

3rd EDITION

**E-EXTENDED
ABSTRACT**

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



COPYRIGHT

INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM (i-AIS)

19 June 2023

Faculty of Plantation and Agrotechnology UiTM Cawangan Melaka Kampus Jasin

Published 2023
Faculty of Plantation and Agrotechnology
Universiti Teknologi MARA Cawangan Melaka Kampus Jasin
77300 Merlimau Melaka.

E-EXTENDED ABSTRACT of the INTERNATIONAL AGROTECHNOLOGY INNOVATION
SYMPOSIUM (i-AIS) (3rd EDITION)

Mode of access Internet

<https://sites.google.com/view/ais2023/publication>

Perpustakaan Negara Malaysia Cataloguing -in – Publication Data

ORGANIZING COMMITTEE

Program Advisor	:	Ts. ChM. Dr. Wan Zuraida Wan Mohd Zain
Program Director	:	Dr. Noer Hartini Dolhaji
Program Secretary	:	Nurul Izzatiafifi Ismail
Program Treasurer	:	Nur' Amira Hamid
Program Registration	:	Siti Aisha Na'illa Che Musa
Program Judging	:	Nur Atiqah Zaharullil Nur Wajihah Mohd Nawi
Program Webmaster	:	Ts. Dr. Siti Fairuz Nurr Sadikan
Program Certificate		Nurul Wahida Ramli
Program Human Contribution		Nur Nabila Huda Aziz
Program Protocol		Siti Nur Atikah Abu Samah
Program Publication		Dr. Mohd Zuli Jaafar
Program Logistic		Muhammad Nuruddin Mohd Nor
Program Technical		Khawarizmi Mohd Aziz

STUDENT COMMITTEE

Mohammad Ali Kamaruddin
Nurul Huda Nabilah Ramlee
Siti Nor Arifah Abd Halim
Nuraliah Aqilah Ayuni Mohamed
Mohamad Khairul Haziq Mohamad Fauzi
Nur Wajihah Mohd Nawawi
Mohammad Hafis Ayub
Aiman Haziq Arifin
Amyra Hazwani Ghazali
Mohamad Syamil Mohd Nor
Mohammad Najmuddin Suriani
Nur Syafiqah Aina Azmi
Muhammad Aidil Ikhwan Kamarudin
Nur Muhammad Ameiriqwan Ahmad Faiza
Muhammad Faiz Zulazmi
Mohd Azri Aiman Zulkifli
Diana Asykin Kamaruddin
Nor Elin Balqis Ismail
Nursyasya Razalil
Muhammad Ismadanial Rozi
Muhammad Amir Asyraf Azman
Mohamad Zairy Zailan

EDITORIAL BOARD

Patron

Prof Ts Dr Azhan Hashim @ Ismail

Advisors

Prof Madya Ts. Dr. Fazleen Abdul Fatah

Ts. ChM Dr. Wan Zuraida Wan Mohd Zain

Dr. Noer Hartini Dolhaji

Editors

Dr. Mohd Zuli Jaafar

Dr. Wan Zuraida Wan Mohd Zain

Dr Noer Hartini Dolhaji

Muhammad Aidil Ikhwan Kamarudin

Abdul Quddus bin Puteh

Nurul Izzatiafifi Ismail

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>

TABLE OF CONTENTS

1. COPYRIGHT	i
2. ORGANIZING COMMITTEE.....	ii
3. STUDENT COMMITTEE	iii
4. EDITORIAL BOARD	iv
5. ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY.....	v
6. PREFACE.....	vi
7. TABLE OF CONTENTS	1
8. CHIRETTA CREAM	2
9. SMART WATER TANK FOR SUSTAINABLE IRRIGATION.....	5
10. PURPLE SWEET POTATO ICE CREAM	8
11. ORGANIC PLANT FOLIAR AS AN ALTERNATIVE WAY TO SAVE FERTILIZER COSTS.....	12
12. NATURAL LIQUID SOAP	17
13. SUGARCANE AND CORN COB PARTICLE BOARD	20
14. NUTRITIOUS PAPAYA CHIPS WITH ZERO SUGAR AND PRESERVATIVE.....	23
15. INFLUENCE OF SOYBEAN RESIDUE FLOUR IN WHEAT BATTER FORMULATION ON PHYSICAL PROPERTIES OF FRENCH FRIES	27
16. FLAKES INCORPORATED WITH BOTTLE GOURD POWDER (<i>Lagenaria leucantha rysby</i>).....	31
17. VARIOUS PROTEIN-BASED COATING TOWARDS POSTHARVEST QUALITY OF PAPAYA (<i>Carica papaya</i>)	36
18. SMART SHALLOW MACHINE	41
19. Utilization of Eco-enzyme promoting growth and production of Kembang Telang plant (<i>Clitoria ternatea L.</i>).....	43
20. COCOA PULP: AN AGRO-INDUSTRIAL WASTE THAT BECOME A JAM PRODUCT.....	47
21. ANANAS COMOSUS LIP BALM	50
22. TECHNOLOGY OF SCAN REMINDER PRO IN COOLING ROOM.....	57
23. EFFECT OF SALINITY ON MICROBIAL POPULATION AND ITS CHARACTERIZATIONS IN PADDY SOIL.....	61
24. EFFECT OF CHEMICAL FERTILIZER ON THE BACTERIA POPULATION AND ITS CHARACTERIZATION IN PADDY SOIL.....	64
25. PINEAPPLE FIBRE PELLET AS BIODEGRADABLE CAT LITTER.....	68
26. EXTRACTION OF SILICON CARBIDE PARTICLES FROM RICE HUSK	72
27. BRAZILIAN SPINACH FISH PATTIES (IKAN PATIN).....	75
28. PAPER FROM PINEAPPLE LEAF FIBRE	79
29. COCOA BUTTER KERNEL BODY SCRUB	83

PINEAPPLE FIBRE PELLETT AS BIODEGRADABLE CAT LITTER

Angelie Marchena Anak Thomas¹, Nurulain Azureen Binti Abdul Malek¹, Odilia Anak James¹

¹Faculty of Plantation and Agrotechnology, Universiti Teknologi Mara, Jalan Meranek, 94300, Kota Samarahan, Sarawak, Malaysia.

Corresponding author e-mail: odiliajames4@gmail.com

ABSTRACT - When pineapples are pruned, the leaves that remain are considered waste. The waste is typically discarded and left at the farms for the decomposition process. Other pineapple waste such as pineapple peel, pineapple core and crown are also often being left on the field. Pineapple leaf is mainly made from fibres has a lot of potential to be developed into new product to utilize the waste into something useful and able to provide income. Due to high fibre content in pineapple leaf, it is commonly turned into animal feed, health supplement and even clothing yarn. Plant-based cat litter has been created by using plant fibres. Cat litter is a sand-like granules that helps to absorb moisture and diminish odour made by indoor animals such as cats and dogs. The objective of this study is to utilize pineapple fibre leaf waste into biodegradable and eco-friendly cat litter. The pineapple leaf fibre are first extracted then converted into pellets

Keywords: Pineapple waste, Fibre, Pellet, Biodegradable Cat Litter

INTRODUCTION

The pineapple, scientifically known as *Ananas comosus*, is a perennial plant that is a species of the Bromeliaceae family. The plant has scaly fruit and leaves that grow out in all directions from the bottom of the pineapple. Pineapples can be grown in fields or in pots, containers, and tissue culture inside. The plant develop well in humid climates in tropical or subtropical areas. Only 60% of the pineapple fruit is edible, so the processing residuals range from 45 to 65%. The crown and stem of the pineapple are removed prior to peeling, and the core is discarded during processing. All of these wastes, including core, peel, stem, crown, and leaves, account for around 50% of total pineapple weight. Two types of waste from pineapple production may be classified as POFW (Pineapple on Farm Waste) and PPW (Pineapple Peel Waste). POFW often consists of leaves, stems, and roots on the farm following pineapple harvesting. Consequently, when pineapple production increases, pineapple waste rises accordingly. Waste disposal is a growing issue since waste is typically susceptible to microbial decomposition and causes severe environmental issues. It is a direct representation of the massive difficulty in properly disposing of pineapple waste, which will eventually lead to environmental pollution if the problem is not resolved. Pineapple fibre refers to be the most subtle of all vegetable fibres. According to the research, among the many plant fibres available, pineapple (*Ananas comosus*) leaf fibres stand out due to their potential qualities as a polymer reinforcement. Natural fibres are good because they are always available, easy to handle, and biodegradable. The pineapple fruit is extremely valuable to the commercial sector, while the pineapple plant's leaves are regarded waste materials but are actually used in the production of natural fibres. Holocellulose makes up between 70 and 82% of PALF, while lignin accounts for between 5 and 12%, and ash makes up 1.1% of PALF. When compared to traditional composites, natural fibre composites are more appealing to industry due to their higher density and more environmentally friendly nature. Cellulose, in its raw state, has a relatively poor capacity for absorption and retention; however, after being modified, cellulose can demonstrate excellent values in both of these categories. After turning pineapple fibre into powder the absorbency rate has significantly increases and promotes clumping when turned into pellets. Additionally, in order for cat litter to be considered environmentally friendly, it must be devoid of potentially hazardous chemicals, artificial fragrances and dyes, sorbent clay, as well as silica dust. The safest and most effective varieties of non-toxic cat litter are plant-based products that are manufactured with components such as corn, wheat and wood dust. It has a high capacity for absorption, is lightweight, eliminates odor, and does not clump, all of which contribute to the ease with which it can be cleaned. Pineapple fibres on the other hand is able to diminish unpleasant odor due to high retention and absorbency.

MATERIAL AND METHOD

Material

1. Josapine pineapple leaf
2. Extractor machine
3. Oven
4. Grinder
5. A sieve of 800 μm mesh size
6. Twin-screw extruder
7. Friabilator
8. 200 ml glass cylinder
9. Weighing scale
10. Gas pycnometer

Method

Pineapple Leaf Waste Preparation

1. Pineapple leaf waste was collected randomly from Northern Region Agriculture Research Centre, Kabuloh Miri.
2. The pineapple leaf fibre were extracted using an extractor machine called Pineapple Leaf Fibre Machine.
3. Then, the waste was chopped and cut into small parts before being dried in the oven at 70°C for 24 hours.
4. Then, a grinder was used to transform the dried waste into powder with a size of 0.8 mm.
5. After that, the powder was put through a sieve with a mesh size of 800 μm .
6. The powder was stored in the refrigerator for the next phase.

Pelletization of Pineapple leaf waste

1. Pineapple leaf powder was crushed into pellets using a twin-screw extruder (Thermo Scientific EuroLab 16 mm XL) using two distinct parameters in the process (screw speed of the extruder and moisture content of the powder).
2. The screw speed was adjusted between 50 to 150 rpm during the extrusion of pineapple leaf powder.
3. Then, the moisture content of pineapple leaf powder was evaluated between 35% to 55% to identify the right moisture content for cat litter pellets.
4. The temperature of the barrel was always kept at 100°C. Meanwhile, the size of the extruder's was set fixed at 7 mm for pellet size.
5. The friability, true density, bulk density, porosity, and hardness of the pellets' physical attributes were assessed. The percentage weight loss of the pellets was used to calculate the friability of the pellets.
6. After that, the pellets were rotated at 25 rpm for 5 minutes in the friabilator (Electrolab). The pellets were once again weighted and cleaned after the rotation.
7. The true pellet density was determined using a gas pycnometer. The powder's true density was determined as its mass per unit volume.
8. While the bulk density was estimated by weighing the pellet in a 200 ml glass cylinder. The average density of a large amount of pellets in air was used to figure out the bulk density.
9. The hardness tester was utilized in order to get an accurate reading of the pellets' hardness. 5 pellets from each moisture content were randomly evaluated.

RESULTS AND DISCUSSION RESULT

There are several benefit for proper management of pineapple waste. Firstly, effective management of pineapple waste can lead to economic growth, employment generation, and income for the community or country. This is reliant on availability of land, the location of the facility, the scale and choice of technology, and the distribution of economic benefits. For example, using pineapple waste to produce environmentally friendly products like pellets of biodegradable cat litter leads to increased employment opportunities, economic growth, and community income. Meanwhile, smallholders can sales their pineapple waste to producer that enable them to generate income. Apart from that, the utilization of pineapple waste can decreased health and environmental concerns for communities and the surrounding area since waste is disposed in a sustainable way. Carbon emissions in the form of CO₂ are produced in modest amounts when energy is produced from biomass. Other greenhouse gases such as methane and nitrous oxide are produced in small amounts with emissions as low as 2% or less of total emissions. On the other hand, it can help to improve industry waste management practices by decreasing pineapple waste on the farm, which has been a growing issue. Proper waste management practices is important in order to reduce hazardnes effect both on human and environment. Lastly, the proper management of pineapple waste can conserve natural resources since our product is biodegradable and able to decay naturally and does not contain any chemicals or harmful substances. Thus, the utilization of pineapple waste by turn it into usable product has create positive impact on environment and economic growth.

DISCUSSION

Pineapple fibre pellet cat litter has many benefits. Our cat litter is made from renewable pineapple fibre. Sustainable forest management can ensure future generations have access to renewable resources like plants. Pineapple processing creates solid waste or biomass waste. Leftover harvesting material can be made into cat litter. Second, our cat litter is biodegradable, which prevents pollution. Biodegradable and non-toxic, our product can decompose naturally. It can be flushed or dumped without harm. Plant fibres produce hygienic compost in industrial composting facilities, while cat litter provides incineration plants with reusable thermal heat. Our plant-based organic cat litter is so light that it weighs little when discarded. Our product's high cellulosic content can reduce cat urine and feces odor. Naturally occurring cellulose-based odor control granules clump quickly, indicating greater effectiveness. Even though the litter is indoors, it smells fresh. Fourth, our cat litter absorbs well. The pellet quickly absorbs liquid. User-friendly organic clumping litter. Lightweight fibres fill a cat litterbox easily. Our plant-based cat litter absorbs liquid quickly due to hydrophilic fibres. Fibers and urine form stable clumps that can be scooped out. Pineapple litter clumps quickly. Plant fibres absorb liquid quickly, preventing drips. This simplified cat owners' scooping and disposal. Larger quantities of our cat litter can be disposed of in the organic waste bin or with household garbage.

TABLE, IMAGE AND FIGURE



Figure 1: Twin-screw extruder machine for pelletization process



Figure 2: The biodegradable cat litter product

CONCLUSION

In conclusion, pellets were made from pineapple leaf waste at various moisture levels and screw speeds. The physical parameters of the pellets, such as friability, bulk density, true density, porosity, and hardness, were determined. It may be determined that pineapple leaf waste has a high fibre content and is excellent for cat litter. With the use of natural fibres from pineapple, it can give benefits to the environmental.

REFERENCES

- [1] Kumar, A. (2021). Utilization of bioactive components present in pineapple waste: A review Amit Kumar.
- [2] Pandit, P., Pandey, R., Singha, K., Shrivastava, S., Gupta, V., & Jose, S. (2020). Pineapple leaf fibre: cultivation and production. In *Pineapple Leaf Fibers* (pp. 1-20). Springer, Singapore.
- [3] Buliah, N., Jamek, S., Ajit, A., & Abu, R. (2019, July). Production of dairy cow pellets from pineapple leaf waste. In *AIP Conference Proceedings* (Vol. 2124, No. 1, p. 020048). AIP Publishing LLC.

E-EXTENDED ABSTRACT of the INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM
(i-AIS) (3rd EDITION)

e ISBN 978-629 -97220-5-2



FAKULTI PERLADANGAN DAN AGROTEKNOLOGI UITM JASIN

(online)



UNIVERSITI
TEKNOLOGI
MARA

Fakulti
Perladangan dan
Agroteknologi

