A Project Work on

Development of Oatmeal Cookies and Quality Assessment.

Supervised by:

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

Co-Supervised by:

Humayra Nawshin (lecturer)
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Submitted by:

Md. Zahid Hasan
ID: 171-34-635
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil international university

Date of submission: 09/12/19

Letter of Transmittal

Date: 09/12/19
To,
Professor Dr. Md. Bellal Hossain
Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

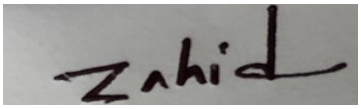
Subject: Submission on Project Report

Dear Sir,

With respect, I would like to inform you that I have completed my project report on "Development of Oatmeal Cookies and Quality Assessment ". I have tried to my level best to focus the project report for consistency with the optimal standard under your valuable direction.

I express my gratitude to you for your kind supervision and I hope that you will consider all my mistakes generously.

Sincerely yours



…… ……
Md. Zahid Hasan
ID: 171-34-635
Program: B.Sc in NFE
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Letter of Authorization:

Date: 09/12/19
To,
Professor Dr. Md. Bellal Hossain
Head
Department of Nutrition and Food Engineering
Daffodil International University

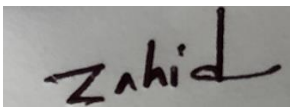
Subject: Declaration regarding validity of the Project Report

Dear Sir,

I would like to inform you that, the **"Project Report"** I have prepared is not a copy of any thesis report previously made any other students.

I also express my honest confirmation in support to the fact that the said project report has neither been used before to fulfill my other courses–related not it will be submitted to any other authority in future.

Sincerely Yours,



Md. Zahid Hasan
ID: 171-34-635
Department of Nutrition and Food Engineering
Faculty of Allied Health sciences
Daffodil International University

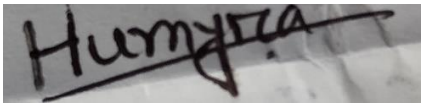
Certificate of Approval

I am satisfied to certify that the project report on **"Development of a Oatmeal Cookies and Quality Assessment "** conducted by Md. Zahid Hasan Carrying ID: 171-34-635, Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences, Daffodil International University; has been approved for presentation and defense for the academic degree.

Md. Zahid Hasan bears a strong moral character and an extremely satisfying identity. It has in fact been an extraordinary delight working with him. I wish him all achievement in life.

…….....

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



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Ms. Humayra Nawshin
(Lecturer)
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Acknowledgement:

At the very beginning, I would like to express my deepest gratitude to almighty Allah for giving me the strength & the composure to complete the thesis paper.

I am grateful to my parents without whom I cannot be here. Without the support of my parents, I could not be able to achieve my objectives and goals.

I would like to express my gratitude to **Professor. Dr. Md. Bellal Hossain,** Head of the Dept. of Nutrition and Food Engineering, Daffodil International University for creating this enormous scope of practical knowledge in the curriculum and providing me valuable guidance to complete my work.

I am deeply indebted to my Co-supervisor, **Ms. Humayra Nawshin**, Lecturer, Department of Nutrition and Food Engineering, Daffodil International University for her wholehearted supervision during my organizational attachment period. It would have been very difficult to prepare this report up to this mark without their guidance.

I would like to express my warmest thanks to NFE Faculty members for their countless inspiration and encouragement during the student life.

Abstract:

. The present study aimed to develop oatmeal cookies with changed wt% of rolled oats as 20% (sample 1), 40% (sample 2), and 60% (sample 3) along with other ingredients like flour, sugar, butter, ghee, milk powder, baking soda, vanilla extract and to specify the quality parameters of the products by proximate analysis. Moisture content of the products were increased as the percentage of the oats increased and were found as 3.72%, 4.14%, 6.28%f for the samples 1, 2 and 3 respectively. Ash content of the samples also showed positive variation with the change of the weight percentage of oats in products and the value for sample 1 was 2.75%, sample 2 was 3.60% and sample 3 was 4.15%. Protein content of the developed samples were increased as percentage of oats and the value of the sample 1 was 3.98, sample 2 was 5.72, sample 3 was 6.56. Fat content were also increased as the changed of oats %, sample 1 was 2.58%, sample 2 was 3.44%, sample 3 was 4.3%. All the three samples were analyzed to find out pH and the values obtained sample 1 was 2.54, sample 2 was 3.18 and sample 3 was 3.72.

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1.1 Introduction:

Cookies is a principal food throughout the world, which are provide more nutrients compared by others single food source. However in modern life cookies are one favorite desserts and snacks. Cookies have been described as small cakes made from a dough that is sufficiently viscous to permit the dough pieces to be baked on a flat try in the oven.

Based on that definition the number of cookies products would be classified in varying their some sensory characteristics such as- sizes, shape, texture, color, composition and flavor. Typically industrial cookies are classified based on their industrial production manner employed, cutting machine, rotary moulded, wire-cut and depositor machine, (pyler- 1988).

Cookies are an snacks food high in fat, calories, and sugar. Typically cookies formulation contain 30-40% sugar, 65-75% fat, and 15-25% egg, when flour-weight equals 100%, (pyler-1988).

But the traditional oatmeal cookies formulation containing 50/50 oatmeal/Flour ratio equals 100%, contain 50% shortening, 60% brown sugar and 2% egg, (pyler -1988).

Modified or Reformulation of favorite foods, like cookies to improve their nutritional profile allows and these modified foods were targeted to individuals with specific dietary needs, and also now targeted to the general customer in the market, (Thomson-2004).

Recently Bangladesh govt. of medical Association emphasizes selected some food products and portion to control as a key steps to reduces some diseases such as- obesity, diabetes, cancer etc, and last several years now in the cookie market has increased consumer awareness of their diet and health conditions, (Mintel-2007).

Now in the modern market to represent the cookie in consumers in different style branding as, sugar free, fat free or low fat, low carb or no carb, no allergens and modified nutrients as well as whole cookie products (ADA-2004) and consumer easily purchased.

Especially the oatmeal cookies formulated with brown sugar and oats, these could be provided a new sensory characteristics, health benefits and increased the consumption for a consumer(Sandrou and Arvanitoyannis-2000).

1.2 Aim of this Study:

The main purpose of this study that

- To know about Oatmeal Cookies.
- To know about new development on Oatmeal cookies and Quality Assessment.
- To evaluate the proximate analysis
- Identify the nutritional value of Oatmeal cookies.
- Identify the health benefit of Oatmeal cookies.
- For Self-development

1.3 varieties of Oates:

There are many varieties of oats are grown in world wide. Some important varieties are included:

*Scottish Oats:

*Rolled Oats:

*Quick rolled Oats:

*Simple Scottish Oatmeal:

*Oat bran power Bowl:

Figure-1: Varieties of Oats

1.4 Uses of Oats:

The Oats products and their derivatives are include:

1) Oat Bread
2) Oat Milk
3) Oat Cake
4) Oatmeal Cookies
5) Export hay
6) Muesli

While oats are used in suitable for human consumption.
Rolled Oats one of the most common uses is as livestock feed.

1.5 Health benefits of Oats:

The major health benefits of oats are include:

1) Energy to keep you going
2) Helps reduces risk of heart disease
3) Helps to maintain body weight
4) Oats contain beta glucan fiber that helps reduce cholesterol
5) May help reduce the risk of high blood pressure
6) Rich source of dietary fiber
7) Good source of protein like globulin, avenalin, prolamines.

2.1 Materials and Methods:

The study was conducted in the NFE Laboratories and Amar food products of Daffodil International University, Dhaka

2.2 Collection of Raw Materials:

The fresh Rolled Oates was collected from the super shop such as mina bazar. The rolled oats were used to prepare for Oatmeal cookies.

2.3 Chemicals and Ingredients used in Oatmeal Cookies Development:

- ✓ Flour
- ✓ Baking powder
- ✓ Oats
- ✓ Ghee
- ✓ Brown sugar
- ✓ salt
- ✓ Eggs
- ✓ vanilla extract
- ✓ Butter
- ✓ Shortening etc.

Figure-2: Raw materials of Oatmeal Cookies.

2.4 Preparation of Oatmeal Cookies:

The study of the development of Oatmeal Cookies was made using the following equipment's, Ingredients and utensil.

Figure no 3: Before Unbaked of Oatmeal Cookies:

2.5 Apparatus and Equipment's:

1) Mixing machine
2) Oven
3) Digital Balance
4) Knife
5) Try
6) Bowl
7) Spoon
8) Cookie cutter
9) Blender machine etc.

2.6 Preparation steps of Oatmeal Cookies:

Ingredients were selected by considering several requirements such as color, taste, rancidity, identifying damage, and also with findings the insect infestation.

Oatmeal Cookie were prepared by maintain the following steps:

Mixing Steps:

The selected ingredients were mixing in three step and make a cookie dough.

1) Creaming: All fatty ingredients such as butter, ghee, milk powder, margarine and sugar added to make a cream.
2) Added the cream egg, salt, pump oil, as per recipe standard and mixing well.
3) Final step added flours, baking powder, rolled oats and mixing few minutes make a dough.

Shapes or cutting:

The raw dough was transferred in the cookie cutter or depositor machine and make a cookie shape. The cookie shape are also change by using different kinds of dies.

Baked and Cooling:

Baked the raw shaped cookie 160 degree Celsius temperature at 20- 25 minutes and then cooling 20 minutes.

Packed and storage:

The cookie was packed by used in many kinds of packaging materials as like plastic jar, film paper, pouch, boxes, etc. Storage the final cookie product cool and dry place.

Figure no 4:Baked Oatmeal Cookies:

2.7 Composition of Oatmeal Cookies:

Table 1: Composition of Sample-1

Ingredients	Grams
Flour	100
Oats	20
Sugar	40
Butter	20
Ghee	20
Milk powder	10
Egg	1pcs
Salt	Small amount
Vanilla extract	2 Spoon
Baking soda	15

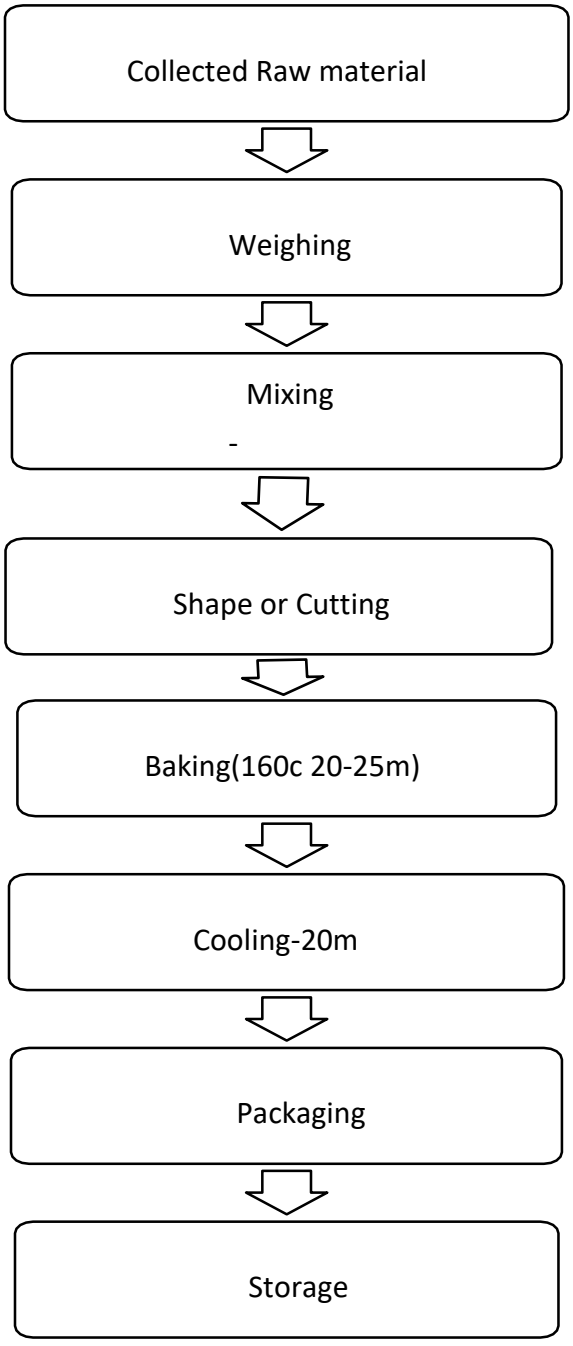
Table 2: Composition of Sample-2

Ingredients	Grams
Flour	100
Oats	40
Sugar	40
Butter	20
Ghee	20
Milk powder	10
Egg	1pcs
Salt	Small amount
Vanilla extract	2 Spoon
Baking soda	15

Table 3: Composition of Sample-3:

Ingredients	Grams
Flour	100
Oats	60
Sugar	40
Butter	20
Ghee	20
Milk powder	10
Egg	1pcs
Salt	Small amount
Vanilla extract	2 Spoon
Baking soda	15

2.8 Flow diagram of Oatmeal Cookies:



3.1 Proximate Analysis

Moisture, Ash, pH, Protein, Fat of Oatmeal Cookies were determined by following methods; moisture content by oven dry method at 105^0C for 1 hour; Ash content by muffle furnace ignition method at 600^0C for 6 hours , pH by pH meter, protein by Kjeldahl method for 24 hours,and fat by Soxhlet method for 6 hours.

3.2 Determination of moisture content of the Oatmeal Cookies.

The moisture content of the sample was determined using the oven drying method. Weight the empty crucible. Then (3gm) of each sample was put into a washed and dried crucible dish and weight it and placed in a phoenix oven (Presser model, New York, USA) at a 105^0C for 1 hours until the weight is constant. The samples were cool in desiccators and weighed. The weight loss was obtained as the moisture content and was calculated as:

Figure-5: Drying Oven

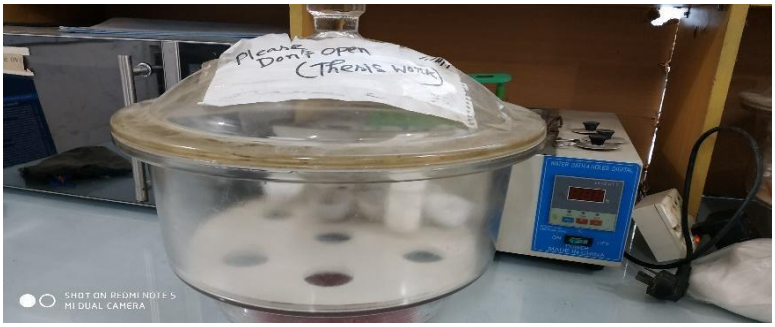


Figure-6: Desiccator

% Moisture Content $= \frac{W2-w3}{w2-w1} \times 100$

Here,

W1=initial weight of empty crucible

W2=weight of crucible + sample before drying

W3= final weight of crucible + sample after drying

3.3 Determination of Ash Content of the Oatmeal Cookies.

Wet the ash sample procedure to get the result. A silica dish or crucible was heated at 60^0C for 1 hours and cooled in desiccators & weighed. 3 gm. of sample was put into the silica dish & transferred to the furnace. The temperature of the furnace was then allowed to reach about 600^0C 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 silica dish was then brought out from the furnace & cooled in the desiccators & re-weight.

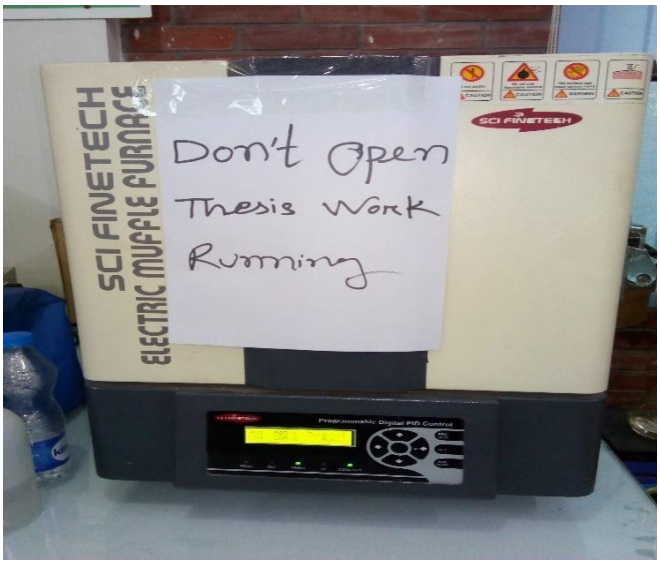


Figure-7: Muffle Furnace

Figure-8: Crucible or silica dish

Calculation:

%Ash Content= $\frac{C-A}{B-A} \times 100$

Here,

A=Weight of empty dish

B= weight of empty dish + sample before ash

C= weight of dish + Ash

3.4 Determination of protein by kjeldahl method

Protein content of different oatmeal cookies sample were determined by following the method of Micro- Kjeldahl .

Reagents and Equipments:

1) Sulfuric acid
2) Digestion mixture(2g Copper sulphate+98g Potassium sulphate)
3) 40% NaOH
4) 0.1N HCL
5) Methyl red indicator
6) 0.1N NaOH
7) Distilled water
8) Kjeldahl apparatus
9) High capacity electronic balance etc.

The Method:

The protein was extracted by kjeldahl method. The principle of this procedure involved digestion of the sample with concentrated sulfuric acid (H2SO4) and digestion mixture , which causes oxidation and destruction of protein and conversion of the organic nitrogen to ammonia that remains in the acid mixture as ammonium bisulphate.

Figure-9: Digestion Apparatus

Figure-10: Distillation Apparatus

The amount of ammonia nitrogen was determined by making the digest alkaline followed by distillation of the liberate ammonia into standard acid solution and estimated titrimetrically.

Cleaned and dried 500 ml kjeldahl flasks were taken along with 0.4g sample in it with about 10 ml of concentrated sulfuric acid (H_2SO_4) and 2gm digestion mixture were added then the digestion chamber was heated about (6-8 hours) until the end point will be no white smoke of sulfuric acid (H_2SO_4) and the solution will be crystal clear. After completing the digestion ,the flask was cooled and digested mixture was transferred in a 100 ml volumetric flask and diluted up to make with distilled water. Ten (10 ml) of that solution was transferred in a kjeldahl distillation apparatus after adding 50 ml distilled water, 10 ml (0.1N HCL), 2 drops methyl red indicator in a conical flask and the opposite of kjeldahl distillation apparatus added 150 ml distilled water, 10 ml (0.1 NaOH) solution. Set up the condenser and distillation for 30 minutes. Cooled the sample and titration with 0.1N NaOH the end point will be color changes from pink to light yellow.

Calculation:

The percentage of nitrogen in the sample was calculated by the following equation

$$\% \text{ Nitrogen} = (B-S)\times 1.4\times 10\times 6.25\times 0.1/\text{Sample weight}$$

Where,

S= Titration reading for sample

B= Titration reading for blank sample

Nitrogen factor= 6.25

3.5 Determination of pH by digital pH meter.

Figure-11: Digital pH meter

Chemical Required:

- ✓ pH meter
- ✓ Beaker
- ✓ Tissue

Procedure:

The pH of the samples were determined with the help of pH meter. Sample was prepared by dissolving into 10 ml of distill water. PH meter was calibrated with two buffer solution to avoid error in result.

3.6 Determination of fat by Soxhlet apparatus:

The Method:

Fat content of oatmeal cookies were determined following the methods by Mehlenbacher. The principle of this method lied in mixing with a solvent n-Hexane which was then removed by distillation and the residue was dried and weighted. The extraction procedure was carried out in soxhlet apparatus.

Figure-12: Soxhlet Apparatus

Figure-13: Round Bottle Flask& Thimble.

Procedure:

The fresh sample (2-3gm) of oatmeal cookies were weighed accurately, mashed slightly and it was taken in extraction thimble. The thimble was placed in an n-hexane for an about six hours.

Calculation:

% of fat content = A/B×100

Where,

A = weight of fat

B = weight of sample take

3.7 Sensory Evaluation:

I conducted a survey among 10 students of Daffodil International University. The total data were submitted below.

Instruction: Taste the given samples, then place a mark on the point in the scale which best describes your feeling.

Score: Sample-1 (20%)

(9) Like extremely	Appearance	Flavor	Taste	Texture	Overall Acceptance
(8) Like very much	3	7	5		2
(7) Like moderately	2	1	3	4	3
(6) Like slightly	4	2	2	5	4
(5) Neither like or dislike	1			1	1
(4) Dislike slightly					
(3) Dislike moderately					
(2) Dislike very much					
(1) Dislike extremely					

Score: Sample-2 (40%)

(9) Like extremely	Appearance	Flavor	Taste	Texture	Overall Acceptance
(8) Like very much	8	6	7	8	9
(7) Like moderately	2	3	3	2	1
(6) Like slightly		1			
(5) Neither like or dislike					
(4) Dislike slightly					
(3) Dislike moderately					
(2) Dislike very much					
(1) Dislike extremely					

Score: Sample-3 (60%)

(9) Like extremely	Appearance	Flavor	Taste	Texture	Overall Acceptance
(8) Like very much	2			1	
(7) Like moderately	5	3	1	2	
(6) Like slightly	3	4	2	2	3
(5) Neither like or dislike		3	2	4	5
(4) Dislike slightly			5	1	2
(3) Dislike moderately					
(2) Dislike very much					
(1) Dislike extremely					

Chapter no-04: Results and discussions

Parameter	Sample 1	Sample 2	Sample 3	Average
Moisture	3.72%	4.14%	6.28%	4.71%
pH	2.54	3.18	3.72	3.15
Ash	2.75%	3.6%	4.15%	3.5%
Protein	3.98g	5.72g	6.56g	5.42g
Fat	2.58g	3.44g	4.3g	3.44g

The Oatmeal Cookies produced. It is visually differ significantly the results of the moisture content analysis. As well as the moisture content for the manually processed sample has a moisture content of sample-1 is 3.72%, sample-2 is 4.14% and sample- 3 is 6.28%.The value of moisture content for the traditional Oatmeal cookies is add a maximum of 5%, low moisture content has a closely related to quality and durability of these products. Ash content of Oatmeal Cookies sample-1is 2.75%, sample-2 is 3.6% and sample-3 is 4.15%. Protein content of Oatmeal Cookies sample-1 is 3.98g, sample-2 is 5.72g, and sample-3 is 6.56g. The pH content sample-1 is 2.54, sample-2 is 3.18 and sample-3 is 3.72.

When I working in the lab I have got few problem during various proximate analysis. Such as- I analysis the ash content of Oatmeal Cookies sample at that time Muffle furnace machine does not work properly. On the other hand, when I was working on protein analysis for Oatmeal Cookies sample. I have faces many problem such as-digestion burner are not work properly.

Department of health has recommended mean dietary reference for dietary protein of 0.8 grams per kg body weight per day for a adults with individual of range 60-70g per day.(department of health,1991) the results show that oats can be a very good sources of Protein. This suggest that there is greater benefit from eating oats that are fresher compared any food. The possible present of resistant starch may also be of benefit as it may be a pre-biotic and promote conditions for growth of beneficial microorganisms in the lower gastro intestinal track .The future research is required to determine the full potential range of benefit of eating oats.

Chapter no-5: Conclusions

In this study the oatmeal cookies were developed to get optimum composition of the oats by taking into account the measured quality. As oats contains insoluble fiber and products were prepared by removing this fiber from oats, fiber content would be higher in the products. To get the optimum product, three samples were prepared and moisture%, ash%, pH and protein % were determined. As oats of oatmeal cookies are not available in the market of Bangladesh and as it is more nutritious and a good source of fiber and minerals, further study can be carried out to evaluate all the required parameters of the products before market research for commercialization. Developed product can be suggested as a good alternative of nutritive contents for human.

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