3rd 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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SUGARCANE AND CORN COB PARTICLE BOARD

Omar Irsyad Bin Omar[1], Muhammad Faiz Bin Zulazmi[2], Muhamad Izzat Zikry Bin Mohd Amran[3]

[1]*Faculty Of Plantation And Agrotechnology,University Technology Mara, Malaysia*

Corresponding author e-mail: muhammadfaizzulazmi@gmail.com

ABSTRACT- This research and project was created to use agricultural waste as a useful product for consumers. A wood-based panel product known as particleboard is made using wood particles or other fibrous lignocellulose materials, a binder, and pressure and heat. It is extensively utilised in the production of furniture, floor underlayment, and home décor. Woods are a major source of lignocellulose utilised in the production of particleboard, although other plant fibres and agricultural waste have also been studied. In this study, particle board manufacturing from corncob and sugarcane dregs are intended to reduce air pollution and waste. It is produced by mixing corncob and sugarcane bagasse with an adhesive material which is Urea- Formaldehyde (UF) resin. This mixture has undergone 3 main processes namely compression, heat and cold to get good results. This research assesses particle board made from sugarcane bagasse (SB) and corncob (CC) particles mixed uniformly in varied amounts (20%, 40%, 50%, 60%, 80% and 100%) using urea formaldehyde resin as the adhesive. Yielding a total of seven unique compositions to carry out physical tests (density, water absorption and thickness swelling) and mechanical tests (modulus of rupture and modules of elasticity). The results revealed that the use of combination type board CC 50% SB 50% is average good and recommended. This is because density value, water absorption and, thickness swelling of this composition is in average good and suitable for outdoor and indoor use.

Keywords: sugar cane bagasse, maize cob, urea formaldehyde resin, modulus of rupture and modules of elasticity.

INTRODUCTION

There has been a comparable rise in the scarcity of the necessities for people's fundamental survival as the world's population has continued to rise. Concerns about the next generation's ability to meet their own demands in the future are raised by the ongoing consumption of these finite resources. The idea of sustainable development provides a solution to the aforementioned issue. Reducing the quantity of trash produced and recycling it in a way that can help achieve the economic, social, and environmental goals of sustainable development is one strategy for achieving it.

Bagasse is the fibrous material that is left over after the juice from the stalks of sugarcane or sorghum has been extracted. It is a dry, pulpy byproduct of the sugar cane juice extraction process. Bagasse is used to produce pulp, building materials, and as a biofuel. Since bagasse is a byproduct of the cane sugar industry, production in each nation is proportional to the amount of sugarcane grown there. Compressing wood chips with glue produces particle board. The chips are primarily parallel to the surface of flat-pressed particle board. Since the surface layer's chips are smaller than those in the centre layer's, the surface of the particle board is more compact and denser than the middle. The most often used binder in conventional particle board is urea formaldehyde. Various surface materials, such as veneer, melamine, laminate, plastic, paper, etc., can be applied on particle board as coatings.

OBJECTIVE

- To convert waste materials in production of Particle boards.
- To identify the mean values of density, water absorption and thickness swelling of board for combination Sugarcane Bagasse and Corn Cob.
- To identify the mean values of modulus and modulus of elasticity.

MATERIAL AND METHOD

The materials used are sugar cane bagasse, corn cob and urea formaldehyde resin.

Corncob is dried for seven days to obtain a fragile structure and ensure corncob particles of moisture content were about 2 to 3%. After that, the corncob is crushed to get a small particle size and then ground and sieved to get the smallest size which is 1.18mm. Same process with corncob, which is sugarcane bagasse dried for seven days to facilitate the grinding process due to its soft structure. Then it is filtered to get 1.18mm particles and the rest to remove oversized and undersized particles and enhance uniformity and avoid balling. Both mixtures were glued with Urea Formaldehyde (UF) resin according to the Volume of the adhesive that was set until it was mixed. The mixture is placed on the mold to undergo 3 processes, the first being the compression process. Second, heated and allowed to dry for 1h at 80 °C and third, cooled to ensure the Urea Formaldehyde (UF) resin hardens after several weeks. Afterwards, the mold was opened and cut according to the desired size to carry out physical tests (density, water absorption and thickness swelling) and mechanical tests (modulus of rupture and modules of elasticity).

RESULTS AND DISCUSSION

Based on the results in table 1, the use of mixed CC abd SB is suitable for making the particle board. This is because the density value produced is an average with other combined percentages of 503 kg/m3. In addition, CC50% SB50% is also a combined percentage group that has a low percentage of water absorption after 2 hours and 24 hours which is 45% and 48% respectively compared to the combined percentage of CC100% SB0%. If the percentage of SB is higher than CC, the lack of space for water penetration into the board is low because SB has a higher compressibility. Based on the data on thickness swelling, showing the combined percentage of CC50% SB50% is also the average thickness swelling percentage value after 2 hours and 24 hours which is 9.18% and 14.32% respectively. As for the value of the swelling percentage of the least thickness at CC0% SB100% after 2 hours and 24 hours which is 5.55% and 12.5%. It shows that the lower the value of the swelling percentage of the thickness if the percentage of SB is higher. It is observed that CC100% has the highest value for (MOR) while SB100% has the lowest value. The modulus of elasticity (MOE) also shows the same pattern of increase and decrease in value expecting CC80% SB20% to have a greater value than CC60% SB40% which is opposite to the MOR value obtained. From the conclusion in this mechanical test, the MOR results that have been shown are much better because they are very enough to the minimum requirement.

TABLE, IMAGE AND FIGURE

Board type	Mean Density (Kg/m^3)	Water Absorption (WA)		Thickness Swelling (TS)	
		% WA after 2 hours	% WA after 24 hours	% T.S after 2 hours	% T.S. after 24 hours
$CC_{100}SB_0$	620	52.25	76.5	16.25	21.25
$CC_{80}SB_{20}$	535	47.5	77.4	10	15
$CC_{60}SB_{40}$	572	44.5	60.3	8.05	13.6
$CC_{50}SB_{50}$	503	45	48	9.18	14.32
$CC_{40}SB_{60}$	605	41.75	44.7	7.42	13.14
$CC_{20}SB_{80}$	593	35.25	45	6.55	16.2
CC_0SB_{100}	400	40.5	54.7	5.55	12.5

Figure 1 : Mean Values of Density, Water Absorption and Thickness Swelling of boards.

Board type	MOR (N/mm^2)	MOE (N/mm^2)
$CC_{100}SB_0$	4.4	21.14
$CC_{80}SB_{20}$	3.3	21.13
$CC_{60}SB_{40}$	3.6	20.5
$CC_{50}SB_{50}$	3.7	26.33
$CC_{40}SB_{60}$	3.2	16.68
$CC_{20}SB_{80}$	2.3	13.58
CC_0SB_{100}	1.9	11.28

Figure 2: Mean Values of Modulus of Rupture & Modulus of Elasicity

CONCLUSION

To conclude this project, we believe that it is possible to create a new bamboo particle board with the use of bamboo bagasse. The panels, however, cannot be utilized for structural or load-bearing purposes due to their weak mechanical qualities, which tend to improve as bagasse content increases. The boards created from these agricultural byproducts could be utilised to produce a variety of goods. Based on the findings of this literature research, implementing the cutting-edge technology for making particleboard out of bagasse would have a significant impact on lowering the demand for forest wood products.

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We would like to praise and thank the Allah S.W.T for giving us the strength and because of His blessing, we finally managed to accomplish this project. Without His blessing, we would not have gone this far. We would like to acknowledge with thanks to our lecture Madam Nur'amira Binti Hamid because without her guide our project cannot be done properly like this. This project cannot complete without effort and co-operation from our group member, which are consist of Omar Irsyad Bin Omar, Muhammad Faiz Bin Zulazmi and Muhamad Izzat Zikry Bin Mohd Amran. We always work hard to produce a good project with our full commitment and responsibility.

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Fakulti Perladangan dan Agroteknologi

INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM

ais2023.fpa@gmail.com