trained professionals in all areas of plantation and agriculture-related industries at national and international levels.

Bachelor of Science (Hons) Plantation Technology and Management is a three-year program that strongly emphasizes the various aspects of Production Technology, Management, and Information Technology highly sought after by the agricultural and plantation sectors. Students in this program will be fully trained to serve as professionals in the plantation sector and related industries. They will have ample opportunities to fulfill important positions in the plantation industry such as plantation executives. This program provides a strong balance of technology and management courses essential for the plantation industry such as management of plantation crops, soil fertility, plantation management operation, plantation crop mechanization, and agricultural precision. As an integral part of the program, students will be required to undergo industrial attachment to gain managerial skills in the plantation industry.

The faculty is highly committed to disseminating, imparting, and fostering intellectual development and research to meet the changing needs of the plantation and agriculture sectors. With this regard, numerous undergraduate and postgraduate programs have been offered by the government's intention to produce professionals and entrepreneurs who are knowledgeable and highly skilled in the plantation, agriculture, and agrotechnology sectors.

PREFACE

International Agrotechnology Innovation Symposium (i-AIS) is a platform to be formed for students/lecturers/staff to share creativity in applying the knowledge that is related to the world of Agrotechnology in the form of posters. This virtual poster competition takes place on the 1st of December 2022 and ends on the 8th of January 2023. This competition is an assessment of students in determining the level of understanding, creativity, and group work for the subject related to agrotechnology and being able to apply it to the field of Agrotechnology. The i-AIS 2022 program takes place from December 1, 2022, to January 8, 2023. The program was officiated by the Dean of the Faculty of Plantation and Agrotechnology, namely Prof. Madya Ts. Dr. Azma Yusuf. The program involves students from faculties of the Faculty of Plantation and Agrotechnology (FPA) and HEP participating in i-AIS 2022, namely, the Faculty of Education and Pre-Higher Education. This program involves the UiTM student and some of the non-UiTM students which come from the international university and the local university. Two categories are contested, namely UiTM and non-UiTM. To date, students from these programs have shown remarkable achievements in academic performance and participation in national as well as international competitions.

This competition is an open door for the students and lecturers to exhibit creative minds stemming from curiosity. Several e-content projects have been evaluated by esteemed judges and that has led to the birth of this E-Poster Book. Ideas and novelties are celebrated, and participants are applauded for displaying ingenious minds in their ideas.

It is hoped that such an effort continues to breed so that there is always an outlet for these creative minds to grow.

Thank you.

Dean
On behalf of the Organizing Committee
Conference Chair
Universiti Teknologi MARA
Faculty of Plantation and Agrotechnology
<http://fpa.uitm.edu.my>

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PALLET FROM COCONUT HUSK

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ABSTRACT - Malaysia have massive amount and size of coconut waste that requires a large space to dispose of. This study tries to make a product from coconut waste that have good quality and not give bad impact to environment. This process is by collecting coconut husk waste from coconut farmers. At high temperatures, grind the coconut husk and press them together. This natural glue is activated during grind process and the standard size for this pallet is 1200 x 1000 x 115mm. material that use is coconut husk waste, lignin (natural glue), grinder and compressor. The new substance is created from the husk, the outer-hairy component of the coconut waste stream. Approximately 1.7 billion pallets are used to carry products from Asia to the rest of the globe each year. The procedure is not only environmentally friendly, but it also eliminates the most expensive component of traditional pressed wood pallets: synthetic resin. This process doesn't require any glue because the coconut husk has its own natural glue called lignin. So, we provide an innovative eco-friendly method for recycling waste coconut husks into shipping pallets, which is CocoPallet. Utilizing the formula, the percentage composition of the coconut trash (husk and shell) by weight was found. Only 15% of the waste from coconut manufacturing is utilized today, which means the remaining 85% is burnt, landfilled, or left to rot. A machete was used to remove the coconut's husk. CocoPallet can prevent the usage of harmful and costly glues or synthetic resins by employing this natural glue.

Keywords: Coconut husk, Pallet, Waste product

INTRODUCTION

Malaysia has gradually boosted its coconut output. From 504,780 MT in 2016, output has climbed to 542,000 MT in 2020. Because of its multipurpose properties. Coconut, or *Cocos nucifera* L., is known as a versatile tree. Coconut is suitable for usage in food, cosmetics, and industrial items [1]. Malaysia have massive amount and size of coconut waste that requires a large space to dispose of. The new substance is created from the husk, the outer-hairy component of the coconut waste stream. Only 15% of the waste from coconut manufacturing is utilized today, which means the remaining 85% is burnt, landfilled, or left to rot. The pallets are manufactured near to the coco husk supply, providing additional money to local farmers.

Furthermore, the farmers will be able to cease burning the coconut husks, minimizing air pollution. Pallets degrade naturally. Pallets can be shredded, recycled, or composted after usage. The firm is looking at methods to use the pallets as soil improvers in order to increase the value of this biomass. CocoPallet provide significant benefits for goods transportation since they are stronger and lighter, fire retardant, and easier to stack due to an improved design, taking up less space. Above all, they are less expensive, and a lower price is always the most effective sales justification for a sustainable product.

This study tries to make a product from coconut waste that have good quality and not give bad impact to environment.

Objective

1. Quantify the amount of wastes that can be generated from whole coconut.
2. Use 100% natural and biodegradable free of any synthetic resins

MATERIAL AND METHOD

- Coconut husk waste
- Lignin (natural glue)
- Grinder
- Compressor

The first process is collecting. This process is by collecting coconut husk waste from coconut farmers. A machete was used to remove the coconut's husk. To determine the number of husks by weight, each was weighed separately. Additionally, the individual shells were taken out, weighed, and the quantity of shells by weight was recorded. By calculating the difference between the weight of the full coconut fruit and the weight of the husk

and shell, the weight of the fruit was determined. Utilizing the formula, the percentage composition of the coconut trash (husk and shell) by weight was found.[3]

$$\text{Percentage waste} = \frac{\text{sum of waste (husk + shell)weight}}{\text{total weight} \times 100\%}$$

At high temperatures, grind the coconut husk and press them together. Each pallet consists of about 60 to 70 coconut husks. This process doesn't require any glue because the coconut husk has its own natural glue called lignin. This natural glue is activated during grind process and the standard size for this pallet is 1200 x 1000 x 115mm.



Grinding process



Grinding process



Pallet as end product

RESULTS AND DISCUSSION

Approximately 1.7 billion pallets are used to carry products from Asia to the rest of the globe each year. Almost 170 million trees are chopped down to make these single-use or one-way export pallets. Meanwhile, 7.4 billion coconuts are collected across the world [4]. After consumption, the undesired hairy coconut shells are either burned or tossed into the ocean, resulting in around 60 billion Kgs of garbage every year. So, we provide an innovative eco-friendly method for recycling waste coconut husks into shipping pallets, which is CocoPallet. CocoPallet can make sustainability in the Asian transport industry more affordable by pressing high-quality nestable pallets with natural glue found in coconut fibers. The procedure is not only environmentally friendly, but it also eliminates the most expensive component of traditional pressed wood pallets: synthetic resin. CocoPallet are created from the hard shell of coconuts, but they are also bonded in an ecologically sustainable manner. Coconut lignin is a particular polymer present in many different types of plants that is deposited in the cell walls. This chemical is responsible for the stiff and woody texture of certain plants. CocoPallet can prevent the usage of harmful and costly glues or synthetic resins by employing this natural glue. Because press wood pallets are constructed with these synthetic resins, they are not as feasible as an eco-friendly alternative to timber pallets. This makes CocoPallet the ideal, ecologically friendly replacement to conventional wooden pallets made from timber. CocoPallet are less expensive than wooden pallets since there is no need to import wood to nations with limited forest resources such as China, Japan, Taiwan, and Korea. Additional advantages include reduced deforestation and reduced transportation of wood used to create wooden pallets. Every year, around 5 billion wooden pallets are produced, resulting in the yearly deforestation of over 500 million trees. Similarly, around 7.4 billion coconuts are collected globally for their contents. 85% of the outermost layer of these coconuts, the hair husk or shell, is wasted, either by burning, throwing into the oceans, or throwing away and piling up to form a vast biohazard over time [5].



Figure 1

Less storage space is required since the CocoPallet saves around 60-70% space when not in use. Heat treatment or chemical treatment (fumigation with methyl bromide) are not required to eliminate pests, and the CocoPallet is completely (ISPM15) compatible with international norms. CocoPallets contain no synthetic nails and are completely biodegradable. The ISPM-15's goal in regulating wood treatment is clear: to reduce the danger of pollution and the spread of harmful organisms in commerce, including as bacteria, viruses, fungus, and insects, which can harm plants and ecosystems. These environmental and health goals are mandated in over 160 countries and strive to preserve biodiversity while also protecting the environment and public health [6].

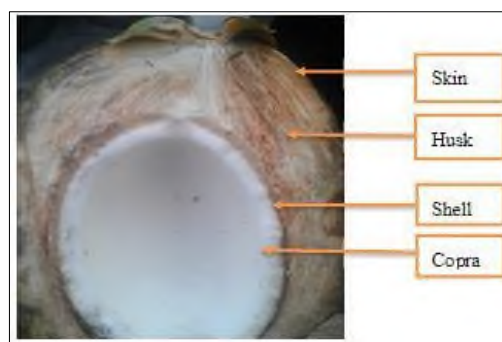


Figure 2: Half view of whole coconut showing the husk, skin, shell and copra.



Figure 3: Coconut husk are best alternative to be pallet.

CONCLUSION

We can see how significant it is to treat trash, especially garbage that is a by-product of the post-harvest process, through this innovative effort. This is due to the fact that processing waste leads to innovation, which leads to a new end product. We may be able to help to the decrease of waste-related concerns, particularly those of an environmental nature, by carrying out various types of processing. This method is expected to play a role in the emergence of additional post-harvest-related difficulties.

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