

3rd 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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FLAKES INCORPORATED WITH BOTTLE GOURD POWDER (*Lagenaria leucantha rysby*)

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ABSTRACT- The purpose of this study are to develop the flakes incorporated with bottle gourd (*Lagenaria leucantha rysby*) and to determine the sensory properties of flakes with bottle gourd powder. This study was aimed to increase the agronomic potential of bottle gourd and to evaluate their potential contribution to food field through assessing nutritional content in their flesh. The flakes incorporated with bottle gourd powder by using five different formulation which is 0% (control), 10%, 20%, 30% and 40%. Samples from each formulation were analyzed for sensory evaluation was conducted in different attributes which are color, appearance, crispiness, taste, after taste and overall acceptability. This was conducted using affective test that were applied by using 7-point hedonic scale (1= dislike extremely, 7= like extremely). Based on the result obtained, the addition of bottle gourd powder positively influenced the sensory characteristics of the bottle gourd flakes. Also, the bottle gourd significantly changed the color of the flakes. Bottle gourd was prepared as powder and incorporated in for making bottle gourd flakes. Overall, the result showed that the presence of bottle gourd powder in production of flakes give a significant difference in terms sensory acceptance. From the result sensory acceptance, bottle gourd flakes with 10% of bottle gourd powder most accepted by panelist based on highest mean value for crispiness, taste, after taste and overall acceptance.

Keywords: Bottle gourd, breakfast cereals, flakes, sensory properties.

INTRODUCTION

Bottle gourd (*Lagenaria leucantha rysby*), also known as a white flowered gourd plant, is a member of the Cucurbitaceae family, Cucurbitoideae sub family, and Benincaseae tribe. Bottle gourd cultivated extensively in tropical and subtropical parts of the world. Preparation of bottle gourd powder is one of the viable technologies for utilization of bottle gourd fruits. Recently, increasing consumer demand for healthier foods has triggered the development of flakes made with natural ingredients exhibiting functional properties and providing specific health benefits beyond those to be gained from traditional nutrients. Foods with high nutritional value are in great demand for proper functioning of body systems and potential health benefits. As a result, value-added foods or functional foods with higher level of dietary fiber have been developed, especially in cereal products such as flakes. The utilization of bottle gourd powder with corn flour in flakes products have not been studied extensively. Therefore, the research was designed to evaluate the effect of substitution of corn flour with different levels of bottle gourd powder on the sensory properties of the flakes.

Problem Statement

Bottle gourd are usually served as fresh in dish or side dish of the food but there is no variation with these fruits where there are plentiful secret of benefit inside bottle gourd. Bottle gourd are easy to found, this fruit also are cheap and limited of usage. This fruits that are people neglected their benefits while this fruit have high in vitamin and until now, there is no development of flakes incorporated with bottle gourd powder. Besides, there are lack of research on bottle gourd product.

Justification

To innovate the local produce that have low economic value with high nutritional value to something that give high quality and produce a healthy and much cheaper breakfast cereal compared that have in the market.

Objectives

The general objective of this study research is to develop flakes incorporated with bottle gourd (*Lagenaria leucantha rysby*) and to evaluate the sensory acceptability of flakes incorporated with bottle gourd by affective test in term of panelist acceptance.

MATERIAL AND METHOD

The fresh light green, well matured and uniform size of bottle gourds (*Lagenaria leucantha rysby*) were obtained from a fruit market. The fruits were transferred into room storage and wait for further processing. The corn starch, salt and emplex used were bought from the bakery shop.

Sample preparation

The bottle gourds were converted into fine powder. For this purpose, the fruits were thoroughly washed after sorting and grading. Fruits were cut into two halves along its vertical axis and nonedible portion was scooped out with the help of spoon and cut into shreds. Thickness of shreds was maintained as 3 mm with the help of stainless-steel slicer. The flesh was sliced thinly and the weight before drying was determined. After that, the slice of the bottle gourds were blanched for about 6 minutes and were placed on the tissue paper for several seconds to absorb the excessive amount of water to facilitate the drying process. Then, the slice of the bottle gourds were placed on the tray and put in cabinet dryer at 60°C for 24 hours. The dried bottle gourds were grinded with dry blender until fine texture was achieved. Then, the bottle gourd powder was sieved by using 250 µm sieve shaker to produce a very fine bottle gourd powder. The dried bottle gourds were weighed. Lastly, the bottle gourd powder was ready for the flakes production.

Preparation of bottle gourd flakes

Firstly, the bottle gourd powder was mixed with corn starch, emplex, salt and water. Then, the mixture was cooked for 2- 4 minutes until the dough form. This was the critical step where the texture of the final product will be affected by this process. Besides, the dough was mixed faster at high temperature as to ensure the dough achieves the desire partially gelatinization. After that, the dough was rolled into thin layer and shaped into small pieces. The bottle gourd flakes were undergone partial drying process in microwave oven for about 30 seconds to enable the baking process occurs completely. Finally, the flakes were baked at 225°C for 1 ½ minutes in convection oven. These steps will further be drying the flakes to give a golden brown in color and puffed- up properties of flakes.

Formulation of bottle gourd flakes

In this bottle gourd flakes, the formulation was altered from the formulation of guava flakes above as the bottle gourd content were 0%, 10%, 20%, 30% and 40%. The formulation as table 2.1 below.

Ingredients	Sample A	Sample B	Sample C	Sample D	Sample E
	(0%)	(10%)	(20%)	(30%)	(40%)
Bottle gourd powder	0.0 g	10.0 g	20.0 g	30.0 g	40.0 g
Corn starch	100.0 g	90.0 g	80.0 g	70.0 g	60.0 g
Salt	3.0 g	3.0 g	3.0 g	3.0 g	3.0 g
Emplex	0.05 g	0.05 g	0.05 g	0.05 g	0.05 g
Water	90.0 g	90.0 g	90.0 g	90.0 g	90.0 g
TOTAL	193.05 g	193.05 g	193.05 g	193.05 g	193.05 g

Table 2.1: Formulation bottle gourd flakes

Sensory evaluation

The evaluation was done at Pasir Salak College Community that involved 35 untrained panelist that are chosen by randomly. They are required to run an affective test to evaluate different formulation of bottle gourd flakes. The sample was presented with five different formulation of bottle gourd flakes that are packed inside transparent seal plastic to enable panelist to clearly see the sample besides to avoid the product loss of the texture. Besides, the panelist are required to evaluate six attributes which are color, appearance, crispiness, taste, after taste and overall acceptability.

RESULTS AND DISCUSSION

Results

Based on the sensory evaluation that was done at Pasir Salak College Community the results show that most of the panelist was preferred 10% of incorporation bottle gourd powder formulation. This is based on color, appearance, crispiness, taste, after taste and overall acceptability. The results of the evaluation are interpreted in terms of bar chart for different attributes.

Sensory evaluation of bottle gourd flakes

Based on figure 3.1 shows that the decline trend of bar chart for color acceptance. Formulation 0% shows the highest mean value of color acceptance among the panelist. Whereas, formulation 40% shows the lowest mean value of color acceptance. This shows that panelist are more preferred lighter color of flakes than darker. This is because, as the percentage of the bottle gourd powder are added into the formulation, the color of the flakes become darker was the reason panelist not preferred the darker color. The resulting of darker color was due to Maillard reaction of the flakes. Bottle gourd contain high sugar amount that contribute to the non- enzymatic browning reaction. Based on result from figure 3.2 shows that the decline of bar chart trend for appearance acceptance. Formulation 0% shows the highest mean score of appearance acceptance preferred by panelist whereas, formulation 40% shows the lowest mean value score. This shows that, panelist are much preferred the lighter yellowish with smooth, puffed-up and uniform in appearance of the flakes. Incorporation of dietary fibre in extruded products often leads to reduced expansion volumes and textures. Moreover, the increasing percentage of bottle gourd powder in the formulation make the decreasing acceptance level in terms of appearance by panelist. Incorporation of dietary fibre in extruded products often leads to reduced expansion volumes and textures that are less preferred by panelists. Based on the result from figure 3.3 shows that the inconsistent of bar chart trend in terms of crispiness acceptance among the panelist. The formulation 10% shows the highest score of mean value whereas, formulation 40% shows the lowest mean value compared with other formulation. As the percentage of bottle gourd powder are added in the formulation, the crispiness of the flakes are decrease. Texture is mainly attributed to the amylose and amylopectin matrix which contribute to overall flakes texture and reported that flakes texture was due to interactions between gluten and fibrous materials. Besides that, crispiness are interrelated with moisture content and water activity. The water activity and moisture content show the increment as the incorporation of bottle gourd powder increases. This was explained the crispiness acceptance of consumer in the sensory evaluation test was declined as the formulation bottle gourd inclined. Based on the result from figure 3.4 shows the taste acceptability among the panelist. shows that formulation 10% shows the highest mean value compared with other formulation and formulation 40% shows the lowest mean. This result is due to the strong bitter taste of bottle gourd bottle gourd due to toxic tetracyclic triterpenoid compounds called cucurbitacin which are responsible for the bitter taste and toxicity. The inconsistent trend of the bar chart from figure 3.5 was observed for after taste acceptance. Formulation 10% shows the highest likeness of aftertaste acceptability among the other formulation. Whereas, formulation 40% shows the lowest mean score of after taste acceptable level among the panelist. As the increasing the percentage of bottle gourd powder in the formulation, the aftertaste acceptability level was declined. This due to the bitter taste brought by the bottle gourd in the flakes. Figure 3.6 shows the overall acceptance. Formulation 10% shows the highest rank sum in terms of crispiness, taste and after taste attribute and thus the highest overall preference among the panelist. On the other side, formulation 40% shows the lowest rank sum, which indicates the least

preference in terms of overall acceptance due to unlikely the color, appearance, crispiness, taste and after taste. Hence, panelist are much preferred the formulation 10% whereas, panelist not preferred formulation 40%. Based on the result shows that the flakes incorporated with bottle gourd powder was able to developed and introduced into the market as a cereal that contain high nutritive value.

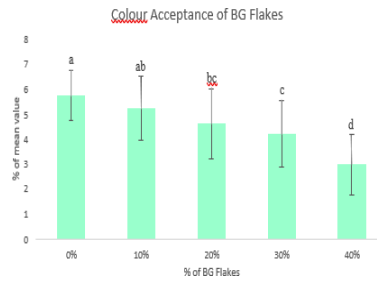


Figure 3.1: Colour acceptance

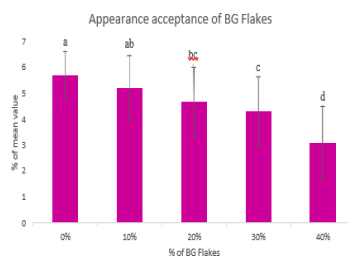


Figure 3.2: Appearance acceptance

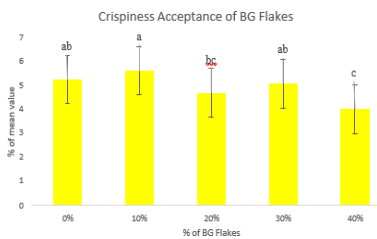


Figure 3.3: Crispiness acceptance

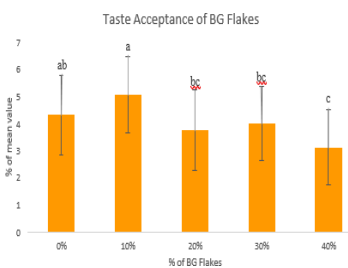


Figure 3.4: Taste acceptance

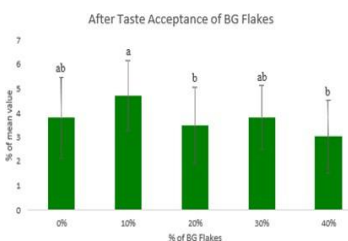


Figure 3.5: After taste acceptance

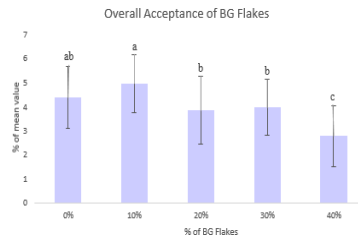


Figure 3.6: Overall acceptan

CONCLUSION

The flakes incorporated with bottle gourd powder has been successfully developed with five different formulations (0%, 10%, 20%, 30% and 40%) of bottle gourd powder. Besides, the effects of incorporation bottle gourd powder in flakes on sensory analysis had also determined. In sensory analysis, it was recorded that formulation 10% of bottle gourd powder incorporated in the flakes was the most acceptable and meet the main objective. This is because, formulation 10% of bottle gourd flakes has the higher mean value in sensory test in terms of crispiness, taste, after taste and overall acceptability compared with others formulation. Besides, panelist are more prefer formulation 10% because the lightness taste of bottle gourd, no bitter taste and puffed- up of the flakes. As further in this area, the researcher suggests that is carried out further study on how the criteria such as texture and flavor of the flakes after the immersion into milk (bowl life). Besides that, researcher also suggest to carry out a further study on how to overcome the bitter taste in the bottle gourd to increase the taste acceptance of the flakes. Last but not least, further study on shelf life on bottle gourd flakes (*Lagenaria leucantha rysby*) and determination of chemical content should be done for this product.

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