

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

Mode of access Internet

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

Perpustakaan Negara Malaysia Cataloguing -in – Publication Data

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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>

## 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



# COCOA PULP: AN AGRO-INDUSTRIAL WASTE THAT BECOME A JAM PRODUCT

Muhammad Salahuddeen Khan Bin Salim Khan<sup>1</sup>, Muhammad Asyraaf Bin Azemi<sup>2</sup>, Abdul Haziq Bin Abd Farouk<sup>3</sup>

<sup>1</sup>*Faculty Plantation and Agrotechnology, Universiti Teknologi Mara (UiTM) Cawangan Melaka Kampus Jasin, Malaysia*

*Corresponding author e-mail: [Salehsalim30@gmail.com](mailto:Salehsalim30@gmail.com)*

**ABSTRACT** - Cocoa pulp is a by-product of cocoa bean production and is the raw material for chocolate. Cocoa pulp can be used as a raw material to make cocoa pulp jam, and cocoa mucilage can also be used in other food and beverage products. It is rich in antioxidants and other nutrients and can help reduce cocoa waste. To determine the pectin content, pectin was dried to a consistent weight. Fresh pulp has a 2.9% pectin content. Based on the research done by the researcher, Studies have shown that many acceptable products can be made from cocoa pulp, which is cocoa mucilage. Jam that produces benefits such as antioxidants that help remove a lot of acid radicals in the body Therefore, waste can be avoided, and cocoa mucilage can be processed and made into jam that can help the body store fewer free radicals in addition to having a delicious taste.

**Keywords:** Cacao mucilage, jam, Theobroma cacao L., nutritional properties

## INTRODUCTION

Cocoa pulp is a by-product of cocoa bean production, which is the raw material for chocolate [7]. It is created when cocoa beans are extracted from their pods and the remaining flesh is separated from the seeds. This flesh, or cocoa pulp, has a sweet, fruity flavour and is rich in antioxidants and other nutrients. One way that cocoa pulp can be used is as a raw material for making jam [5]. To make cocoa pulp jam, the pulp is first cleaned and sterilized to ensure that it is free from any contaminants. It is then mixed with sugar, pectin, and any other desired ingredients, such as spices or fruit, and cooked over low heat until it reaches the desired consistency. The finished jam can be canned or packaged for storage and sale [1]. In addition to being used in jam, cocoa pulp can also be used in other food and beverage products, such as smoothies, ice cream, and fermented drinks. It has the potential to be a valuable source of income for cocoa farmers and can help to reduce waste in the cocoa industry.

## MATERIAL AND METHOD COCOA-MUCILAGE JAM

### INGREDIENTS

1. 500 g – Cocoa pulp
2. 125 g – Sugar
3. 1 g – Citric acid solution
4. 1 g – 325NH Pectin
5. 135 g – Powdered glucose

## PROCEDURE & PREPARATION

1. Mucilage-cocoa collection: Cocoa bean juice was collected immediately after cocoa pods opened. Mucilage is collected using a cocoa depulper and filtered using a muslin cloth.
2. Mix ingredients: Blend everything together (500 g cocoa pulp, 110 g sugar, and 1 g citric acid solution) in a Thermomix blender, then heat to 30 °C.
3. Blend 1 g of 325 NH pectin and 15 g of sugar, then add to the previous mixture.
4. Heat up 135 g of glucose powder, then stir it into the prior mixture.
5. Using a brix refractometer, prepare the jam until it reaches a brix of 65°.
6. Maintain the jam's temperature. Once cooled, pour into jars.



## RESULTS AND DISCUSSION

According to [3], the processed product was discovered to have been mold-free for 17 months. Molds are a sign that a product's shelf life is still excellent because they were not present. As a result, processed products with a long shelf life might be made from the mucilage found in cacao pods. Additionally, the nutritional attributes of the mucilage jam, which retained 19.58 percent of its sugar, revealed that raw cacao mucilage had a far higher total sugar content. Jam had a tremendous rise of 555 percent, but raw fruit had a substantial decrease in vitamin C, with retention rates of 5.37 percent and 20.56 percent, respectively, for crude fat and crude protein. As a result, the cocoa mucilage jam had a high nutritional value, indicating that it was high in fat, carbohydrates, crude protein, minerals, and vitamins [6]. Pectin in jam creates a mesh that encloses the sweet liquid and supports the fruit pieces that are floating in the mixture. Pectin may be found in all fruits. When fruit ripens and when under-ripe fruit is cooked to produce jam, protopectin, the fruit's parent component, is converted to pectin. Compared to partially ripe fruits, fully ripe fruits have less pectin. This is why some jam recipes call for using slightly underripe fruit. Precipitation analysis was used to determine the pectin concentration of cocoa pulp. To determine the pectin content, pectin was dried to a consistent weight. Fresh pulp has a 2.9% pectin content [4].

## TABLE, IMAGE AND FIGURE

### DIFFERENT HIGH NUTRITION CONTENT BETWEEN COCOA PULP AND PINEAPPLE JUICE

COCOA PULP	PINEAPPLE JUICE
Calcium	Vitamins B1, B2, B6 and C
Iron	Magnesium
Fat	Bromelin
Phosphorus	

[2]

## CONCLUSION

In conclusion, the waste from cocoa can be used to create a product that can be commercialized. The use of mucilage has indeed been studied so that this waste material is not wasted. The mucilage, or pulp, from the cocoa fruit has its own taste. In addition, the high content of nutrients found in mucilage makes it suitable for use as a food product. The production of jam from this cocoa mucilage is one of the alternative uses of cocoa waste.

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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

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