PROJECT REPORT

On

Physicochemical, Sensory Acceptance and Shelf-Life Study of Function Drinks Using Chia Seeds

Submitted To

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Date of Submission: January 14, 2023

LETTER OF TRANSMITTAL

Date: January 14, 2023

To

The Head,

Department of Nutrition and Food Engineering,

Faculty of Allied Health Science

Daffodil International University Dhaka, Bangladesh.

Subject: Submission of Project Work Report.

Sir,

I, **Chaity Akter**, bearing ID No: **191-34-147** would beg to state that, it is a matter of honor and pleasure for me to have this momentum to submit this thesis report as a part of the curriculum of Nutrition and Food Engineering (NFE) program.

I have prepared this report based on the knowledge as well as information I have gathered throughout the period of my product development. This report contains the detailed information of Product Development. Since this was the first time, I was given the chance to develop a product on my own, I tried my level best to learn and work as much as I can within this period of time. This thesis project provided me the opportunity to not only learns how a new product can be developed but also how different laboratory tests are done.

I therefore, would like to present this thesis report to you. Your kind advice and suggestion will guide as well as encourage me to do well in the near future.

Sincerely Yours,

Chaity Akter

……………………..

Chaity Akter

ID No:191-34-147

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

LETTER OF AUTHORIZATION

Date: January 14, 20231

To

The Head,

Department of Nutrition and Food Engineering

Faculty of Allied Health Science

Daffodil International University

Subject: Declaration regarding the validity of the project report.

Sir,

This project report is entitled knowledge and extension the practice of **"Physicochemical, Sensory Acceptance and Shelf-Life Study of Function Drinks Using Chia Seeds".** It was submitted to the Department of Nutrition and Food Engineering, Faculty of Allied Health Science, Daffodil International University, Ashulia, Dhaka, Bangladesh.

This study was fully concerned with the department and faculty members.

Sincerely Yours,

Chaity Akter

………………………………

Chaity Akter

ID: 191-34-147
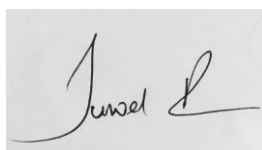
Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

LETTER OF RECOMMENDATION

I am pleased to certify that the project report on **"Physicochemical, Sensory Acceptance and Shelf-Life Study of Function Drinks Using Chia Seeds"** conducted by **Chaity Akter**, bearing respectively **ID No: 191-34-147** of the department of Nutrition and Food Engineering has been approved for presentation and Defense/viva-voice.

I am glad to certify that the facts and conclusions contained in the report are the genuine work of Chaity Akter. I strongly recommended the report presented by Chaity Akter for further academic recommendations and defense or viva-voice. Chaity Akter bears a strong moral character and a very pleasant personality. It has indeed a great pleasure working with her. I wish her all success in life.

…………………………

Juwel Rana

Senior Lecturer

Nutrition and Food Engineering Department

Faculty of Allied Health Science

Daffodil International University

CERTIFICATION OF APPROVAL

This is to certify that the project report on **"Physicochemical, Sensory Acceptance and Shelf-Life Study of Function Drinks Using Chia Seeds"**. Conducted by **Chaity Akter**, bearing respectively **ID No: 191-34-147** of the Department of Nutrition and Food Engineering. Worked under my guidance on her project, and She has completed this report and has been approved for presentation and Defense/viva voice.

I am glad to hereby certify that the data and findings presented in the report are the authentic work of Chaity Akter and She bears a strong moral character and a very pleasant personality.

I wish her all success in life.

……………………………….

Dr. Nizam Uddin

Associate Professor & Head

Department of Nutrition and Food Engineering

Faculty of Allied Health sciences

Daffodil International University

ACKNOWLEDGEMENT

Firstly, I want to thank almighty Allah for keeping me with the soundness and opportunity from the very beginning to the end of my thesis period so that I could learn and complete the thesis report on time.

I would like to express deepest appreciation to my supervisor, **Juwel Rana**, Lecturer (Senior Scale), Department of Nutrition & Food Engineering, Daffodil International University, for his kind advice, support and supervision. I choose this moment to acknowledge his contribution gratefully.

I'd like to express my gratitude to **Dr. Nizam Uddin**, Head, Department of Nutrition and Food Engineering, Daffodil International University for his kind advice and support. My deepest gratitude goes to Daffodil International University's entire NFE Department for giving me an opportunity that helped me not only with theoretical knowledge but also with proper practical implications.

I would also like to thank **Md Reaz Mahmud**, Assistant Technical Officer, Department of Nutrition & Food Engineering, Daffodil International University for making my thesis days easier and providing me enough time and scope to learn. Also, for being there for me throughout my lab tests and help me.

At last, but not the least, I'd like to thank the entire NFE dept. lab attendant for helping me from moral to material needs as well as enlightening me with their knowledge to improve mine.

ABSTRACT

The primary purpose of the study is to develop more nutritious functional drinks using chia seeds (*Salvia hispanica*) rich in protein, vitamin, dietary fiber etc which help to lose weight, improved bone mineral density. Increasing customer demand for these goods, particularly in developed nations where eating a balanced diet is associated with maintaining or even improving health status, raises concerns about the proliferation of these high-nutrient drinks. Three drinks samples were made using citric acid, xanthan gum, and sugar with different amounts of chia seeds to improve customer outcomes and finalize the product. According to the proximate analysis for the final product, the protein content is about 2.08gm, while the fat content is about 0.40gm. Meanwhile, the pH value is 6.5 and Brix 7. The number of bacteria is $2.8*10^3$ cfu/ml. Sensory characteristics analysis was conducted with 50 assessors utilizing a 9–point hedonic scale, with one to nine indicating extreme like to extreme disliking of attributes sch as color, taste, flavor, texture and overall acceptability. Where sample-2 got good marks overall according to color, taste, texture and overall acceptability. That's why, I decided to develop sample 2 as a final product. Overall sensory quality of chia seed drinks (sample 2) among all assessors 55% liked extremely while 30% liked very much and 15% liked moderately according to sensory characteristics.

This drink's overall quality hasn't changed in the nearly three months since it was prepared. The results show that beverages may produce an outcome that is both nutritional and healthy.

Keywords: (*Salvia hispanica*), Function Drinks, Health Promoting Properties, Acceptance, Novel food development.

TABLE OF CONTENTS

CHAPTER 1

1.1   Introduction

Chia seeds are the edible seeds of (*Salvia hispanica*), a plant that is native to central and southern Mexico and is a species of the mint family (*Lamiaceae*), or of Salvia *columbariae*, a closely related plant that is endemic to both the southwest of the United States and Mexico. Chia seeds have an oval shape, a diameter of around 2 millimeters, and are gray with black and white dots (0.08 inch). It generally, grows in mountainous areas in nature. In sandy loam and clay loam soils with adequate drainage, (*Salvia hispanica*) grows properly. Chia-based products and beverages have a characteristic gelatinous texture because the hygroscopic seeds acquire a mucilaginous coating after being soaked, which can absorb up to 12 times their weight in liquid (Hrnčič, 2019)

Chia seeds have a high nutritional value and are packed with nutrients like dietary fiber, protein, vitamins, essential minerals, iron, manganese, phosphorus, zinc, magnesium, and hydrochloric acid. It might enhance the organ's functionality and prevent the formation of toxins in the body. Additionally, regular chia seed consumption can lower the risk of developing lung cancer, bowel cancer, and mastitis. Chia has an anti-inflammatory function and is one of the foods with the greatest concentrations of omega-3 fatty acids. The seed is free of gluten and mycotoxins (Mburu, 2021). It is advantageous for the efficient functioning of the intestine since it is a rich source of dietary fiber (Haiyan, 2021).

The concept of functional food was, defined as foods with protective properties, body-regulating properties, and health-promoting properties. Functional beverages are a subset of beverages that contain one or more bioactive compounds in specific proportions and are good for human health in addition to established traditional nutrients (Haiyan, 2021). They contain nutrients that are beneficial not only for metabolism but also for the prevention and treatment of various diseases. It can regulate physiological processes or reduce the risk of certain diseases. Drinking the right number of functional beverages every day will have

the best effect on your health (Asep Dedy Sutrisno, 2022).

Chia is an important feature in the development of functional food products. Chia seeds contain bioactive compounds that act as a delivery system for the uptake of certain essential nutrients as well as being used to enhance food. The integration of chia seeds into the production of novel functional products provides an effective and novel strategy for the protection and delivery of omega-3 fatty acids in various food products. This growth has been fueled by research into more nutritious and nutritious beverages. Its widespread acceptance as a novelty food accounts for the large variety of chia seeds used in food products. Using a sensorial standardized nine-point hedonic scale, beverages' general approval was assessed. The future potential of chia seeds for use in food and beverages has been the main focus of this review (Ashura Katunzi-Kilewela ,. L., 2021).

1.2 Objectives of The Study

Aim of the study is to come up with a new kind of drinks.

- To serve, vitamin C, High dietary fiber rich beverages.
- To develop more nutritious drinks.
- To produce and provide consumers with inexpensive and nutritious beverages.
- Providing nutritious drinks to consumers instead of artificial drinks.

CHAPTER 2

Literature Review

The development of food products using chia seeds with high nutritional value is a real concern for food industry scientists and producers. Foods like gluten intolerance and low-calorie foods are prepared with special consideration for those whose sensitivity to certain foods is strong. Both adults and children should be able to consume a low-calorie, gluten-free product. Chia seeds, sugar, and xanthan gum were the essential components in this study (Edith Wilderjans*, 2013).

In the 21st century, A key cause for concern is the rise in consumer demand for products with high nutritional content, especially in developed nations where eating a balanced diet is associated with preserving or even enhancing health status. When creating food products, special consideration is given to those who are more sensitive to particular foods. One of these is sensitivity to gluten and calorie content. The nutritional value of food can be improved by enriching it with other nutritious products. Consumer food acceptability and choices have continuously shifted from eating to satisfy hunger to accessing healthy and quality food with functional appeal, low caloric value, and good sensory quality (Ann Nyawira Kibui1, 2018).

As an important member of food, the beverage is an important source of vitamins, minerals, amino acids, and other physiologically active ingredients in the diet as well as thirst-quenching and heat prevention with the advancement of technology. In addition, because of their convenience and portability, drink beverage takes up a huge amount of advantage in modern life. Surprisingly, chia seeds provide a number of health advantages as a dietary supplement, such as improving digestion, promoting healthy skin, building stronger bones and muscles, and reducing the risk of heart disease, diabetes, and other illnesses. The seed has a significant number of polyphenolic antioxidants and is devoid of toxins and gluten. According to contemporary research, food has nutritive, sensorial, and physiological

regulating purposes. Four major categories may be found in functional drinks: sports, energy, healthful, and nutraceuticals. The focus of this effort is on the advancement of technologies for popular, mass-market healthy drinks (Haiyan, 2021).

All researchers have reported the necessity to develop low-cost goods with reduced calorie counts and balanced acid and fat compositions. Several research organizations are conducting research into the consequences of bioactive chemicals found in chia seeds. Chia is a novel food in its implementation (Katarzyna Marcinek*, 2017).The use of seeds like chia seeds can also improve the value of beverages. Furthermore, foods have been produced to have lower levels of macronutrients in order to enhance their nutritional profiles (Ashura Katunzi-Kilewela L. D., 2021).

In addition to various alternative sources of rich foods including plants, the capacity and value of these high-quality, safe, and high-standard foods are necessary. Numerous studies have been carried out to find low-cost and long-term ways to replenish the required nutrients from various plant sources, such as soybeans (SB), Moringa oleifera, and chia seeds. Because of the makeup of chia seeds, they have a lot of nutritional potentials. Their genetic makeup and the impact of the environments where the plants are cultivated determine their composition. Additionally, both protein-energy malnutrition (PEM) and micronutrient malnutrition (MNM) has risen in several emerging nations, especially among youngsters. They have a connection to food insecurity and, consequently, non-communicable diseases. In many societies, chia seeds could be utilized as a preventative measure (Ashura Katunzi-Kilewela ,. L., 2021).

While in globalized era, chia has enormous potential in the health, pharmaceutical, nutraceutical, and food industries, among others. It can be used as seeds or as oil and yet provide the same advantages. However, there is a research gap that prevents accurate identification and use. Due to the chia seeds' exceptional, important chemical makeup, there is also a lot of market attention on them. Due to their high anti-oxidant properties, chia seeds, and oil have such a long list of wellness advantages (Mburu, 2021) .

In the meantime, chia is only used in a few drinks and foods. There is a greater likelihood of producing a few foods, such as bread, that include chia seeds. These goods only occasionally contain a little amount of chia (Zia-ud Dina, 2021). Chia has the potential used in food as a whole seed or as an ingredient, which has to be researched to reap the advantages. Additionally, it will benefit the nutritional industry and the economy (A. A. BUSHWAY, 1981).

CHAPTER 3

Materials And Methods

3.1.1 Raw Materials

The list of raw materials is given below:

- Chia Seed
- Sugar
- Water

3.1.2 Processing of Raw Material Collection

Basically, chia seeds were the main ingredient, and I purchased them from a nearby grocery store. And I store the chia seeds in a zipper bag in a cool dry place. Also, I brought sugar from the local market and store it in a cool dry place while using it.

3.1.3 Chemicals/Reagents Used

- Sodium Benzoate
- Citric Acid
- Xanthan Gum

3.1.4 Apparatus/Equipment's Used

List of apparatus that has been used in making the product:

1. Measuring Balance
2. Zipped bag
3. Beaker
4. Aluminum Foil paper

5.   Glass Bottle

6.   Electromagnetic Stirring

7.   Thermometer

8.   Spatula

3.1.5 Preparation

Figure 1: Chia Seed Drinks

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3.2.1 Flow chart For Chia Seed Drinks Making Process:

```
┌─────────────────────────────┐
│     Weighing Chia Seed      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│      Deeping Into Water      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Continuous Stir and Heat Treated │
└─────────────────────────────┘
              │                    ┌──────────────────────────────────────┐
              ▼                    │ Electromagnetic Stirring In 1500 rpm and │
                                   │ Temperature 60 °C, Time 60-65min        │
┌─────────────────────────────┐   └──────────────────────────────────────┘
│        Mixing Stage          │
└─────────────────────────────┘
              │                    ┌──────────────────────────────────────┐
              ▼                    │ Add Sugar, Sodium Benzoate, Citric Acid, │
                                   │ flavor, color at temperature 35°C       │
┌─────────────────────────────┐   └──────────────────────────────────────┘
│          Cooling             │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│         Packaging            │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│          Storage             │
└─────────────────────────────┘
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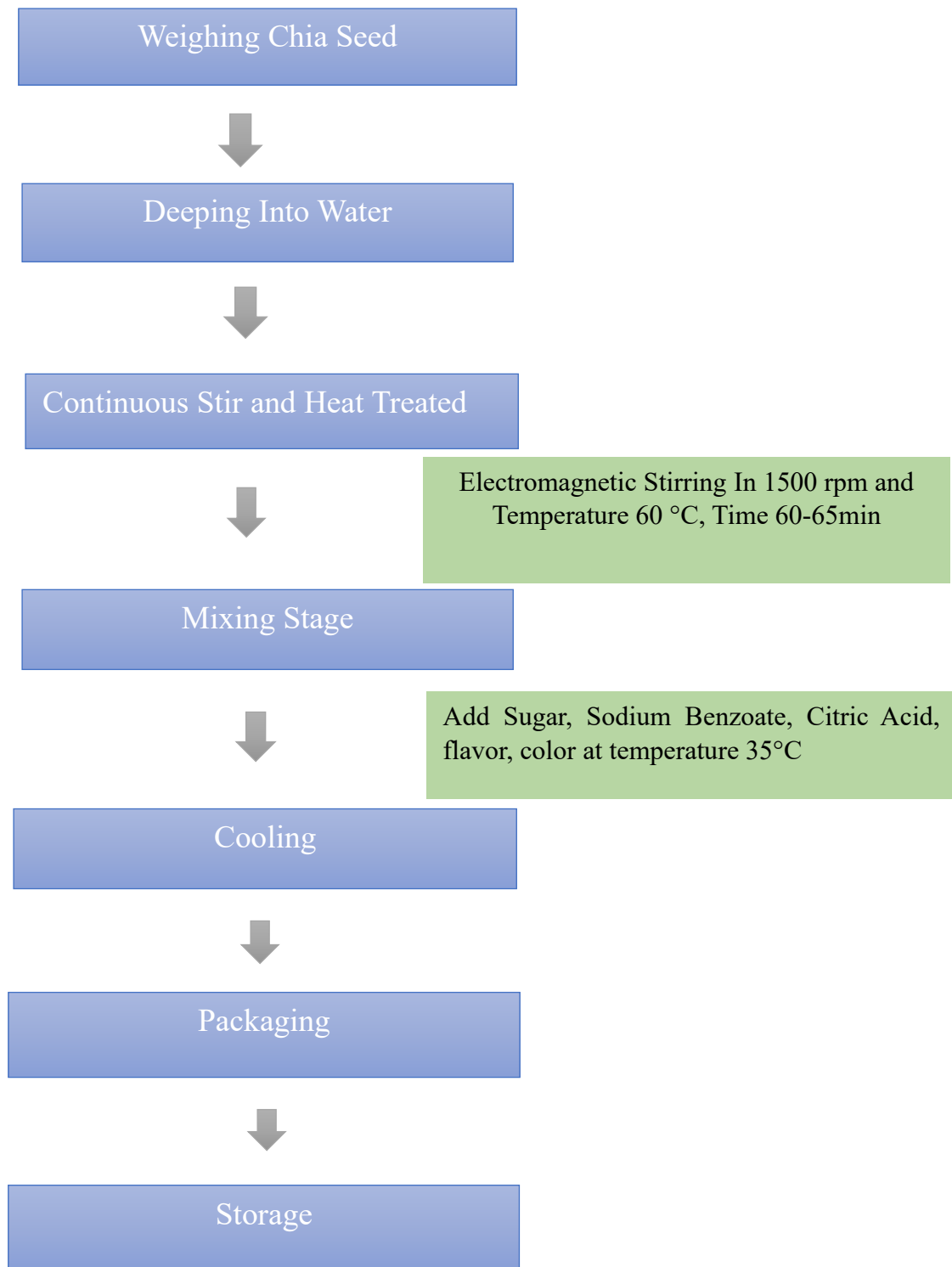
Figure 2: Process Diagram of Chia Seed Drinks

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3.2.2 Different Formulation of Chia Seed Drinks

Table-1

Ingredients	Sample 1	Sample 2	Sample 3
Chia Seed	0.5%	1%	1.5%
Sugar	7%	7%	7%
Citric Acid	0.1%	0.1%	0.1%
Sodium Benzoate	0.13%	0.13%	0.13%
Xanthan Gum	0.3%	0.3%	0.3%

Samples:

Figure 3

Sample 1   Sample 2   Sample 3

3.2.3 Samples Overview of Chia Seed Drinks

Table 2

Samples	Parameter	Result
Sample 1	Color	Fade
	Texture	Watery
	Flavor	Odd
	Taste	Insipid
	Stability	Semi Precipitated
Sample 2	Color	Orange
	Texture	Gelatinous
	Flavor	Mild
	Taste	Good
	Stability	Stable
Sample 3	Color	Fade
	Texture	Sticky
	Flavor	Odd
	Taste	Unpleasant
	Stability	Not Stable

3.3.1 Determination of °Brix:

The °Brix content of various novel chia seed drinks samples was determined using the Refractometer.

3.3.1.1 Materials:

1.Refractometer

2.Water

3.3.1.2 Procedure:

1. At first, Taken the refractometer out to determine the brix level.

2. Next, rinse or wash the refractometer's sensor to calibrate the meter.

3. Then, taken a dropper and pour 1 drop of the sample through it.

4. Pour the sample into the refractometer's sensor.

5. Observe the degree of brix on the refractometer's internal scale.

3.3.1.2 Result: The °brix content of this drink is 7.

3.3.2   pH Determination:

Using a logarithmic scale with 7 as the neutral value, pH measures how acidic or alkaline a solution is. Lower values are more acidic, and higher ones are more alkaline.

3.3.2.1 Materials:

1. Beaker

2. pH Meter

3.3.2.2 Procedure:

1. Taken the pH meter out to determine the pH level.

2. Then made the buffer solution of pH 4, pH 7 and pH 10 for calibration.

3. Measured the pH value.

4. And, Observed the pH value.

3.3.2.3 Result: The pH value of this drink is 6.2.

3.3.3 Protein Determination:

The protein content of various novel chia seed drinks samples was determined using the Method.

3.3.3.1 Four Steps of Kjeldahl Method

Step-I: Digestion

Step-2: Distillation

Step-3: Titration

Step-4: Calculation

3.3.3.2 Chemical / Reagent List:

• Sulfuric acid

• Digestion mixture (2g Copper sulphate+98g Potassium sulphate)

• 40% NaOH

• 0.05 H_2SO_4

• Methyl red indicator

• 0.1N NaOH

3.3.3.3 Procedure:

▪ **Digestion:**

For the digestion of the sample, 0.4g was placed on foil paper or weighing paper. The was put in a digestion flask. Ten milliliters of H_2SO_4 were added to the flask, and then two grams of the digestion mixture were added. To determine an average value, two digestion flasks were employed. After being cooked in a kjeldahl digesting chamber, the flasks were used. At a temperature of 40 degrees Celsius, the experiment got started. Eventually, temperature reached 60 degrees Celsius. For the solution to turn colorless, it must solution for 3-4 hours.

The flasks were next allowed to cool before being diluted with 100ml of distilled water to finish the experiment.

- **Distillation:**

After this. 10 ml of the mixture yere transferred to the distillation flask 150 cc of distilled water were put into the flask. 10ml of 40% NaOH were added to the distillation flask. The remedy lacked any color. In this experiment, three distillation flasks were used, just one of which had any material at all. The third distillation flask contained simply chemicals; no sample at all was present. In comparison, 50 ml of pure water were combined with 10 ml of 0.1N HCl in a conical trapping flask. Two drops of methyl red Were added to the trapping conical flask. The response began to become pink. Three sets of identical conical trapping flasks were employed. The distillation procedure was finished by using operation after 30 minutes. The NaOH solution was titrated in conical flasks. The burette was loaded with O.1N NaOH for titration. Conical trapping flasks were subsequently used after that.

- **Titration:**

Placed under the burette for titration. NaOH was introduced drop by drop into the trapping conical flask of the burette while the flask was gently agitated. Until the color changed. NaOH was added. The color eventually turned from pink to a brilliant yellow.

3.3.3.4 Calculation:

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

The formulas utilized were as follows:

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

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

Blank reading, B=6.3 Sample reading, S= 6.4

3.3.3.5 Result: Protein content of this drink is about 2.08gm.

3.3.4   Fat Determination:

The fat content of chia seed drinks samples was determined using Gerber method.

3.3.4.1 Procedure:

1.Poured 10ml Sulfuric Acid into a Butyrometer.

2.Poured 10.75ml Sample into the Butyrometer. (That will burn all components except fat)

3.Again, Poured 1ml Amyl Alcohol into the Butyrometer. (That helps to separate the fat)

4.Placed the Butyrometer into Centrifuge Machine for 3min.

3.3.4.2 Result: The fat percentage is 0.4gm.

3.3.5 Microbial Test:

Determination of CFU (Colony Form Unit) of Chia Seed Drink samples. The CFU count was conducted by using serial dilution in a pour plate technique.

3.3.5.1 Apparatus and Materials:

1.Media -PCA

2.Petri-dish

3.Beaker

4.Measuring Cylinder

5.Conical Flask

6.Spatula

7.Aluminum Foil

8.Autoclave

9.Incubator

10. Hot Plate

11. Micro-pipette

12. Laboratory Films

13. Electronic Balance

14. Test Tubes

15. Test Tube Stands.

3.3.5.2 Procedure:

1.   5.875gm of PCA media was measured into a conical flask and dissolved in 250 ml distilled water.

2.   After appropriately dissolved, the mixture was mixed with a hot plate.

3.   After mixing the pH level has been checked and adjusted to neutral.

4.   After that, the mixture and all apparatus were placed into an autoclave at 121℃ and 15psi for 45 min.

5.   During the autoclave, the serial dilution process was been conducted.

- 5 test tubes were taken into a test tube rack and marked in serial.
- after that, 9 ml of distilled water was taken into each test tube.
- Then 1 ml of the sample has been dropped into the 1st tube and mixed well and 1 ml of the diluted mixture was transferred into the 2nd tube with the help of a micro-pipette. and the process was repeated till the 5th dilution.

6.   After the Autoclaving process, the agar mixture and all apparatus were placed into a laminar airflow to prevent air contaminates.

7.   5 Petri-dish was taken and 0.5ml of the sample was poured based on the dilution serial.

8.   The agar media was poured into the petri-dish and left at room temperature to solidify after reaching the ideal warm temperature of 36℃.

9.   After solidifying, the petri-dish was wrapped by the laboratory films and marked with initial information.

10.   Now the petri-dish was placed into an incubator for 16 to 24 hours at 35 to 37°C.

3.3.5.3 Calculation:

After 24 hours of incubation, the Petri dishes were gently observed with a light media.

For the 4th dilution: 1/10,000.

Number of colonies on plate x reciprocal of the dilution of sample = number of bacteria/ml

28*10,000=280,000/ml

3.3.5.4 Result: number of bacteria $2.8*10^3$ cfu/ml.

3.3.6 Sensory Evaluation:

Effect of the chia ratio on sensory parameters (color, flavor, taste, texture, and overall acceptability) of drinks, I have generated 3 samples of drinks. Sensory analysis was done to determine the consumer acceptance by using 9-points hedonic rating scale (9-like extremely, 8-like very much, 7-like moderately, 6- like slightly, 5-neither like nor dislike, 4- dislike slightly, 3- dislike moderately, 2-dislike very much, 1-dislike extremely).

whereas sample 2 is the final result, which was surprisingly excellent. I used it for the hedonic test and 50 assessors for that. Examples include taste, texture, color, flavor, and other essential sensory properties. hedonic scale is successfully used in consumer research to collect data on liking.

3.3.6.1 Sensory Evaluation of Chia Seed Drinks By 9-Point Hedonic Scale Test:

The hedonic rating exam is used for this sensory evaluation. Only a few of the most important sensory attributes are taste, texture, color, and flavor.

Hedonic scales are well tried and tested in consumer research for capturing liking data (Stone & Sidel, 1985).The 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.

Table 3

Like Extre-mely	Like Very Much	Like Mode-rately	Like Slightly	Neither Like nor Dislike	Dislike Slightly	Dislike Mode-rately	Dislike Very Much	Dislike Extre-mely
9	8	7	6	5	4	3	2	1

3.3.6.2 Procedure:

1. A succession of spoken expressions that express varying degrees of likeness or dislike makes up a hedonic scale.

2. The degree of like or bate is indicated by smiley faces with more kid-friendly vocabulary, simple images of facial emotions, or a 9-point scale.

3. The taster may also want to comment on the product's texture, odor, taste, and appearance.

4. Finally, I have analyzed the outcomes.

CHAPTER 4

Result & Discussion

The 3 samples of drinks have been tested for nutritional analysis, sensory testing, and microbial test, and obtained the proximate composition, has been analyzed in the NFE laboratory.

4.1.1 Proximate Analysis (100ml):

Samples	Protein	Fat	Brix	pH
Sample 1	1.86g	0.35g	7	6.1
Sample 2	2.08g	0.40g	7	6.2
Sample 3	2.45g	0.45g	7	6.2

4.1.2 Microbial Analysis:

Samples	Dilution Factor	Number of Colonies on Plate	cfu/ml
Sample 1	4th	28	$2.8*10^3$
Sample 2	4th	28	$2.8*10^3$
Sample 3	4th	28	$2.8*10^3$

4.1.3 Sensory Evaluation Data:

Particular	Sample 1	Sample 2	Sample 3
Taste	2	6	9
Flavor	3	7	8
Stability	2.5	5	8.5
Overall acceptance	3	3	7

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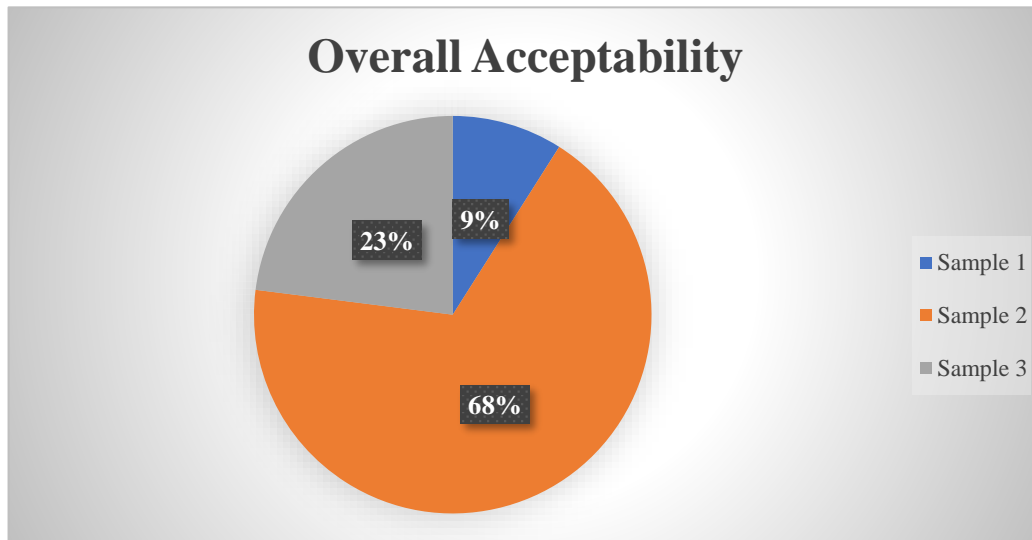### 4.1.3.1 Three Samples Overall Acceptability

Figure 1

Sample 2's outcome on the 9-point hedonic test got the highest rating for being highly favored by customers. Where sample 1's overall acceptability was 9%, sample 2's was 68%, and sample 3's was 23%. according to the results of a 9-point hedonic test for overall sensory quality as measured by taste, flavor, color, and stability.
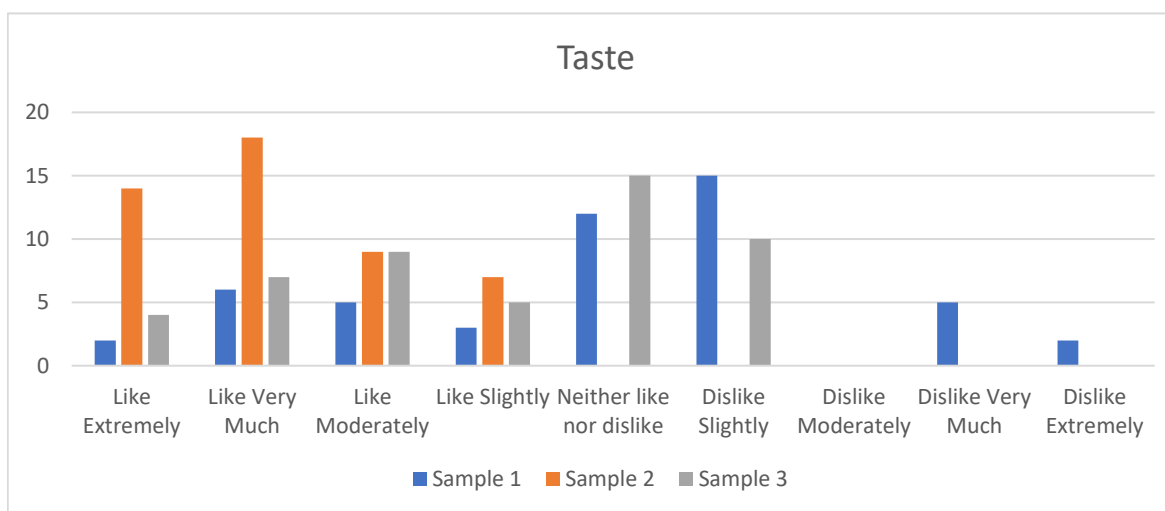
4.1.3.2 9-Point Hedonic Scale According to Taste:

Figure 2

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.

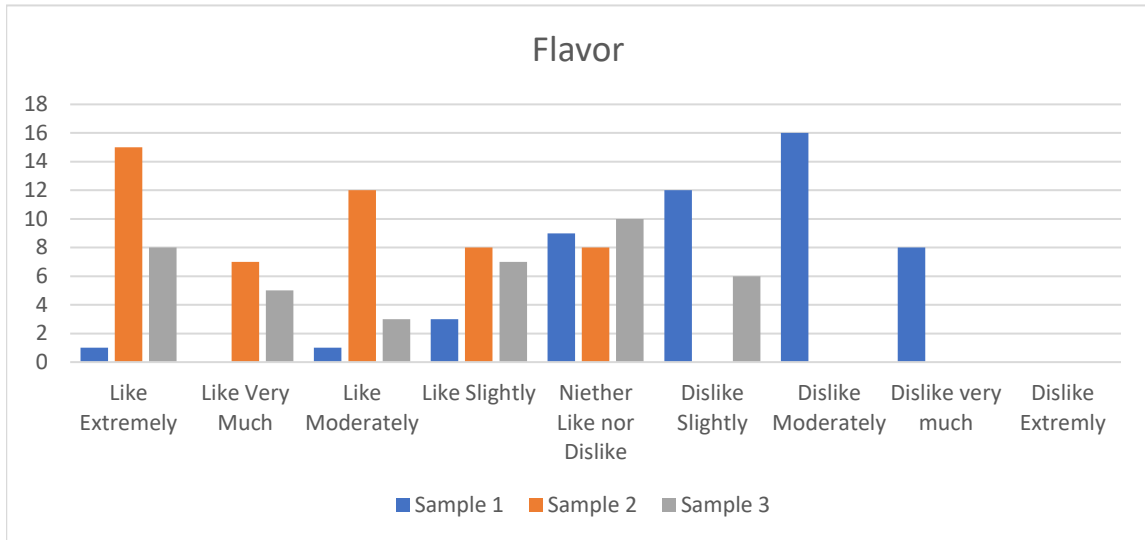### 4.1.3.3   9-Point Hedonic Scale According to Flavor:

Figure 3

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.

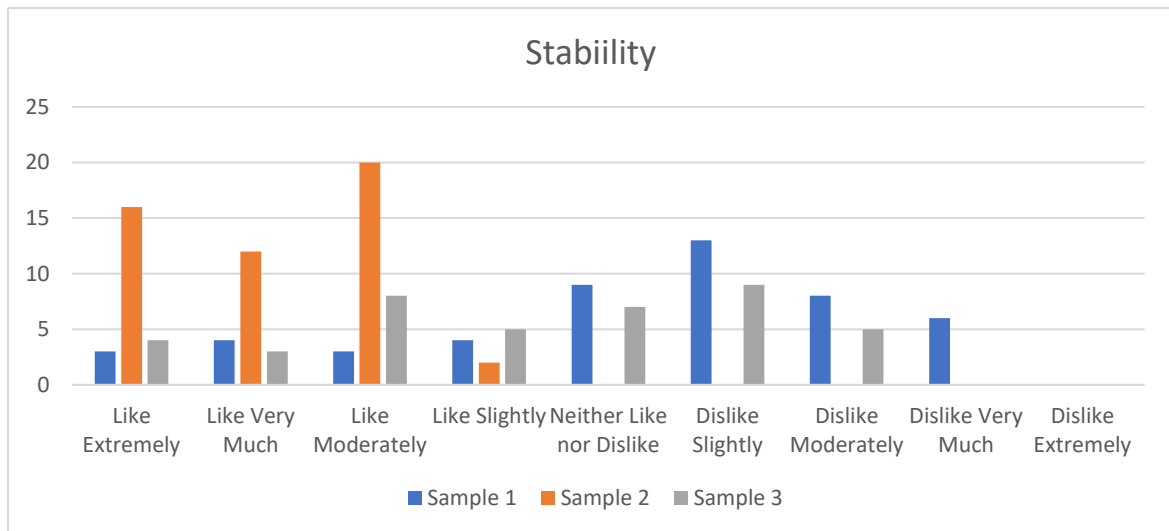### 4.1.3.4   9-Point Hedonic Scale According to Stability:

Figure 4

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

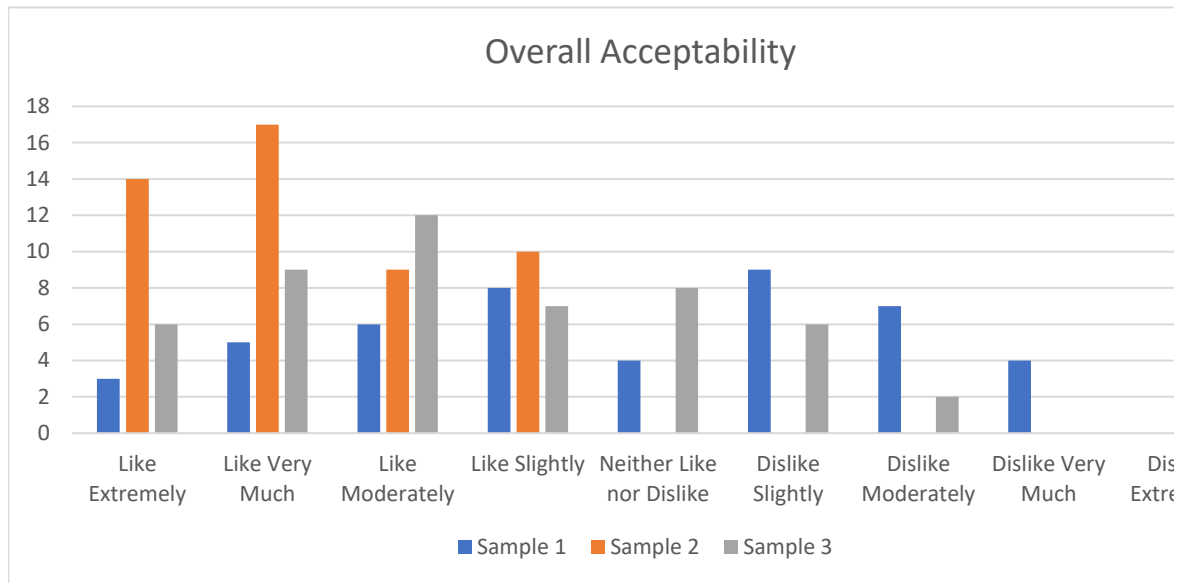## 4.1.3.5 9-Point Hedonic Scale According to Acceptability:

Figure 5

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

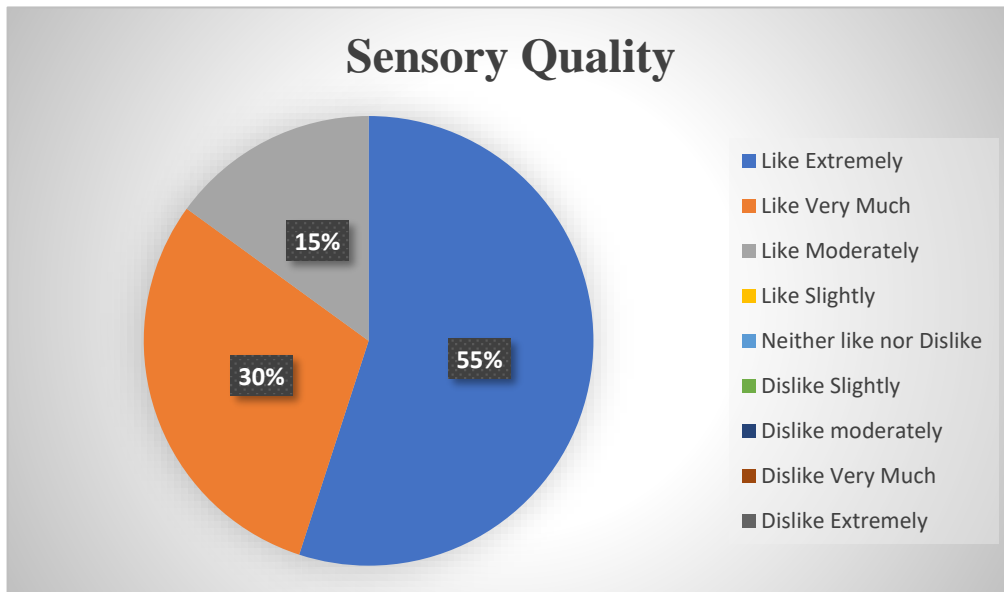### 4.1.3.6 Overall Sensory Quality of Sample 2 (Final Product):

Figure 6

4.2 Shelf-Life Determination

The shelf life of the function drinks was analyzed through sensory and physiochemical characteristics (color, flavor, taste, pH, and Brix) at intervals of 1, 3,5,7,9,11,13,15,17,19,21,23,25,27, and 30 days. The samples of beverages were kept in a cold environment (4 ºC) the entire time.

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CHAPTER 5

CONCLUSION

Chia seed has emerged as one of the most popular food due to its rich nutritional content, high edible value, and several health benefits. It's necessary to consume it the proper way. Chia seed drinks with various ingredient ratios were created for the study to determine the best product composition. For quality assurance objectives, the produced goods ' Brix, pH, protein, and fat contents were evaluated. As chia seeds are predominantly high in nutrients which will provide several health benefits. More studies could be carried out to uncover all relevant product qualities before doing market research for commercialization. The generated goods may be a great source of nutrients.

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