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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BIODEGRADABLE PLASTIC BAG FROM CORN STARCH

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ABSTRACT- Biodegradable plastic bags are plastic derived from renewable resources likes corn starch. Given their ability to biodegrade, these plastic bags are a more environmentally friendly option than their non-biodegradable counterparts. Polylactic acid, a polymer made from corn starch, is used in the production of biodegradable plastic bags (PLA). For the production of starch-based plastic, glycerol was added for the gelatinization of starch during thermal processing. Biodegradable plastic was made by the amount of ingredients such as water and glycerin. The Corn starch 10g, vinegar 5ml, glycerin 5ml and distilled water 50ml were the most suitable conditions for the preparation of biodegradable plastic. But keep in mind that corn starch-based biodegradable plastic bags might not work for everything. For instance, it's possible that the durability of these plastic bags is lower than that of more conventional plastic bags, and that they're not ideal for usage in hot climates. Corn starch-based biodegradable plastic bags have the potential to be a more environmentally friendly option than standard plastic bags, however this does not mean that they can be used in every situation.

Keywords: Corn starch, plastic bags, biodegradable, renewable

INTRODUCTION

Due to environmental pollution, there is a growing interest in the biodegradation of plastics. Carbon, hydrogen, nitrogen, oxygen, chlorine, and bromine are the primary ingredients in plastics (Gautam., et.al.,2008). In addition, toxic gases are often released during high-temperature degradation processes like pyrolysis (burning) (Mohee R.,et.al.,2007). The fact that a sizable amount of plastic garbage has never been recycled is very worrying as the problem of plastic waste pollution in the world is escalating at an unprecedented rate. In addition to the growing issue, public awareness and outrage have compelled a number of states and countries to act on the issue in order to protect both human and environmental security. While the global oceans are experiencing crisis-level plastic trash pollution. The millions of tonnes of plastic garbage that are dumped might physically harm wildlife, either because plastic waste itself is potentially hazardous or because plastic waste absorbs other contaminants, which is even worse (Bo Bo Thet, 2019).

As we all know, plastic materials' principal environmental drawback is that they take a long time to decompose in the environment. For example issue, the main contributors to marine and coastal plastic litter, according to a UNEP assessment, have been plastic bags and single-use disposable food containers and packaging. Because of this, a lot of research has been done to determine the negative consequences that plastic pollution has on marine life and ecosystems. After a horrific and violent YouTube video of rescuers pulling a straw from a sea turtle's nostril went viral in 2015, the debate over plastic pollution and marine wildlife heated up (Nur Raudah Ibrahim & Noor Nirwandy Mat Noordin, 2020). Therefore, numerous materials including corn, water, glycerin and vinegar can be used to make bio-plastics as the best strategies to prevent the pollution in our earth.

MATERIAL AND METHOD

Materials used in the preparation of plastic bags from corn starch include corn, glycerin, vinegar, and water. The corn is washed three times in a bowl and the length necessary for the soak of corn grain is 2-3 hours, and also if the corn grain is dry, soak for 6-12 hours. After softening the corn, the grinding process begins with a blender that has been soaked in water to aid in the grinding process. The corned corn must next be filtered to remove the waste, and the filtering procedure using the cloth must be done several times until the wastes are removed. The corn filtered water was then covered for 2-3 hours, and after 2 hours of sediment in the water, the water should be removed promptly, resulting in white concentrated water. During the drying process, expose the concentrated water to the sun until the dizziness and cracks resemble lime. The next step is to use a blender to smooth out the starch.

The preparation for making a plastic bag from cornflour begins with measuring the components, which include 90ml of water, 6ml of vinegar, 6ml of glycerin, and 10g of corn starch. In a mixing bowl, combine all of the ingredients except the cornflour. When the liquid is heated, add the weighed corn starch and stir until the mixture thickens and becomes sticky. A tray is prepared for placing and spreading the mixture over the tray's surface until thin, the plastic then dries for 1-2 days. The dried plastic is then carefully pulled off the tray and split into two halves before being sealed with glue and having the edges of the plastic trimmed when the glue has set. When the bag holder design is completed, the bag plastic made from corn starch will be successful.

RESULTS AND DISCUSSION

Biodegradable plastic bags made from corn starch are a type of plastic that is able to break down and decompose in the environment (Wang et al., 2018). These plastic bags are made from renewable resources, specifically corn starch, which is converted into a polymer called polylactic acid (PLA) (Wang et al., 2018). One of the benefits of using corn starch to make biodegradable plastic bags is that corn is a plentiful and renewable resource. In addition, the production of biodegradable plastic bags from corn starch generates fewer greenhouse gas emissions compared to the production of traditional plastic bags.

In this work, biodegradable plastics were made from corn starch by varying the proportions of the ingredients such as vinegar, glycerin and water. It was found that the viscosity of the prepared plastic is directly proportional to the glycerin extent. The more the extent of the glycerin, the more viscous the plastic is. Drying time is also varied with the amount of glycerin. The drying time is longer when more glycerin is used. Also, the thickness of the plastic depends on the variation of glycerin since more glycerin gave thicker layer and less glycerin made thinner layer.

Among the prepared plastic samples, optimum product was obtained by using corn starch 10g, vinegar 6ml, glycerin 6g and water 90 ml because it has less drying time, no bubbles and good tensile strength. The drying temperature must not exceed 80˚C because the boiling point of the product was 85˚C. If the temperature was elevated to 100˚C, the plastic would become brittle.

The prepared plastics were dried in two days under room temperature with normal humidity. Under more humid environment, the plastic would absorb more moisture. Since the plastics had tendency to absorb more moisture, it would be better to store the dried plastics in air-sealed bags.

However, it is important to note that biodegradable plastic bags made from corn starch may not be suitable for all applications (Wang et al., 2018). For example, these plastic bags may not be as strong as traditional plastic bags, and they may not be suitable for use in high-temperature environments (Wang et al., 2018). One area of research is focused on improving the performance of these plastic bags, such as their strength and durability (Zhang et al., 2020). For example, researchers have explored the use of nanomaterials to reinforce biodegradable plastic bags made from corn starch, which can improve their mechanical properties (Zhang et al., 2020).

TABLE, IMAGE AND FIGURE

Figure 1: The ingredients

Figure 2: 50ml of water measured

Figure 3: Fill in the pan

Figure 4: 6ml of Vinegar Measured

Figure 5: Fill in the pan

Figure 6: 6ml of Glycerin Measured

Figure 7: Fill in the pan

Figure 8: 10g Corn starch added

Figure 9: Stir it until become sticky

Figure 10: Sticky solution spread into

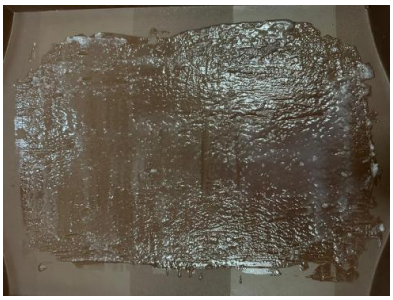

Figure 11: Let it dry for 2 days

Table 1: The Ingredient Uses on The Product

ITEM	QUANTITY
Corn starch	10g
Vinegar	6ml
Water	90ml
Glycerin	6ml

CONCLUSION

As a conclusion, the extent to which our society embraces and values environmental preservation will determine how widely biodegradable polymers are used. As a fact, every year massive quantities of plastic are dumped in landfills (Bo Bo Thet,2019). Thus, it is reasonable to assume that when these bags are used more frequently, there will be a corresponding rise in plastic trash.

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