

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) (1<sup>st</sup> 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

<b>1.</b>	<b>COPYRIGHT .....</b>	<b>2</b>
<b>2.</b>	<b>ORGANIZING COMMITTEE.....</b>	<b>3</b>
<b>3.</b>	<b>STUDENT COMMITTEE.....</b>	<b>4</b>
<b>4.</b>	<b>EDITORIAL BOARD.....</b>	<b>5</b>
<b>5.</b>	<b>ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY .....</b>	<b>6</b>
<b>6.</b>	<b>PREFACE.....</b>	<b>7</b>
<b>7.</b>	<b>TABLE OF CONTENTS .....</b>	<b>8</b>
<b>8.</b>	<b>GOLD AWARD .....</b>	<b>1</b>
	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
<b>9.</b>	<b>SILVER .....</b>	<b>44</b>
	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
<b>10.</b>	<b>BRONZE.....</b>	<b>83</b>
	CENTRALISE FRUIT NETTING SENSOR.....	84
	BIO – BRICKS.....	86



## PORTABLE ELECTRIC POWER FEIST TILLER

Norhayati, Jamal<sup>1</sup> and Nurul Huda Nabilah, Ramlee<sup>1</sup>

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

*Corresponding author e-mail: 2021149769@student.uitm.edu.my*

**ABSTRACT-** Agriculture began with the presence of humans. It is a crucial aspect of human existence since it feeds us and hence keeps the environment running. It is a critical section for all living things. However, contemporary agricultural practices are labor-consuming and intense. Modern tractors that operate on petroleum are bad for the environment and are out of reach for farmers. Besides, weeds are undesired plants that impede the use of land and water resources and have a negative impact on agricultural output. Following early research, it was discovered that a power tiller might be used for weeding. Tilling is the most important phase in farming, and ancient techniques were time-consuming and labor-intensive, while current ones are unaffordable and environmentally harmful. Portable Electric Power Fiest Tiller machine employs an electric-powered mechanism to fulfill the tilling function at the lowest possible cost and time in tilling, enhancing production and efficiency while also promoting a healthy environment. As a result, the research sought to improve its performance by modifying key essential components, such as weeding blades and depth gauges. Machines are often used in higher-level farming in Malaysia. To address this issue, we are developing this model. This article goes through the machinery needed to till one and a half hectares. The plough will be able to move forward thanks to this innovative technology, and the base wheel will revolve with traction blades.

**Keywords:** Electric power tiller machine, fiest, motor, portable and weed.

## INTRODUCTION

Tillage is a fundamental farming practice. It is usually done to produce a favorable environment for seedlings and plant growth. Ploughing, harrowing, and mechanical weed and soil crust elimination are examples of these procedures. A power tiller is essentially a set of blades installed within a wheeled housing and propelled by electricity. A power tiller is sometimes known as a cultivator or rotavator. Aside from seedbed preparation, it may also be used to remove weeds and stubbles, as well as mix manure, fertilizers, and agricultural leftovers. Weed removal is a common post-planting process that involves the use of chemicals (herbicides), hand uprooting of the weed, and mechanical soil manipulation. The power tiller can remove weeds and harrow the soil to create a healthy seed bed. The inherent characteristics of the power tiller of stocking and clogging of the weeding tines are quite difficult. This hinders and reduces the machine's weeding efficiency. Low weeding efficiency ascribed to the power tiller because it was not built particularly for weeding operations sparked interest in the design and production of new weeding blades and depth gauge for effective weeding. The tiller is a lightweight equipment that is compressed and designed for simple transportation and operator comfort. The addition of a depth wheel, which regulates the depth of the weed cut, avoids the difficulty of stocking while in operation.

This equipment is designed particularly for sugarcane cultivation and is suitable for black moist silted soil. Due to their inability to move on slopes, power tillers are not suitable for usage in mountainous terrain. This is mostly owing to its hefty weight, which has to be reduced further. As a result, it is thought that a lightweight power tiller is required. Considering all of these issues, and as a tiny step toward mechanizing agriculture and assisting Malaysians who rely on agriculture for a living, and to promote their participation in the development of our economy.

Normally, portable tiller require energy to walk, but this time there is a difference in the portable electric power feist tiller, in which the normal portable tiller is paired with a bicycle. Farmers may use the bicycle's paddles to workout their legs instead of walking. The equipment employs a wheel with welded angles to improve dirt grip. The wheel design was developed to provide a firm hold on the soil, allowing the cultivator prongs to be pulled during the tilling operation. A switch on the handle turns the machine on and off. The machine is propelled by an electric motor, which powers the pulling wheel using a sprocket chain arrangement. A battery powers the motor, which provides enough force to pull the forks through the earth. The three cultivator forks provide accurate and simple tilling, which is great for farming. The machine's direction may be readily adjusted while in operation because of its portable and lightweight design. The machine may also be transported in cars or by

hand. As a consequence, the electric power tiller provides a clever, non-fuel-consuming mechanism for farm and garden tilling.

This power tiller is intended for use in sugarcane plantations with a minimum inter row spacing of 1.2 meters for weeding. This machine is simple to use, inexpensive, portable, and straightforward to manufacture and maintain, with spare parts readily available.

## **MATERIAL AND METHOD**

The research goal was to modify an electric powered tiller used as a weeding tool on a flat area. The electric driven tiller was enhanced by designing and fabricating the weeding unit and depth gauge elements. The evaluation methods are explained in the headings.

### **Modification**

Two elements were modified. These were the weeding unit and the depth gauge. The weeding unit consisted of a collection of three blade gangs that had been modified to improve weeding and soil engagement. The depth gauge was included to ensure accurate measurement of the depth of cut during the weeding operation, convenience of mobility, and to prevent the weeding unit from becoming overstocked.

### **Materials**

The modified power tiller components were made using the materials listed below. A bicycle, an electric motor, a battery, a chain sprocket, wheel angles, a bearing, electrical and wiring, mounts and joints, supporting frames, screws and fittings, and also a bicycle wheel. were used for fabrication. These materials were chosen because they were readily available and reasonably priced.

### **Operations**

A fiest electric power tiller is operated by cycling behind the machine. The machine is made up of a bicycle, an electric motor, a battery, a chain sprocket, wheel angles, a bearing, electrical and wiring, mounts and joints, supporting frames, screws and fittings, and also a bicycle wheel. A battery powers the motor that forces the blades into the soil. The cultivator blades allow for precise and easy tilling, which is necessary in farming. The machine is lightweight and portable. As a result, the electric power tiller offers a smart, innovative, and fuel-free mechanism for farm and garden tilling.

### **Working**

The machine is powered by a motor, which provides power to the total system, allowing it to run the item. The equipment is powered by an electric motor that communicates with a belt drive, which ultimately aids in the operation of the tiller's wheels. The tidy and correct alteration of the supporting structure for the tiller machine is provided. A tidy and exact alteration of the supporting structure is offered for tiller machines, resulting in output voltage of fixed proposition. It is designed in such a manner that the magnitude remains constant and the input voltage does not change for voltage situations. The regulator is linked to the main wire, which is linked to the switch. The operation is started by connecting the regulator and wire to the motor. The motor is installed at a proper angle to ensure worker stability during operation. Wheels are given to make farm work easier. When the engine creates power, the machine and its teeth run side by side, easily digging through agricultural ground. There is only one sensor included. The sensor's function is to halt or cut off excess or excess energy that is not required. A battery is used to power the tiller machine.

## **RESULTS AND DISCUSSION**

Analysis of statistical results for weeding efficiency demonstrate that the calculation of machine torque and power (KW) are highly significant. The relationship between efficiency of machine torque and power (KW) was quite significant. The results are shown at Table 1: Calculation.

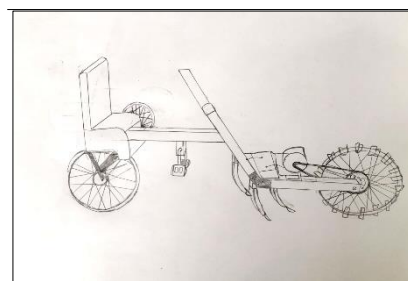
The result of the efficiency of machine torque and power (KW) on the field capacity . The result shows the total of machine torque is 7.96 N/m and power (KW) is 0.25 KW . For efficiency, after the calculation of both machine torque and power, the result is 89.91% . The high mean field capacity may be attributed to the high width of the machine for weeding and tiller operation.

Calculations have been made to analyze suitable matching implements for the power tiller to make it more useful and economical. Table 1 presents the calculation of machine torque, power (KW) and the efficiency of motor power and motor speed. The matching implements of Portable Electric Power Fiest Tiller that focus on sugarcane crop in the flat area.

The tiller attached with a carriage consisting of standard “L” shaped blades as a working tool was selected for this innovation. The tiller was operated in a reference soil condition at different depths and speeds to determine parameters like torque & speed of fiest tiller . The detailed specification of the motor power and speed is given in Table 1.



**Figure 1: Modern Tiller**



**Figure 2: Innovation**  
(Portable Electric Power Fiest Tiller)

**Table 1: Calculation**

	Machine Torque	Power (KW)	Efficiency ( $\eta$ )
Motor power = 250 W= 0.25 KW Motor Speed = 300 rpm 250 W = 0.335256 Hp	$= \frac{9.5488 \times \text{Power}}{\text{Speed}}$ $= \frac{9.5488 \times 0.25}{300}$ Torque = 7.96 N/m	$= \frac{\text{Torque} \times \text{Speed}}{9.5488}$ $= \frac{7.96 \times 300}{9.5488}$ = 0.25 KW	$= \frac{0.745 \times \text{Hp} \times \text{load}}{\text{Pi}}$ $= \frac{0.745 \times 0.335256 \times 90}{0.25}$ = 89.91%

### CONCLUSION

The portable electric power fiest tiller is most suited for use in mountainous areas, damp circumstances, and on small farms because it can do both primary and secondary tillage. A portable electric power fiest tiller with the right equipment and accessories can undertake the majority of the field chores in intensive cultivation. The portable electric power fiest tiller is perfect for working in both wet and dry conditions because of its light weight. External attachments to the tiller can be added depending on the type of work. As a result, the tiller may be used for a wide range of purposes.

## REFERENCES

- [1] Varghese, A., Cherian, A., & Jessen Punnan. (2016, May 18). A Review on Power Tiller Attachments. ResearchGate; unknown.
- [2] [https://www.researchgate.net/publication/303305626\\_A\\_Review\\_on\\_Power\\_Tiller\\_Attachments](https://www.researchgate.net/publication/303305626_A_Review_on_Power_Tiller_Attachments)
- [3] Kadu, S. L., Kadam, G. B., Jadhav, K. P., Gawade, V. S., Garje, A., & Gosavi, A. (2015). Design, Development and Operation of 3.5 HP Power Tiller. *Int. J Recent Res. in Civil and Mechanical Eng*, 2(1), 149-154
- [4] Zakariyah, A., El-Okene, A. M., Mohammed, U. S., Oji, N., Abubakar, I., Agunsoye, J. K., & Ahmad, K. Modification of Portable Power Tiller for Small Scale Weedi



الجامعة  
UNIVERSITI  
TEKNOLOGI  
MARA

Fakulti  
Perladangan dan  
Agroteknologi

