

**3<sup>rd</sup> EDITION**

**E-EXTENDED  
ABSTRACT**

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



## COPYRIGHT

### 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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# SMART SHALLOW MACHINE

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**ABSTRACT-** Cocoa bean fermentation is a spontaneous process driven by an ordered microbial succession of a wide range of yeasts, lactic acid and acetic acid bacteria, some aerobic sporeforming bacteria and various species of filamentous fungi. The process of cocoa fermentation is a very important step for developing chocolate flavor precursors which are attributable to the metabolism of succession microbial. The microbial ecology of cocoa has been studied in much of the world. In Venezuela, studies have been carried out with Criollo, Forastero, and Trinitario cocoa, fermented under various conditions, the results obtained coinciding with the reported scientific information. Fermentation must be associated with the type of cocoa available, carried out knowing the final processing and derivative (paste, butter, powder). The results shown in this chapter correspond to investigations carried out with cocoa from three locations in Venezuela. The quantification, identification, isolation, functionality of the most representative microbiota involved in the fermentation of these grains was sought. This to give possible answers to the fermentation times and improvement of the commercial quality. Likewise, generate greater interest on the part of the producers in carrying out the fermentation.

**Keywords:** Cocoa bean, Fermentation, Microbial ecology

## INTRODUCTION

Cocoa beans (*Theobroma cacao* L) are the basis for the production of cocoa powder and butter, as well as chocolate. In order to obtain fine cocoa beans of aroma it is necessary to carry out a process of benefit (harvesting, shelling, fermentation, drying) in which the spontaneous fermentation of the grains has great influence, since in addition to an interesting occurrence Microbial succession favors the production of enzymatic, chemical, physicochemical reactions among others that still need to be studied. The part used of the cacao tree *Theobroma cacao* L. are the beans and the edible is its cotyledons, which undergo important changes during the fermentation, drying and manufacturing process, giving rise to a flavor and aroma that is appreciated by chocolate consumers around the world. The raw cocoa has an extremely bitter and astringent taste, so it must be treated by a process in which the microorganisms, through fermentation, modify their components. The fermentation of the cocoa begins with the opening of the ear and the extraction of the cocoa beans.

### Scope

This study is involved in the post harvest handling of cocoa which is referring to fermentation process of cocoa bean.

### Objective

The study is conducted to prevent the cocoa bean from damage during the fermentation process and less supervision needed.

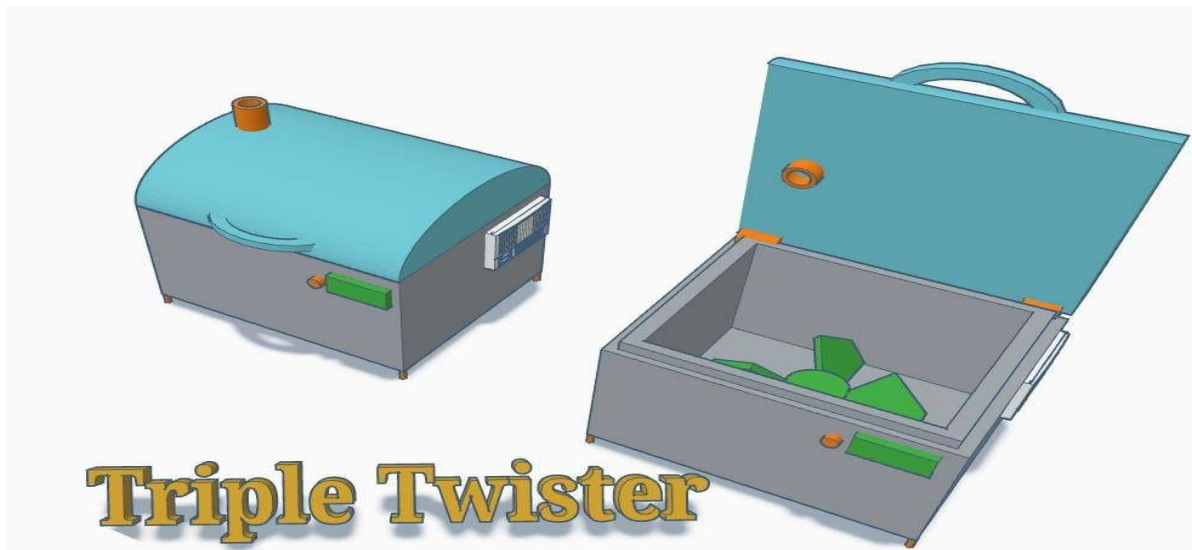
## MATERIAL AND METHOD

The previous fermentation process was using old shallow box. It require a person to supervise the fermentation process such as the temperature and need to transfer the bean to another box after 7 days. So, to ease the process and supervision, we invented the smart shallow machine. The temperature can be set up. The bean also doesn't need to be transferred to another box after 7 days like the old shallow box, it will be one go process of fermentation. Smart shallow machine has one component in it to make sure the fermentation is uniform and perfect.

## RESULTS AND DISCUSSION

By using this product, it can fasten the fermentation process of cocoa beans. There is no need to transfer the bean from one box to another box after 7 days. The supervision of temperature from time to time also can be reduced. Other than that, damaged cocoa beans can be avoid and amount of bean to be fermented can be flexible.

## TABLE, IMAGE AND FIGURE



**Figure 1: Figure of Smart Shallow Machine**

## CONCLUSION

As a conclusion, smart shallow machine need to be considered in order to improve the production and quality of cocoa beans in Malaysia. The processes like fermentation will be one of a factor affecting the quality to produce many products.

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