1ST EDITION

E-EXTENDED
ABSTRACT

INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM (i-AIS)

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Faculty of Plantation and Agrotechnology UiTM Cawangan Melaka Kampus Jasin

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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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MANAGING WASTE PRODUCT OF PALM OIL MILL (DECANTER CAKE) AS COMPOST

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ABSTRACT - One of Malaysia's crucial industries is the oil palm sector. Due to the huge demand from other nations, palm oil output keeps growing year after year, producing a lot of trash from the field and the mill. This waste could have a big impact on the ecosystem. One way to reduce the amount of waste produced is by composting. Due to the qualities that have been improved during the composting process, compost material is widely employed, particularly in agricultural activities. Empty fruit bunch (EFB) compost primarily functions as mulch to keep the soil moist and acts as organic fertilizer because it is rich in nutrients that the plant needs to grow.

Keywords: Empty fruit bunch (EFB), Oil Palm Wastes, Decanter Cake

INTRODUCTION

The oil palm tree (*Elaeis guineensis*) belongs to the Arecaceae family, which had been previously known as Palmaceae. Palm oil is one of the most significant agricultural commodities in the world, as well as one of the largest agricultural industries. Oil palm is a type of commercial plantation that is widely grown in Indonesia, Malaysia, and Thailand. Malaysia is the world's second-largest producer of palm oil, after Indonesia, and palm oil has always been Malaysia's primary agricultural export.

Palm oil mills will perform the extraction process for both forms of palm oil, CPO and PKO, from the fruit of the oil palm tree. The extraction of CPO and PKO in palm oil mills would greatly benefit Malaysia's economy and agriculture industries. Unfortunately, palm oil mills would increase environmental pollution at the same time. All waste generated during the manufacturing process has the potential to damage the environment. There are few processes of palm oil should go through before it ends into by-products. Empty fruit bunches, palm fiber, and palm kernel shell are the main solid phases produced by milling processes. These solids could be widely used for a variety of purposes, such solid fuels. A by-product of the palm oil milling decantation process includes decanter cake.

MATERIAL AND METHOD

The fertilizer content determination is by drying the peat or organic soils sample inside an oven at a temperature of 110°C. The air flow mechanism of the Memmert universal oven is shown in Figure 1. The convection oven does not have a fan. The air was drawn from the oven's bottom and warmed inside the preheat chamber before being discharged via the ventilation openings. The heated air will enter the chamber to heat up the decanter cake. Provide sufficient Spacing between multiple subjects inside the oven to obtain proper air circulation.

The decanter cake was evaluated by drying the samples in the oven and weighing them at 1-hour intervals until the samples do not have any change of mass pan. Decanter cake samples can be weighed and dried on sampling pans. The aluminium sample pan will keep the sample inside the pan if it cracks during the drying process, allowing us to find the actual moisture content of the sample accurately. To achieve the best results, always use a new sample pan instead of reusing the same pan in Figure 2.

Analytical balance will be used to find the weight of the decanter cake and aluminium pan. The model used was the A&D Company, Limited's GR-200. The mass of the aluminium sample pan will be measured first, then by the mass of the decanter cake samples on an aluminium pan. The weighing capacity for this model is 210 g and has a minimum weighing value of 0.1 mg. Figure 3 shows the photo of the analytical balance.

RESULTS AND DISCUSSION

Decanter cake samples are dried in a three-hour convection oven. Three samples are weighed every five minutes for the first two hours and every 10 minutes for the third hour before being let to dry entirely at a specified temperature. The drying findings have been used to calculate the moisture content, moisture ratio, and drying rate of decanter cakes. A 1 cm thick sample does not achieve an appropriate moisture ratio or moisture content because it takes time to dry. However, the drying rate for each thickness started to rise at the beginning of the experiment and gradually fell as the drying duration increased. For the drying process, the thinnest sample, 0.3 cm, had the greatest drying rate, while the thickest sample. Had the lowest drying rate. This is because moisture from the inside of the decanter cake sample moves a shorter distance. To the surface when it becomes thin. This is because the thickness is insufficient to be dried in three hours using mechanical dryers, resulting in a higher cost for industrial firms. If the decanter cake thickness is greater than 1 cm, instead of using mechanized dryers, it is preferable to use solar drying which is cost effective. Fig. 1

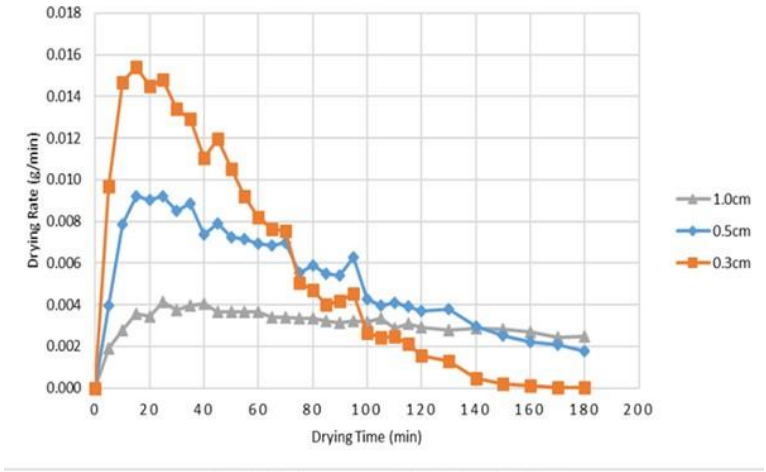

Fig. 9. Drying rate against drying time

Figure 1: Drying Rate Against Drying Time

Table 1

Table 4

Decanter cake linear regression data for 0.3 cm thickness

Model	R^2	X^2	RMSE
Newton	0.9930924	0.210331×10^{-2}	0.458619×10^{-1}
Henderson and Pabis	0.9897233	0.129250×10^{-2}	0.359513×10^{-1}
Logarithmic	0.9941421	0.629139×10^{-3}	0.250826×10^{-1}
Two Term	0.9897240	0.138824×10^{-2}	0.372591×10^{-1}

Table 5

Decanter cake linear regression data for 0.5 cm thickness

Model	R^2	X^2	RMSE
Newton	0.9949333	0.150321×10^{-2}	0.387713×10^{-1}
Henderson and Pabis	0.9917535	0.766776×10^{-3}	0.276907×10^{-1}
Logarithmic	0.9985685	0.125484×10^{-3}	0.112020×10^{-1}
Two Term	0.9917538	0.823574×10^{-3}	0.286980×10^{-1}

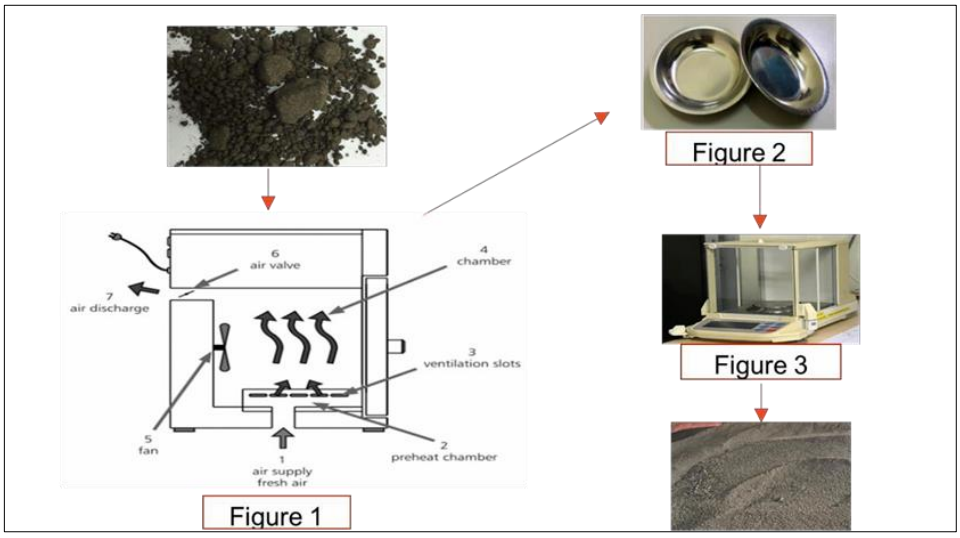

Figure 2

CONCLUSION

This research uses waste from an oil palm mill to investigate the drying properties of decanter cake, which is one of them. The decanter cake was dried in a convection oven dryer with thickness samples 0.3 cm, 0.5 cm, and 1 cm in thickness. The experiment's moisture content, moisture ratio, and drying rate were estimated using the applicable formulae for all thicknesses. The experiment results showed that a 1 cm sample thickness cannot be completely dried in a convection oven at 105°C in three hours. Moisture might move a larger distance from the interior to the outside surface of a thicker sample. To lower the cost of the drying process for related sectors, it is preferable to dry decanter cake with a thickness of 1 cm or more using open sun drying. The drying procedure may be completed in three hours with only 0.3 cm and 0.5 cm sample thickness.

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