

Development and Proximate Analysis of Muffin Cake Enhanced with Plantain Flower and Almond Powder

A project report submitted to the Daffodil International University, Dhaka.

For the fulfillment of the Nutrition & Food engineering



Submitted to

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LETTER OF TRANSMITTAL

Date: 18.01.2023

The Head,

Department of Nutrition and Food Engineering (NFE)

Faculty of Allied Health Science

Daffodil International University

Subject: Submission of Project Work Report

Dear Sir,

It is a great pleasure to submit my Project Report titled as “**Development and Proximate Analysis of Muffin Cake Enhanced with Plantain Flower and Almond Powder**” as a partial requirement of the Program and a prerequisite for completion of the B.Sc. in Nutrition and Food Science Program.

Based on the knowledge and experience I obtained over my entire project, I wrote this report. I have the possibility to work at your university under Md. Harun-Ar Rashid, Lecturer(Senior Scale),Department of Nutrition and Food Engineering.

As a result, I respectfully ask and expect that you would evaluate my report as soon as possible and honor me with any kind of advice or worthwhile proposal. As a result, I kindly request and anticipate that you will appreciate my recommendations and valuable suggestions and will accept this report for your thoughtful review in formal way. I shall be highly obliged if you are kind enough to accept this report and provide me your valuable judgment. It would be my immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Thank you again for your support and patience.

Joya Rani Mondol

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CERTIFICATE OF APPROVAL

I am pleased to certify that the project work/thesis report on “**Development and Proximate Analysis of Muffin Cake Enhanced with Plantain Flower and Almond Powder**” driven by **Joya Rani Mondol** and **ID: 182-34-773**; Department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voice.

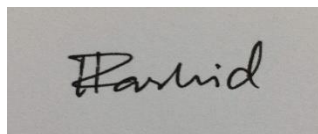
I am glad to certify that the data and findings contained in the report are the result of Joya Rani Mondol’s excellent effort. I heartily recommend Joya’s report for further academic recommendations and defense/viva voce. Joya has a lovely demeanor and a great moral character. Working with him has been a real pleasure. I wish him the best of luck in life.

Dr. Nizam Uddin

Associate Professor and Head In-Charge

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Md. Harun-Ar Rashid

Senior Lecturer

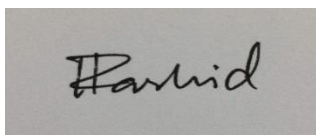
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DECLARATION

This treatise, titled “**Evaluation of Sensory Quality and Proximate Composition of Muffin Cake**” is being submitted to the Department of Nutrition and Food Engineering, Faculty of Allied Health Science, Daffodil International University, Daffodil Smart City, Ashulia, Savar Dhaka-1341, Bangladesh, as part of the requirements for the degree of Bachelor of Science in Nutrition. No part of the thesis’s work has been submitted in support of an application for another degree or qualification from this or any other university or institute of learning.



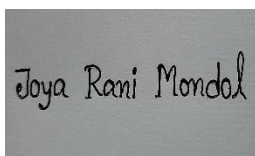
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ACKNOWLEDGEMENT

First of all, my gratitude's and thanks go to the Almighty Allah, the most merciful and the kind who has blessed me with the ability to make this work successful. I would like to say thanks to the Honorable Vice Chancellor of Daffodil International University (DIU) for extending me this opportunity to pursue my B.Sc. Degree in Nutrition and Food Engineering (NFE) Department.

My deep gratitude and sincere thanks to Professor **Dr. Bellal Hossain** the Associate Dean, Faculty of Allied Health Sciences (FAHS); and Associate Professor **Dr. Nizam Uddin** the Head (In-charge), Department of Nutrition and Food Engineering (NFE), for their kind cooperation and encouragement to assign and accept this Internship Report. My deep and sincere appreciation to **Md. Harun-Ar Rashid**, Lecturer (Senior Scale), Department of Nutrition and Food Engineering for his constructive suggestions, effortless guidance and continuous support throughout my project work which has helped me immensely to complete this work successfully.

I am also thankful to my Batch Advisor **Ms. Tasmia Tasnim**, Assistant Professor, also thankful to all of my great teachers.

My warmest thanks to our Coordination Officer **Mr. Emran Hossain**, Assistant Technical Officer **Mr. Reaz Mahmood** and Assistant Officer **Mr. Elahi Box**. My gratitude goes to the entire NFE Department of Daffodil International University for arranging this research opportunity and facilitating the work throughout.

ABSTRACT

Muffins are baked goods with a moderate to high sugar content. Plantain flower is an underutilized part of banana plant, which is rich in protein and minerals. There for the primary purpose of this study is to develop protein rich more nutritious muffin cake enhanced with plantain flower and almond powder as well as rich in iron and calcium. Basically 3 cake samples were prepared for better consumer outcome to finalize final product using various quantity of gluten free wheat flour, Almond powder, Plantain flour and butter combination. The proximate composition of the final product is 16.40% moisture, 1.25% ash, 14.58% protein and 34.3% fat. Sensory characteristics analysis was conducted with 65 assessors utilizing a nine-point hedonic scale, with 9 indicating extreme like and 1 indicating extreme disliking of attributes such as color, taste, flavor, texture, and overall acceptability. Where sample 3 got good marks overall according to color, taste, texture and overall acceptability. So that I decided to develop sample 3 as final product. As Plantain flower primarily rich in protein, iron, calcium while almond powder also rich protein, fat, calcium, selenium, dietary fiber so that which can improve the nutritional profile of traditional muffin cake. The sensory quality of newly developed cake were also analyzed. Overall sensory quality of Muffin Cake Enhanced with Plantain Flower and Almond Powder (sample 3) among all assessors 55% liked very much while 39% liked extremely and 6% liked moderately according to sensory characteristics.

Keywords: *Muffin, Plantain flour, Almond powder, Sensory characteristics, proximate analysis, Hedonic test, Food development*

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CHAPTER 1

Introduction

1.1 Background of the Study

Concerns over the development of this muffin with high nutritional content are strongly related to rising consumer demands for these foods, especially in industrialized nations where eating a balanced diet is connected with preserving or even enhancing health status. The creation of food products for those who have heightened sensitivities to particular foods is given special consideration. [1]

Muffins are baked goods with a moderate to high sugar content. A typical muffin also includes different amounts of flour, oil, and egg, as well as baking powder, flavoring, and milk, in addition to sugar. Depending on the type of baked goods, different ingredients in cakes and hence muffins seem to work differently. On the functionality of protein and starch, there are speculative and outdated data, whereas the impacts of fat and sugar have undergone more recent research. [2]

Because of the increasing number of people suffering from food intolerances in general and gluten intolerance in particular, the development of such cereal based foods could no longer be delayed.

As almond flour has become such a standard in carb baking, I've started utilizing it more frequently in my last several baking. Almond meal and almond flour were formerly only available at health food stores. These days, they are practically as ubiquitous as your typical whole wheat or all-purpose flour. The less sweet, starchier alternative to the banana is the plantain.

Plantains are a very significant nutritious source of food in tropical nations, even though that sweet bananas, commonly referred to as "dessert bananas," are significantly more popular. Another reason why people are drawn to banana blossoms is that they are soy-free, gluten-free, and cholesterol-free, according to Brody.

1.2 Operation Definition

Health benefits of Almond: 9 Evidence-Based Health Benefits of Almonds

1. Almonds Contain a Huge Variety of Nutrients
2. Almonds Contain a Lot of Antioxidants
3. Almonds Contain a Lot of Vitamin E
4. Almonds Can Help Control Blood Sugar
5. Magnesium Helps Lower Blood Pressure
6. Cholesterol Levels Can Be Reduced by Almonds

Health benefits of Plantain flower: These are just a few of the many advantages of plantain flour.

1. It enhances heart health.
2. Rich in Iron, Calcium, Potassium, Vitamin A,C,E.
3. Guards against neuritis and anemia. Its iron content works well to raise blood levels.
4. Rich in dietary fiber encourages healthy eating and weight loss.
5. Enhances the digestion and circulatory systems.

1.3 Risk Factor

Insufficient Evidence Insufficient Evidence to Rate Effectiveness for plantain

- ✓ Common cold.
- ✓ Ongoing (chronic) bronchitis
- ✓ Bladder infections.
- ✓ Hemorrhoids.
- ✓ Skin conditions, when applied to the skin.
- ✓ Eye irritation, when applied to the eye.

1.4 Objectives:

- ✓ Aim of the study is to come up with a new kind of cake.
- ✓ Development of plantain flower and almond muffin.
- ✓ To develop a gluten free bake good.

- ✓ To develop more nutritious muffin.
- ✓ To serve iron and calcium rich muffin.
- ✓ To compare as high caloric muffin to other.

CHAPTER 2

Literature review

Development of food products which is muffin using plantain flower and almond powder with high nutritional value is an actual concern for scientist and producers from food industry. Food products for people with increased sensitivity to specific foods, such as gluten intolerance, that might suggest a condition known celiac disease, are developed with special consideration. In this study, it has been suggested to create a gluten-free product for celiac disease patients as well as for kids and other people. In this study, gluten-free muffins made with chia seeds, rice flour, and almond flour (AF) as well as fruits were produced (apple and banana). [3]

Concerns over the development of foods with high nutritional content are strongly related to rising consumer demands for these foods, especially in industrialized nations where eating a balanced diet is connected with preserving or even enhancing health status. The creation of food products for those who have heightened sensitivities to particular foods is given special consideration. Because of the increasing number of people suffering from food intolerances in general and gluten intolerance in particular, the development of such cereal-based foods could no longer be delayed. [1]

Gluten is a protein complex which is found in some cereals - barley, wheat, rye and in some bakery products such as pasta or bread. Almonds (*Prunus dulcis*) are one of the most widely produced tree nuts in the Mediterranean nations, the USA, Australia, and China. Consuming gluten can cause celiac disease, also known as autoimmune enteropathy, which is triggered to persons with a genetic susceptibility. [4] Over the past few decades, the consumption of almonds has grown yearly in industrialized nations. With a high quantity of protein, minerals, and unsaturated fatty acids, almonds offer a strong nutritional value. Its fatty acid composition may have positive effects on health. Almonds, on the other hand, are a highly popular food allergy. [4]

During baking and mixing, air bubbles are integrated into the batter, creating linked gas bubbles in the final muffins' crumb that give them an aerated structure. Both the fat crystals and the adsorbed egg protein serve to stabilize the air bubbles. A stable emulsion

of fat and water results from the fat dispersing into a protein-stabilized emulsion during mixing. Fat crystals melt as the temperature rises during baking and form a protective covering on the inner surface of the air bubbles. [4]

CHAPTER 3

Materials and Methods

3.1 Materials and Location of Study

All of the materials used to make the gluten-free muffins were bought from hypermarket and department stores.

The study was conducted at Well Food and Beverage Company Limited in their production floor. But before making final products I have made two products for trail at Food Processing Lab, DIU.

3.2 Ingredients

- Flour
- Sugar
- Butter
- Egg
- Salt
- Vegetable oil
- Baking powder
- Citric acid
- Cake jell
- GMS (Glycerol monostearate)
- Soya Lecithin
- Potassium sorbate
- Sodium propionate

3.3 Major Ingredients

- ✓ Plantain Flower
- ✓ Almond Powder

3.4 Process of getting raw materials:

The major raw materials basically plantain flower and almond powder, I collected those from local market. After that I have blended for getting powder.

All of the raw materials I used here getting from their store room (Well Food and Beverage Limited) most of the ingredients and preservatives were imported.

3.5 Equipment and Apparatus:

- Bowl
- Planetary mixture
- Rotary oven
- Measuring balance
- Sealing machine
- Knife
- Muffin tray

3.6 Formulation of a Muffin:

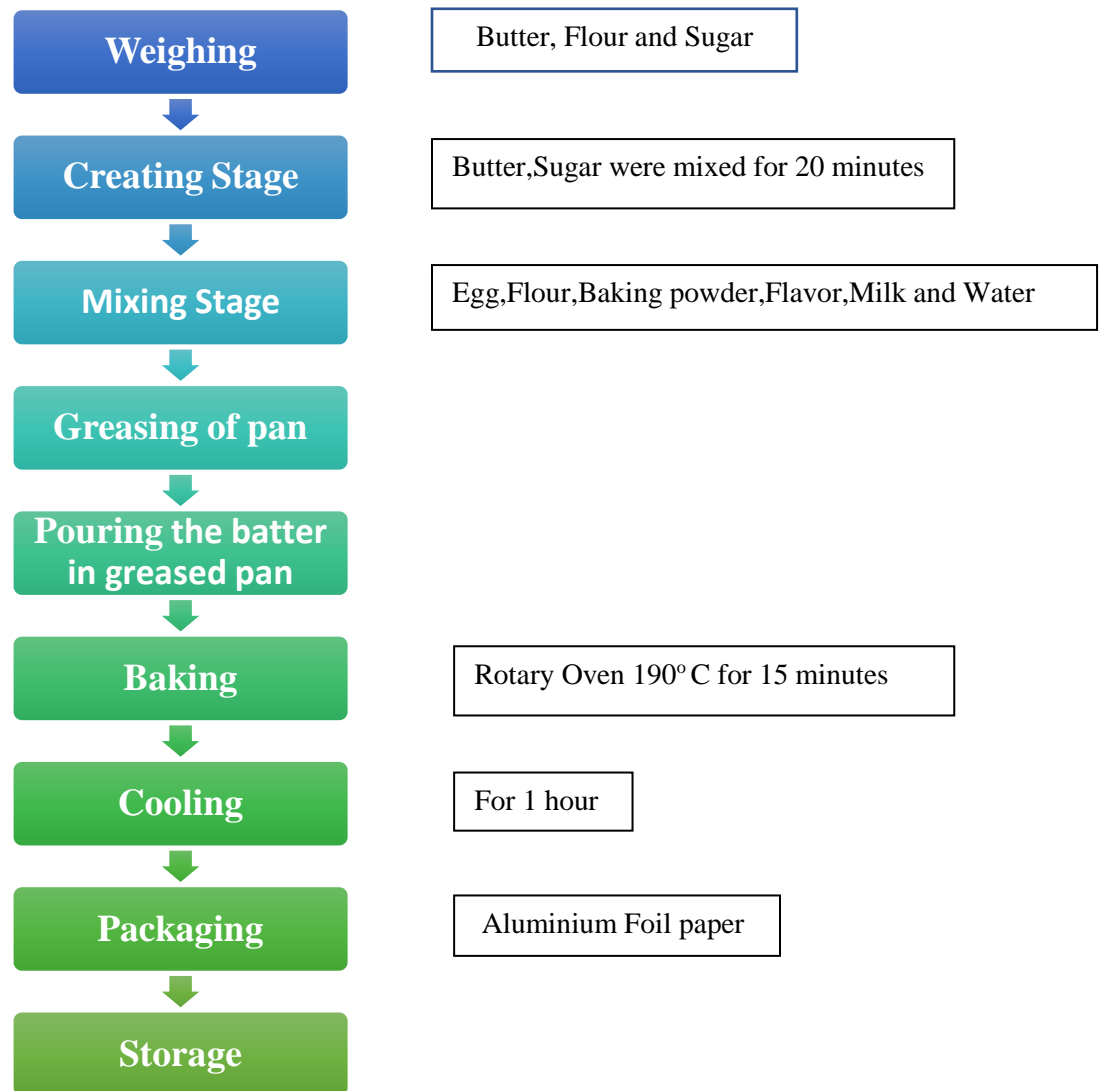


Figure-1: Flow Chart for preparation Muffin Cake

3.7 Different formulation of cake

Table-1:Ingredients and Measurement Chart for Muffin

| Ingredients | Sample 1 | Sample 2 | Sample 3 |
|-----------------------------|----------|----------|----------|
| Wheat flour (low gluten) | 70g | 70g | 70g |
| Plantain flour | 6g | 3g | 6g |
| Almond powder | – | – | 5g |
| Sugar | 8g | 8g | 8g |
| Egg | 1pc | 1pc | 1pc |
| Butter | – | 10g | 10g |
| Salt | 0.8g | 0.8gm | 0.8g |
| Vegetable oil | 10g | 10g | 10g |
| Cocoa powder | 2g | – | – |
| Baking powder | 1g | 1g | 1g |
| Cake jell | – | – | 5g |
| Milk powder | 5g | – | – |
| Citric acid | – | – | 0.1tsp |
| Soya lecithin | – | – | 0.05tsp |
| Potassium sorbate | – | – | 0.2tsp |

Source: Author's Compilation

Sample 1

Figure-2: Muffin with Cocoa powder



Sample 2

Figure-3: Muffin without Cocoa Powder



Sample 3

Figure-4: Enhanced with Almond powder



3.8 Samples defect of muffin cake

Table 2: Quality analysis of Muffin

| Samples | Parameter | Result |
|----------|---------------------|----------|
| Sample 1 | Taste | Good |
| | Texture | Bad |
| | Egg smell | Yes |
| | Hardness | Yes |
| | Soft | Medium |
| | Approve this muffin | No |
| Sample 2 | Taste | Medium |
| | Texture | Bad |
| | Egg smell | Slightly |
| | Hardness | Yes |
| | Soft | Medium |
| | Approve this muffin | No |
| Sample 3 | Taste | Good |
| | Texture | Good |
| | Egg smell | No |
| | Hardness | No |
| | Soft | Good |
| | Approve this muffin | Yes |

Final Product



Figure-5: Final Product after Sensory Evaluation

CHAPTER 4

Proximate Analysis

The following techniques were used to measure the moisture, ash, fat, and protein content of developed muffin cakes. Moisture was measured using a Digital Moisture Analyzer wet method at 1200 C for 5-7 minutes; ash was measured using a muffle furnace ignition method at 6000 C for 6 hours; protein was measured using the Kjeldahl method for 24 hours; and fat was measured using Soxhlet method with n-hexane for 6 hours.

4.1 Moisture determination using a functional muffin cake

Instrument: Digital Moisture Analyzer

Sample weight 1.200 gram

Procedure:

- ✓ I started by taking a 1.2 gram sample.
- ✓ When the digital moisture analyzer indicated it was finished, the sample was inserted into it.
- ✓ After the signal, I looked at the moisture value.
- ✓ On the other hand, samples' moisture content was examined in a dry air oven at 105°C. The equation read as follows:
- ✓ $[\text{Final weight (in gram)} / \text{Raw sample weight (in gram)}] \times 100 = \text{Moisture content (\%)}$.
- ✓ Final weight in this case is (Crucible + dried sample) - (Crucible + raw sample).

4.2 Ash determination

For one hour, a silica dish was heated to 100°C before being dried off. Every sample was put on a silica plate and heated for around 3 grams. The dish was placed inside the furnace, and the temperature was allowed to increase until it reached about 6000 C. The samples' organic matter content was entirely destroyed since the temperature was maintained at the same level until all of the water had been removed. The silica dish was then taken out of the furnace, let to cool in desiccators, and then it was given new weight.

Procedure

Step-1: The Crucible's Preparation

Step-2: Sample preparation

Step-3: Combustion/Burning

Step-4: The final weight (After Ashing)

Calculation

In other terms, ash is the inorganic residue that is left over after the full oxidation of organic materials in a food sample or after its ignition. Ash concentration in the muffle furnace was measured. The equation read as follows:

$$\% \text{ Ash} = ((\text{ashed wt.}) - (\text{crucible wt.})) \times 100 / ((\text{crucible and sample wt.}) - (\text{crucible wt.}))$$

$$\text{Crucible} + \text{Ash weight} = 24.945 \text{ gram}$$

$$\text{Crucible weight} = 24.920 \text{ gram}$$

$$\text{Crucible} + \text{Sample wt.} = 26.920 \text{ gram}$$

4.3 Protein determination

The protein content of various novel muffin cake samples was determined using the Kjeldahl Method.

4 steps of Kjeldahl method

Step-1: Digestion

Step-2: Distillation

Step-3: Titration

Step-4: Calculation

Chemical / Reagent List:

Digestion:

- ✓ Sulfuric acid(concentrate 95%-98%)
- ✓ Catalyst (2g Copper sulphate+98g Potassium sulphate)
- ✓ 40% sodium hydroxide solutions
- ✓ Hydrochloric acid (0.1N)
- ✓ Boric acid (4%)
- ✓ Methyl red indicator

Digestion

4g was put on foil paper or weighing paper for the sample's digestion. A digestion flask was filled with the material. Two grams of the digestion mixture were added to the flask after ten milliliters of H₂SO₄ were added. Two digestion flasks were used to calculate an average value. The flasks were then utilized after being heated in a kjeldahl digesting chamber. The experiment began at a temperature of 400 degrees Celsius. The temperature eventually rose to 600 degrees Celsius. The solution has to remain in the solution for 3–4 hours in order to become colorless. In order to complete the experiment, the flasks were then allowed to cool before being diluted with 100mL of distilled water.

Distillation

10 mL of the solution were transferred from that flask to the distillation flask. The flask was filled with 150 ml of distilled water. The distillation flask received 10ml of 40% NaOH.

The solution had no color at all. Three distillation flasks were used in this experiment, one of which had no sample in it at all. The reagents were the only thing in the third distillation flask; there was no sample at all. In contrast, 10 mL of 0.1N HCl were added to 50 mL of clean water in a trapping conical flask. The trapping conical flask received two drops of methyl red. The answer started to become pink. Conical trapping flasks in three identical sets were used. The distillation procedure was finished by using operation

after 30 minutes. The NaOH solution was titrated in conical flasks. The burette was loaded with 0.1N NaOH for titration. Conical trapping flasks were subsequently used after that.

Titration

Placed under the burette for titration. The burette's trapping conical flask was filled with NaOH, and each drop was added while the flask was gently shaken. NaOH was poured in until the color changed. In the end, the hue changed from pink to bright yellow.

In short, Micro-kjeldahl method was estimated to protein content of the samples.

The formulas utilized were as follows:

$$[(B - S) * 10 * 5.95 * 1.4 * 0.1]/0.4$$

Here,

S = Titration reading for sample; B = Titration Reading for blank

Initial reading = 0-9.1;

Final reading = 9.1-17.5

Blank reading, B = 9.1

Sample reading, S = 17.5-9.1 → 8.4

4.4 Fat determination

Equipment:

- Weighing machine
- Thimble
- Water bath
- n-Hexane
- Hot plate
- Dish
- Soxhlet apparatus
- Moisture analyzer machine

Procedure

1. Fill the thimble with a 5 gram quantity of grounded, dry material (moisture removed).
2. Put the thimble in the soxhlet extractor in step two.
3. Put 90 mL of n-Hexane in a 150 mL flask with a circular bottom.
4. Set up the whole thing on a heating mantle and let the n-Hexane come to a boil.
5. The extraction process should be carried out for a number of hours, up to six.
6. Permit the sample to cool completely before detaching the condensing unit from the extraction unit. It finally gets rid of all lipids.
7. Almost all of the solvent should be collected after distillation.
8. After drying the sample off and removing it from the oven, place it in the desiccator.
9. Determine the sample's weight.

In summary, the crude lipid content was estimated using the Soxhlet organic extraction device. Materials were dried before extraction with petroleum ether.

This formula was used to compute it:

$$[(w_2 - w_1)/p] * 100$$

Here,

W_1 = 168.1 gram (Empty thimble)

W_2 = 169.8 gram (Thimble with sample)

p = 4.95 gram (Weight of Sample)

4.5 Sensory Evaluation

This sensory assessment makes use of the Hedonic Rating exam. Taste, texture, color, flavor, and other crucial sensory qualities are only a few.

Hedonic scales are well tried and tested in consumer research for capturing liking data (Stone and Sidel, 1985). Figure shows a typical example of a nine-point hedonic scale, a version regularly used with consumers in preference mapping studies to capture liking scores. [5]

Table 3: Hedonic scale table.

| | | | | | | | | |
|---------------------------|-------------------------------|----------------------------|--------------------------|---|-----------------------------|-------------------------------|----------------------------------|------------------------------|
| Like extremely | Like very much | Like moderately | Like slightly | Neither like nor Dislike | Dislike slightly | Dislike moderately | Dislike very much | Dislike extremely |
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Procedure:

- ✓ A succession of spoken expressions that express varying degrees of likeness or dislike make up a hedonic scale.
- ✓ The degree of like or hate is indicated by smiley faces with more kid-friendly vocabulary, simple images of facial emotions, or a 9-point scale.
- ✓ The taster may also want to comment on the product's texture, odor, taste, and appearance.
- ✓ Finally, I have analyzed the outcomes.

CHAPTER 5

Result and Discussion

5.1 Proximate composition

Table 4 is showing the nutrient content of the selected category. Muffin cake enhanced with plantain flower and almond powder contains about 16.4% moisture, 1.25% ash, 14.58% protein, 34.3% fat and 33.47% carbohydrate.

Table 4: Proximate composition(g/100g)

| Muffin Cake | Protein (g/100g) | Fat (g/100g) | CHO (g/100g) | Moisture (g/100g) | Ash (g/100g) |
|--|---------------------|-----------------|-----------------|----------------------|-----------------|
| Enhanced with plantain flower and almond powder | 14.58 | 34.3 | 33.47 | 16.4 | 1.25 |

Basically I've generated three samples out of them, with sample 3 being chosen as the final product based on nutritional content and a 9-point hedonic test. I used varying amounts of the primary ingredients for three distinct samples, such as a 30:30:20g plantain flour ratio for samples 1, 2 and 3. For sample 1, I only used milk powder, and for sample 3, I only used almond powder. In particular, cake jell weighs roughly 50g, and sample 3 required 1 teaspoon of citric acid to develop as well as the other two samples.

Where the final outcome was surprisingly excellent for sample 3. For that, I conducted sensory assessment with 65 assessors make use of the hedonic rating exam. Taste, texture, color, flavor, and other crucial sensory qualities are only a few. Hedonic scales are well tried and tested in consumer research for capturing liking data. And the result of 9-point hedonic test sample 3 got the highest score for being extremely liked by consumers. Where overall acceptability were 18% for sample 1, 30% for sample 2 while sample 3 got highest acceptability about 52% by 9-point hedonic test result for overall sensory quality according to taste, texture, flavor, color and appearance.

5.2 Sensory Quality

5.2.1 Sample 1 Sensory hedonic test

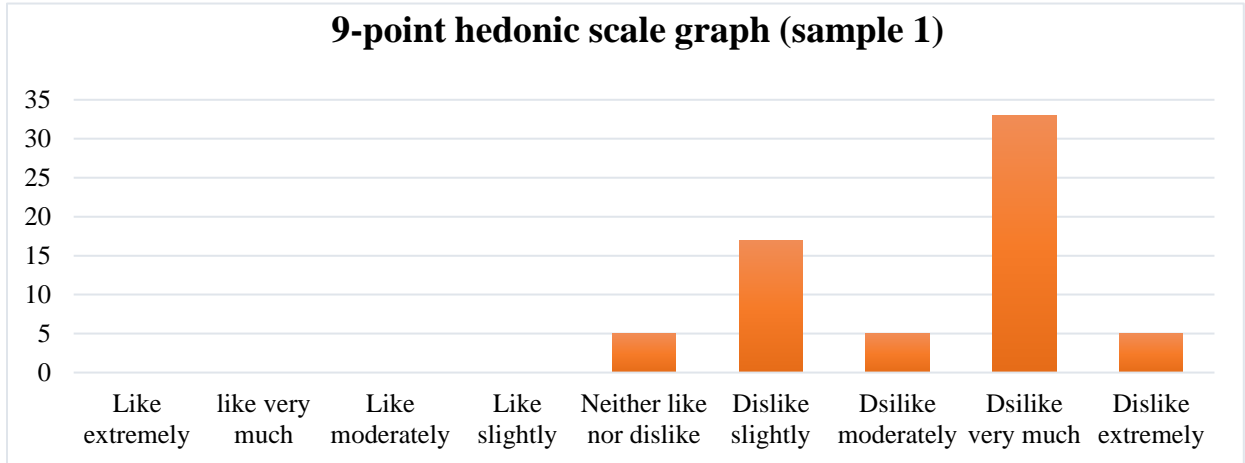


Figure-6: Sensory evaluation form of Sample 1

Figure 6 showing that out of 65 respondent's majority of them 33 people answered they disliked very much so that the acceptance of this sample cake going negative, that's why I rejected this sample for start developing new one.

5.2.2 Sample 2 Sensory hedonic test

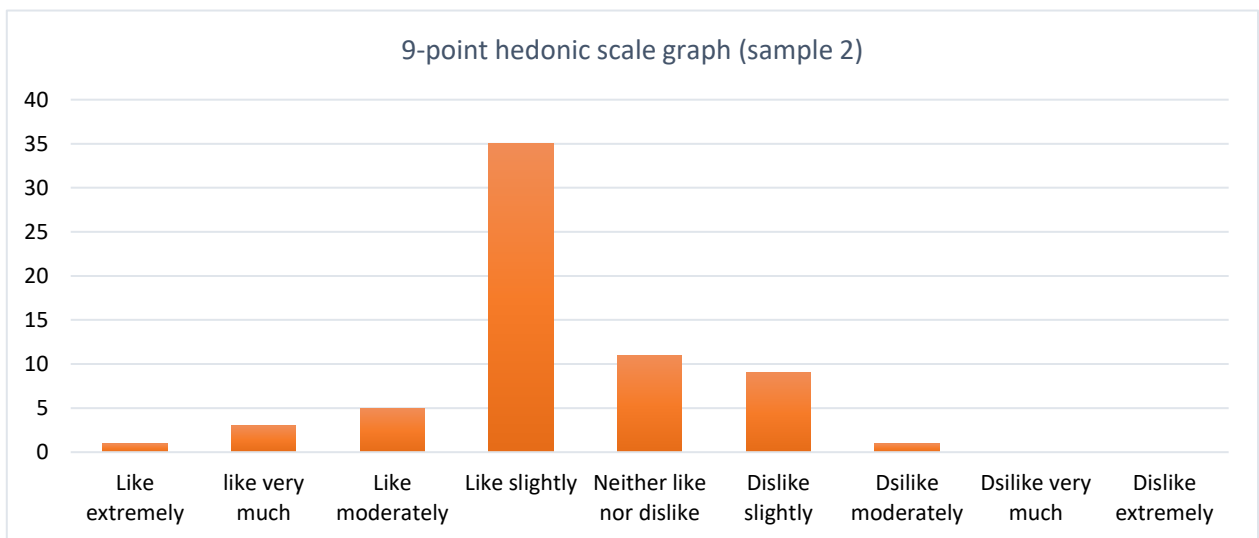


Figure-7: Sensory evaluation form of Sample 2

Figure 7 showing out of 65 respondent's majority of them 35 people said they liked this product slightly while some people said they disliked this product so the chances of acceptance is also negative for this product.

5.2.3 Sample 3 Sensory hedonic test

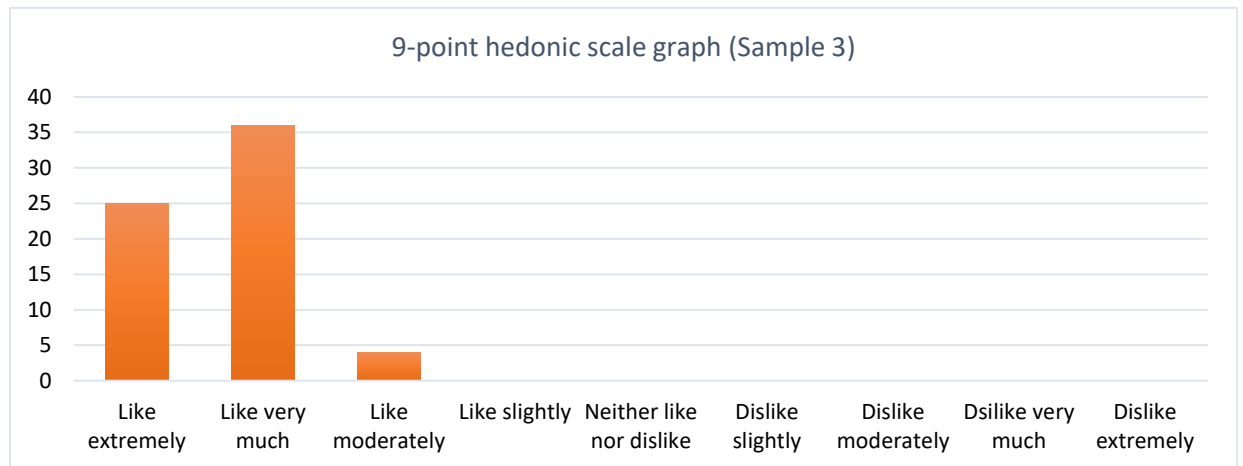


Figure-8: Sensory evaluation form of Sample 3

Figure 8 showing that out of 65 respondents here majority of them 36 people said they liked very much while 26 people said they liked extremely and people liked moderately while none said they like slightly or dislike. So that, this product sample 3 majority of people liked here consumer with dislike is Zero to that acceptance of this product is 100% to be finalize.

5.2.4 Overall Sensory Quality

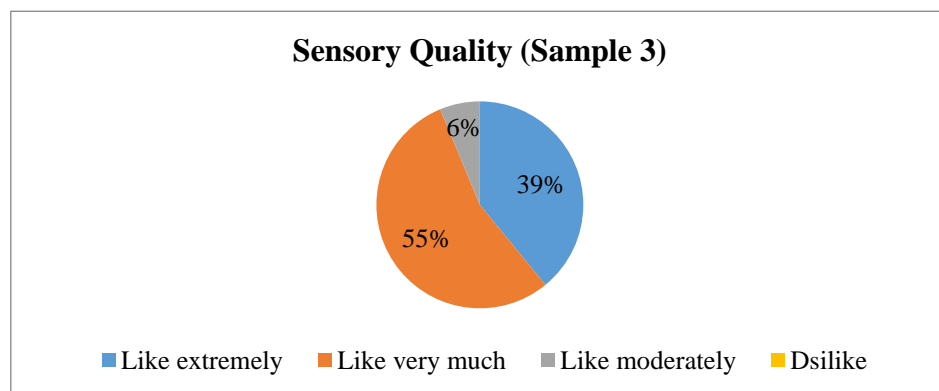


Figure-9: Overall Sensory quality of Muffin Cake Enhanced with Plantain Flower and Almond Powder

5.2.5 Appearance

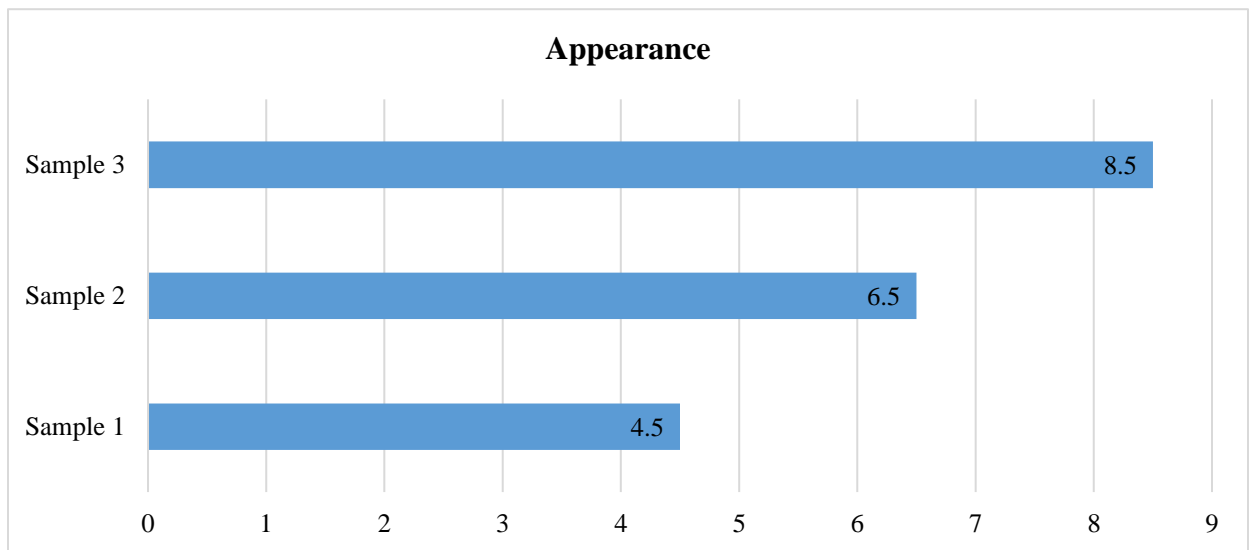


Figure-10: Appearance

The appearance attributes of samples 1, 2, and 3 are displayed on a 9-point hedonic scale, with sample 3 scoring the highest value for being extremely loved.

5.2.6 Taste Preference

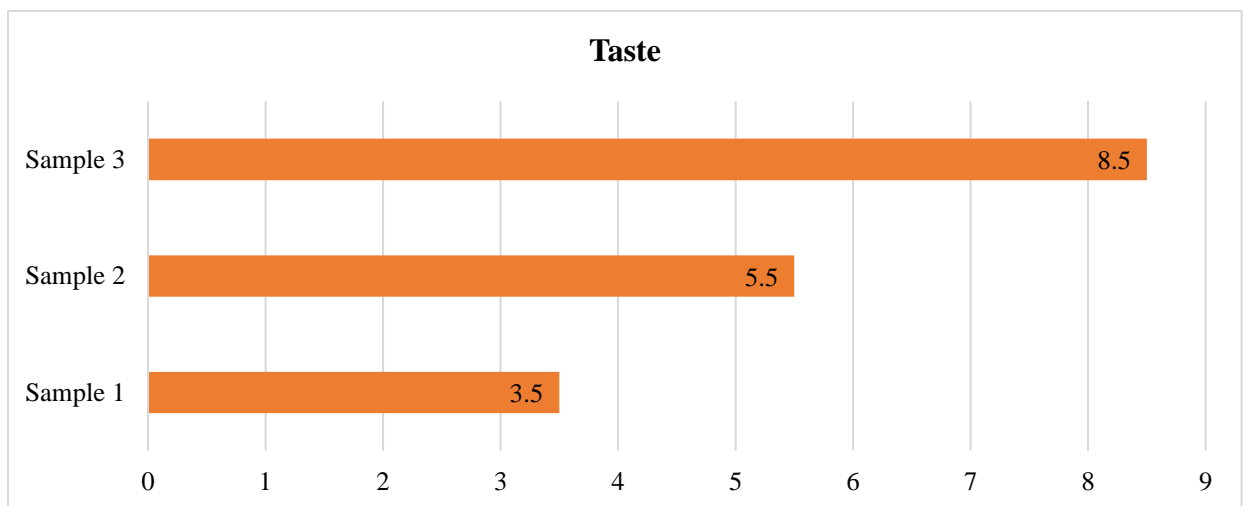


Figure-11: Taste Preference

The taste attributes of samples 1, 2, and 3 are displayed on a 9-point hedonic scale, with sample 3 scoring the highest value for being extremely loved.

5.2.7 Texture Preference

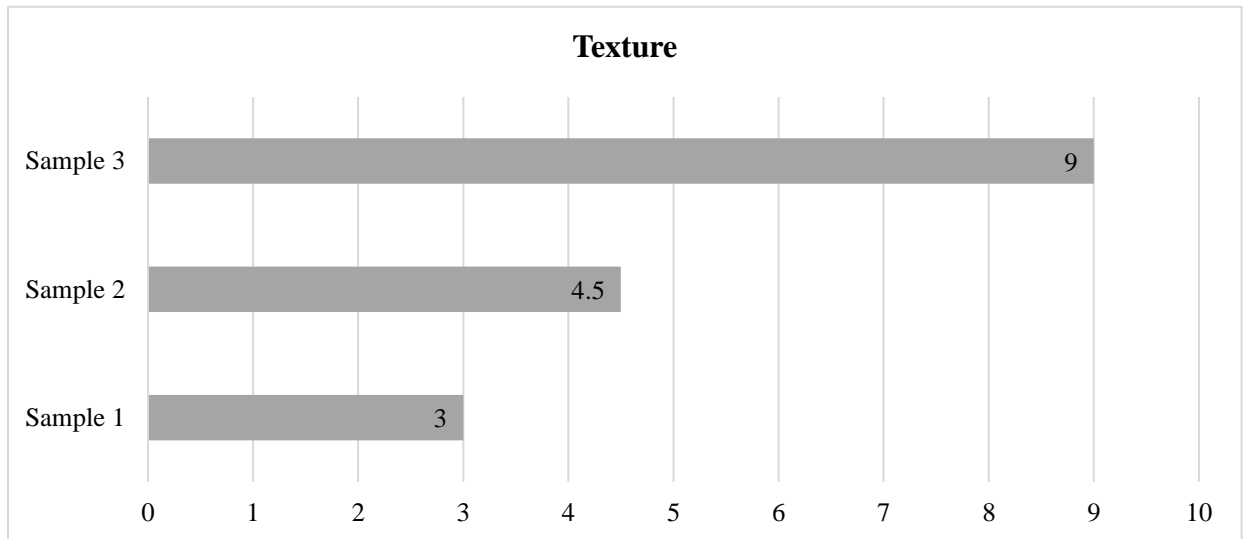


Figure-12: Texture Preference

The texture attributes of samples 1, 2, and 3 are displayed on a 9-point hedonic scale, with sample 3 scoring the highest value for being extremely loved.

5.2.8 Flavor Preference

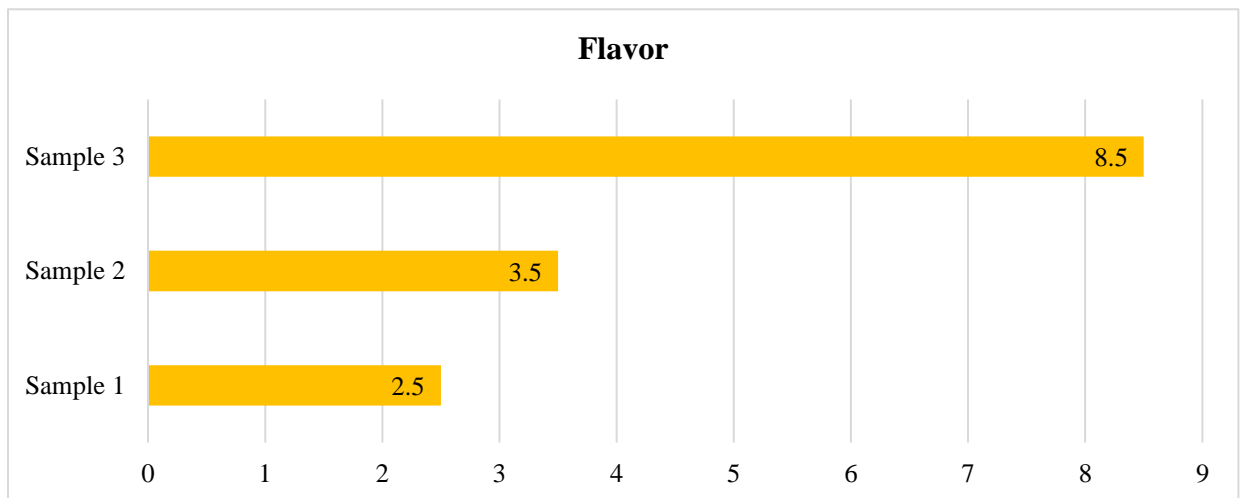


Figure-13: Flavor Preference

The flavor attributes of samples 1, 2, and 3 are displayed on a 9-point hedonic scale, with sample 3 scoring the highest value for being extremely loved.

5.2.9 Overall acceptability

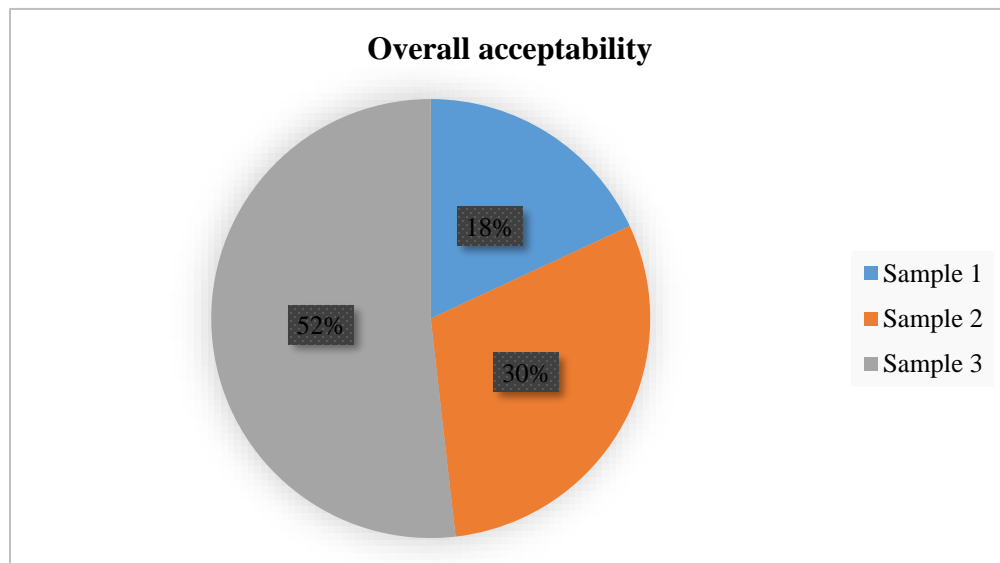


Figure-14: Overall acceptance of Muffin

Figure showing that, the overall acceptability of sample 3 novel muffin cake is surprisingly higher according to appearance, taste, texture and flavor attributes by 9-point hedonic scale. So that I have developed sample 3 as final product.

CHAPTER 6

Conclusion

To find the ideal product composition, muffin cakes with different ingredients and other component ratios were made for the study. The moisture content, ash content, protein content, and fat content of manufactured commodities were assessed to find the nutritional composition. asPlantain flower primarily rich in protein, iron, calcium while almond powder also rich protein, fat, calcium, selenium, dietary fiber so that which can improve the nutritional profile of traditional muffin cake. The sensory quality of newly developed cake were also analyzed and found that most of the consumer liked the 3rd composition significantly.

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QUESTIONNAIRE

SAMPLE – HEDONIC SCORE CARD RATING FOR MUFFIN CAKE ENHANCED WITH PLANTAIN FLOUR AND ALMOND POWDER

STUDENT NAME:

DATE:

PANELIST NAME:

CAKES CODE:

Please taste the given coded sample and mark (✓) how much you like or dislike it on the point in the scale which best describes your opinion.

| SL. NO | HEDONIC SCORE | ORGANOLEPTIC QUALITY | | | | |
|-----------|-----------------------------|----------------------|---------|-------|--------|------------|
| | | Taste | Texture | Color | Flavor | Acceptance |
| 1 | DISLIKE EXTREMELY | | | | | |
| 2 | DISLIKE VERY MUCH | | | | | |
| 3 | DISLIKE MODERATELY | | | | | |
| 4 | DISLIKE SLIGHTLY | | | | | |
| 5 | NEITHER LIKE NOR DISLIKE | | | | | |
| 6 | LIKE SLIGHTLY | | | | | |
| 7 | LIKE MODERATELY | | | | | |
| 8 | LIKE VERY MUCH | | | | | |
| 9 | LIKE EXTREMELY | | | | | |