

1ST 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) (1st 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	2
2.	ORGANIZING COMMITTEE.....	3
3.	STUDENT COMMITTEE.....	4
4.	EDITORIAL BOARD.....	5
5.	ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY	6
6.	PREFACE.....	7
7.	TABLE OF CONTENTS	8
8.	GOLD AWARD	1
	ABELMOSCHUS ESCULENTUS FACIAL MASK	2
	ECO ENZYME	6
	COFFEE GROUNDS AS A GROWING MEDIUM FORMUSHROOM	8
	HYDRAULIC RAM PUMP	11
	DIETARY MUSHROOM NOODLES	15
	JACKY FLORENTINE	19
	AMARANTHUS VIRIDIS - BASED GRAIN SNACK BAR	22
	PALLET FROM COCONUT HUSK.....	30
	ORGANIC COCO PEAT POT SUPLEMENTED WITH BLACK SOLDIER FRASS (BSFF)	35
	MANAGING WASTE PRODUCT OF PALM OIL MILL (DECANTER CAKE) AS COMPOST.....	40
9.	SILVER	44
	MULTIFUNCTIONAL TOOLS	45
	MANAGING WASTE PRODUCT OF AVOCADO (SKIN & STONE) AS INK/DYE	48
	HARVERTING: EASY SEPERATE	51
	BRIQUETTES OIL PALM FRONDS.....	54
	REPLACEABLE SHOE SOLES.....	58
	EXTRACT OF NATURAL DYES FROM BUTTERFLY PEA (<i>CLITORIA TERNATEA</i>) TO MAKE A MARSHMALLOW CUBE	61
	DIY SPRAY NEEM LEAVES PROTECT PLANTS FROM INSECT	68
	HAND SANITIZER FROM FRUIT WASTE	71
	MANAGING WASTE FROM DURIAN (DURIAN PEELS) AS FOOD PALLET FOR LIVESTOCK	77
	PORTABLE ELECTRIC POWER FEIST TILLER	79
10.	BRONZE.....	83
	CENTRALISE FRUIT NETTING SENSOR.....	84
	BIO – BRICKS.....	86

OIL PALM SAP TRUNK AS A MEDIUM CULTURE

Luqmanul Hakim, Abd Kahar¹, Ikmal Iskandar, Kaszeman², M. Hafiz, Mohd Zulpry³

¹ Faculty of Plantation and Agrotechnology, Universiti Teknologi Mara, Jasin, Malaysia

Corresponding author e-mail: Luqmanulhakimabdkahar@gmail.com

ABSTRACT - The oil palm also known as *Elaeis guineensis*, is such a productive plant, its oil is widely available and may be purchased at a cost that is not prohibitive. No other oil crop comes close to matching the productivity of palm oil when measured in terms of yield per hectare because with a potential production of 4 to 5 tonnes of crude palm oil per hectare per year, oil palm is the most. after 25 years of planting, the oil palm needs to be replanting. The oil palm must be cut down and the trunks were shredded into the pieces for nutrient recycling purpose. the trunk oil palm has the potential in growth medium because the pressed sap from oil palm trunks has strong potential as a feedstock for a microbial culture medium. Material use agar, shredded trunk and presser. For method to make the sample of OPT will be press in a laboratory with 80mPa pressure, becoming shredded and produce medium culture that based on oil palm sap it will fully utilize the palm oil trunk as oil palm sap produced from the process that press the oil palm trunk. Oil palm sap from oil palm trunk has high chance for being used in making growth medium. Oil palm sap contain a large volume of sugar and other valuable substances such as amino acids as well as organic acids. Oil palm trunk sap contain almost all macronutrient and micronutrient that needed for bacterial growth.

INTRODUCTION

The oil palm also known as *Elaeis guineensis*, is such a productive plant, its oil is widely available and may be purchased at a cost that is not prohibitive. No other oil crop comes close to matching the productivity of palm oil when measured in terms of yield per hectare because with a potential production of 4 to 5 tonnes of crude palm oil per hectare per year, oil palm is the most productive vegetable oil crop in the world.[1]. Usually, after 25 years of planting, the oil palm needs to be replanting. The oil palm must be cut down and the trunks were shredded into the pieces for nutrient recycling purpose. This is the normal ways how the plantation used to do the replanting. However, the trunk oil palm that being shredded has the potential in growth medium because the pressed sap from oil palm trunks has strong potential as a feedstock for a microbial culture medium.

MATERIAL AND METHOD

Material

Agar, shredded trunk and presser

Method

Total height of each palm was approximately 12 m and testing sample (2.5 m long) were taken from the middle part of the whole OPT as shown in Figure 1 and 2. Sample was stored avoiding direct sunlight and rain. Temperature during the storage was 28-32 °C with humidity of 70-80%. An oil palm disc with 10 cm thickness was sliced from each oil palm cut after a certain day. To avoid microbial contamination, 5 cm from the end was trimmed before the slicing. Then, the disc was cut into three sections: inner (A), intermediate (B) and outer (C) as shown in Figure 1.[2]

Each sectional sample was placed in an airtight plastic bag and kept in a deep freezer at -20°C. Further sample disks were prepared from the different positions of the trunk disc according to the outer and inner layer as shown in Figure 1. The sample will be press in a laboratory with 80mPa pressure, becoming shredded and produce medium culture that based on oil palm sap as state in figure 3 and 4. At the end, liquid from the sample will pursue to further experimental which is culture medium use of liquid OPT in figure 4.

RESULTS AND DISCUSSION

Process in producing nutrient agar has been applied in producing oil palm sap agar. The characteristic and composition may be similar with nutrient agar. For instance, OPSA is a liquid medium that supports growth of bacteria and comes with a clear color. It may contain peptone, agar, sodium chloride and distilled water.

Oil Palm Sap Agar (OPSA) able to fully be utilized the oil palm trunks. In terms of traditional farming, the palm of oil palm was piled up and burned at the end of dry season. Due to criticism of certain organization on those practices, currently, trunks being fell and chip in the field to decomposed. However, it requires a lot of times to decomposed because the trunks contain high water level. According to past studies, oil palm trunk requires approximately two years to completely decompose [3]. Therefore, with growth medium that based on oil palm sap it will fully utilize the palm oil trunk as oil palm sap produced from the process that press the oil palm trunk. In addition, shredded trunk has high possibility to become an area that infested by the fungi and insect and this occurrence is not favor by the oil palm industry. This is due to oil palm trunk that have high water content that favor by fungi and insect. OPSA able to prevent the outbreak of insect and fungi infestation on oil palm plot because OPSA fully utilize the oil palm trunk, there is low chance for fungi and insect to infest the oil palm plot. According to past studies, decomposition process of oil palm trunk prone to microbial and insect assault [3]. The infestation of the insect may be the causal of certain disease that has the possibility for other oil palm at other area being infected.

Oil palm sap from oil palm trunk has high chance for being used in making growth medium. Oil palm sap contain a large volume of sugar and other valuable substances such as amino acids as well as organic acids. Based on past research, there are free sugar, amino acid, and vitamin in oil palm sap that can be uses for the growth of microorganism [4]. The composition of free sugar, amino acid, and vitamin are shown in table 1, table 2 and table 3.

TABLE IMAGE AND FIGURE

Freesugars	Part		
	Inner (a)	Middle (b)	Outer (c)
	g/L	g/L	g/L
Sucrose	6.5 ± 1.1	3.0 ± 0.4	1.9 ± 0.1
Glucose	85.2 ± 2.5	52.2 ± 3.4	13.1 ± 2.6
Fructose	4.1 ± 1.2	3.1 ± 1.0	2.1 ± 1.7
Xylose	0.7 ± 0.1	0.8 ± 0.1	1.4 ± 1.1
Galactose	0.9 ± 0.1	0.8 ± 0.3	1.0 ± 0.8
Rhamnose	0.4 ± 0.2	0.5 ± 0.2	0.5 ± 0.2
Others	0.3 ± 0.3	0.1 ± 0.1	0.1 ± 0.2
Total	98.1 ± 5.5	60.5 ± 3.3	20.1 ± 1.1

Table 1: Sugar Content in Oil Palm Sap

Table 2: Amino Acid in Oil Palm Sap [4]

Amino acids	Concentration ($\mu\text{g/g}$ of sap)
Aspartic acid	17.3
Threonine	7.4
Serine	45.3
Glutamic acid	33.9
Glycine	3.1
Alanine	38.8
Valine	7.6
Methionine	1.7
Isoleucine	5.1
Leucine	1.9
Tyrosine	1.8
Phenylalanine	6.9
Tryptophan	12.1
Lysine	2.3
Histidine	1.6
Arginine	5.8
Proline	5.7
Total	198.3

Table 3: Vitamin in oil palm sap [4]

Vitamin	Concentration ($\mu\text{g/g}$ of sap)
Pyridoxine, pyridoxal, pyridoxiamine	1.1
Pantothenic acid	1.5
Niacin	2.6
Inositol	640
Biotin	0.024
Ascorbic acid	20

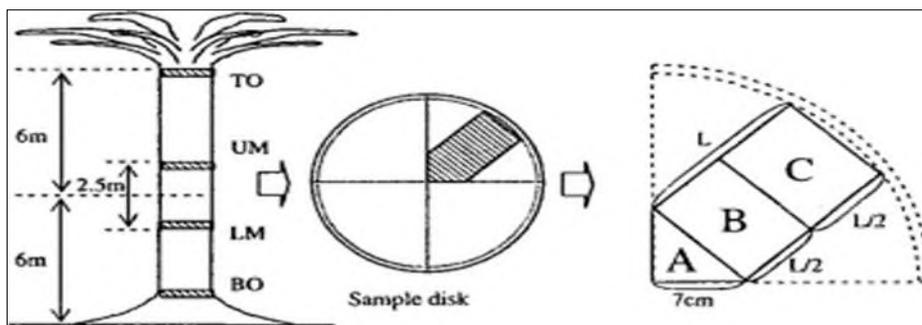


Figure 1: Preparation of Oil Palm Trunk Samples



Figure 2: Whole Oil Palm Sap (OPSA)



Figure 3: Condition of OPSA after press



Figure 4: Extracted after done of OPSA

CONCLUSION

In conclusion, oil palm tree trunks can be seen as beneficial tools and promising resources as it contains sugar, amino acid, and vitamin. Glucose was the higher sugar content in oil palm sap followed by sucrose and fructose. Oil palm trunk sap contain almost all macronutrient and micronutrient that needed for bacterial growth. Therefore, oil palm producer can still utilize oil palm trunk such as it may be use in growth medium production.

REFERENCES

- [1] Ghulam Kadir, A. P. (2022). Oil Palm Economic Performance In Malaysia And R&D Progress In 2021. *Journal of Oil Palm Research*. <https://doi.org/10.21894/jopr.2022.0036>
- [2] H. Yamada a, b. R. (2010). Old oil palm trunk: A promising source of sugars bioethanol production. *BIOMASS AND BIOENERGY* 34, 1608-1613. Retrieved from *BIOMASS AND BIOENERGY* 34 (7.010).
- [3] Pulingam, T., Lakshmanan, M., Chuah, J.-A., Surendran, A., Zainab-L, I., Foroozandeh, P., Uke, A., Kosugi, A., & Sudesh, K. (2022). Oil palm trunk waste: Environmental impacts and management strategies. *Industrial Crops and Products*, 189, 115827. <https://doi.org/10.1016/j.indcrop.2022.115827>
- [4] Akihiko Kosugi, Tanaka, R., Kengo Magara, & Mori, Y. (2010, September). Ethanol and Lactic Acid Production Using Sap Squeezed from Old Oil Palm Trunks Felled for Replanting. *ResearchGate*; Elsevier. https://www.researchgate.net/publication/44672547_Ethanol_and_Lactic_Acid_Production_Using_Sap_Squeezed_from_Old_Oil_Palm_Trunks_Felled_for_Replanting



الجامعة
UNIVERSITI
TEKNOLOGI
MARA

Fakulti
Perladangan dan
Agroteknologi

