

2ND 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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ORGANIC FOOD PRESERVATIVES

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ABSTRACT - Chemical-based preservatives are often used by farm workers, farmers and suppliers of fruits and vegetables to ensure that both fruits and vegetables last longer and do not spoil during the storage period. But the use of chemical-based materials has a negative impact on the health of users in the long term. So, this experiment aims to study the effectiveness of organic preservatives that based on herb source which is cloves. This experiment was tested on both of apples and bananas and on 18th December 2023. We decided to used two apples where are one apple labelled as “with spray” and another one apple labelled as “without spray”. We do the same thing to bananas fruit. We made an observation on several aspects and started with aspects of physical appearance (%), taste, fruit structure, spoilage period and smell then made a comparison between fruit with spray and fruit without spray. The equipment used is spoon, bowl, pot and stove. The materials used are twenty pieces of cloves, two cups of water, one teaspoon of salt, five pieces of kaffir lime leaves, bottle spray, seal plastic and sticker. The result of observation shows that fruits that sprayed by an organic preservatives was last longer than fruit without sprayed by an organic preservatives.

Keywords: Food preservatives, preservation, chemical, organic, food, fruit

INTRODUCTION

The stability and shelf-life of food products are an important responsibility for the food industry, not only for reasons of quality and safety but also to satisfy the trust and preferences of consumers. The qualities of the product, the barrier strength of the packaging, and the environmental conditions are three important factors in shelf life. This is why food preservation exists to avoid food contamination from agents that damage food and slow down the growth of microorganisms in food. Over time, various methods of food preservation have been improved in order to increase the shelf life of foods while preserving their nutritional value and quality. Drying or dehydrating food is the earliest method of food preservation. In the past, people utilised this technique to preserve meat or fish by sun-drying it. Fruits, vegetables, and seafood can sometimes be preserved by being briefly dehydrated and frozen. This technique is among the safest and most economical ways to increase food security, stop food from spoiling, preserve nutrients, and save money.

Spices, salt, sugar, vinegar, and other ingredients were some of the first food preservatives. For chemical substances including sorbic acid, benzoates, nitrates, and sulphites are examples of modern food preservatives. Therefore, in the food industry there are companies that use food preservatives based on chemicals ingredients. But the use of food preservatives based on these chemicals can have adverse effects on health in the future. therefore, the existence of the creation of natural food preservatives which ingredients to create organic food preservatives is by using natural ingredients which can extend the shelf life of food and not disturb the health of the body. So, because of that, this innovation exists where we use cloves as the main natural ingredient because it has antibacterial activity against food-borne bacteria. Therefore, the objective of the study is to see the durability of this clove-based organic food preservative against fruits. At the same time, the manufacture of organic food preservatives is made to reduce the use of chemical-based food preservatives in the future.

MATERIAL AND METHOD

Preparation of Organic Preservatives

Materials:

Cloves (20 pieces), Water (500 ml), Salt (1 teaspoon), Kaffir Lime Leaves (5 pieces), Spray Bottle (1 unit).

Method:

Boil water and add cloves until the water turns dark brown.

After that, add chopped kaffir lime leaves, add one teaspoon of salt and stir until dissolved.

Let it cool, and pour the solution into the bottle.

Fruit Preservation Process

Materials:

Clear zip lock bag (2 pieces), sticker note (2 pieces)

Method:

Prepare two fruits of the same type and spray on one of the fruits. Then put the two fruits into a different zip lock bag.

Next, label sprayed and not sprayed on the zip lock bag using a sticker.

Lastly, wait and see the changes in the fruit after a week.

RESULTS AND DISCUSSION

Based on observation, fruit sprayed with organic preservatives and without preservatives shows differences in aspects such as. For bananas, we take 7 days to observe; for apples, we take 12 days to observe. The differences between fruit sprayed, and fruit without sprayed are shown in table 1 and table 2 below

Table 1: Fruit (Apple)





OBSERVATION	APPLE “WITH SPRAY”	APPLE “WITHOUT SPRAY”
PHYSICAL APPEARANCE (%)	There are bruises on apples’ flesh but in a low rate around 10%.	There are bruises on apples’ flesh but in a high rate around 50%.
TASTE	It tastes same as before	It tastes same as before
FRUIT STRUCTURE	The structure in a good condition and still in firm flesh.	The structure in a bad condition and it flesh did not firm and very mushy.
SPOILAGE PERIOD	Take time 12 days to spoil	Take time 10 days to spoil
SMELL	Did not have any smell	Did not have any smell
		

Table 2: Fruit (Banana)

OBSERVATION	BANANAS “WITH SPRAY”	BANANAS “WITHOUT SPRAY”
PHYSICAL APPEARANCE (%)	There are bruises on bananas’ skin but in a low rate around 50%.	There are bruises on bananas’ skin but in a high rate around 80%.
TASTE	It tastes sweet like before it was sprayed with organic preservatives.	It taste sour
FRUIT STRUCTURE	The structure in a good condition and still in firm flesh.	The structure in a bad condition and it flesh did not firm and very mushy
SPOILAGE PERIOD	Take time 7 days to spoil	Take time 5 days to spoil
SMELL	The sweet smell of bananas	Smell bad of bananas
		

As for the discussion, the physical appearance of bananas “with spray” has a low rate which is 50% of bruises on banana’s skin. However, bananas “without spray” have a high rate of bruises, around 80%. It shows that bananas “without spray” have a higher rate of bruising than bananas “with spray”. In a process known as enzymatic browning, high levels of ethylene cause the yellow pigments in bananas to decompose into their characteristic brown blotches (Jonathan Hogeback, n.d.). Next, the taste of bananas “with spray” was sweet, like before it was sprayed with organic preservatives and the taste of bananas “without spray” was sour. It shows a difference in taste between bananas “with spray” and “without spray” due to the presence of spoilage bacteria. Bacteria create acid as they consume and grow on food nutrients. In addition, the structure of the bananas “with spray” was still in good condition and still in firm flesh and the structure of the bananas “without spray” was in bad condition, and its fleshes did not firm and were very mushy. It shows that organic preservatives positively affect the structure of bananas. And then, the spoilage period of bananas “with spray” took 12 days to spoil while “without spray” took 5 days. It shows that bananas “with spray” can last longer in terms of damage to the fruits than bananas “without spray”. Lastly, the smell of bananas “with spray” was sweet, while “without spray” smelled bad. It shows that the smell of the bananas with and without spray differs. Typically, the growth of spoilage microorganisms such as bacteria, yeasts, and mould is responsible for the deterioration and odour of food. Compounds released from the food when microorganisms degrade it and chemicals created directly by the bacteria themselves can both contribute to odours. Next, based on the result of the apple, the physical appearance of apple “with spray” has a low rate of 10% of bruises on apples’ flesh. However, apple “without spray” has a high rate of bruises, around 50%. Next, we look into the taste. The taste of apples “with spray” and “without spray” tastes the same as before and is no different. In addition, the structure of the apple “with spray” was in good condition and still in firm flesh and the apple “without spray” was in bad condition, and its flesh was not firm and very mushy.

And then the spoilage period for apples “with spray” took 12 days, to spoil while apples “without spray” took 10 days. Lastly, the smell of apples “with spray” and “without spray” did not have any smell.

CONCLUSION

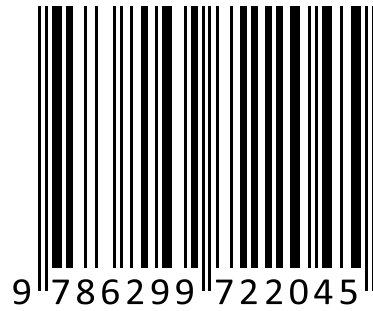
In conclusion, the use of natural ingredients in the food preservation process is highly recommended to maintain the health of the community because it does not cause adverse effects to oneself or the environment compared to chemical-based food preservatives. The public needs to know that the use of chemical-based food preservatives over a long period of time can have adverse effects on human health and it can also disturb the balance of aquatic life when the preservative waste is channeled into the water environment. therefore, this innovation in which the use of natural materials as organic food preservatives will not be a factor in human health problems because the natural materials used are guaranteed to be safe and do not cause adverse effects on the environment.

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