

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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SOLAR RICE THRESHER

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ABSTRACT - Sunlight is one underutilised source of renewable energy. By transferring sunlight to solar panels, renewable energy can be shaped as an alternative form of power that can be applied to a source of electrical energy in rice thresher equipment. Solar energy can be used to automatically replace the rice thresher, increasing its efficiency. The solar energy will then be converted into a charging source for the regulated battery charger, which will then be supplied to the control circuit at a voltage to drive the DC motor. A DC motor is a machine that converts electrical energy into mechanical energy. Direct current motors are widely used in industrial applications that require high starting torque, constant acceleration, and efficiency. The DC motor obtained energy from the solar panel via a control circuit and transferred it to the shaft of the thresher via a chain and sprocket transmission system.

Keywords: Electrical Energy, Solar Energy, Rice Thresher, Renewable Energy

INTRODUCTION

Malaysia have not fully utilized the sunlight from the sun to become a source of energy or Malaysia has not fully utilised the sun's sunlight as a source of energy. In rural areas, thresher machines are becoming more popular. Energy is critical to any country's long-term development and economic growth. Electrical energy has been shown to be the most efficient type of power generator in both rural and urban areas, and its availability promotes rapid economic and industrial growth. Rice is a staple food resource that produces rice, which is essential in Malaysia's economic life. Rice, as a staple food, is especially difficult to replace with other staple foods such as potato, sago, and other carbohydrate sources. Rice has become the nation's top priority in meeting the requirements of carbohydrate intake, which is filling as well as the main source of carbohydrates that are easily converted into energy.

Solar energy, with the exception of storage batteries, emits no emissions and consumes no fuel. They are low-maintenance, long-lasting, highly reliable, and a cost-effective source of energy. On farms where electricity is unavailable, solar energy will be the best option for powering rice threshing machines. In rural areas where grid electricity is unavailable, a solar energy system is the best alternative solution for meeting the basic electricity needs of many post-harvest operations. This necessitates the use of a solar energy system in rice threshing machines. Solar energy systems are widely used due to their simplicity, compactness, and high power-to-weight ratio.

The goal of this utility model is to provide a portable and effective type thresher that is easy to operate in the field.

MATERIAL AND METHODS

Solar panel

Solar panel is a device that can immediately turn sunlight into electricity. Solar panels are the important factor in maximising the immense potential of the sun's light energy that reaches the ground, but the sun's rays could also be fully utilized for its heat energy via a solar thermal system in addition to being used to generate electricity. Crystalline silicon has become the most commonly used solar panel material. Single crystal, mono or single-crystalline, and poly or multicrystalline components are examples of crystalline materials. Crystalline silicon cells are classified into two types that really are nearly identical, but while single crystalline cells are much more productive than poly-crystalline cells since poly-crystalline is a cell-to-cell bond.



Figure 1: Solar panel

Rice thresher machine

A rice threshing machine or also known as a rice thresher, is a farm machinery that threshes grain, or separates the seeds from the stalks and husks. It accomplishes this by striking the plant and causing the seeds to fall out. Rice threshing is the method of extracting rice grains from rice stalks and separating them. The concept of discharging rice grains out from stem would be to exert pressure or strike the rice stalk with an item.



Figure 2: Rice thresher machine

Battery charger regulator (BCR)

Battery Charger Regulated is an electronic device that serves as just a direct current control board, charging the battery and transferring the battery's electrical power to the load. A regulated battery charger is a method of controlling overcharging. Overcharging can shorten a battery's life.



Figure 3: Battery charger regulator (BCR)

Battery

A battery is an electric cell in which an elevated reversible electrochemical process occurs. A reversible electrochemical reaction happens when a chemical conversion process into electric power (discharging process) and vice versa from electric power into chemical energy (charging process) occurs inside the battery as a result of the regeneration process mostly from electrodes used, such as by passing an electric current through the battery.

DC motor

To generate kinetic energy, direct current motors demand a direct power level towards the field coil. A dc motor contains two coils which are the field coil, which produces a magnetic field, and the anchor coil, which serves as a location for the creation of an electromotive force. The application of DC motors necessitates a direct power level to the field coil, which would be generally referred to as the stator, and the armature coil is referred to as the rotor.

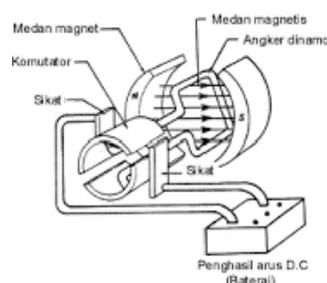


Figure 4: DC motor

How electricity is created

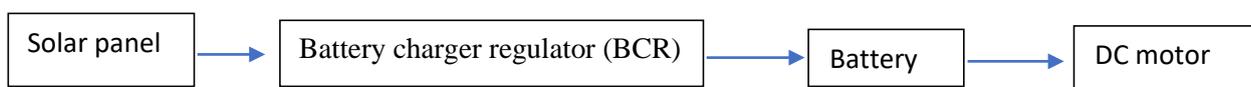


Diagram 1: How electricity is created.

How does the machine work?

When the main switch is turned on, the next step is determined by the amount of light; if there is light, the battery is charged; if there is no light, nothing happens, but the motor can still function with battery power. The charging process is only possible if the solar cell receives enough light from the sun to supply power to the battery via BCR (Battery Charger Regulated). The method of turning on and off the motor, which would be carried out by a control circuit configured to turn on and off the engine.

Construction design

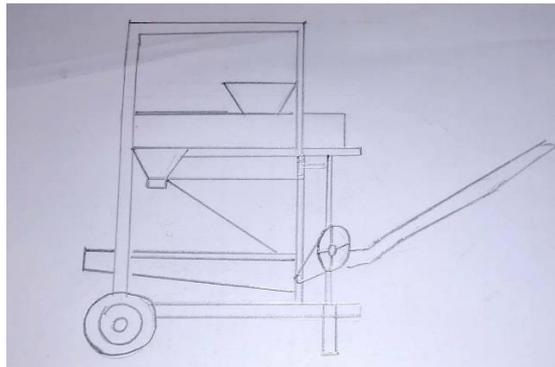


Figure 5: Left view

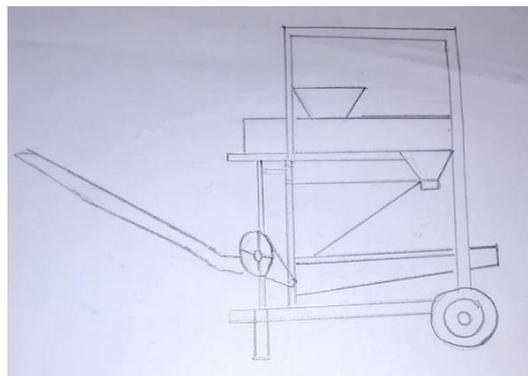


Figure 6: Right view



Figure 7: Front view

RESULT AND DISCUSSION

A threshing machine is a type of agricultural machinery that threshes grain, separating the kernels from the stalks and husks. It does this by pounding the plant to release the seeds. The rice and wheat thresher's primary purpose is to shell various grains, including wheat, rice, sorghum, barley, and millet, among others. It works quickly and thoroughly, and it can thresh both rice and wheat. Rice thresher has the qualities of having a compact construction, a beautiful form, and a dependable functioning.

To separate the grain from the stalk of a plant (such as rice or wheat) is called threshing, and it is an essential element of agriculture. For smaller farms, threshing sometimes involves a lot of backbreaking manual labour, since it is done by pounding or crushing the grain by hand or foot. The farmer's workload may be lightened with the help of a basic thresher powered by a hand crank. A minimum of two individuals are required to operate one of these, one to turn the crank and the other to feed the grain into the machine. Using these threshers, you can thresh your grain more quickly and with less effort. For even less effort and quicker threshing, they may be designed with pedals or coupled to a bicycle.

The harvesting of maize/corn, rice, wheat, sorghum, pearl millet, and any other grain or seed that must be separated off a stalk may be done using a thresher, which can be manufactured in a variety of ways using basic equipment. A thresher may be attached to a pedal system using very simple hardware. The pedal-powered thresher is a one-piece device, whereas the traditional threshing attachment is designed to be mounted on a bicycle. [1] Farming communities have been offered and given access to pedal-powered threshers by various governmental and non-governmental groups.



FIGURE 8: The design

CONCLUSION

Malaysia hasn't used solar energy well. Rural regions favour threshers. Long-term economic expansion requires energy. Electricity is the most efficient way to generate power in rural and urban areas, helping the economy and industry. Rice drives Malaysia's economy. Potato, sago, and other carbohydrate sources can't replace rice. Rice is the country's most important carbohydrate because it fills you up quickly. Solar power doesn't pollute and uses only batteries. They're dependable, affordable, and simple to maintain. Rice- threshing machines on farms without electricity will be solar-powered. In rural areas without grid power, solar energy is best for many post-harvest tasks. Solar-powered rice threshers are needed. Solar energy systems are popular because they're small, powerful, and lightweight. This portable, easy-to-use thresher works well.

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