

Project Report

On

Study on the Shelf life of Non-Fermented Pickled Beetroot

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DEPARTMENT OF NUTRITION AND FOOD ENGINEERING

DAFFODIL INTERNATIONAL UNIVERSITY



Project Report

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Study on the Shelf life of Non-fermented Pickled Beetroot

Submitted by

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Submitted to

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Head

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Date of Submission: 07.08.2021

LETTER OF TRANSMITTAL

Date: 05.08.2021

To

Dr. Sheikh Mahatabuddin,

Head

Department of Nutrition and Food Engineering (NFE)

Daffodil International University

Subject: Submission of the Project Report

Dear Sir,

I would like to take this opportunity to thank you for giving me the opportunity to conduct my project work at the laboratory of NFE department, Daffodil International University. I have successfully completed my project entitled “**Study on the Shelf life of Non-fermented Pickled Beetroot**” in due time. I have concentrated my best effort to achieve the objective of the report and hope that my endeavor will serve the purpose. The practical knowledge and experience, I have gathered during preparation of the report will immeasurably help in my future professional life. I request you to excuse me for any mistake that may occur in the report despite of my best effort.

I would really appreciate if you enlighten me with your thoughts and views regarding the report. Also, if you wish to enquire about an aspect of my report, I would gladly answer your queries.

Therefore, I would humbly request you to accept my report for fulfilling the requirement of my graduation degree.

Thank you again for your support and patience.

Sincerely Yours,

Joyita Das Jui

ID: 171-34-632

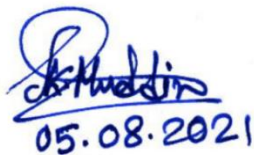
Department of Nutrition and Food Engineering (NFE)

Daffodil International University

CERTIFICATE OF APPROVAL

We are pleased to certify that the project report on **Study on the Shelf-life non-Fermented pickled Beetroot** driven by **Joyita Das Jui** bearing ID **171-34-632** of the department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voice.

We are pleased to hereby certify that the data and finding presented in the report are the sterling work of Joyita Das Jui, I strongly recommended the report presented by Joyita Das Jui for further academic recommendations and defense/viva voce. Joyita Das Jui bears a strong moral character and a very pleasant personality. It has indeed a great pleasure working with her. We wish her all success in life.



05.08.2021

.....
Dr. Sheikh Mahatabuddin

Head

Department of Nutrition & Food Engineering

Faculty of Allied Health Science

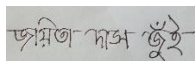
Daffodil International University.

DECLARATION

This is to certify that the project report entitled “**Study on the Shelf life of Non-fermented Pickled Beetroot**” submitted for assessment to the examination committee by **Joyita Das Jui** bearing ID: 171-34-632 is a student of the Department of Nutrition and Food Engineering (NFE), Daffodil International University. I am pleased to declared that this report is entirely written by the author and all the related research work have been conducted by the researcher under my supervision. This is a partial works of original task and has neither been submitted to, nor been published anywhere before for any other purpose.

I strongly recommend the approval of the report by the authority and I also request for a positive and fare evaluation of the work.

I wish Joyita Das Jui every success in his life.



.....
Submitted By:

Joyita Das Jui

171-34-632

Department of Nutrition and Food Engineering

Daffodil International University



.....
Supervised by:

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ACKNOWLEDGEMENT

First of all, my gratitude and thanks to almighty God, the most merciful and kind for making this work successful. I would like to say thanks to the Honorable Vice Chancellor DIU for extending me this opportunity to fulfill my BSc. degree on Nutrition and Food Engineering.

My deep gratitude and sincere thanks to the Honorable Dean, Faculty of Allied Health Science Department of Nutrition and Food Engineering (NFE), **Professor Dr. Ahmed Ismail Mustafa**, and **Associate dean, Professor Dr. Md. Bellal Hossain** for their kind cooperation and guidance at this work and encouragement throughout my education journey in this department.

My deep and sincere appreciation, **Dr. Sheikh Mahatabuddin** Head of Department of Nutrition and Food Engineering (NFE) and I am also thankful to **NFE faculty members** for their countless inspiration and encouragement in my student life.

My gratitude goes to the entire NFE Department of Daffodil International University for arranging this research opportunity and facilitating the work throughout.

My warmest thanks to our Coordination Officer, Mr. Emran Hossain, Assistant Technical Officer, Mr. Reaz Mahmoud and Assistant Officer.

Abstract

Beta Vulgaris is ordinarily known as beetroot. It is a Cruciferous tuber vegetable because rich in nutrients, minerals, and vitamins but it also has incomparable phytoconstituents, which have various therapeutic importance such as anti-oxidant, anti-depressant, anti- microbial, anti-inflammatory, and diuretic activities. But beetroots are not available in every season. So, there is must to preserve this vegetable. The objective of the present study was to develop some value-added preserve beetroot nonalcoholic fermented pickle products from raw beetroot and to evaluate their shelf life. All the preserve products were kept at room temperature (29-30 °c) for 10 months and analyzed for their shelf life at 0, 180, 300 days and microbial analysis by using pour plate technique. The result showed that beetroot pickle can consume up to 300 days of storage. However, the microbial load of all the preserve products was within the acceptance range for 300 days of storage so they can store up to 12 months and also safe for consumption.

Keyword: Beetroot, Microbial analysis, Shelf-life, Preserve






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Chapter

2

-  **Introduction**
-  **What is pickle**
-  **Why do we eat pickle?**
-  **Health Benefit of Beetroot**
-  **Literature review**

Introduction

Beet is plant. Beetroot is the alkaline food and its pH range 7.5 to 8.0. It is also called “super food”. The root and leaves are used as medicine. Beetroot and leaves are also eaten as a vegetable. The little taproot vegetable is filled with the goodness of nature (TNN, 2018). Beetroots are ranked among ten strongest vegetables with respect to the antioxidant capacity and total phenolic content of 50-60 micro mole/g dry weight. Beetroot is a potential source of valuable nitrogenous pigments called betalains (Dr.Lakshmi Bala, 2018). Beetroot belongs to the Beta vulgaris species and it grows as the root of the beet plant. Usually, this species of veggies grows as mostly edible root veggies. They have a lot of nutrients and low amount of carbs (TNN, 2018).

The ancient Egyptians, Greeks and Romans cultivated beetroot as a domestic vegetable in the middle East. In the Roman era, it was thought that these were cultivated for their roots. Beetroot has been used in various medical field since the Middle Ages, especially for digestive or blood related diseases ((Germany), 2021). Traditionally sucrose was extracted from beetroot for commercial reasons because beetroot was the only vegetable with high sugar content (TNN, 2018). Beetroots are low-caloric vegetable, rich in essential vitamins, minerals, anti-oxidants and other helpful phytonutrients.

It is well documented that consumption of vegetables and fruits have many health benefits and reduced the risk of many non-Communicable and chronic diseases and this leads to an increase in interest in so- called “functional food”. Many studies have proven that beetroots have many therapeutic importance such as hepatoprotective, anticancer, anti-inflammatory, antihypertension, antibacterial, antimicrobial, antidiabetic, cardioprotective, beneficial in dementia and many others. But beetroots are not available in liberal amount in all seasons. So, there is a requirement to preserve this vegetable for taking its benefit in all seasons (Dr.Lakshmi Bala, 2018).



What is pickle

Pickles come in all sizes, shapes and variations but to make things easier we can establish that they all use brine solution for preservation. Whether it is vinegar or salt or other seasoning. Pickles are first fermented- where good bacteria break down the sugars in vegetables or fruits and give pickles standard sour taste (Acid Is Key To What A Pickle Is, 2021).

Why do we eat pickles?

Pickles are fat free and low in calories. The main advantage of pickles is that some pickles carry helpful bacteria. Uses brine solution to make pickles. Brine solution is salt or acid such as vinegar mixed with water. Brine contains some good bacteria that improve health, but only few brines go through the fermentation process (Healthline Media UK Ltd, 2004-2021).

Pickles are rich in probiotic and help with digestion and alleviate minor stomach problems. From small to big people, we all like to eat sour food. If the sour food is pickled, then there is no question. Pickles act as a remedy for our health- As can be seen, many times the body feels bad or vomits as a result of eating something then it feels a little better as a result of eating pickles. Pickles are useful in some hangover cases such dehydration, lack of sleep, and loss of liquids from alcohols diuretic properties. Moreover, every family has pickles on the dining table, eating with it doubles the taste of food.



Health Benefits of Beetroot

Beetroot is rich in vitamins and minerals such folate, fiber, Manganese, Vitamin B9, Iron and Potassium etc. These vitamins and minerals are essential for the proper functioning of our body. There are many health benefits of this vegetable but most of us do not know it. We can put beetroot in our daily diet. The best thing about this vegetable from cold juices to beet salads is that it enhances the health of each item. Beetroot vegetables can prevent various diseases and increase immunity which creates a healthy body and mind (TNN, 2018).

➤ Reduce blood pressure:

Globally, high blood pressure is a silent killer that leads to other deadly diseases. This vegetable helps to keep the blood pressure level balanced. Beetroot is a good source of nitrate which is naturally converted into nitric oxide inside our body, which dilates blood vessels and lowers blood pressure. Beetroot is very beneficial for those who suffer from high blood pressure (TNN, 2018).

➤ Low in fat and calories:

Beetroot contains high levels of sucrose; beet is also containing a lot of fiber which is a good source of nutrients and has no fat and no calories. Moreover, plant-based calories are much healthier than other. It is suitable for weight watchers help to lose weight by mentioning hunger pangs (TNN, 2018).

➤ Good for diabetics:

It is a myth that beetroot is unhealthy for diabetic patients because it contains high levels of sugar. As we said myths, but beetroot is rich in good fiber, manganese, iron and potassium, these provide more nutrients when combined with other foods (TNN, 2018).

➤ Rich in anti-oxidants:

The eye-catching color of beetroot is due to the presence of betanin, which is an antioxidant. The pigment of this vegetable has gained a reputation in the past like other antioxidants like polyphenols, which help in lowering bad cholesterol and improve cognition (TNN, 2018).

➤ May help treat anemia:

We know that most of the causes of anemia are iron deficiency. Beetroot carries more iron than the green part of the beet. It has been found that beets are rich in iron and beetroots absorbs iron better than other vegetables. It is a good blood maker (Kumar, 2015).

Literature Review

Pickle is one of the oldest and best ways to preserve food known to human. Conduct quality optimization depends on appropriate acidity, concentration, temperature and safety conditions. The skillful combination of spices, sugar, and oil combined with any fruit or vegetable gives it a crispy, soft texture, aroma and sweet- sour taste. Vegetables and fruits are very juicy and have a short life so they are used for easy and quick pickling. Pickles are available in different sizes such as square pieces, round pieces, slices and whole and also available in different flavors such a sweet or sour flavors (Qureshi, 2013). When it is not available or out of season, the fruits or vegetables is stored in long- termed preserve using a pickling method. The climate of our country changes every year so it is necessary to preserve food. Not only vegetable and fruits are used for preserving, other foods such as egg, grains item etc. are also preserved or pickled (Khandekar SA, 2020).

Pickles are served with variety of foods (pluses, meat etc.). This doubles the taste of food. Pickles help digest food and eliminate gas problems. Fermented pickles also contain helpful bacteria that help kill harmful bacteria in the intestine (Qureshi, 2013).

Two types of methods can be used to make pickles such as Fermentation and Without Fermentation. Brine solution is used in both methods. The use of high amounts of salt in the pickles gives it a characteristic odor. Fermented pickled foods contain nutrients in the form of sugar. The salt present in the brine solution remove the nutrients and the lactic acid bacteria naturally present in the food item turn the sugars into nutrients. These give pickles a taste, smell, texture. Without Fermentation- raw ingredients of pickles have to be soaked in brine solution for many hours and then boiled in vinegar solution and given pickling spice. The boiled solution kills all microorganisms. Boiling solution helps in pickling the smell, taste, texture. The packaging needs to be good to keep the pickles (Khandekar SA, 2020).

Good packaging will prevent the growth of microorganisms. There are different varieties of pickles such fruits include mango, olive, amalki, and vegetables include eggplant, carrot, cauliflower, tomato, garlic etc. Pickles are widely used and accepted food items in Bangladesh as well as around the world (Qureshi, 2013).

Chapter

3

 **Material and Methods**

 **Brix**

 **Acidity and pH**

 **Microbial Analysis**

 **Viscosity**

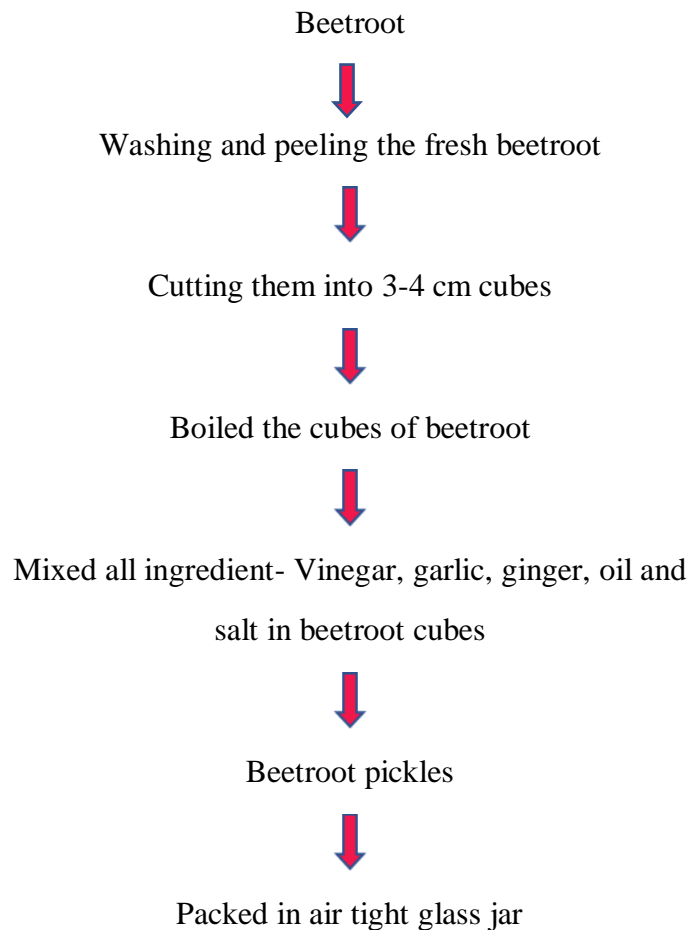
 **Ash**

Materials and Method

Formulation of Non- Fermented beetroot pickle:

1. Fresh raw Beetroot – 5 kg
2. Common Salt: 250 g
3. Sugar: 300 g
4. Master oil: 150 g
5. Acetic Acid: 500 g
6. Ginger peel: 50 gm
7. Cardamon: 25g
8. Garlic: 50 g

Flow chart diagram



Methods:

Pickle beetroot sample preparation --

First, I took the beetroot, then washed it well, peeled its skin. Then I cut the beet into 3-4 cm size so that it blends well in the brine solution. Then boiled the beet pieces. Then I put the beet cubes in a jar with the brine solution and the rest of the ingredients. Preserved for a few days to pickle.

This table describes the process of pickled production. The study was performed in the laboratory of the Department of Nutrition and Food Engineering at Asuliya campus. I collected fresh Beetroot and other raw material from the local market. Glass bottles and other laboratory equipment, chemicals used in processing were used to process the product.

Pickled are usually produced on a small scale in the industry. Physical environmental conditions such as pH, temperature and acidity are to be observed from time to time. Fruits or vegetable are taken washed and peeled skin with a knife. These are usually cut into a fixed shape and size so that they are well immersed in the brine solution. Brine solution and Fruits or vegetable ratio must be taken 1:1

Brix

Apparatus:

Brix meter

Sample (Pickle Liquid)

Procedure:

Firstly, take brix meter



Then gave 2 drop samples in brix meter



Check

Result: Being the value of the sample: **11⁰(Be)** (Abbey Refractometer)

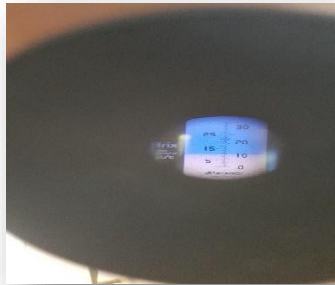


Fig: Brix

Acidity and pH

Acidity determines the ability of bacteria to grow on fermented pickled item. The amount of acidity must be increased to prevent the growth of microorganisms in any food item. But the amount of acidity must be kept to a balanced so that microorganisms can be killed and safe for eaten at the same time. So, slight change in the amount of acid impairs the growth of bacteria because they are much more sensitive to acidic conditions than humans. Acidity determines the pH value in pickles. Measuring acidity means that a certain amount of acid is present in the pickle. While measuring the pH means measuring the strength of the acid. The range of pH is basically 0 to 14. The pH value 7 is considered to be neutral. If the pH value falls below 7, then the product is called acidic. And if the pH value is above 7, then the product is naturally called basic (Khandekar SA, 2020).

The number of microorganisms in fermented pickles increases with the decrease in pH value. Studies have shown that different types of bacteria increase the pH of different levels. According to the research, I found that most of the bacteria grew below pH 5. But the pH value must be kept between 5 to 10, because if the pH value is below 5 and above 10, it makes the pickle is not safe for eat, increases the acidity and bacteria to grow (Khandekar SA, 2020). When I Checked the pH of beetroot pickles in 0 days it was 5, then in 180 days it was 4.5, then in 300 days it was 3.5

In 300 days,

1st reading pH value: 3.60

2nd reading pH value: 3.48

The average of the two-pH value: **3.5**



Fig: pH meter

Shelf-life analysis Preserve products:

The sample of product of beetroot pickle was kept room temperature (29-30 °C) for 10 months. Various method has been observed to evaluate the deterioration of the product after 1 month interval, again after 5 months and then after another 5 months and they were analyzed for their shelf life in way by microbiological analysis and sensory evaluation.

Shelf life by Sensory Evaluation:

Beetroot pickles are evaluated by testing panels to improve consumer acceptance. Acceptability is determined by the Hedonic rating scale and the panelist was selected as teacher, student and lab attendant of department of Nutrition and Food Engineering. The Nine-point scale panelist was given a sample and told to score by properly observing the color, texture, flavor, appearance and overall acceptability of the beetroot pickle.

Shelf life by microbiological analysis:

In microbiological analysis, the shelf life of pickle product was analyzed by using pour plate technique at our laboratory in Asuliya campus.

The analyzed by applying following methods.

Apparatus:

1. Media
2. Petri-dish
3. Beaker
4. Conical flask
5. Measuring Cylinder

6. Spatula
7. Autoclave
8. Spreader
9. Aluminum Foil
10. Hot plate
11. Incubator
12. Laboratory Films
13. Micro-pipette
14. Electronic Balance

Reagent:

Nutrient Agar --- 2.8 gm

Procedure:

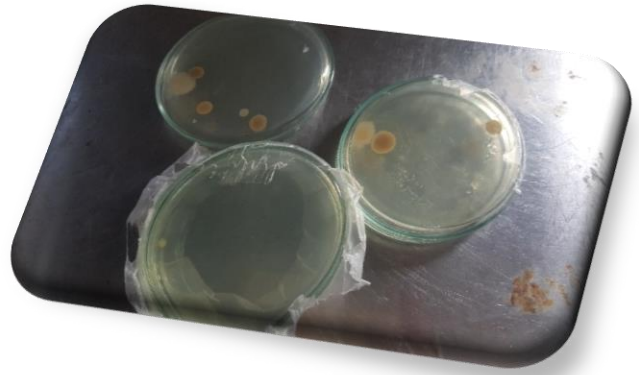
- ✚ First of all, measure the selective media (Nutrient agar) into a conical flask and dissolve it by 100 ml distil water.
- ✚ After dissolving properly mixed it by hot plate.
- ✚ After mixing media conical flask with media, Petridis, Spreader, all wrapped in fuel paper for autoclave.
- ✚ Autoclave it for 25 min at 121 °C with 15 psi.
- ✚ After autoclave, all apparatus and media keep into laminar air flow for preventing the air contaminates.
- ✚ I took 3 Petridis for better results than pure the media into the Petridis and wait some time for solid it.
- ✚ After the solid form then pour the 0.5 ml of my sample (beetroot pickle clear juice) into the media through micropipette.
- ✚ Then I spread the sample in three Petridis through the spreader.
- ✚ After that, I wrap the Petridis with laboratory films and put them in the incubator.
- ✚ I keep it in the incubator at 35 to 37 °C for 24 to 48 hours to allow bacteria to grow.

After two days I note the result and calculate the number of colonies using this method:

Count:

1st Petridis + 2nd Petridis + 3rd Petridis

$$\begin{aligned} & 5 \quad + \quad 7 \quad + \quad 2 \\ & = 14/3 \\ & = \mathbf{5 \text{ cfu/g}} \end{aligned}$$



Viscosity

Apparatus:

Viscometer

Glass

Sample (pickle clear juice)

Procedure:

- ✚ First take a sample of beetroot pickle then blend it through a blender machine.
- ✚ After blending, we filter the sample with sieve and then a beetroot pickle clear juice is obtained.
- ✚ Then I take the pickle clear juice in a glass and I put it in the viscometer machine to get the read
- ✚ The viscometer begins to read and the final gives a value.
- ✚ After that, I get a final value.

Result: Viscosity: **13.5% (135.0 m Pa's)**

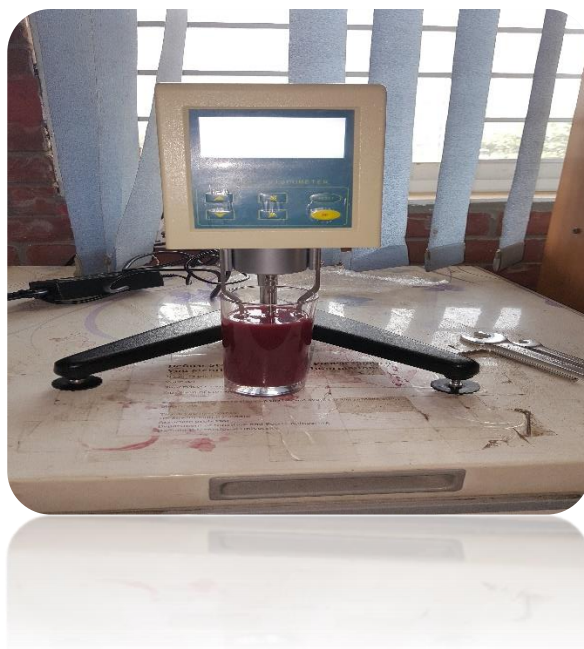


Fig: Viscometer

Ash

Apparatus:

Sample (beetroot pickle clear juice)

Dry oven

Electronic Balance

Container

Crucible

Muffle Furnance

❖ Pickle clear juice 61g -- Empty container 12.2g
= 48.8g

Procedure:

✚ At first, I take clear juice in a container 48.8g and put the juice in this container in a dry oven to dry at 70° C

- ✚ After drying, I take some amount in crucible. Before that I measured the empty crucible then measure the sample with crucible.
- ✚ Then I put the crucible with the sample in Muffle furnace and switch on the Muffle furnace.
- ✚ Set the temperature to be Ash at 600°C for 6 hours.
- ✚ After the Ash, is given time to reduce the heat of the muffle furnace a bit then I take out the crucible.
- ✚ Again, I measured the crucible with Ash with electric balance.

Calculation:

- Weight of crucible (W1) = 24.025 g
- Weight of sample (Ws) = 0.513g
- Weight of crucible with Ash (W2) = 24.045g

$$\begin{aligned}
 \text{✚ Ash \%} &= \frac{W2 - W1}{W_s} * 100 \\
 &= \frac{24.045 - 24.025}{0.513} * 100 \\
 &= \mathbf{3.89\%}
 \end{aligned}$$

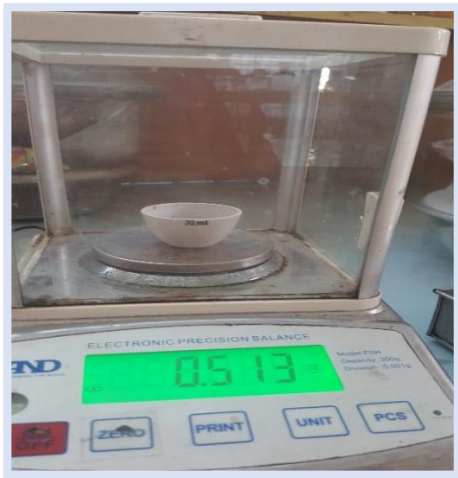


Fig: Electric balance and Muffle Furnace

Chapter

4

- ✚ **Result and Discussion**
- ✚ **Sensory Evaluation**
- ✚ **Sample code**
- ✚ **Microbial Analysis**
- ✚ **Preserve studis**

Result and discussions:

Sensory evaluation was conducted using Hedonic scale among trained panelists at laboratory and awareness workshop center in Bangladesh.

Form:

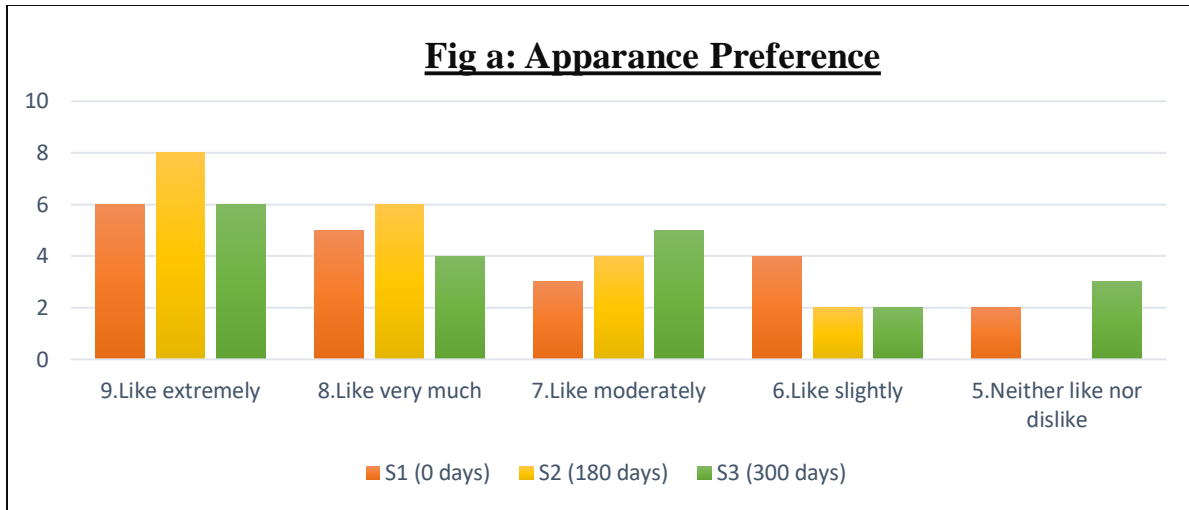
Sensory Evaluation:

Name:		Product:	
Panelist no:		Date:	
Instructions: Taste the given sample, then place the x mark on the point in the scale which best describes your feeling.			
Score	Sample code		
	S1(0days)	S2(180days)	S3(300 days)
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			

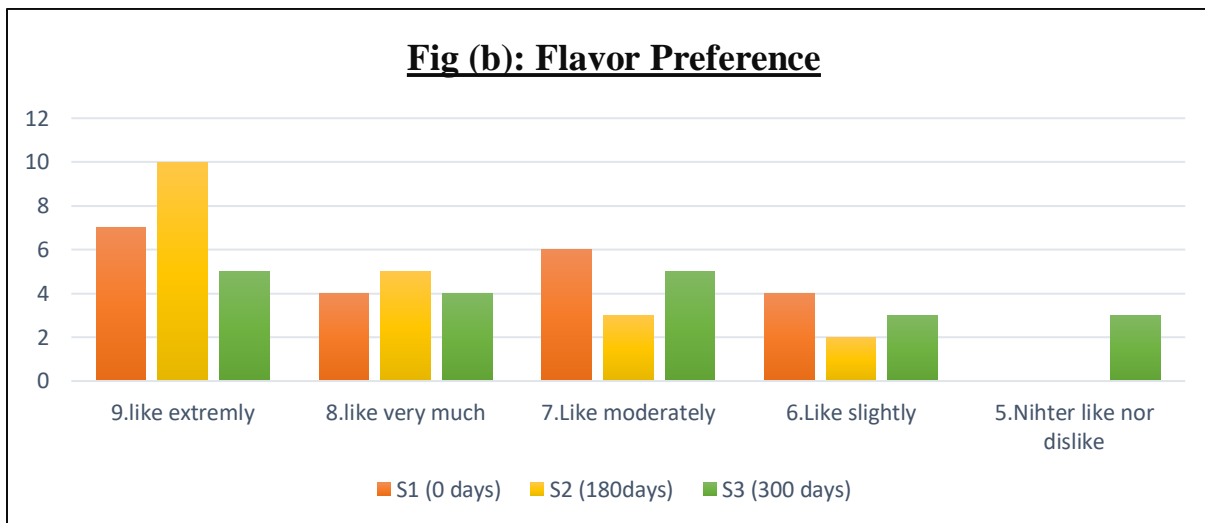
Score	SAMPLE CODE														
	S1 (0 Days)					S2 (180 days)					S3 (300 days)				
	Appearance	Flavor	Taste	Texture	Overall Acceptance	Appearance	Flavor	Taste	Texture	Overall Acceptance	Appearance	Flavor	Taste	Texture	Overall Acceptance
(9) Like extremely	6	7	5	5	7	8	10	9	12	12	6	5	6	8	5
(8) Like very much	5	4	6	4	5	6	5	5	3	5	4	4	4	6	3
(7) Like moderately	3	4	3	8	4	4	3	4	3	2	5	6	5	3	6
(6) Like slightly	4	4	2	2	3	2	2	2	2		2	3	3	2	4
(5) Neither like nor dislike	2		4	1	1						3	2	2	1	2
(4) Dislike slightly															
(3) Dislike moderately															
(2) Dislike very much															
(1) Dislike extremely															

Total Respondent = 20

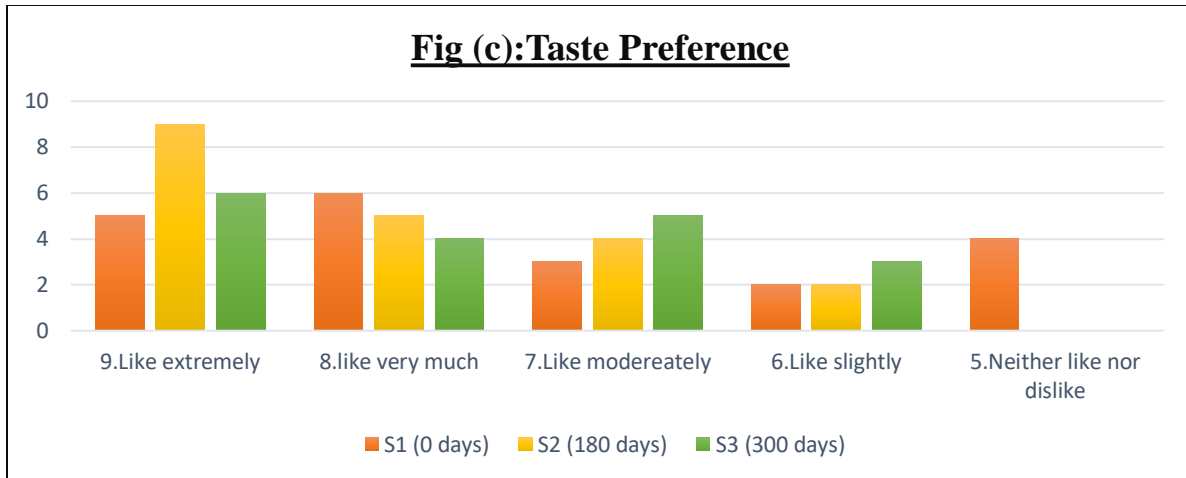
S1 = 0 days beetroot pickle S2 = 180 days beetroot pickle S3 = 300 days beetroot pickle



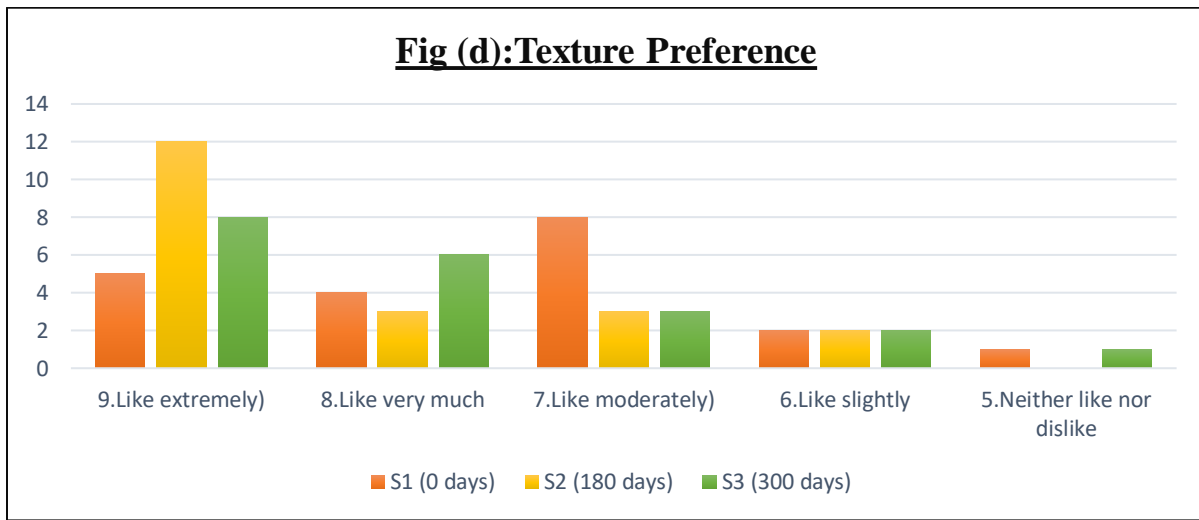
As we can see **Fig (a)** the Nine- point hedonic scale chart has the **Appearance Preference** of the beetroot pickle. In this chart shows **sample 2 (180 days)** got a higher score which is “**like extremely**”.



As we can see **Fig (b)** the Nine- point hedonic scale chart has the **Flavor Preference** of the beetroot pickle. In this chart shows **sample 2 (180 days)** got a higher score which is ‘**like extremely**’.

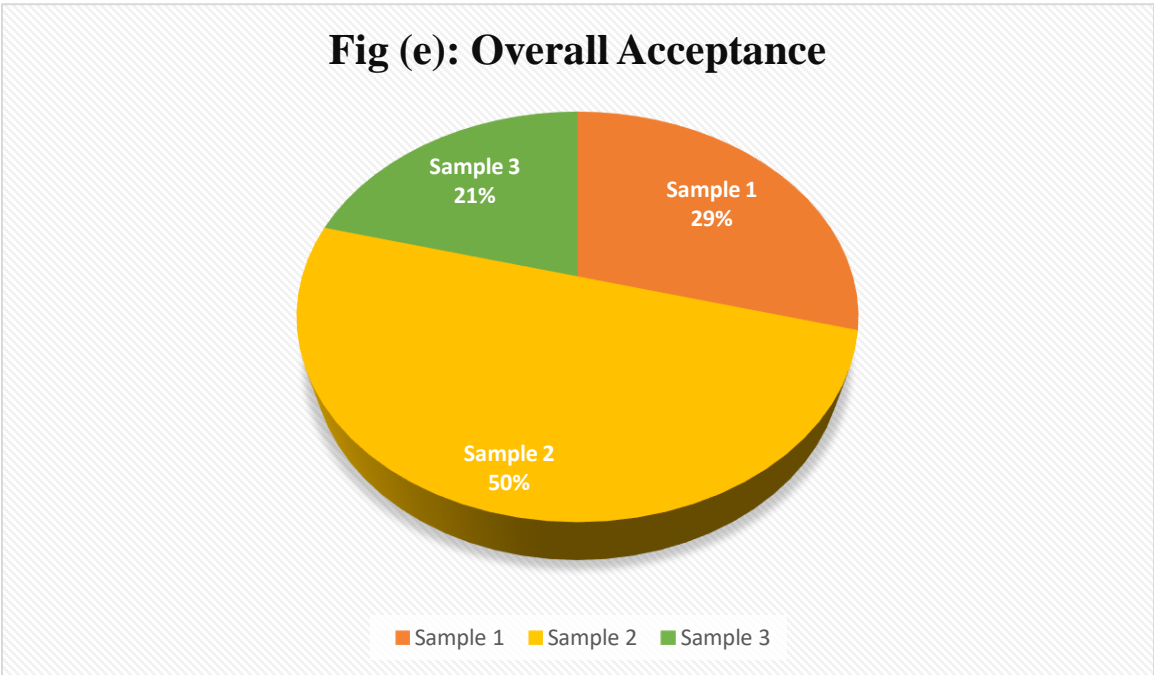


As we can see Fig (c) the Nine- point hedonic scale chart has the **Taste Preference** of the beetroot pickle. In this chart shows **sample 2 (180 days)** got a higher score which is **‘like extremely’**.



As we can see Fig (d) the Nine- point hedonic scale chart has the **Texture Preference** of the beetroot pickle. In this chart shows **sample 2 (180 days)** got a higher score which is **‘like extremely’**.

Fig (e): Overall Acceptance



As we can see Fig (e) the Nine- point hedonic scale chart has the **overall Acceptance** of the beetroot pickle. In this chart shows **sample 2 (180 days)** got a higher score in ‘**Overall Acceptance**’.

❖ Microbial Analysis

The study was accomplished by pour plate technique. The number of bacteria per gram in the total bacterial sample was calculated. Total bacteria were counted by multiplying the colony forming unit with dilution number. Dilution is done to get better result. For dilution have to take 10 test tubes and given 9 ml distilled water and 1 ml sample in it, the density of the last test tube is less, good value comes from calculating the value from it. Total bacteria in the sample at different storage times come in different values. After 1 month of pickle storage comes a small amount of value, 180 days later the microorganisms were noticed again and there was very little difference with previous value. After 300 days noticed again that the value is slightly higher than before. Yeast and mold are required for bacterial testing, but there was not enough time to examine it in details because of this pandemic.

❖ Preserve studies of Beetroot Pickle

According to preserve time of beetroot pickle, I took 3 samples. The preserve time temperature was 29-30° c. A sample S1 in 0 days, A sample 180 days, A sample S3 in 300 days and their external properties have been checked. It is given in the shape of a table:

Beetroot Pickle						
Storage period days	Sample code	Color change	Off flavor	Texture	Visual fungal	Remark
0 days	S1	No	No	Firm	No	Good
180 days	S2	No	No	Soft	No	Good
300 days	S3	Slight	Slight	Slightly Soft	Slightly	Slightly spoiled

Beetroot pickles sample were preserved in good condition for up to 7 months. But as the pickles are processed with vinegar, they slowly start to deteriorate after 7 months. The sample begins to spoil. This may be due to lack of preservative, because no preservative is used in beetroot pickles. Oil and spices affect the shelf life of the pickle. Color change was not seen in sample 1 and sample 2. But some changes were seen in sample 3 it is slight. The texture of the sample was also good for the first 7 month. But gradually it started to change a little. After noticing the first 7 months, not much taste was found off. But in the next 3 months of preserved conditions, some taste was found off.

So, in preserved condition, it has been seen that pickles last for 7 months, if more up to 8 months. After that increasing time, the shelf life of pickles decreases and some of them get damaged

Chapter

5



Conclusions



References

Conclusions

After all the study was found the pickles were good in 180 days (29-30°C). It is understood that microbial analysis, Sensory evaluation, preserve time, observing everything. Studies have described the effects on pH, acidity. Microbial growth, pickles due to different environment. Proper control of physical and microbial growth can result in good quality pickle. So, of course the physical condition like pH, temperature, acidity, etc. should all be well maintained so that the pickled is protected. Beetroot is commonly used as a vegetable. But it can make more delicious through various processing. Farmers are biddable to sell vegetable at lower price when it is the season of vegetables. But if farmers can preserve vegetables in a good way and economically, they will get a good price and will be able to increase their out-of-pocket capital. Beetroot pickles must be encouraged to be commercially prepared and preserved in our country. People who are semi-skilled and not skilled can also earn their income by doing this business. So, the unemployment problem in our country can be solved a bit. Processed beetroot pickles can be sold in the off- season in the local market and exported. This will increase the income of our national economy.

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