

# Product Development: Banana Jam Infused with Apple and Cucumber

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**Abstract**— The study aims to develop and incorporate apple and cucumber into a recipe for their existing banana jam recipe, thus, they would be able to hopefully improve both the flavor and the health benefits of the product that in the long run might revitalize or enhance the product's market competitiveness. The quantitative research approach served as the foundation for this product development study. In the process of developing new products, quantitative research may be helpful since it can find a way to reach a perspective on the product's attractiveness, advantages, and the purchasing intention of existing or future consumers. Students, instructors, and employees of the NEUST-San Leonardo campus, as well as housewives and residents of Tambo Adorable in San Leonardo, Nueva Ecija, comprised the population for this study. The findings revealed that the two variations of banana in banana-apple and banana-cucumber had found feasible and acceptable and final output of banana jam.

**Keywords**— Apple, Banana Jam, Cucumber, Product Development.

## I. INTRODUCTION

Together with the local government unit of the municipality of San Leonardo, Nueva Ecija the Nueva Ecija University of Science and Technology (NEUST) San Leonardo Off-Campus program had been extending its assistance in an effort to aid those members of their community who are struggling to support themselves financially. For the purpose of empowering a sustainable livelihood program for the people of San Leonardo, Nueva Ecija who are categorized in the Pantawid Pamilyang Pilipino Program (4Ps) and the Kalipunan ng Liping Pilipina (KALIPPI), members of the university's faculties and staff had conducted seminar workshops about banana jam making last October 2018, as a way of strengthening the said commitment. The completion of the aforementioned endeavor was a tremendous milestone. Because each participant was able to sell banana jams in their neighborhood as a result of the technical information that was passed on to them in the course of the training, their households were able to benefit from a consistent flow of extra income. In point of fact, an assessment that was carried out to determine how efficient the advocacy was demonstrated that the people who benefited from it were overjoyed to learn that the institution had gone out to help ease their financial hardship. On the assessment, they further bring out certain suggestions and proposals for the university to provide them with more advanced training or perhaps further exploration of banana jam, hoping to enhance the market competitiveness of the said product.

With that in mind, the Bachelor of Science in Hospitality Management (BSHM) department of NEUST San Leonardo Off-Campus program had come up with an idea to enhance or create added flavor options/variety of the said



banana jam. According to Foroudi and Foroudi, (2021), flavor variety is one of the many factors behind a product's chance to stand out and increase its consumer marketability. When it comes to establishing and expanding a selection of food products, flavors are an essential component; the revitalization of a brand's products via flavor innovations may keep consumers coming back for more and encourage repeat transactions (Tze et. al, 2022). According to Gengler and Reynolds (2015), it is essential to provide a sufficient number of offerings; however, not so excessive that they cause confusion among the customers. Therefore, rather than concentrating a great deal of effort on producing as many choices as possible, it will be sensible to provide unique flavors that appeal to a wider audience (Gengler & Reynolds, 2015). Needless to reiterate, flavor variation helps a product stand out and sell to consumers; to revitalize and grow the aforementioned banana jam's market competitiveness.

Banana jam as it is already having a multitude of potential health advantages, many of which may be improved upon by adding extra flavor components that can simultaneously add to the jam's already enticing list of health advantages. Keeping all of that in consideration, the researchers have developed a core idea of incorporating fruits like apple and cucumber in particular which are not just flavorful but are also nutritionally pleasing into the existing banana jam recipe that they have.

To emphasize, apples and cucumbers are nutritious foods in many contexts and are also being made into jams. Apple is suggested to be consumed daily because it constitutes a wide variety of nutrients that are good for our health, such as vitamin C, which helps the body combat diseases and improves its resistance, as well as the B complex vitamins, which are essential for the immune system to have in order to keep its supply of red blood cells and its nervous system (Skinner et al., 2018). If unable to consume an apple on a daily basis, one alternative is to include it in breakfast as homemade apple jam by simply starting the day off with some toast and jam to still get all of these advantages (Awulachew, 2021). On the other hand, cucumbers are full of vitamin K, which is essential for maintaining strong bones and enables blood to prevent clotting; it is also rich in Vitamin A which is essential for several bodily functions, including reproduction, maintenance of healthy eyesight, and ensures that organs such as your heart, lungs, and kidneys function perfectly (Uthpala et. al, 2020). The cucumber's richness in pectin is one of the reasons why it is also utilized as a key ingredient in making jams (Friday, 2021). Without the need for further elaboration, the researchers have concluded that apples and cucumbers can be an excellent complement to the existing banana jam recipe that they have in terms of taste and added nutrients.

However, despite that several studies that have been published proving the viability of producing jams whose main ingredient and flavor component are either apple, or cucumber; however, studies that incorporate these said ingredients into a banana jam recipe are nowhere to be found in any published journals or articles. It was identified that there seemed to be a research gap in this area of interest, resulting in the researchers' motivation to undertake this study.

The researchers hope that by developing and incorporating apple and cucumber into a recipe for their existing banana jam recipe, they will be able to hopefully improve both the flavor and the health benefits of the product that in the long run might revitalize or enhance the product's market competitiveness.



## II. OBJECTIVES OF THE STUDY

The objective of the study is to come up with a recipe that, when combined with the one for banana jam, yields an improved product by the addition of healthy elements such as apples and cucumbers. And provide some suggestions as to whether or not the final product is acceptable and whether or not it will be profitable.

Specifically, the objectives of the study are the following:

1. to develop a banana jam recipe flavor variation with apple and cucumber as added ingredients;
2. in order to conduct a cost analysis of the raw ingredients and components used in the production process;
3. to evaluate the new banana jam recipe utilizing the following characteristics:
  - 3.1 taste;
  - 3.2 appearance;
  - 3.3 texture;
  - 3.4 smell/aroma;
  - 3.5 overall opinion of respondents.
4. to determine the acceptability and feasibility of banana jam infused with apple and cucumber.

## III. RESEARCH METHOD

The quantitative research approach served as the foundation for this product development study. In the process of developing new products, quantitative research may be helpful since it can find a way to reach a perspective on the product's attractiveness, advantages, and the purchasing intention of existing or future consumers, moreover it can help put certain theories about your goods to the test, and let the results inform your judgments regarding the next steps to take (Jagtap & Duong, 2019). It was an attempt to develop and evaluate the acceptability of apple and cucumber-infused banana jam, in terms of appearance, texture, flavor, and aroma. Additionally, it was an attempt to evaluate the acceptability of other ingredients that were incorporated into the recipe or the overall characteristics.

### **Materials:**

#### **1. INGREDIENTS for BANAPPLE JAM**

*BANAPPLE JAM - Combination of banana based jam with apple flavour.*

- 500 grams Banana
- ¼ kg White sugar
- ¼ kg Brown sugar
- ½ tsp Cinnamon powder
- 1 Lemon Juice or 20 calamansi
- 500 grams Apple



- 1Tbsp Brown sugar
- 1Tbsp Vanilla extract

## **2. INGREDIENTS FOR BANACUMBER JAM**

*BANACUMBER JAM - Combination of banana based jam with cucumber flavour*

- a. 500 grams Banana
- b. ¼ kg White sugar
- c. ¼ kg Brown sugar
- d. ½ tsp Cinnamon powder
- e. 1 Lemon juice or 20 calamansi
- f. 5000 grams Cucumber
- g. 1Tbsp Brown sugar
- h. 1Tbsp Vanilla extract

## **3. TOOLS AND EQUIPMENTS**

- a. Bowl
- b. Kitchen knife
- c. Chopping board
- d. Measuring cups
- e. Measuring spoons
- f. Pot of water
- g. Large cooking pot
- h. Sauce pan
- i. Spatula or wooden spoon
- j. Pot holder
- k. Spoon



### **Procedures:**

#### **BANAPPLE JAM**

1. Sterilize your glass jars.
2. Wash, peel, slice and mash your bananas.
3. Extract the juice from calamansi.
4. Mise en place all the ingredients and double check it.
5. Place all the ingredients in a sauce pan except the grated apple and 1Tbsp brown sugar.
6. Heat and cook (stirring occasionally) for about 5-10 minutes.
7. Add the washed and grated apple and 1Tbsp brown sugar. Stir.
8. Let cool and transfer to sterilized jar.

#### **BANACUMBER JAM**



1. Sterilize your glass jars.
2. Wash, peel, slice and mash your bananas.
3. Extract the juice from calamansi.
4. Mise en place all the ingredients and double check it.
5. Place all the ingredients in a sauce pan except the blended cucumber and 1Tbsp own sugar.
6. Heat and cook (stirring occasionally) for about 5-10 minutes.
7. Add the washed and blended cucumber and 1Tbsp brown sugar. Stir.
8. Let cool and transfer to sterilized jar.

### ***Sensory Taste Test Evaluation Tool***

The palatability of a food product, often known as its taste, is the most significant factor for present consumers to take into consideration while selecting and eating a food product. In order for businesses to have a competitive edge in the food and beverage industry, they need to ensure that the food they sell has an aroma, taste, texture, and look that customers will find appealing and tasty (Civille & Oftedal, 2012). In other words, the most important factor in evaluating the excellence of a food product is how much the customer loves it and how little the consumer hates it; hence, sensory evaluation is a reliable method for measuring the level of acceptance of a food product.

Because of this, the researchers generated the instrument that was used to assess the produced recipe for apple and cucumber-infused banana jam from Linn Svensson's Design and Performance of Small Scale Sensory Consumer Tests (2012). Svensson's sensory evaluation is defined as a scientific discipline that, among other things, is used to elicit, measure, analyze, and evaluate responses to goods encountered through the five senses of a human person. Affective Analysis tests, also known as preference tests or hedonic tests, were compiled into the research instrument that was employed for this particular investigation. A consumer's degree of approval or disapproval of a product may be determined using the Affective Analysis technique, this approach can also be used to gauge a respondent's preference (Wolf Frandsen et al., 2003). The purpose of this research is to ascertain whether or whether current or potential customers have a special affinity or acceptance for a newly developed idea, a certain component, or particular product features (Johns, 1993). It is common practice to employ consumer testing for affective testing since the volunteers in such studies are required to always be inexperienced and fair representatives of the population that is being tested (Svensson, 2012).

In order to collect data on the acceptability of apple and cucumber-infused banana jam recipes in terms of look, aroma, texture, taste, and overall acceptability, researchers developed a questionnaire. On a hedonic scale with nine points apiece, the questionnaire for the study project comprises four sensory ratings for each item. The nine-point hedonic scale is among the market testing procedures that are used the most often for analyzing the attractiveness of food products among customers. There are a variety of market testing approaches that are used (Yang & Lee, 2018). The responses that respondents gave to the questions regarding the market potential and acceptability of apple and cucumber infused banana jam recipe were included in the questionnaire checklist that was used for the research. This made the questionnaire the primary source of information for the study.



When taking part in the test, participants/consumers are asked to express their hedonic opinion on a product sample by choosing and marking one of nine alternatives. This is done so that the results may be analyzed (range from 1 to 9; 9 extremely like and one being extremely disliked). In the given circumstances, each of the nine possible choices on the scale does in fact correspond to a linguistic representation. Each scale option has been designed and confirmed via extensive effort and research. Because each scale choice is founded on roughly equivalent variances, the scale has properties similar to a ruler as a consequence of this process. The linguistically anchored nine-point hedonic scale, often known as "The degree of liking scale," is seen in the image below.

**Table 1: Verbally Anchored 9-Point Hedonic Scale/" The Degree of Liking Scale."**

Scale	Verbal Interpretation
4	Like Very Much
3	Like Moderately
2	Dislike Moderately
1	Dislike Very Much

The instrument used for the research was indeed a good match, just as the researchers intended to gauge how participants/consumers reacted to the product they were testing.

#### IV. RESULTS AND DISCUSSION

Shown below is the summary of the findings of the sensory evaluation for varieties 2 using the four-point hedonic scale.

**Table 2: Banana Jam Infused with Apple**

Category	Weighted Mean	Verbal Interpretation
Appearance	7.11	Like Moderately
Aroma	7.25	Like Very Much
Taste	7.68	Like Very Much
Texture	6.87	Like Moderately
Over-all Weighted Mean	7.23	Like Very Much

Table 2 shows the findings of the sensory evaluation of Banana Jam Infused with Apple. The overall weighted mean got 7.23 and verbally interpreted as "Like Very Much". The taste of banana jam with apple got the highest mean of 7.68 with verbal interpretation of "Like Very Much", while texture had lowest mean of 6.87 and interpreted as "Like Moderately". The findings revealed that Banana Jam with infused of apple had good taste with aromatic smell and good in appearance even the texture. The findings concluded that banana and apple was feasible and had potential as Banana

**Table 3: Banana Jam Infused with Cucumber**

Category	Weighted Mean	Verbal Interpretation
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<b>Appearance</b>	7.52	Like Very Much
<b>Aroma</b>	7.24	Like Very Much
<b>Taste</b>	6.48	Like Moderately
<b>Texture</b>	6.38	Like Moderately
<b>Over-all Weighted Mean</b>	6.91	Like Moderately

Table 4 shows the findings of the sensory evaluation of Banana Jam Infused with Cucumber. The overall weighted mean is 6.91 or Like Moderate. Appearance got the highest weighted mean of 7.54 with verbal interpretation of Like Very Much. On the other hand, Texture got the lowest weighted mean of 6.38 which can be interpreted as Like Moderately. Banana Jam infused with Cucumber is associated with smoothie due to its much-alike characteristic which was evident on the result since both fruits are being used as ingredients in making a smoothie. The moist appearance of pureed cucumber combined with the sugary appearance of pureed banana resulted to a pleasing appearance for the correspondents.

## V. CONCLUSION AND RECOMMENDATIONS

### *Conclusion*

Based on the result of the sensory evaluation conducted using the nine-point hedonic scale, the researchers came up with the following conclusions:

1. Variety 1 which is Banana Jam Infused with Apple got the highest weighted mean compared with other variety with a 7.23 weighted mean interpreted as Like Very Much. Which means it is more acceptable to the palate of the possible clients. Variety 2 seconded the highest evaluation result with 6.91 weighted mean verbally interpreted as Like Moderate, a Banana Jam Infused with Cucumber which means an another feasible product that is also acceptable to the palate of the customers.
2. Acceptability to the palate of the customers on the two varieties of banana jam have the relevance to its ingredients individual characteristics which when combined are able to produce an acceptable taste and appearance. Apple, Cucumber and Banana were widely used as ingredients in making.

### *Recommendation*

The researchers recommend to conduct further studies on other Fruits that will complement the flavors of the Banana Jam. Other processes to prolong the shelf-life of the product be studied and tested as well. Market profitability and acceptability of the drink must be considered and checked.

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