

4TH 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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COCOA SOLAR DRYER

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ABSTRACT - In Malaysia, Cocoa (*Theobroma cacao*) can be categorized as one of the important industries. Innovation of cocoa in the postharvest process is needed by the industry to ease their production of cocoa products. As a high demand of cocoa products from consumers, the continuous availability of cocoa is one of the challenges that need to be faced by the cocoa industry. The traditional drying method that industry tends to use is natural drying (Sun drying) and artificial drying (Samoan dryer and Circular dryer) process. Sun drying process takes a long period and they need to supervise dried beans from time to time. The farmers must be alert with the weather conditions. Samoan and circular dryers also take a long period of time to dry and decrease the taste quality. By creating a new technology for the cocoa industry, they can produce a higher quality of cocoa production. We created a Cocoa Solar Dryer to fasten the drying process which could help shorten the time for drying before it moves to another stage of postharvest processing. The purpose of the solar panel method is our main focus for our technology because it helps to reduce the cost of electricity, fasten the duration of drying process and less manpower needed for supervision.

Keywords: Cocoa (*Theobroma cacao*), innovation, drying process, solar panel.

INTRODUCTION

Innovation is application of new or improvement on ideas about product goods or services. In other words, it means implementing new ideas, knowledge or practices to specific contexts with the goal of bringing about positive change to meet demand of consumers. An innovation technology that we want to create is known as Cocoa Solar Dryer. The objective of this builds up technology is to fasten the drying process especially during the rainy season.

Genus *Theobroma* has 22 species all around the world. *Theobroma cacao* is the only species widely cultivated. Trinitario is a crossbreed between Forastero and Criollo which is mainly cultivated in Asia. The cocoa fruit is commonly used to produce chocolate, beverages and non-food products such as cosmetic products, lotion and others. In addition, this innovation could help to ensure the availability of raw material supply to the cocoa industry. We choose Solar Dryer for cocoa crops to minimize the cost of labour income.

MATERIAL AND METHOD

The materials that we use to create Cocoa Solar Dryer are solar panels, a single drying rack, inverter fan, bricks, transparent roof, zinc, LED lamp and wood to build racks. Four units of solar panels are installed as a heat collector which will fasten the process of drying cocoa beans. Inverter fan will be installed for air circulation in the room. The drying room will be made from bricks which will help in the drying process. Two units of a single drying rack were installed as a place to dry the cocoa beans.

RESULTS AND DISCUSSION

Detail of innovation

1. Solar panels: Use to store energy that will be use at night and during rainy season
2. Single drying rack: A place to store and dry the cocoa beans
3. Inverter fan: To allow air circulation in the room
4. Transparent roof: To allow direct sunlight for the evaporation process.
5. Zinc: To absorb heat and increase the room temperature during daytime.
6. LED lamp: Use at day night. Act as replacement for sunlight.

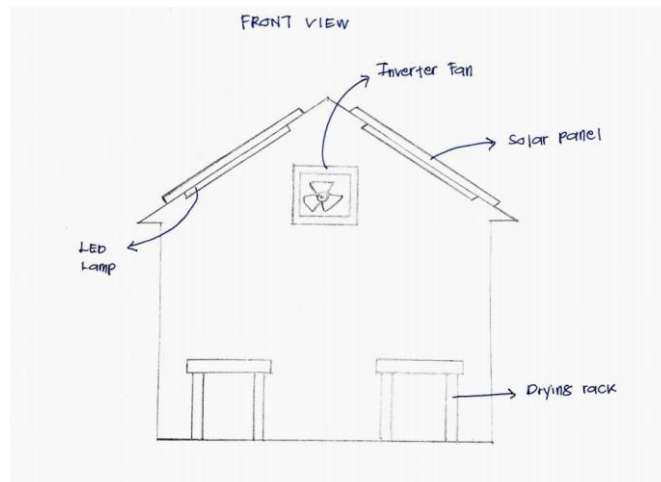


Figure 1: Front View Of The Room With Cocoa Solar Dryer

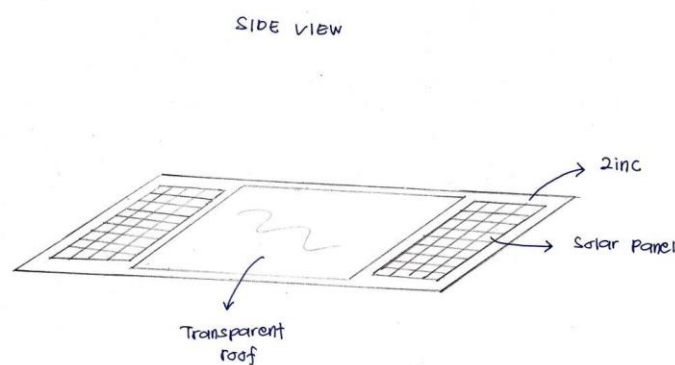


Figure 2: Side View Of The Rooftop That Have Attached With Solar Panels And The Position Of Transparent Roof

How it works:

1. During daytime, the solar panel will be charged and store the energy from the sunlight.
2. At the same time, sunlight will directly reach cocoa beans through a transparent roof top.
3. The inverter fan needs to be switched on during daytime. As the inside air gets hot, the fan will circulate the hot air inside the room out thus this helps to control the temperature so that the room is not too hot.
4. Cocoa beans are placed on the single drying rack for the whole day for the drying process.
5. During night, solar panel energy as a replacement of electricity to switch on the LED lamp. The heat from the lamp will enhance the drying process.



Figure 3: Sun Drying



Figure 4: Samoan Dryer



Figure 5: Circular Dryer

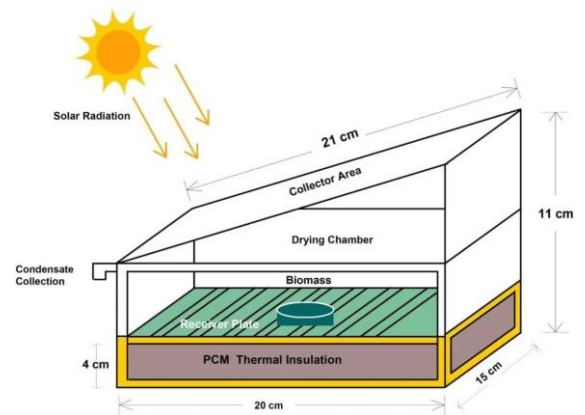


Figure 6: Inspired Technology For Solar Dryer Process

CONCLUSION

In a nutshell, the innovation of new technology of postharvest processing can ease the supervision task in the drying process. Thus, it can save more time and there is no need to worry about the weather condition especially during rainy days. This technology, Cocoa Solar Dryer, really meets the needs of consumers where it saves the cost of electricity as it is using solar panels that will store the energy from sunlight where it can be used during day night. This proved that this technology is recommended to the cocoa industry and at the same time it helps to solve other issues or challenges facing the industry.

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