Project Report

On

Assessment of quality and sensory parameter of java apple jelly

Submitted By

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Date of Submission: 13-08-2022

LETTER OF TRANSMITTAL

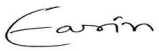
Date: 13-08-2022
To
Ms. Fouzia Akter
Assistant Professor & Head,
Department of Nutrition & Food Engineering
Faculty of Allied Health Science
Daffodil International University.

Subject: Submission of project work report.

Dear Madam, with all due respect, I would like to thank you for your guidance and assistance throughout my research. Without your assistance, it would be impossible for me to complete this report. I also want to thank Daffodil International University, my teachers, and a lot of other individuals for their guidance, support, and assistance with my project. This report was created using the taste information I gained during the project period. A big accomplishment is working. This report could not have been finished without your assistance. The "Assessment of Quality and Sensory Parameter of Java apple jelly" is the basis for this report. I have the chance to work on product development at your university.

This initiative was the first to give me exposure to both academic and practical settings. First and foremost, I now have more knowledge of the corporate culture of a well-known company in our nation that assesses the sensory and quality parameters of Java apple jelly. Second, the initiative allowed me to build a network within the business setting. As a result, I want to leave this report up to your opinion and advice. Your thoughtful counsel will motivate me to carry out greater preparation in the future.

Sincerely Yours,



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LETTERS OF AUTHORIZATION

Date: 13-08-2022
To
Ms. Fouzia Akter
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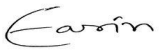
Daffodil International University.

Subject: Submission of project work report.

I hereby certify that the "Project Report" I have created is an original work and not a copy of any thesis report created by another student.
I further express my sincere confirmation that the aforementioned thesis report will not be submitted to any other person or authority in the future or utilized to complete any other course requirements.

Sincerely Yours,



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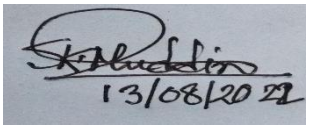
CERTIFICATE OF APPROVAL

I am pleased to certify that the Project report on "Assessment of quality and sensory parameter of java apple jelly" conducted by **Md. Easin Mia**, bearing respectively ID No: **192-34-967** of the department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voice.

I am pleased to hereby certify that the data and finding presented in the report are the authentic work of **Md. Easin Mia**. I strongly recommended the report presented by further academic recommendations and defense/viva-voice **Md. Easin Mia** bears a strong moral character and a very pleasant personality. It has indeed a great pleasure working with him. I wish him all success in life.

…… **Ms. Fouzia Akter** Assistant Professor and Head, Department of Nutrition and Food Engineering Faculty of Allied Health Sciences Daffodil International University.	 13/08/2022 …… **Dr. Sheikh Mahatabuddin** Associate Professor, Department of Nutrition and Food Engineering Faculty of Allied Health Sciences Daffodil International University.

ACKNOWLEDGEMENTS

In the readiness of this report, I might wish to express my gratitude for the support and assistance that many people have given me. I would want to begin by thanking Allah, the Almighty, for giving me the ability and opportunity to successfully complete the report on schedule. I'm using this opportunity to express my gratitude to everyone who has been a part of my life at any point.

I appreciate my family; without whom I would be unable to function. I wouldn't be able to reach my goals and destinations without the support of my family.

For this thoughtful partnership and to acknowledge this Degree, I sincerely thank my teacher, Assistant Professor **Ms Fouzia Akter**, who is the Head of the Department of Nutrition and Food Engineering in the Faculty of Allied Health Science at Daffodil International University. I'm taking advantage of this opportunity to thank each and every person who has supported me throughout my life.

I'm profoundly obligated to my authoritative Supervisor, **Dr. Sheikh Mahatabuddin**, Associate Professor, Department of Nutrition and Food Engineering, Daffodil International University for his outstanding assistance with my project work. Without his guidance, it would have been unquestionably difficult to put up this report up to this moment.

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Additionally, I would like to thank all of my friends who have always encouraged and supported me in achieving success.

Abstract

The Java apple is a native fruit that provides numerous nutritional and therapeutic benefits. It is a good source of carbohydrates as well as various vitamins and minerals. It contains 5.70 gm carbohydrate, 22.3 mg vitamin C, and 123 mg potassium per 100gm of java apple, as well as protein, fat, and other vitamins and minerals. Fruit jelly is also popular among consumers. In the Bangladeshi market, there is no java apple fruit jelly. As a result, the physicochemical properties and sensory characteristics of jelly made from java apple fruit were investigated. The moisture content of Java apple fruit jelly is 33%, the acidity is 0.10%, and the ash content is 2.29%. The pH of the jelly was 3.9, and the degree Brix was 66. In terms of sensory qualities, 57% of participants liked the jelly very much and none disliked it. Micronutrients were not analyzed due to a lack of facilities, but I did taste the vitamin C test, protein test, fat test, and mineral test. As a result, the jelly contains and will be a healthy alternative for Bangladeshi consumers.

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Chapter One
Introduction

1. Introduction

Syzygium samarangense is a genus of flowering plants. Syzygium samarangense is a flowering plant in the Myrtaceae family, which includes the greater Sunda Islands, the Malay Peninsula, and the Andaman and Nicobar Islands, but it was introduced to a wide range of areas in prehistoric times and is now widely cultivated in the tropics. Wax apple, Java apple, Semarang rose-apple, and wax jambu are all common English names. Syzygium samarangense is a 12 m (39 ft) tall tropical tree with evergreen leaves 10-25 cm (4-10 in) long and 5-10 cm (2-4 in) wide. The leaves are elliptic but rounded, and when crushed, they are fragrant. The trunk is relatively small, and a broad - yet open - crown emerges from beneath the tree. The bark is pinkish-gray in color and easily flakes. Flowers are white to yellow-white in color, 2.5 cm (1 inch) in diameter, and have four petals and many stamens. These appear in panicles of 3 to 30 near the tips of the branches. The result is a bell-shaped, edible berry that ranges in color from white, pale green, or green to red, purple, or red, deep purple, or even black. The fruit of wild plants is 4-6 cm (1.6-2.4 in) long and has four fleshy calyx lobes at the tip. The flesh is white and spongy, with thin skin. Each berry contains 1-2 round seeds no larger than.8 cm in diameter (0.3 in). Flowers and fruits are not restricted to the leaf axis and can be found at almost any point on the surface of the stems and branches. When ripe, the tree is a heavy carrier, producing up to 700 fruits. When the fruit is ripe, it will blow outwards with a slight concave in the center of the bottom of the "bell." A healthy wax apple has a light sheen to it. Despite its name, a ripe wax apple looks exactly like an apple on the outside. It does not taste like an apple and lacks the flavor and concentration of an apple. It tastes like a snow pear and has a flesh-to-waxy apple juice ratio similar to a watermelon. Waxy apple flesh has a very loose texture, unlike apples or watermelons. In the very center, there is a seed that looks like a cotton candy net. This mesh is edible, but it has no flavor. The color of its juice varies depending on the cultivar; it can range from purple to colorless.

1.2 Literature Review

1.2.1 History of Java Apple

From southern India to eastern Malaysia, the java apple grows naturally. It is widely grown in India, Southeast Asia, and Indonesia. It grows wild in Mindanao, Basilan, Dinagat, and Samar provinces in the Philippines. It has never been widely distributed, but it is grown on occasion in Trinidad and Hawaii. It was introduced to Puerto Rico in 1927 but only lasted a few years.

1.2.2 Types and varieties

In Indonesia, two varieties are recognized: one with white fruits and one with red fruits, with the latter developing from the bottom to the top. The fruits of various Malaya trees vary greatly, and some of the flavors are quite acidic. Several large-fruit cultivars have been chosen. It is sweet, whether it is light or dark in color. In Southeast Asia, black or dark varieties are known as "Black Pearl" or "Black Diamond," while light green-white varieties, known as "Pearl," are the most expensive in the fruit market.

1.2.3 The nutritional fact of Java apple

The Java apple is a red bell-shaped fruit that is popular in tropical Southeast Asia countries such as India, Sri Lanka, Malaysia, Indonesia, and Thailand. This fruit has many health benefits, including enriching skin structure, detoxifying the liver, and increasing heart function. It contains plenty of water to quench thirst in hot summers. Water apple fruit, also known as rose apple, has an impressive nutritional profile, with many beneficial ingredients. The Java apple is a red bell-shaped fruit that is popular in tropical Southeast Asia countries such as India, Sri Lanka, Malaysia, Indonesia, and Thailand. This fruit has many health benefits, including enriching skin structure, detoxifying the liver, and increasing heart function. It contains plenty of water to quench thirst in hot summers. Water apple fruit, also known as rose apple, has an impressive nutritional profile, with many beneficial ingredients. Java apples, in addition to anti-inflammatory and antioxidant compounds like flavonoids, tannins, carotenoids, selenium, and zinc, improve skin appearance, hair growth, and reduce the risk of cancer, diabetes, cardiac problems, and neurodegenerative disorders. When ripe, this juicy fruit has a bright red color, is crunchy, and has a sweet taste. It is widely eaten and tastes like that. Ripe water apples have numerous culinary applications, as they add a delicious essence to salads, juices, smoothies, ice creams, and jams. Even raw, green water apple fruit, which has a mild sour flavor, is used to make pickles, sauces, and curries. Water apples are a great natural product that is packed with essential nutritional properties. When consumed on a regular basis, they provide excellent fitness benefits.

1.2.4 The benefits of Java apple

Water Apples are high in vitamin C and flavonoids, which are phenolic compounds. These protect cells from free radicals, contaminants, and toxic chemicals that cause heart disease, cancer, and arthritis. Free radicals are formed in the body when it comes into contact with radiation, tobacco, or smoke, as well as during the digestion process. Water Apples' antioxidant properties effectively combat toxins in the body. Vitamin C boosts the production of white blood cells and aids in their function. Because vitamin C is an antioxidant, it prevents oxidative damage and improves overall function. Vitamin C effectively boosts cold immunity. Water apples contain sodium and cholesterol, which reduce the risk of stroke and other health problems such as inflammation, oxidative damage, cardiac health, atherosclerosis, blood pressure, and endothelial health. Plaque formation in the body causes stroke or heart attack, which can be prevented with vitamin C. Water apples contain niacin, which regulates cholesterol synthesis in the body. Niacin raises good HDL cholesterol levels while decreasing harmful triglycerides and bad LDL cholesterol levels in the blood. Acts as an enzyme catalyst in biochemical processes, accelerating the combination of carbohydrates, fats, and proteins in food. It instead promotes healthy appetite and metabolism and aids in the maintenance of a healthy body weight. The dietary fiber content of apples in water aids digestion and adds bulk to the stool, which is beneficial for irregular bowel function or constipation. It promotes a healthy weight and lowers the risk of cardiovascular disease and diabetes. Water Apples have a high potassium and water content. It improves muscle strength and alleviates muscle

cramps, which are frequently caused by low potassium, sodium, and dehydration. Water Because apples contain a lot of water, they are an excellent way to quench thirst and cool the body during the hot summer months when people are frequently dehydrated. The fruit can be eaten or chewed, chilled and sipped to ensure adequate water supply and electrolyte replenishment in the body's cells. Alcoholism, anemia, malnutrition, infections, and the overuse of hepatotoxic drugs can all cause liver damage. Hepatoprotective agents found in watery rose apples aid in the effective treatment of liver disease.

1.2.5 Side effects of Java apple

Digestive issues: Fiber improves our digestive health, but too much of it can cause bloating and constipation. Depending on their age and gender, people require 20 to 40 grams of fiber per day. Going over 70 grams is considered excessive. Although 15 Java apples are required for this, it is important to remember the other fiber sources in your daily diet. So, eating healthy foods with more than six Java apple per day can cause serious digestive issues.

Blood sugar levels may fluctuate: Java apples are a good pre-workout snack because they are high in carbohydrates, which can give you energy. The Java apple also makes you joyful because it encourages the release of serotonin and other 'beautiful' neurotransmitters. Due to its high carbohydrate content, however, a Java apple overdose might cause blood sugar levels to rise. Too much fruit sugar might decrease insulin sensitivity in diabetics and affect how well their medications work.

Might consume too many pesticides: The fruit and vegetable with the highest pesticide residue each year is the java apple. Diphenylamine is a pesticide that is frequently present in Java apples, therefore consuming an excessive amount of apples can expose you to numerous poisons.

Can gain weight: Java apples are a great source of quick-acting energy-giving carbs. But you might be shocked to find that eating too much of it can make you gain weight. Eating too many Java apple can impede your body from burning fat when you need to lose weight since the body burns carbohydrates first.

Can damage your teeth: Because java apples are acidic, they can harm your teeth more than soda if you consume them in large quantities. By eating a Java apple as a snack or while chewing it with your back teeth, you can prevent this. However, you don't need to worry about your teeth unless you go beyond and only eat a Java apple every day.

It can put extra pressure on intestines: Java apple should not be consumed by people who frequently break out in rashes or have stomach issues. Java apple take up more room in dishes high in sugar, which are more difficult to digest.

Chapter Two
Materials & Methods

2. Materials and methods

2.1 Materials

2.1.1 Ingredients

Fresh Water, Java apple Fruits Juice, Refined Sugar, pectin (E440).

2.1.2 Equipment's

Graduated Cylinder, Autoclave, pH Meter, Spectrophotometer, Pipette, Burets, Petri Dish, Laminar Air Flow Unit, Conical Flask, Glass Tube, Electronic Balance, Moisture machine, Beaker, blender, Thermometer, and Saucepan.

- As well as used Gamma source in my product as a preservation.

2.1.3 Raw materials

From the neighborhood market, we bought some fresh Java apple (Mirpur-1). All of the chosen fruits were fully mature and devoid of pests and extraneous objects. The drawback is that white refined sugar was previously available at the local market. Java apples are cleaned in purified water and dried in the air to get rid of dirt and residue. After that, java apples are sliced into 5 cm thick slices and blitzed to soften them. Apple juice is also produced by Java apples.

2.2 Production of Java apple jelly

I am making four-time sample. Sample one, two, three, four. After that perfect one I confirmed.

Sample One

First, Collect, peel, grate, and cut the fruits into small pieces. After that, a blender machine blends fruits of small sizes. The components are then all measured in accordance with the recipe. The mixture of measured sugar and juice from pureed fruits is then boiled for 5-7 minutes. I added pectin once the Brix reached 64 to 66. For that lovely gelatinous texture, pectin was employed. The fruit juice to sugar ratio in one example was (65:35). I am employing gamma radiation as a preservation, so please do not use any preservatives. Its pH value was 3.81.

Sample (Juice)	Sugar	Pectin
130 ml	70 gm	2 gm

Sample Two

Similar way, Gather the fruit, peel it, sprinkle it, and then chop it up. A blender is then used to combine the tiny fruit. The components are then all measured in accordance with the recipe. Then, combine the fruit juice and sugar in a pot and bring to a boil for five to seven minutes. 110 ml of fruit juice and 90 g of sugar were added to this sample. A sample juice and sugar ratio of two fruits was (55:45). When the Brix ranges from 64 to 66, I add pectin. For that lovely gelatinous texture, pectin was employed. This sample pH was 3.80. Additionally, no preservatives were used.

Sample (Juice)	Sugar	Pectin
110 ml	90 gm	2 gm

Sample Three

The creation of sample no three gather the fruit, peel it, sprinkle it, and then chop it up. A blender is then used to combine the tiny fruit. The components are then all measured in accordance with the recipe. Then, combine the fruit juice and sugar in a pot and bring to a boil for five to seven minutes. I put 100 ml of fruit juice and 100 g of sugar to this sample. A sample juice and sugar ratio of two fruits was (50:50). When the Brix ranges from 64 to 66, I add pectin. For that lovely gelatinous texture, pectin was employed. Its pH value was 3.81. Additionally, no preservatives were used.

Sample (Juice)	Sugar	Pectin
100 ml	100 gm	2 gm

Process diagram of making Java Apple Jelly

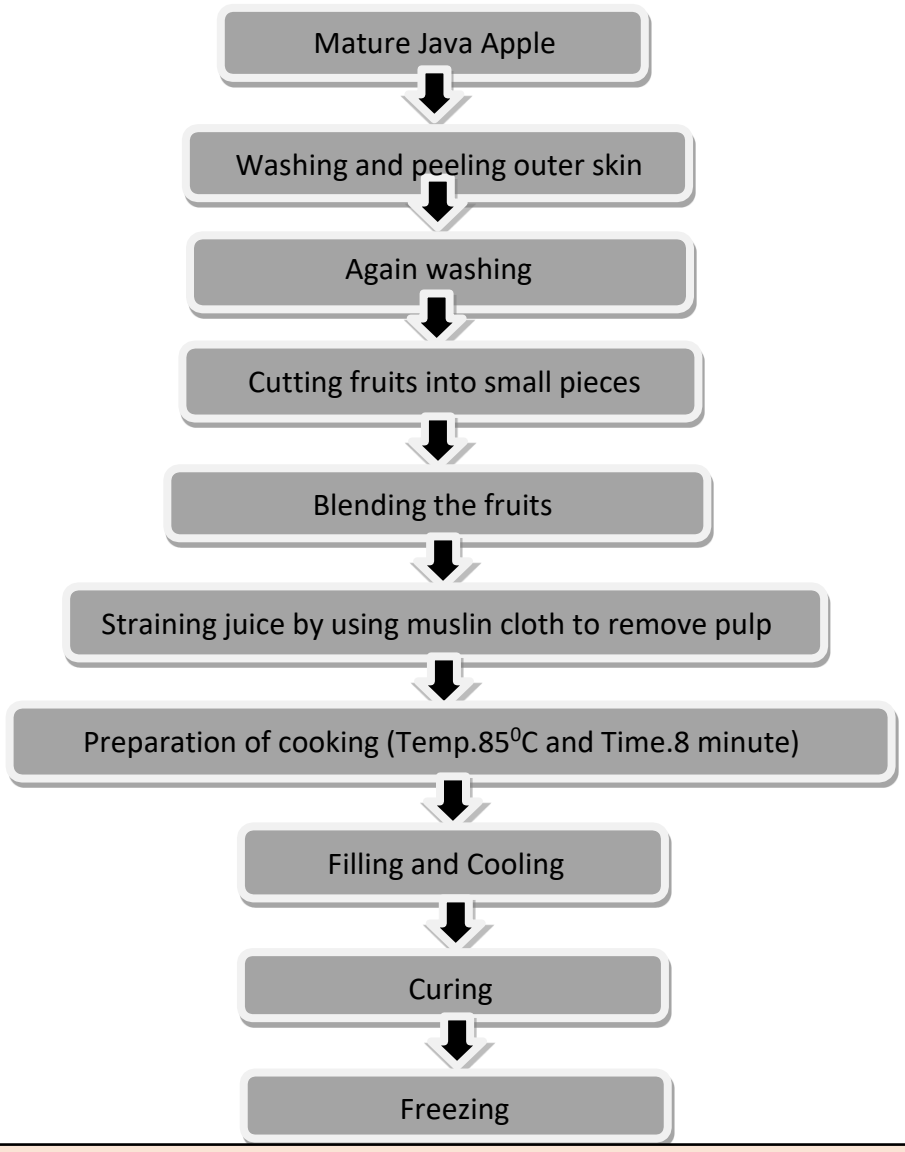

Figure-1: Process diagram of making Java Apple Jelly

2.3 Analysis of Physicochemical Properties

2.3.1 Determination of Ash

Figure: Electric muffle

Ash testing is finished using the AOAC (2005) procedure. This procedure requires accurately placing 5–10g of the sample into a porcelain crucible at a temperature of 600°C before cooling. This entire process is-

1. Start by putting the crucible in the oven.
2. Next, dry the Crucible for 20 minutes at 100C.
3. Next, allow to cool in a crucible before putting into a desiccator.
4. Take note of the blank crucible's weight.
5. Pay attention to sample weight.
6. The sample goes into the crucible.
7. Next, set the temperature to 600°C and the time to six hours (muffle furnace).
8. Insert the sample-containing Crucible carefully into the muffle furnace.
9. Remove the muffle furnace from the desiccator once more.
10. Measure out the final weight that contains Ash. final calculation follows.

2.3.2 Determination of Brix

Brix determination We actually measure a sample's TSS. The TSS of the sample was determined using a hand refractometer with a limit range of 0-90 $Brix^0$. With the daylight plate slightly closed, a few drops of sample were placed on the prism surface. The refractometer was held in the direction of natural light when the reading was taken. The entire process is as bellow-

Hand refractometer zeroing

1. Drop distilled water in little amounts onto the view plate.
2. After letting the water spread, close the lid.
3. Look into the refractometer while holding it up to the light.

4. If required, adjust the eyepiece's focus.
5. Use the screw or knob to change the zero setting.

Primary analysis

1. Wipe the prism after opening the daylight plate.
2. Suck some liquid up with an eyedropper.
3. Drop a few of the liquid's drips onto the prism.
4. Focus the viewer by taking a look through it.
5. Take notice of where the line in the viewer falls.
6. Recognize typical Brix values for various plants.

2.3.3 Determination of pH

The pH of samples was measured using a pH meter. Three measurements of each sample were taken to get the average reading. The full process is described below-

From my total of three samples I confirm one and divide a simple into six several parts. After that I apply gramma radiation source in every sample, but there is not any changed after applying gramma radiation.

1. I start by putting a little quantity of liquids in a sanitized beaker.
2. Switch the pH meter on.
3. After 15 minutes, I inserted the digital pH meter into the beaker.
4. After that, I recorded the pH meter's reading.

2.3.4 Determination of Moisture

Typically heated to 105°C, the mass of water in a soil sample is expressed as a percentage of the dry mass to determine the moisture content of the sample.

$$\text{Moisture content, } W = M_W/M_D \times 100\ (\%)$$

Where, M_W = mass of water

M_D = dry mass of sample

Procedure details are as follows-

1. A tiny (5 grams) sample of Jelly is weighed and put in a moisture dish.
2. The sample is cooked for an hour at 105 degrees Celsius in an air oven.
3. After being cooled to room temperature, the sample is weighed with the residue.
4. The moisture content of a drink sample is calculated by heating it in an air oven and comparing the sample's weight before and after heating.
5. The moisture content determines how much weight is lost.
6. Results for moisture content are presented as a percentage.

Calculation:

Using oven drying processes, the following equations can be used to determine the moisture and total solids contents of food:

%Moisture (wt/wt) = wt H2O in sample × 100 /wt of wet sample------- [1]

%Moisture (wt/wt) = wt of wet sample − wt of dry sample × 100 / wt of wet sample ----- [2]

%Total solids (wt/wt) = wt of dry sample× 100 / wt of wet sample------- [3]

2.3.5 Determination of Protein

Kjeldhal

The method consists of 3 steps. They are as follows:

1. Digestion of sample
2. Distillation
3. Titration

Figure: Kjeldhal machine

Digestion of sample

1. Take a sample. 4 g, 10 ml H2SO4, and 2 g of the digestion mixture
2. Attach it to the stomach flask.
3. Use two digestion flasks so that an average value may be calculated.
4. Heat slowly at first, then turn up the heat and heat for around 3–4 hours.

5. The outcome will be a crystal-clear solution without any H2SO4 white smoke.
6. Let it cool for a while.

Distillation

1. Place the solution in a conical flask and add distilled water to level it out to 100ml.
2. Transfer 10 ml of that solution to a distillation flask.
3. Add 10 ml of 40 percent NaOH and 150 ml of distilled water to the distillation flask.
4. Fill the trapping conical flask with 50 ml of distilled water, 10 ml of 0.1 N HCl, and 2 drops of methyl red (1 percent).
5. For this technique, use three distillation flasks, one of which will be blank—that is, it will contain no sample.
6. Use three trapping solutions in three identical trapping conical flasks.
7. Set up and turn on the condenser.
8. Turn on the distillation system and let it run for 30 minutes.

Figure: Distillation

Titration

1. Burette filled with 0.1N NaOH
2. Titrate 3 times with 3 different trapping solutions.
3. The transition from pink to light yellow will be the final stage.

Calculation

$((B - S) \times 1.4 \times 10 \times 5.95 \times 0.1) / sample\ weigh$

2.3.6 Determination of Fat

A soxhlet apparatus was used to measure the fat.

Apparatus:

Filter paper.
Balance.
Soxhlet apparatus.

Reagent:

N-hexane

Procedure:

1. First, rinse all glass equipment with petroleum ether, dry it in an oven set to 102°C, and then remove and store in a desiccator.
2. Put 5 grams of ground-up, dry sample into the thimble after weighing it.
3. Insert the thimble into the extractor for the soxhlet.
4. Clean a 150 ml round-bottom flask and add 90 ml of petroleum ether to it.
5. Set everything up on a heating mantle and let the petroleum ether come to a boil.
6. Extraction should go on for a few hours, almost six hours.
7. Take the condensing unit out of the extraction unit, then let the sample cool. Finally, all of the lipid is eliminated.
8. After distillation, collect practically all of the solvent.
9. After removing the sample from the oven, place it in the desiccator.
10. Determine the sample's weight.
11. The end product is a defat sample.

2.4 Sensory Quality Analysis

A sensory analysis of the jelly taste, flavor, and texture was conducted. The acceptability was calculated using the hedonic scale technique (1 to 9 scales), where 9 denotes a strong preference and 1 a strong distaste.

Chapter Three

Results

&

Discussion

3. Results and Discussion

3.1 Physicochemical Properties

Table 1 displays the physicochemical characteristics of Java apple jelly. The pH ranged from 3.8 to 3.93, which is in line with commercial fruit jelly sold in the Bangladeshi market. The fruit jelly's moisture content was about 32%, which is considerably less than that of comparable fruit jellies sold in Bangladeshi markets. Higher than any other fruit jelly on the Bangladeshi market, the degree Brix was 66. The ash concentration was 2.29%, more minerals are present in the Java apple jelly.

Table-1: Physicochemical properties of Java apple jelly.

Test Name	pH	Moisture	Degree Brix	Protein	Fat	Ash
Sample-1	3.93	33.5%	66	0.97%	0.57%	2.29%
Sample-2	3.85	33%	66	0.95%	0.60%	2.25%
Sample-3	3.83	33%	66	0.96%	0.59%	2.25%
Sample-4	3.82	32.5%	66	0.99%	0.58%	2.26%
Sample-5	3.81	32%	66	0.97%	0.54%	2.24%
Sample-6	3.80	32%	66	1%	0.60%	2.25%

3.2 Sensory Quality of Java apple jelly

About 30 people participated in a test of the sensory quality of jelly made by Java apple. The participant's responses are shown in table 2 of the data. Of the 30 participants, 53% find the jelly to be very appealing overall. 30% of them find it to be extremely enjoyable. The Java apple jelly is not disliked by any of the participants.

Score	Appearance	Flavor	Taste
Like extremely	63.33%	33.33%	43.33%
Like very much	30%	33.33%	30%
Like moderately	6.66%	33.33%	26.66%
Like slightly	0%	0%	0%
Neither like or dislike	0%	0%	0%
Dislike slightly	0%	0%	0%
Dislike moderately	0%	0%	0%
Dislike Very much	0%	0%	0%
Dislike Extremely	0%	0%	0%

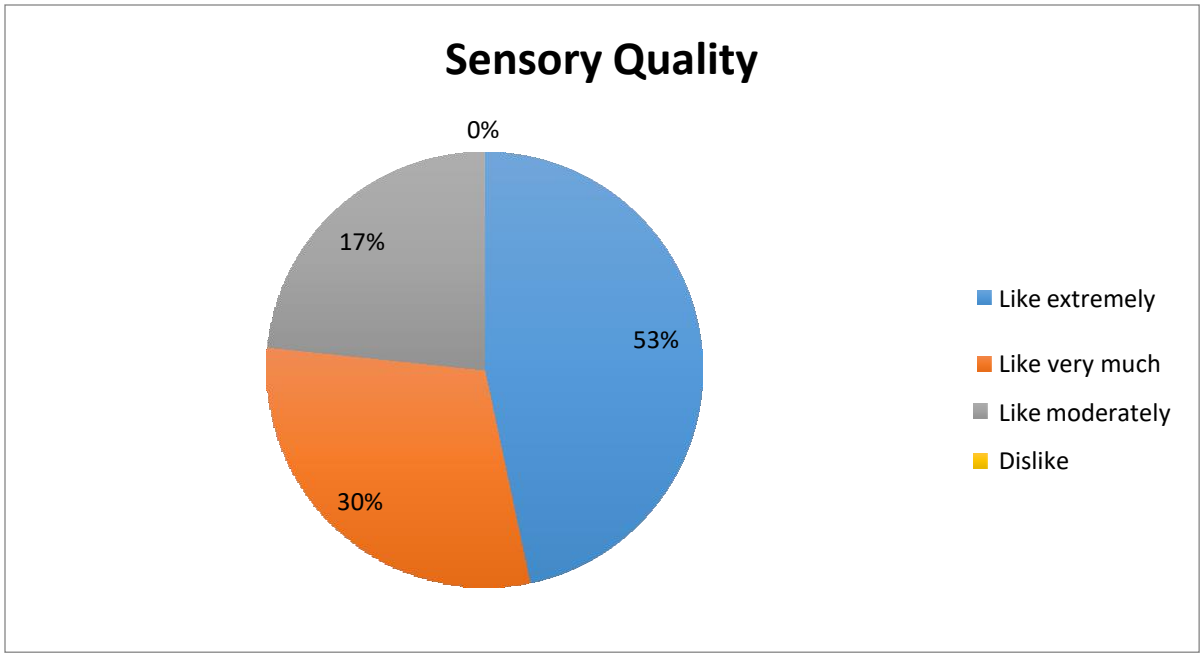

Figure-2: Overall sensory quality of Java apple jelly.

Chapter Four
Conclusion

4. Conclusion

The sensory attributes of the Java apple jelly created throughout the investigation are quite good. None of the participants disliked the beverages, and 53% of participants thought they were very good. It is an excellent source of minerals and will keep the user hydrated, according to the physicochemical characteristics. The micronutrients were not examined due to facility restrictions, but the literature analysis already reveals that Java apple jelly is a good source of phytonutrients. As a result, The Jelly will stock them as well, offering Bangladeshi consumers a healthier alternative.

Chapter Five
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5. References

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