A PROJECT WORK REPORT

On

"Study on Physio Chemical Analysis and Acceptability of Pineapple Jam Filled Rusk"

Submitted To:

Prof. Dr. Md. Bellal Hossain

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Submitted by:

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Date of Submission: 20/12/ 2018

LETTER OF TRANSMITTAL

Date: 20 December, 2018

Professor Dr. Md. Bellal Hossain

Head

Department of Nutrition and Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Subject: Submission of Project Report.

Dear Sir,

I the student of Department of Nutrition and Food Engineering, Daffodil International University have successfully completed our internship report. I have prepared this report based on the acquired taste knowledge during my Thesis period in our food lab. It is great achievement to work under your active supervision. It is a great pleasure and honor for me to have the opportunity to submit Project on "Study on Physio Chemical Analysis and Acceptability of Pineapple Jam Filled Rusk" as a part of the B.Sc in Nutrition & Food Engineering (NFE) program curriculum.

I, therefore, request and expect that, you will appreciate us with any sort of recommendation & valued suggestion & will cordially receive this report for your kind assessment.

Sincerely Yours,

Nafisa Tamanna

ID: 151-34-343

Department of Nutrition and Food Engineering

Daffodil International University

LETTER OF AUTHORIZATION

Date: 20 December, 2018

Professor Dr. Md. Bellal Hossain
Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Subject: Declaration regarding the validity of the Project Report.

Dear Sir,

This is my truthful declaration that the **"Project Report".** I have prepared is not a copy any thesis report previously made any other students.

I also express my honestly confirmation in support to the fact that the said thesis report has neither been used before to fulfill my other course related not it will be submitted to any other person a authority in future.

Sincerely Yours,

Nafisa Tamanna
ID: 151-34-343
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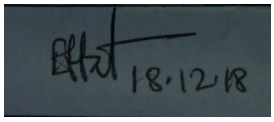
CERTIFICATION OF APPROVAL

I am pleased to certify that the Project on **"Study on Physio Chemical Analysis and Acceptability of Pineapple Jam Filled Rusk"** conducted by **Nafisa Tamanna**, bearing respectively **ID No: 151-34-343** of the department of Nutrition and Food Engineering has been approved for presentation and defense/viva-voce.

I am pleased to hereby certify that the data and finding presented in the report are the authentic work of **Nafisa Tamanna**. I strongly recommended the report presented by **Nafisa Tamanna** for further academic recommendations and defense/viva-voce. **Nafisa Tamanna** 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.



…….. ……

Professor Dr. Md. Bellal Hossain
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ACKNOWLEDGEMENT

At first I would like to express our heart-felt thanks to Almighty ALLAH for his kind blessing for complete the thesis successfully.

My deep gratitude and sincere thanks to the honorable Head, Department of Nutrition and Food Engineering, **Professor Dr. Md. Bellal Hossain** for his scholastic guidance, constructive criticism, painstaking help constant inspiration and advice from the very beginning till the completion of this work for giving us the opportunity to accomplish the attachment.

I am encouragement taking this privilege to deliver my gratefulness to each and every people who are involved with me in every phase of my life.

I am deeply indebted to my Supervisor, **Lecturer, Effat Ara Jahan,** Department of Nutrition and Food Engineering**,** and Daffodil International University for her whole hearted supervision during my organizational attachment period. Without her help it would not have been possible to complete the training report successfully and valuable guidance, suggestion, encouragement and constructive criticism throughout the Industrial training.

My deep gratitude and sincere thanks to the honorable Dean, Faculty of Allied Health Science, **Professor Dr. Ahmed Ismail Mostafa** for his kind cooperation and to accept this Degree.

I also grateful to all the other **NFE Faculty member** for their great help during university life.

The encouragement as a continued source of inspiration provided by our parents is fully appreciated.

Dedication

I dedicate this to my parents

ABSTRACT

This study was conducted on the preparation of pineapple jam filled rusk and specify its quality parameters. The fruits and flour, sugar, yeast were collected from the local market, Pineapple washed and cut into pieces, then pineapple pieces blended to paste boiled for prepare Pineapple Jam also produce bread and toast by their ingredients. The Rusk undergo two separate baking operation separated by on interval of 24 hours production and baking of the loaves following by a rest tempering period from 18 to 24 hours, and cutting the loaves into slices around 10 mm thick. Toast prepared the quality ingredients like flour, sugar, fat, yeast, salt on some toast rusk commercial product of rice bread that is baked once, shrived a baked again until dry. In this study it was found that protein content 12.49 percent, Moisture content 10.98 percent, Ash content 1.18% percent. The sensory evaluation of the rusk was carried out by 30 panelists on a nine-point hedonic scale for different sensory parameters such as appearance, flavor, taste, body consistency and overall acceptability. In quality parameter test the sample showed a positive result and it was approved to be the best in all sensory attributes by the panelists. The study also showed the pineapple jam filled rusk got the highest score as like extremely very much in taste attributes and sample containing were liked very much by the panelist in flavor attributes.

Key words: Pineapple, sugar, flour, yeast, oil.

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CHAPTER-1

INTRODUCTION

1.1 Introduction

Rusk is an also known as dry bread. Rusk are dry hard biscuits or twice baked bread that are used for everything from Greek- style make rusks from regular bread but because you need to low oven temperature it takes on the bread you use [1]. Rusk is very tasty snack it is sometimes used as baby teething food. In the United Kingdom, the name also refers to food additives [2]. Alight, dry biscuit or piece of twice-baked bread, especially one prepared for use as baby food twice-baked bread used in foods such as sausages, and formerly as rations at sea. Sponge rusk is similar to biscotti but it is made out of twice-baked yellow cake batter.

Indian rusk two types one is the cake rusk and another is the regular or toast or bread rusk.

There are different rusk (double oven dried bread) types, sizes and shapes, the popular

1. Wheat rusk with whole grain wheat flour is a regular size.
2. Rye rusk with whole grain rye flour is a regular size.
3. Barley rusk with whole grain barley flour is a regular.
4. Eptazymo rusk with grind chicness, sesame, black sesame, seasoning [3].

If we talk about the nutrition information of rusk protein, fat, vitamin, minerals fibers, sodium and calories. This is what all food in the universe contributes to it. Per cent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

- Calcium. White bread is fortified with calcium and four medium slices per day would provide over 30% of the recommended daily intake of calcium which we need every day to maintain healthy bones and teeth.
- Fiber. ...
- Protein. ...
- Iron. ...

- Vitamins & Other Minerals. ...
- Energy. ...
- Fat. ...
- Sugar.

Toast are not good source fiber, biscuits that are high sugar and low nutrition can for harm body taken and we. Fiber helps maintain a healthy digestive system and a stable blood sugar level leading to a feeling of satiety. As for toasted bread, the process of toasting actually only removes the water from the bread and not the nutrients, so it doesn't affect the calorie content of the piece of bread before toasting.

A slice of warm, buttered toast can really hit the spot at breakfast. Although toasting bread doesn't have a large effect on the amount of essential nutrients in the bread, it does cause some chemical changes that affect how healthy the bread is. Lightly toasted bread is a better choice than darker toast [4].

The Rusk Company in Jeddah has the largest market share in the Saudi Rusk market. The company produces two main types of Rusk with different flavors, one with white flour and the other with whole wheat. The company has only one Rusk production line that is over 25 years old. The line was upgraded and production capacity was increased several times before. The company is facing a situation where it cannot make any new upgrades on the line or any expansions in the existing plant due to the limited space.

The company is also faced continuously with a higher demand on its products. This study was conducted to attempt to increase the production rate of the existing line to the highest feasible rate taking into consideration the space constraint. The objectives of the project included an in-depth study of the production processes involved, analysis of these processes in details, finding out the ways and means by which these processes can be optimized. A schematic diagram representing the production process.

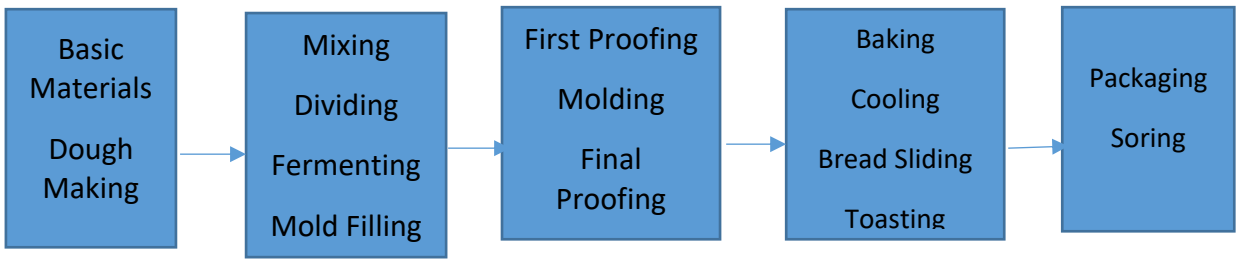


Fig: Stages in the Rusk Production Process

The production line of the Rusk has been divided into five main stages, namely preparation of the basic materials for Rusk & dough making, dividing and fermenting the dough and molds filling, dough baking and cooling, bread slicing and toasting and finally Rusk packaging and storage. After cooling the toasted Rusk slices on the conveyor they are packed in the packaging section and ready for dispatch [5].

1.2 General Objectives of Rusk

- Study on Physiochemical analysis and acceptability of Pineapple jam filled Rusk.

1.2.1 Specific objectives of Rusk

- To determine proximate analysis pineapple jam filled rusk.
- To evaluate the sensory characteristics.
- To develop new tested fruit jam filled product.

1.3 Nutrition fact of Rusk [7]

100 grams, Calories 407		
Total Fat		**% Daily Value**
Saturated fat 1.4 g		7%
Polyunsaturated fat	2.3 g	
Monounsaturated fat	2.8 g	
Cholesterol	78 mg	26%
Sodium	253 mg	10%
Potassium	245 mg	7%
Total Carbohydrate	72 g	24%
Protein	14 g	28%
Vitamin A-1%		

Vitamin C-0%
Calcium-5% and Iron -15%

CHAPTER-2

Materials and Method

2.1 Materials and Methods

The study was conducted in the Laboratories of the Department of Nutrition and Food Engineering, Daffodil International University, Dhaka.

2.2 Collection of Raw Materials

The fresh, Pineapple, flour, sugar and others was collected from the local market. The pineapple used to pineapple jam and its used to Rusk.

Collection of Chemicals

- Pectin
- Sodium Hydroxide
- Yeast
- Color
- Flavor
- Methyl Red Indicator
- Sulphuric Acid
- NaoH
- 0.1 N HCl
- 0.1 N NaoH

The packet were used in the packaging of rusk.

Pic- Laboratory produced Rusk

2.3 Methodology

The study on the preparation of natural pineapple jam filled Rusk using the following equipment, ingredients and utensil.

2.4 Apparatus and Equipment

1. Blender
2. Drying Oven
3. Electrical Balance
4. Glass rod
5. Petroleum ether
6. Cotton plugs
7. Crucible Lid
8. Disc Bowl Centrifuge
9. Desiccators
10. Heater
11. Conical Flask
12. Measuring Flask
13. Biker
14. Sauce pan
15. Knife

16. Tray
17. Chopping board
18. Mixing spoon
19. Large bowl

2.5 INGREDIENTS

Preparation of pineapple jam	
Pineapple	100 gm
Water	300 ml
Pactin	2 gm
Coconut milk	450 gm
Sugar	300 gm

Preparation of Rusk	
Vegetable oil	1 tbsp.
Yeast	2 tbsp.
Warm water	¼ cups
Flour	¼ cups
Sugar	1 tbsp.
Salt	1 tbsp.
Baking powder	¼ cups

Pineapple jam is a sweet, juicy spread that is slightly tarter than the average berry jam. It's also quite easy to make at home, even if you've never made jam or jelly before.

2.6 Procedure

For Pineapple Jam from Fresh Pineapple

Step-1—

Remove the skin of the pineapple. Before cutting into the pineapple, give it a rinse in the sink. Then, Peel a Pineapple by laying it on its side and cutting off the top and the very bottom. Set the pineapple upright and slice off the outside skin in strips.

Steps-2—

Cut the pineapple into small pieces. Slice the pineapple into small, 1 inch cubes. You don't have to be precise, as you will be blending the pineapple. Just make sure that the pieces are small enough to put in a food processor or blender.

- Cut out any little knots or seeds that you may come across while cutting the pineapple.

Steps---3—

Blend the pineapple chunks. Drop the pineapple pieces into a blender or food processor. Blend until the pineapple reaches a smooth, somewhat pulpy consistency. Remove any seeds or rough pieces from the mixture.

Steps---4—

Squeeze in the lemon juice. Wash the two lemons and cut them in half. Either in a lemon juicer or by hand, squeeze the lemon juice into the pineapple mixture. Stir with a spoon.

Steps—5—

Mix in the sugar. Pour the five cups of sugar into the pineapple mixture. Stir thoroughly so that the sugar is fully incorporated into the pineapple and dissolves. Let the mixture sit for fifteen minutes or so.

Steps—6—

Bring the pectin and coconut milk to a boil in a saucepan. Combine one packet of pectin and one cup (240 ml) of coconut milk in a small saucepan, then bring the mixture to a boil on medium heat. Boil for one minute, then remove the saucepan from the stove.

Steps—7-

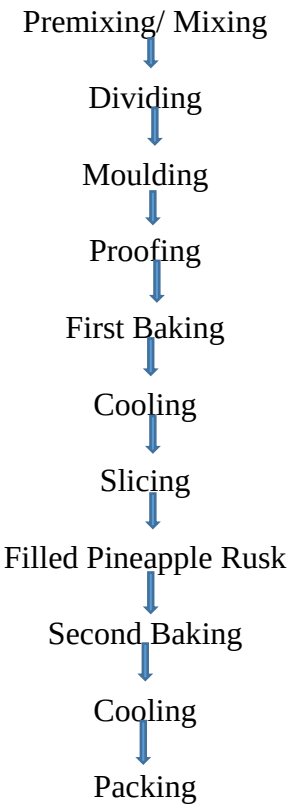
Combine the pectin and the pineapple mixture. Pour the pectin into the pineapple mixture and stir for one minute. You should notice that the mixture has thickened considerably and has a more jam-like texture than before.

- The jam is now ready to be canned or to be eaten once it has cooled down [6].

2.7 Preparation of Rusk

1. In a large bowl, mix the sugar, oil, yeast and water.
2. In another large bowl mix 31/2 cups of flour add the salt.
3. Put the solid in the liquids and mix well my fingers. Measure an additional cups of flour and flour your work my surface.
4. Knead the dough with the flour until the dough small and elastic. Greases a brush the dough with oil and cover with cling wrap. Put the boil in a warm place for about an hour or so.
5. Preheat the oven 400 to 425F.
6. Grease your baking pan and put the dough in. Place in the oven for 40-60 min.
7. Now jam wrapped into the rusk then heated it by oven.
8. Now rusk with pineapple jam will be cool.

2.8 Rusk Manufacturing Process Flow chart



CHAPTER-3

Chemical Analysis

3.1 Chemical Analysis

Moisture, Ash, Fat% of Ruskwere determined by following methods described by; Moisture content by digital moisture analyzation method at 130°C for ½ an hours; However the ranges in temperature is slightly different. Normally conventional oven range from approximately 200 degrees to 500 degrees Fahrenheit.

3.2 Protein Test

To estimate total protein content in Pineapple Jam Kjeldhal method was used. But it is indirect method to estimate total protein content from the sample protein content of the sample was calculated by estimating total sample.

Materials:

1. Conical flask
2. Volumetric flask
3. Condenser
4. Weighing balance

Reagent:

1. Digestion mixture
2. Sulphuric Acid
3. 40% NaoH
4. 0.1 N HCl
5. Methyl Red Indicator
6. 0.1 N NaOH

Procedure:

The Kjeldahl method can conveniently be divided into three steps:

- Digestion
- Neutralization and
- Titration.

Digestion of Sample:

0.40 L sample was taken in a foil paper or a weighing paper. The sample was poured in a digestion flask. 10 ml of Sulphuric Acid was added into it. Then 2 gm of digestion mixture was taken into the flask.2 digestion flask was used so that was average value can be taken. The flask were the heated in a kjeldahl digestion chamber. At first temperature was 40 degree Celsius. Later temperature increased to 60 degree Celsius. 3-4 hours waited for become the solution colorless. Then the flask were cooled and diluted with 00 ml distilled water.

Distillation:

10 ml of solution from that flask was taken to the distillation flask. 150 ml of distilled water was taken into the flask. Then 10 ml of 40% NaOH was added to the distillation flask. Solution was colorless.

Figure: 3.1. Distillation flask with colorless solution

Three distillation flask was taken for this procedure where one of them was blank. In the 3rd distillation flask only reagents were taken and contained no sample. On the other hand 50 ml of distilled water and 10 ml of 0.1 N HCl was taken in a trapping conical flask. 2 drops of methyl red was taken into the trapping conical flask. The solution become pink color.

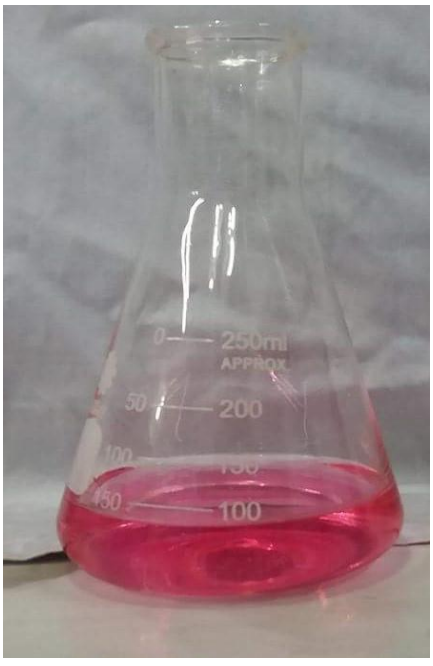


Figure: Conical flask with Pink color solution

Titration:

For titration the burette was filled with 0.1N of NaOH. Then trapping conical flask were set under the burette titration. From the burette NaOH was added into trapping conical flask by drop-wise and conical flask was shaken gently. NaOH was added until color change. The end point was color change from pink to off white color.

Figure: End point of titration with light yellow color

Content	Burette Reading		Average
	Initial	Final	
Blank	0	8.6	8.6
Sample-1	8.8	15.9	7.9
Sample-2	16.2	24.2	8

Table: Burette Reading For Titration

Calculation:

Percentage of crude protein was calculated by using the following formula

$$\text{Percentage of Protein} = \frac{(c-b)\times 1.4\times 10\times 5.95\times 0.1}{\text{Sample wt}}$$

Where,

Here,

Sample Weight = 0.4

b= 8.6

c= 8.0

Percentage of Protein = $\frac{(8.6-8)\times 0.1x1.4\times 10\times 5.95}{0.4}$

=12.49 %

3.3 Moisture Test

The moisture content of the samples was determined using the hot oven method. Weight the empty crucible. Then Five milliliters (5 ml) of each sample was put into a washed and dried crucible dish and weight it and placed in a Phoenix oven (Preiser model, New York, USA) at a 105°C for 1 hours until the weight is constant. The samples were cooled in a desiccator and weighed. The weight loss was obtained as the moisture content and was calculated as:

Fig: Freeze Dryer

Apparatus

1. Weighing balance
2. Foil paper
3. Refrigerator
4. Freeze dryer

Here:

Sample=5 gm

W1 = initial weight of empty crucible=25.173 gm

W2 = weight of crucible + sample before drying=29.632 gm

W3 = final weight of crucible + sample after drying =30.182 gm

% Moisture content

$$= - \frac{W2 - W3 \mathbf{X} 100}{W3 - W1}$$

$$= (29.632\text{-}30.182)/ (30.182\text{-}25.173) \text{ X } 100$$

$$= 10.98\ \%$$

3.4 Ash Test

Wet ashing is the sample procedure to get result. A silica dish was heated at 60°C, cooled in a desiccator and weighed. Five milliliters (5 gm) of the sample was put into the silica dish and transferred to the furnace. The temperature of the furnace was then allowed to reach about 550°C after placing the dish in it. The temperature was maintained until the water was fully removed indicating that all the organic matter content of the sample has been destroyed. The dish was then brought out from the furnace and cooled in the desiccator and re-weighed.

Calculation:

% Ash content

$$= \frac{W1\text{-}W2 \ \mathbf{X} \ 100}{}$$

W1

= (5-0.059)/5X100

= (98.82-100) %

= 1.18%

3.5 Sensory Test

Chemicals / Equipment Required

No chemicals are required.

Procedure:

1. Pine Apple Jam filled Rusk is tested by physical/sensory method.
2. This is done by using of eye, nose, and tongue.

Result:

Smell is not change, and the test is not so change but after time to time to change the texture of pine apple jam filled Rusk.

CHAPTER-4

Result and Discussion

4.1 Chemical Composition of Natural Pineapple Jam Filled Rusk

Sample	Moisture %	Protein %	Ash %
Pineapple Jam Filled Rusk	10.98 %	12.49%	1.18%

Table– Result Analysis

4.2 Sensory Evaluation

I conducted a survey among 30 staff of Daffodil International University. Total data are submitted below.

Name:	**Product:** Pineapple jam filled Rusk
Panel List:	**Date:**
Instruction: Taste the given samples, then place a right mark on the point in the scale which best describes your feelings.	

Score	**Sample**

	Appearance	Flavor	Taste	Texture	Overall Appearance
Like extremely	12	12	21	11	16
Like very much	14	12	6	12	11
Like moderately	3	4			2
Like slightly				2	
Neither like nor dislike		1			
Dislike slightly					
Dislike moderately					
Dislike very much					
Dislike extremely					

Table - Sensory Evaluation

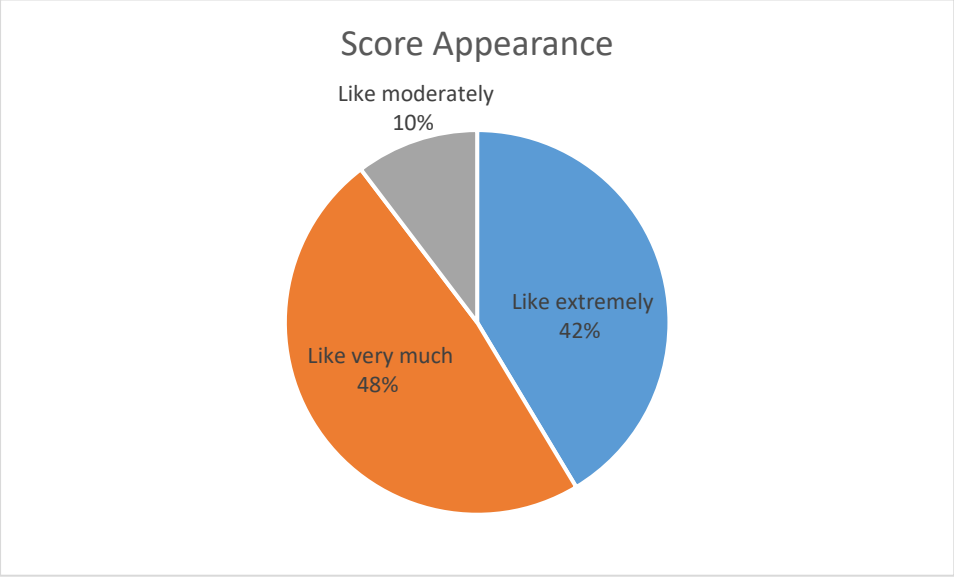


Fig- Pie chart of sensory evaluation -Appearance

Figure--shows the appearance attributes of Pineapple jam filled Rusk in pie charts in 9 point hedonic scales. The pie charts showed that Sample got the highest score as like very much.

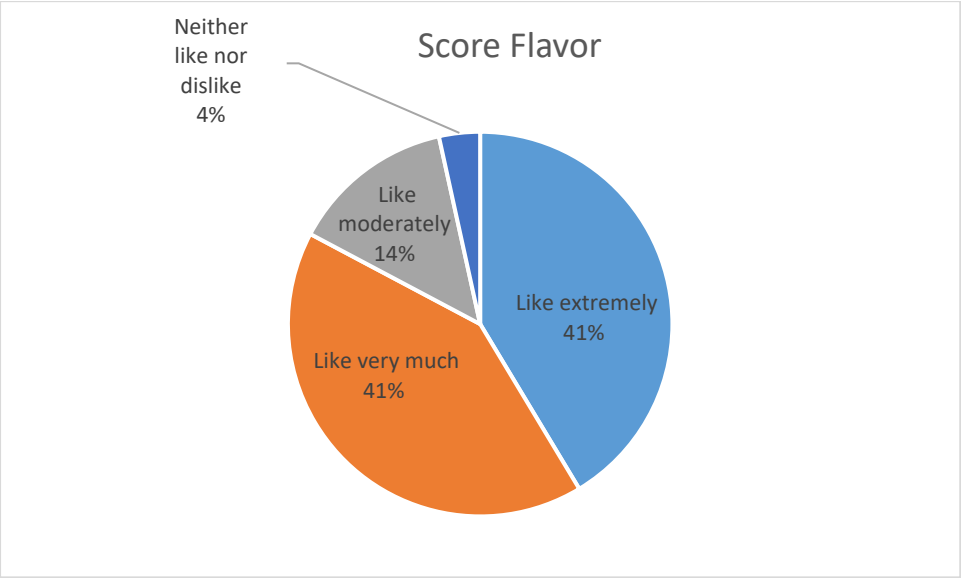


Fig- Pie chart of sensory evaluation -Flavor

Figure--shows the flavor attributes of Pineapple jam filled Rusk in pie charts in 9 point hedonic scales. The pie charts showed that Sample got the highest score as like very much & like extremely.

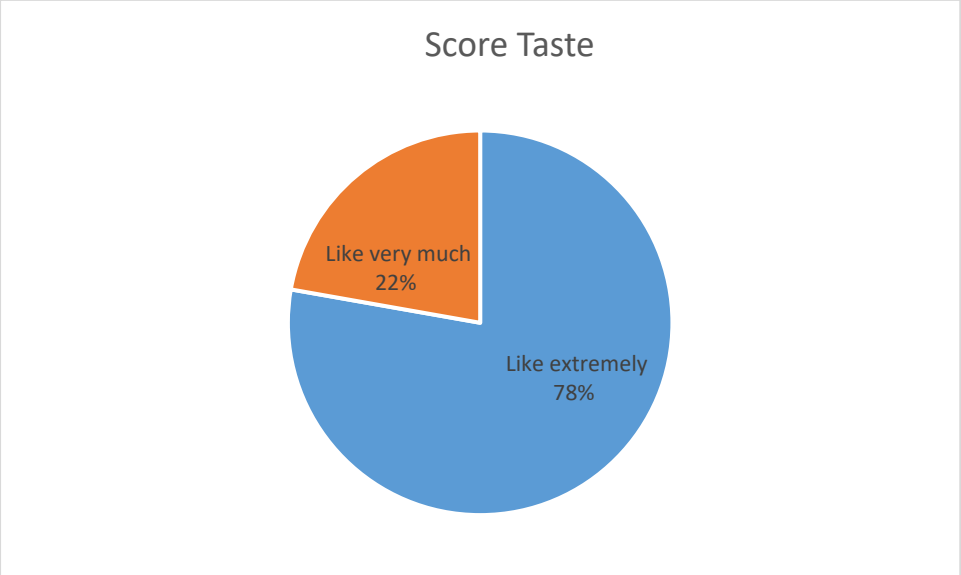


Fig- Pie chart of sensory evaluation -Taste

Figure--shows the taste attributes of Pineapple jam filled Rusk in pie charts in 9 point hedonic scales. The pie charts showed that Sample got the highest score as like extremely.

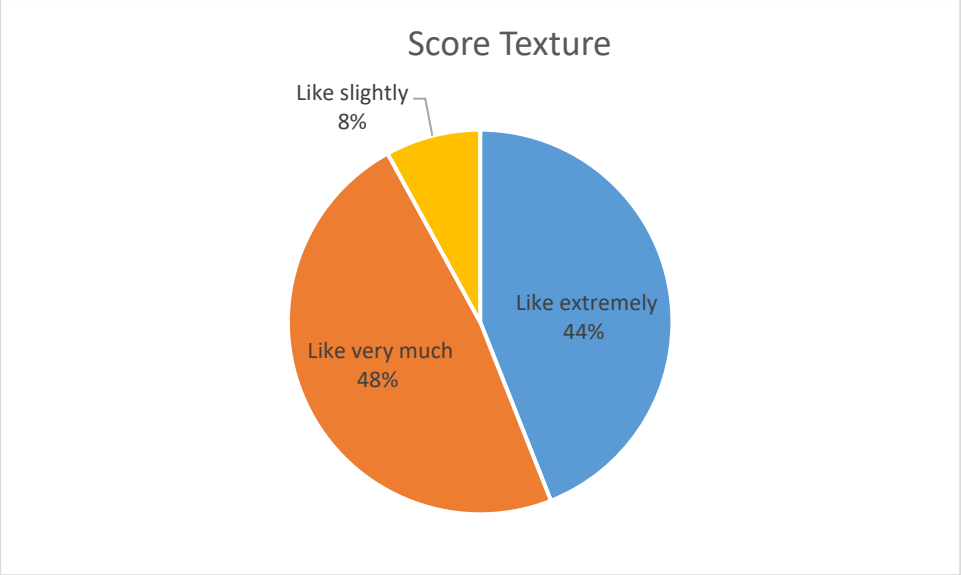


Fig- Pie chart of sensory evaluation -Texture

Figure--shows the texture attributes of Pineapple jam filled Rusk in pie charts in 9 point hedonic scales. The pie charts showed that Sample got the highest score as like very much.

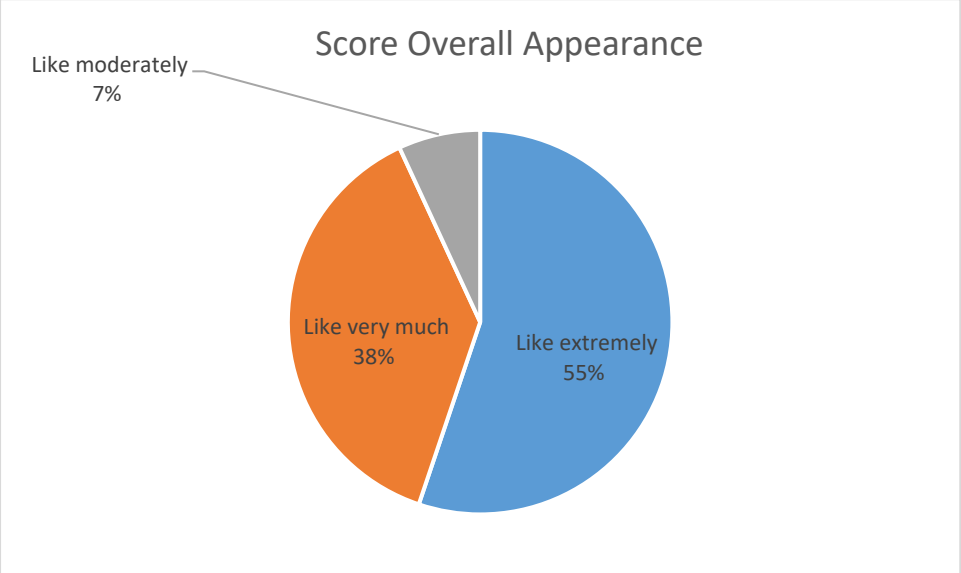


Fig- Pie chart of sensory evaluation –Overall Appearance

Figure--shows the Overall appearance attributes of Pineapple jam filled Rusk in pie charts in 9 point hedonic scales. The pie charts showed that Sample got the highest score as like extremely.

CHAPTER-5

Conclusion

Conclusion

The result of the study showed that rusk prepared with pineapple jam showed a positive result and was approved to be the best in all sensory attributes by the panelists. This is the first time analysis about this topics means physio chemical analysis & acceptability of pineapple jam filled rusk. Hence there is a great scope to develop & popularize pineapple jam filled rusk in Bangladesh.

Pineapple and rusk produced ingredients are available in the global market but pineapple jam filled rusk are not available its totally innovative product. Keeping in view all above results, the production of pineapple jam filled rusk at commercial level is recommended.

Chemical Composition of Natural Pineapple Jam Filled Rusk protein value is 12.49 percent. The pineapple jam filled rusk got the highest score as like extremely very much in taste attributes and sample containing were liked very much by the panelist in flavor attributes.

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THE END