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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BRIQUETTES OIL PALM FRONDS

Muhammad Izwan Azlan[1], Muhammad Hafizul Afzan Mansor[1], Wan Muhammad Hamizan Ab Halim[1]

[1]*Faculty of Plantation and Agrotechnology, University Technology MARA, Melaka*

Corresponding author e-mail: izwanazlan888@gmail.com

ABSTRACT - The briquettes are the result of processed biomass waste, such as coconut shell and oil palm fronds. The purpose of this study was to determine the effects of temperature, concentration and composition of the adhesive raw materials against the calorific value of the briquettes. This innovation aims to obtain the best characteristics of charcoal briquettes of oil palm fronds and coconut shells in making briquettes with tapioca flour adhesive. The results showed that the briquettes from oil palm fronds could be made both with tapioca adhesive and coconut shell adhesive, resulted in different properties of briquettes in which the briquette with oil palm fronds as adhesive in general showed better quality which can be seen from the burning resistance for 36 minutes while in tapioca only 13 minutes,

Keywords: *briquettes; oil palm fronds; coconut shell; tapioca flour; adhesive; charcoal*

INTRODUCTION

Due to its importance in determining a nation's ability to expand economically, the global energy crisis is one of the biggest issues that practically the whole nation must deal with. When more energy is required to continue economic development, the whole country's energy supply will be used instead of generating a supply of traditional energy reserves, which is becoming scarcer. One kind of plant waste is dried oil palm fronds. By processing oil palm leaves or fronds as a raw material for one of the briquette products, they may add economic value and save fuel costs. Charcoal briquettes are an alternative fuel made from the process of burning materials that have a small size/diameter. Small-sized charcoal or powder is transformed into the form of charcoal briquettes which will be able to improve its physical properties especially density, cleanliness, and compression resistance as well as slow down the burning speed so that the shape of the product will have the same size and more preferred by users.

Objectives

To produce a superior briquette product, particularly in terms of caloric value, volatile matter content, and ash content, palm oil charcoal must be combined with other materials (charcoal). Rubber seed husk coal is one of the coals with a low ash content, low volatility, and high calorific value. Rubber seed shell charcoal is one kind of high caloric value, high carbon content charcoal that may be used to augment palm leaf charcoal while making briquettes. This goal seeks to achieve the optimal treatment of rubber seed husk and palm leaf charcoal briquettes using tapioca adhesive.

MATERIAL AND METHOD

Step 1: The process of making charcoal briquettes

The first step is the stage of making charcoal briquettes. Briquettes are made with a mixture of charcoal coconut shell and tapioca flour as an adhesive and oil palm frond charcoal. The process of making charcoal briquettes starts with raw material preparation, carbonization, size reduction, making briquette dough, and briquette moulding.

Step 2: Raw material preparation

The raw material prepared is palm fronds. The fronds are dried in the sun for three days. After drying, the palm fronds are cut into small pieces to facilitate the carbonization process, the size of the fronds is 20 cm long. The selection of this size is to adjust the size of the container or place for carbonization. After the dry raw materials proceed to the carbonization process.

Step 3: Carbonization Process

The carbonization process is carried out on a sheet of used zinc drum, the zinc drum is perforated at the bottom so that when it is sprinkled with water, the water immediately goes down without stagnant. All the raw materials have been burned, immediately cooled by dousing them with water until the burning stops.

Step 4: Size Reduction

Size reduction is done by pounding it using a cup made of iron. The results of the collision are divided into three according to the treatment, namely non-sieved, mashed using a 50 mesh sieve, and mashed using a 70 mesh sieve. The dregs resulting from the sieving are ground again until all the ingredients can be utilized.

Step 5: Briquette Dough Making

Oil palm frond charcoal that has been given three different treatments is mixed with an adhesive with an adhesive concentration of 5% of the total raw material for each treatment. The weight of the raw materials used in this study ranged from 39.7 - 40.6 g, the weight of the raw materials referred to the preliminary research, in the raw material weight range of 39.7 - 40.6 g, the results obtained were briquettes that had the right density, and did not break when removed from the mould. The adhesive is made by cooking the flour in a ratio of 1:10 to water, the adhesive is cooked until it thickens and the initially white colour turns clear, or the adhesive mixture thickens.

Step 6: Briquette Printing

The dough that has been mixed with the adhesive is put into a tubular mould with a diameter of 4 cm and a height of 4 cm. After the raw material is put into the mould, it is pressed so that the raw material solidifies and the adhesive used seeps into the pores of the briquette, so that the briquette does not break and crack easily. Pressing of raw materials is carried out using a press with a pressure of 10 tons/cm^2.

RESULTS AND DISCUSSION

Based on the result and experiment in making this product, Briquettes Oil Palm Fronds is functioning well. The product use waste of fronds which is often discarded. So with waste that can be processed, charcoal from frond oil palm can be produced. There are some advantages such as being durable when burning, having good burning power around and being able to recycle waste materials in the farm. Next in terms of shape, briquettes have air holes to help the fire to burn the part. The cylindrical shape also helps the buyer to arrange the briquettes in an orderly and easy manner while moving them during burning.

However, our product also has problem such as requiring a careful process when drying the fronds. The water required is only below 6%. High humidity affects the quality of good charcoal.

Despite the problem occurring, our side will try to ensure that the problem can be overcome to ensure that the buyer gets our product in a quality condition.

Figure 1 Tapioca Flour

Figure 2 Oil Palm Frond

Figure 3 Coconut Shell Charcoal

Figure 4 Briquettes Oil Palm Fronds

Table 1: Briquettes Oil Palm Frond Content

Parameter	Content (% wet basis)
Moistures	13.159
Volatiles	67.173
Ash	3.980
Fix carbon	15.688

CONCLUSION

The results of this study to indicate that oil palm fronds can be used as a raw material for making charcoal briquettes. Palm fronds, which so far have been underutilized by the community, are therefore waste because these fronds are usually just piled up around the tree. After doing research that the leaf midrib in oil palm has the potential to be used as fuel. Oil palm frond biomass from palm oil plantation waste can be converted into solid fuel through densification and can be an alternative source as an impact and high capacity combustion agent that has the potential to be used to generate heat or electricity. It can also be added in the future to be used as a source of energy such as steam power generation, power generation in combustion engines and as gas for cooking.

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INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM

ais2023.fpa@gmail.com