

Acceptability Study of Banana Blossom (Banana Musa) Cupcake Fortified with Honey: A Bread Innovation

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Abstract

Purpose: The province of Quirino, Philippines, is a good source of different varieties of bananas. The purpose of this research is to determine the organoleptic assessment and acceptability of Banana blossom Cupcakes fortified with Honey.

Methodology: The study utilized a descriptive survey method. Data were gathered through structured questionnaires and were assessed using a Likert scale. The questionnaires were distributed to 50 trained and untrained respondents who were faculty and students at Quirino State University. Sensory evaluation was employed on the Honey Banana Blossom Cupcake in terms of the following parameters: taste, texture, appearance, color, aroma, and presentation.

Main Findings: Generally, Honey Banana Blossom Cupcake is highly acceptable among the taster respondents, particularly on its appearance, color, texture, and aroma where it was rated as moderately high while its flavor was rated as highly acceptable.

Implications of study: This study specifically addresses the use of banana blossoms to exploit their potential and to support local farmers and growers to maximize their profit.

The novelty of the study: This research aimed to produce a policy to support local products in the province of Quirino.

INTRODUCTION

The food industry continually develops new products by keeping up with consumer preferences, which are shifting more and more toward ready-to-eat foods. Freshly cut fruits and vegetables are at the top of every consumer's list among these. Ergo, the market has expanded quickly in recent years due to changes in consumer behavior. Therefore, to attain general market acceptance, it is imperative to identify new approaches to product creation.

Since the beginning of mankind's civilization, bread has been a staple food that has been prepared using a wide range of ingredients and techniques (Vilasrao D.T, 2019). It was prepared using flour and water to produce dough and baked using an oven or the traditional wood-fired oven or the so-called Pugon. The patisserie industry includes a wide range of breads and pastries. The sweet patisseries market is experiencing a wave of innovation that includes the revival of old classics, the rise of the individual portion, and new dining occasions to enjoy them. As a result, a subset of modern, urban "foodies" has emerged, who regard baking and cooking as a form of art, an extension of self.

The banana plant, widely regarded as nature's gift to mankind, is well known for its fruit due to its enormous nutritional and health benefits (Mohiuddin, et al. 2014), and the unnoticed banana blossom has the potential to be regarded as a functional food or superfood due to its high nutrient content. Despite being such a wonder food, it is still underrated in most of the world. Therefore, the present time demands to increase the awareness about banana blossom as it will not only reduce banana waste but will also help people all over the world, reap its health benefits.

LITERATURE REVIEW

Bananas are an edible fruit produced mainly in any tropical country where the climate contributes to the flavor and quality enhancement of this fruit. It usually comes in many sizes and colors depending on the planted variety. Accordingly, this fruit has been said to contribute a sum amount of money to the economic development of one's country because of its ability to produce a variety of products (Clark, J. 2015). Not only used as a main dish but in bakery products as well. It has also been said that cultivating such plants will not require the producer to throw away any waste since every part or so to say all parts of this tree have its benefits. The leaves of it are used as a traditional foil in the preparation of bibingka and different finished products among Filipinos. The fact that its fruit is so delicious, it can be also used as part of the diet. The banana blossom is a part of the banana plant that was proven edible.

In 135 countries and territories across the tropics and subtropics, bananas are being produced (Mishra, S., & Sutar, N. 2010). The majority of producers are farmers who grow the crop for either home consumption or for local markets (Tiwari, S., & Shukla, S. 2015). Banana is the second most produced fruit after citrus. It has a 16% contribution to the world's total fruit production. It has also stated that India is the most or largest producer of bananas in the world estimated up to 27% of banana production. According to them, the banana is useful in every part just as food, feed,

pharmaceutical, packaging, and many other industrial applications. Banana blossoms are an excellent source of fiber in the human diet. The benefits of having fiber in the diet are well documented in the nutritional and medical literature. Banana blossoms are a rich source of other nutrients and antioxidants which have several health benefits. (Tasnim, et al. 2020; Nataraj L, et al, 2010). The Blossom of the banana plant (*Musa acuminata* Colla), a by-product of banana cultivation, is often consumed as a vegetable in many Asian countries. It is consumed as a curry as well as a boiled or deep-fried salad with rice and wheat bread. An example of a dish out of it in the Philippines is the “sauteed banana blossom in soy sauce”.

The Philippine banana industry contributes significantly to the agriculture sector and the economy in general. Banana production is a source of income and employment in the countryside with more than 5.6 million smallholder farmers dependent on it (Horwood, C. 2006; Rapsomanikis, G., 2015). In 2000, the banana sector contributed about 7% to the total value of production in agriculture. Bananas are also one of the country’s top export earners. Banana (*Musa* sp.) is grown in all regions of the Philippines throughout the year (Calderon, R. P., & Rola, A. C. 2003), the first botanist in the Philippines, as a variety compress. In Indonesia as Pisang Kepok, in Malaysia as Pisang Nipah, and in Thailand as Kluai Hin. Saba is the type of cultivar of edible and cultivated *Musa balbisiana* species (Valmayor et al. 2002). The banana bud or flower or blossom is a component in the inflorescence of the banana plant. The male and female flowers of the plant are both present but come out of the plant separately. The female flowers are the first to come out which then develops into fruits. The first 5-15 basal nodes or hands produce female flowers, and the upper digital nodes produce male flowers (Nann, K., & Swe, N., 2012).

Banana is grown commercially for its fruits. The various parts of the plant other than the fruit are also used for food, packaging, and other purposes. Banana bud (bracts and flowers), one of its parts, is eaten as a boiled vegetable and is also used as an ingredient in an assortment of cuisines. Banana bud or inflorescence is one of the most important parts of the banana plant. Aside from its being a mere ingredient in vegetable preparations, it is also processed and exported as a canned banana bud (De Vera 1992). Banana blossom is often consumed as a vegetable in many Asian countries such as Sri Lanka, Malaysia, Indonesia, and the Philippines (Wickramarachchi, K. S., & Ranamukhaarachchi, S. L., 2005). It is consumed as a curry and as a boiled or deep-fried salad with rice and wheat bread. Banana blossoms are widely considered to be a high-fiber source. Dietary fiber has demonstrated its benefits in health and disease prevention in medical nutrition therapy (Kendall, et al. 2010). Banana flowers are high in vitamin E and flavonoids, as well as dietary fibers, proteins, and unsaturated fatty acids. (Salvador I., 2018).

Banana flowers, similarly, to fruits, are an excellent source of potassium, plus Vitamin A, C, and E. According to research at the Chinese Academy of Tropical Agricultural Sciences (2009) which studied the flowers of *Musa paradisiaca*, banana flowers have tremendous nutritional value. It was also reported that banana blossom extract possessed medicinal properties for diabetes (Aларcon et. al, 1998; Pari, L., & Maheswari, J.U. 1999) and malaria (Bagavan et. al, 2011). It is a good source of fiber and protein. The flowers contain a class of phytochemicals known as saponins. Saponins lower LDL, or bad cholesterol, boost our immunity against infection, and are thought to inhibit the growth of cancer cells. They also have antioxidant activity and so can reduce our risk of chronic diseases such as cardiovascular disease. Banana flowers are also an excellent source of flavonoids. These phytochemicals found in many plant-based foods help prevent damage to DNA cells by neutralizing free radicals. They also help lower cholesterol, and anti-inflammatory, anticancer, and anti-aging.

With the existing Banana Research and Development Center and Banana Clonal propagation of Quirino State University, researchers from Quirino State University, young entrepreneurs, and bakery owners produced lots of innovative food products from its fruits. They developed food products such as fresh juices, chips, breads, liqueurs, and wines. Banana blossoms or the so-called banana heart a fleshy, hot pink flower with a tear-shaped that grows at the end of a cluster of banana fruit were limitedly consumed as viand or snacks. Now, the undermined banana blossoms were also used as a main ingredient in making banana blossom cupcakes fortified with honey to enhance their nutritional content. The researchers aimed of developing products made of banana blossoms to maximize their potential which may lead to standardization and commercialization.

This study, therefore, leads into the development and production of Cupcakes with the incorporation of honey and banana blossom as the main ingredient and assesses its acceptability to the consumers.

CONCEPTUAL FRAMEWORK

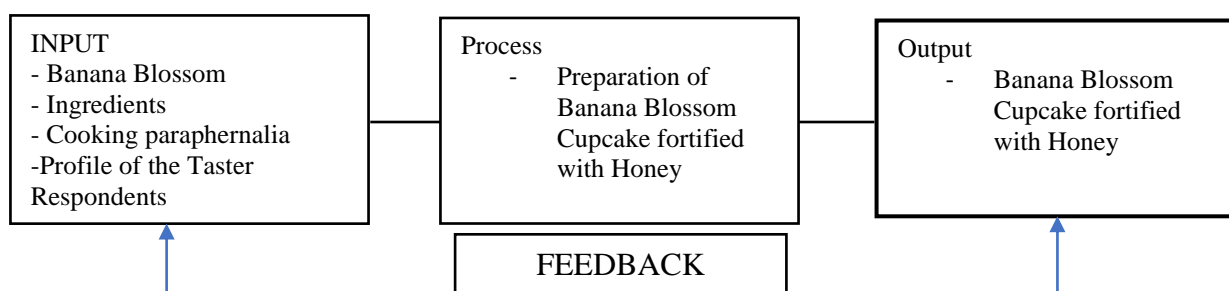


Figure 1: Shows the Paradigm of the study

Figure 1, Research Paradigm shows the relationship of the 30 respondents on Banana Blossom Cupcake fortified with honey in terms of the following parameters: color, texture, aroma, taste, appearance, and presentation.

Statement of the Problem

The purpose of this research is to determine the organoleptic assessment and acceptability of Banana blossom Cupcakes fortified with Honey.

Specifically, it intends to:

1. Determine the level of acceptability of Banana blossom Cupcake fortified with Honey *in terms of* appearance, color, texture, aroma, presentation, taste.
2. Established financial viability and profitability analysis of developed products.
3. Established a proposed plan of action aligned with the 6 P's project output (*People Services, Products, Places & Partnerships, Publication, patents, and Policy*)

METHODOLOGY

Composition and Processing of Honey Banana Blossom Cupcake

- a. Raw Materials:** Banana Blossom, All-purpose flour, baking powder, Brown sugar, White sugar, Vanilla, Butter, Egg, Honey
- b. Tools and Equipment:** Oven, mixing bowls, utility bowls, rubber scraper, baking sheet, baking pan, wire whisk, spoon.
- c. Procedure:**
 - Preheat oven to 375 degrees F (190 degrees C).
 - Banana blossoms were soaked in water with salt, washed, and squeezed.
 - Boil the banana blossom for 3-5 minutes then chop using the food processor.
 - In a mixing bowl, stir together flour and baking powder. Set it aside.
 - In a large bowl, cream together the butter and sugar until smooth. Beat in egg and vanilla. Gradually blend in the dry ingredients as well as the chopped banana blossom. Stir in gradually.
 - Bake 20-25 minutes in the preheated oven, or until golden.

Research Design

The study utilized the descriptive-survey method in characterizing the organoleptic assessment and acceptability of "*banana blossom cupcake fortified with honey*".

Research Participants

The researcher used a random sampling from the faculty and students at Quirino State University in which both trained and untrained and is likewise included as respondents using the same technique of sampling.

Instrumentation

The instrument used in the study it was adapted from the study of [Tariga, et al \(2019\)](#). The result of the survey served as the basis for crafting the rating scales. There were six parameters used which include: Appearance, Color, Texture, Aroma, Presentation, and Taste.

Data Gathering & Analysis

Upon approval of the request to conduct the study, the researcher personally administered the questionnaire to the participants. Each participant was interviewed regarding their responses to the questionnaire. Mean and standard deviation were used to describe the appearance, color, flavor, texture, aroma, and overall evaluation of the product. The mean values are described using the following guidelines.

RESULTS

Objective 1: This part presents the result of the product development which is the creation of the Honey Banana Blossom Cupcake. Hence it shows that the sensory evaluation tool comprises the parameters for assessing the acceptability level of the developed product. Furthermore, discussions were highlighted as to the possibility of the product being commercialized.

As gleaned in Table 1, the Banana Blossom Cupcake fortified with honey garnered an overall mean of 3.16 with a description of *Moderately High*. Among the parameters given, *Flavor* is very high which means the product is acceptable. Meanwhile, the rest garnered a *Moderately High* as a descriptor. This shows that the product considering the given parameters is acceptable thus, its marketability is most likely high. Murray, J.M (2003) stresses that acceptability is a subjective measure based on hedonics (pleasure), which in turn is influenced by the sensory properties of the food, previous exposure to it and subsequent expectations, contextual factors, an individual's culture, and physiological status.

Table 1: Point System

Point	Mean	Description
1	1.00-1.49	Very low
2	1.50-2.49	Low
3	2.50-3.49	Moderately high
4	3.50-4.49	Very high
5	4.50-5.00	Extremely high

However, observing from Table 2, the color got the lowest mean, which is 2.77, and a high standard deviation of 0.68 which only means that the product is weak in this part of the parameter. [Hoppu, et al. \(2020\)](#), explain how color affects the acceptability and palatability of food. Foods are frequently given color additives to improve their appearance, make up for natural variances in the raw ingredients or color loss during processing, and give flavor identities to foods.

Table 2: Level of Acceptability of the Honey Banana Blossom Cupcake

Criteria	Means	Standard division	Description
Appearance	2.95	0.61	Moderately high
Color	2.77	0.68	Moderately high
Flavor	3.52	0.53	Very high
Texture	3.14	0.57	Moderately high
Aroma	3.42	0.58	Moderately high
Overall	3.16	0.59	Moderately high

Objective 2: Financial Viability and Profitability of Banana Blossom Cupcake Fortified with honey.

Table 3: Cost Calculation

A. INPUT	Unit Price
3 medium size banana blossoms	45.00
2 cups honey	150.00
10 pcs egg	80.00
2 cups brown sugar	60.00
2 cups white sugar	75.00
6 cups all-purpose flour	80.00
3 tbsp. baking powder	5.00
1 cup butter	45.00
1 tbsp. vanilla	5.00
Cupcake cups (paper)	80.00
Box for cupcakes	120.00
LPG	80.00
Total	825.00
B. OUTPUT	
• 128pcs Cupcakes	1,512.00
• 6 pcs/box- (21 boxes X 72.00per box)	
C. NET INCOME (B-A)	687.00
D. ROI (Net Income/gross Expenses)	83 %

Objective 3: Established a proposed plan of action aligned with the 6 P's project output (*People Services, Products, Places & Partnerships, Publication, patents, and Policy*)







Project Output-6 P's Metrics		
	PEOPLE SERVICES	Train technology beneficiaries, entrepreneurs, TESDA Scholars (Processing of Banana Blossom Cupcake with Honey); and Beneficiaries of the existing QSU Banana Project (Raw Material)
	PRODUCTS	Processing Technology for Banana Blossom Cupcake with Honey
	PLACES & PARTNERSHIPS	Craft Memorandum of Understanding/ Memorandum of Agreement with LGU Diffun and Aglipay and other existing QSU Banana beneficiaries
	PUBLICATIONS	Publication to QSU Journal, International Refereed Journal, Scopus Indexed or ACI.
	PATENTS	Applications of Intellectual Property Rights (UTILITY MODELS) for the Processing and Composition of the develop Banana Blossom Cupcake
	POLICY	Policy Implementation to LGU, partner agencies such as DepEd, DSWD, DOT TESDA and DTI to promote banana blossoms products to feeding programs and inclusion to OTOP to display in Pasalubong centers.

Figure 1: 6 P's Metrics

CONCLUSION AND FUTURE WORKS

Based on the findings of the study, the following conclusions are drawn:

- The sensory evaluations of the respondent in the different variables range from moderately high to very high.
- The respondents' category influences their evaluations in appearance and taste but has nothing to do with the other variables.
- There is a positive financial viability and profitability in the commercialization of Banana Blossom cupcakes fortified with honey.
- Market orientation should also be established consistently to discover and meet the needs and desires of customers.
- Local Policy on the commercialization of Banana Blossom cupcakes fortified with honey should be implemented.

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