

4TH 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) (4th 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 Naw
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	vii
8.	GOLD AWARD.....	1
9.	VACUUM LOOSE FRUIT COLLECTOR.....	2
10.	3 IN 1 COCOA POST-HARVEST MACHINE	6
11.	THE UTILIZATION OF GREEN BANANA (MUSA ACUMINATA X MUSA BALBISIANA) FLOUR IN THE DEVELOPMENT OF KEROPOK LEKOR	9
12.	THE UTILIZATION OF DATE PALM FRUITS POWDER IN THE DEVELOPMENT OF PASTA.....	18
13.	THE UTILIZATION OF JACKFRUIT SEED FLOUR IN THE DEVELOPMENT OF MALAYSIAN FISH CRACKER.....	25
14.	THE USE OF BAMBOO SHOOTS IN THE DEVELOPMENT OF PLANT- BASED PATTIES.....	38
15.	SMART FERMENTATION SHALLOW BOX	44
16.	PHYTOCHEMICAL AND BIOLOGICAL ANALYSIS OF MEDICINAL PLANT, <i>Apium graveolens</i> (CELERY): A REVIEW	48
17.	CALCIUM BIOFORTIFIED SCHIZOPHYLLUM COMMUNE AND ITS RELATION TO STUNTED GROWTH AMONG CHILDREN	51
18.	REAL-TIME TEMPERATURE AND HUMIDITY MONITORING OF STINGLESS BEE COLONIES USING IOT TECHNOLOGY	59
19.	THE ANTIBACTERIAL PROPERTIES OF SCHIZOPHYLLUM COMMUNE AND THEOBROMA CACAO L	63
20.	PALM OIL CARTON PACKAGING	69
21.	SILVER AWARD	73
22.	COCOA SOLAR DRYER.....	74
23.	SUSTAINABLE PLANT WASTE MANAGEMENT (BANANA PEEL POWDERED FERTILIZER)	77
24.	ANANAS COMOSUS SMART SENSOR GRADING	79
25.	FRUIT SANITIZE POSTHARVEST	82
26.	LOOSE FRUITS REMOVER.....	87
27.	PADDY-TECH MACHINES	93

28.	OIL PALM CREAMPUFF	96
29.	BUD-KIT AS A CLASSROOM LEARNING TOOL.....	101
30.	PORTABLE PEPPER COLLECTER	105
31.	SOLAR RICE THRESHER.....	107
32.	THEOBROMA TECHNOLOGY (DRYER).....	113
33.	BRONZE AWARD.....	116
34.	SOLAR SEED DRYER WITH AUTOMATIC TRACKING	117

3 IN 1 COCOA POST-HARVEST MACHINE

Ellisvianie Anak Gani¹, Geraldine Ringgau Anak Morris¹, Mohd Haziq Al-Harith Bin Junaidi¹

¹*Faculty of Plantation Management and Agrotechnology, UiTM Kota Samarahan, Sarawak Branch.*

Corresponding author e-mail: ellisvianiegani@gmail.com¹,

ABSTRACT - Cocoa production around the world are mostly still using manual labour the post harvest process. It takes more time to complete the operation process in the same time causes lower quantity of yield for cocoa bean production. The aim of this innovation is to help minimizing manual labour during cocoa post harvest process as well as improving the mechanization that has already existed in cocoa production. This 3 in 1 post-harvesting working machine includes fermentation, drying and storage process being combined and innovated here.

Keywords: Post harvest process, cocoa production, minimizing manual labour, improving the mechanization.

INTRODUCTION

Cocoa (*Theobroma cacao*) is tropical evergreen tree (family *Malvaceae*) grown for its edible seeds, whose scientific name means "food of the gods" in Greek. Native to lowland rain forests of the Amazon and Orinoco river basins, cacao is grown commercially in the New World tropics as well as western Africa and tropical Asia. The Malaysian cocoa industry started its commercial planting in the early 1950s where the growth was accelerated by the high price of cocoa in the 1970s and 1980s. The cultivated area of cocoa plantation expanded to its peak at 414,236 hectares in 1989. However, the achievement holds shorter than expected as the persistent low prices started in early 1990 shows the declining in hectareage.

Its seeds, called cocoa beans, are processed into cocoa powder, cocoa butter, and chocolate. Cocoa processing involve fermentation and drying and most of these processes are still performed manually by labour forces. Fermentation is the exothermic process that involves microbial activities in the mucilaginous pulp producing alcohol, acids, liberate heat and simultaneously triggers biochemical reactions in the bean. The process can be divided into external and internal fermentation. The external fermentation reaction are sugars are converted to ethanol by yeast, bacteria oxidizes the ethanol into acetic acid, acetic acid is oxidized to carbon dioxide and water, and the pulps start to break down and drain away. Meanwhile, for the internal fermentation reaction are complex chemical changes such as enzyme activity, oxidation process, break down of protein into amino acids, and developing of chocolate flavor (flavonoid) and color. Besides, the objectives of fermentation are to produce good chocolate flavor pre-cursors, remove pulp (mucilage) surrounding the beans, "kill" the cocoa beans to prevent from germinating, chocolate beans dry more easily and prevent the breakdown of cocoa fat. In addition, drying is the process to stop the fermentation process. The proper drying method must be employed to maintain and preserve the bean. Drying process can be carried out either naturally by sun drying and artificially by Samoan dryer and circular dryer.

MATERIAL AND METHOD

This innovation started with the article review and online research made on cocoa post harvest process. The idea was based on the objective that aimed to minimize the usage of manual labour during the fermentation and drying process of cocoa by innovating automatic mechanism that helps to save time and reduce human workforce. The articles that were reviewed here can be found online in the internet. This enable the innovation to be sketched along with the function details as well as the labelling. In addition, video review was used as methods to get more data on the post harvest process of cocoa that is by referring to videos on the internet through YouTube as a medium.

RESULTS AND DISCUSSION

According to our innovation there are three process that we combine together in 1 unit which are fermentation process, drying and storage of cocoa bean.. At the part of fermentation process, we design it by using the concept of Ferris wheel rotation. The cocoa beans took 7 days fermentation before it been transfer for drying processing. Besides, for drying process we agree to use circular dryer that dries the bean using the high temperature. The dryer is equipped with rotating agitator arm that spanning across the dryer platform for mixing the beans. In addition, the storage of cocoa bean after drying process are using the concept of conveyor belt with vertical box storage. There are 3 phase that is included in the sketching that operates without the needs of man workforce except controlling the activation of machine.

TABLE, IMAGE AND FIGURE

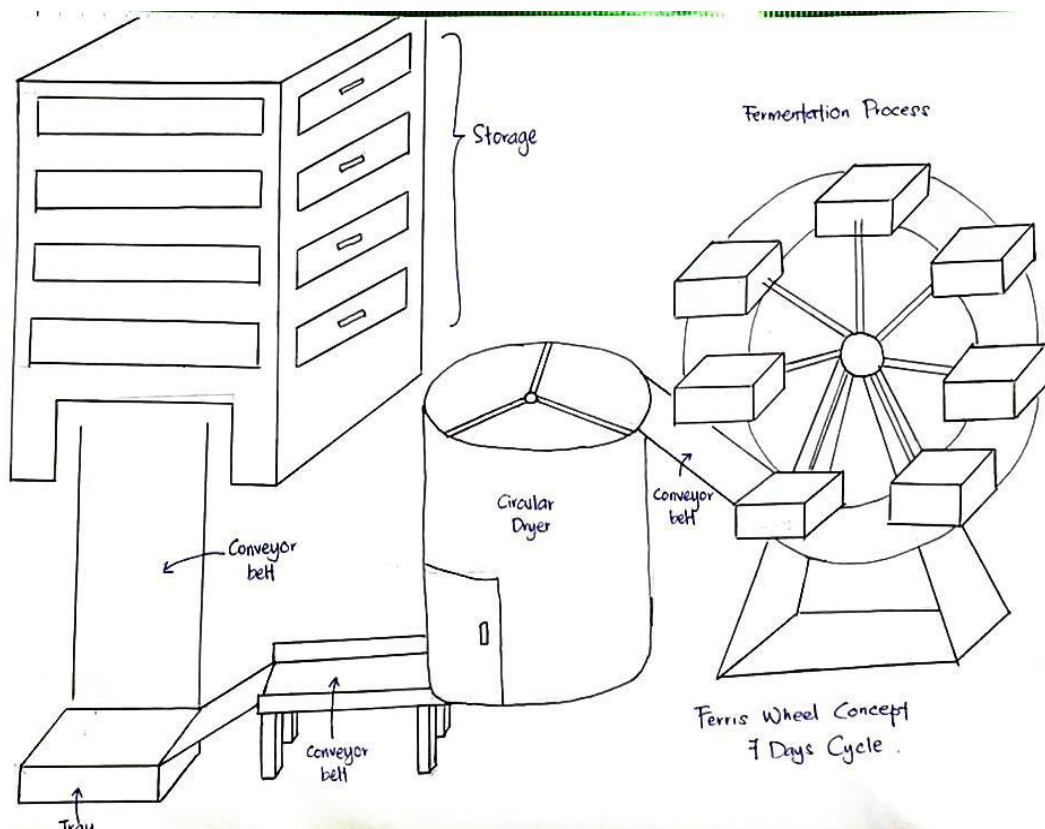


Figure 1: Sketching Of 3 In 1 Post-Harvest Machine

CONCLUSION

In a nutshell, this product will surely cost the people who purchase the product but the after effect can definitely be seen as the machine completes the task. As changes to better efficiency and sustainability may also involve the machine involved, the idea starts appearing and makes the innovation comes true with the innovation of the 3 in 1 cocoa post-harvest processor. This product will bring changes to the time taken to process the cocoa bean and reduce the number of labours needed in processing the cocoa bean harvested before it becomes the dry cocoa. The post-harvest process is vital in order to produce a high quality of dry cocoa bean to be processed into various products as chocolate drinks, chocolate bar and many more. So it is important to improvise these processes to increase the efficiency as well as the production and the quality of yield. We believe that with the existence of this product it will help the cocoa company to produce more yield with less labour and cost as it is automated. We hope that this innovation may improve the efficiency of the cocoa post harvest processing in order to produce a high quality of yield in the future.

REFERENCES

- [1] Agus, B. A. P., Mohamad, N. N., & Hussain, N. (2018). Composition of unfermented, unroasted, roasted cocoa beans and cocoa shells from Peninsular Malaysia. *Journal of Food Measurement and Characterization*, 12(4), 2581- 2589
- [2] Bariah, K. (2014). Impact of fermentation duration on the quality of Malaysian cocoa beans using shallow box. *Asia-Pacific Journal of Science and Technology*, 19, 74-80.
- [3] Biehl, B., Meyer, B., Crone, G., Pollmann, L., & Said, M. B. (1989). Chemical and physical changes in the pulp during ripening and post-harvest storage of cocoa pods. *Journal of the Science of Food and Agriculture*, 48(2), 189- 208.
- [4] Carr, J. G., Davies, P. A., & Dougan, J. (1981). Cocoa fermentation in Ghana and Malaysia. In 7. *International Cocoa Research Conference. Proceedings, Douala, Cameroon, 4 12 Nov 1979*. (pp. 573-576). Cocoa Producers' Alliance.
- [5] Hamid, A., & Damit, A. A. (2004). Quality of Malaysian cocoa butter during storage. *Journal of the Science of Food and Agriculture*, 84(6), 513-516.
- [6] Kaur, A. (1995). The origins of cocoa cultivation in Malaysia. *Journal of the Malaysian Branch of the Royal Asiatic Society*, 68(1 (268), 67-80
- [7] Kyi, T. M., Daud, W. R. W., Mohammad, A. B., Wahid Samsudin, M., Kadhum, A. A. H., & Talib, M. Z. M. (2005). The kinetics of polyphenol degradation during the drying of Malaysian cocoa beans. *International Journal of Food Science & Technology*, 40(3), 323-331.
- [8] Meyer, B., Biehl, B., Said, M. B., & Samarakoddy, R. J. (1989). Post-harvest pod storage: A method for pulp preconditioning to impair strong nib acidification during cocoa fermentation in Malaysia. *Journal of the Science of Food and Agriculture*, 48(3), 285-304.
- [9] Munusamy, P., & Berry, S. K. (1982). Post-harvest cocoa technology in Malaysia. In *Food Technology in Developing Countries: Proceedings of the International Symposium on Food Technology in Developing Countries*. Faculty of Food Science and Technology, Universiti Pertanian Malaysia.
- [10] Schwan, R. F., & Wheals, A. E. (2004). The microbiology of cocoa fermentation and its role in chocolate quality. *Critical reviews in food science and nutrition*, 44(4), 205-221.

E-EXTENDED ABSTRACT of the INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM
(i-AIS) (4th EDITION)



FAKULTI PERLADANGAN DAN AGROTEKNOLOGI UiTM JASIN

(online)



UNIVERSITI
TEKNOLOGI
MARA

Fakulti
Perladangan dan
Agroteknologi

