2ND EDITION

E-EXTENDED
ABSTRACT

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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SOIL CONDITIONER DERIVED FROM BANANA STEM

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ABSTRACT - A soil conditioner made from a banana stem is a method to reuse the banana waste. Soil conditioner used to enhance the soil applied. The material is banana stem from the harvested banana tree. The procedure in makingbanana stem is simple and easy, chop and shred into a fine texture, let it dry and it will be ready. Banana stem soil conditioner have a positive effects to the soil. It will improve soil structure, increase soil fertility, promotes growth of beneficial soil microorganism and a natural alternative to synthetic soil conditioners. The main nutrient content in banana stem soil conditioner are sodium, potassium, calcium, magnesium and phosphorus. Potassium is the highest NPK content in banana stem, Potassium content in banana stem are ranged from 2.91% to 4.24%, with average of 3.58%.

Keywords: Soil conditioner, banana stem, compost, organic matter

INTRODUCTION

The stem of a banana plant is an important part of the plant's anatomy. It helps to anchor the plant in the ground and provides support for the leaves, flowers, and fruit and also plays a role in the plant's water and nutrient uptake. When it comes to waste, banana stem took longest period to fully decompose naturally which is up to 6 months. Usually, after harvesting the stem chopped off and left for decompose. Researcher have used banana stem to make a compost with help of tiger worms using vermicomposting. This method will enhance the nutrient in the compost, but it will need more complex procedure and organic material. This whole process will need up to 100 days of preparation (Khatua et al, 2018).

The idea is to make a soil conditioner from the banana stem waste. It is different from compost, soil conditioner is a product or material that is added to soil to improve its physical properties. These materials can help to improve the structure of the soil, increase its water-holding capacity, and enhance its nutrient content. Soil conditioner will stay in the soil longer for benefits.

MATERIAL AND METHOD

Material used in making this soil conditioner are purely based on banana stem that are obtained after its fruit were harvested.

Step in making soil conditioner from banana stem are as follows:

1) Cut the banana stem into small pieces.
2) Dry the banana stem pieces in the sun for several days, or until they are completely dry
3) Grind the dry banana stem pieces into a fine powder using a blender or food processor.
4) Mix the banana stem powder into your soil at a rate of about 10-20% by volume.
5) Water the soil well to help the banana stem powder blend in and begin releasing its nutrients.
6) Use the soil conditioner as you would any other soil amendment, such as for planting flowers, vegetables, or other plants.

RESULTS

1) Usage of banana stem as part of soil conditioner could reduce the dependencies on inorganic amendment. Effect of using banana stem as soil conditioner are as follows:
2) Improves soil structure: Banana stem is high in fiber, which can help to loosen compacted soil and improve its drainage.
3) Increases soil fertility: Banana stem is a natural source of potassium and other minerals, which can help to increase the fertility of soil and promote healthy plant growth.
4) Promotes the growth of beneficial soil microorganisms: Banana stem contains organic matter that can be broken down by beneficial soil microorganisms, helping to create a more diverse and healthy ecosystem in the soil.
5) Can be used as a natural and sustainable alternative to synthetic soil conditioners: Banana stem is a natural byproduct of banana farming and can be used as a sustainable alternative to synthetic soil conditioners.
6) Can be used in a variety of gardening and farming applications: Banana stem can be used to enrich soil in a variety of applications, including vegetable gardens, flower beds, and agricultural fields.

DISCUSSION

Using banana stem as soil conditioner also help the farmers to reduce its operating cost especially to those who grow banana crop as supplemental crop.Potassium content of banana are different depending on the specific type of banana variety. However, some study have found the average content of potassium in banana crop.Potassium content in banana stem are ranged from 2.91% to 4.24%, with average of 3.58% (Ani et al., 2009). Same study conducted also found that the potassium content in banana stem are about 3.79% in average (Madukwe et al., 2008).The mineral content in the banana stem are essential for the crop growth and soil fertility thus make it the valuable waste product from banana plant.

Table 1: Banana Stem Mineral Content

Minerals	Content (mg/ 100 g dry sample)
Sodium	444.1
Potassium	944.1
Calcium	1335.3
Magnesium	255.0
Phosphorus	137.8
Iron	3.3
Zinc	8.1
Manganese	1.3

Source: Ho *et al.* (2012)

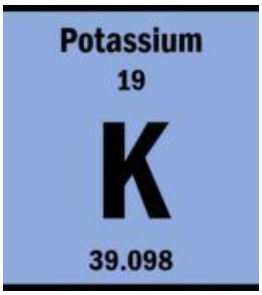

Figure 2: Potassium **Figure 3: Soil** **Figure 4: Banana Stem**

CONCLUSION

In conclusion, using banana stem as a soil conditioner is an innovation that can provide a number of benefits for plants and soil. It is a natural byproduct of banana farming that can be used to improve the physical, chemical, and biological properties of soil. It is high in potassium and other minerals, and also contains organic matter that can promote the growth of beneficial soil microorganisms. Using banana stem as a soil conditioner can lead to healthier, more productive plants and can be a sustainable alternative to synthetic soil conditioners. While there may be some limitations to the availability and handling of banana stem as a soil conditioner, it can be a useful tool for those looking to improve the quality of their soil in a natural and cost- effective way.

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