A Project Report
On
‘Development and sensory evaluation of Noodles enrich with Beetroot powder.’

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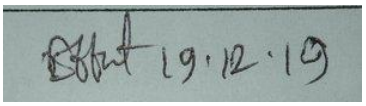
Date of submission: 19 DECEMBER 2019

CERTIFICATE OF APPROVAL

The project report entitled as "Development and sensory evaluation of Noodles enrich with Beetroot powder" prepared by Md.Sazzadur Rahman (163-34-564) has been completed under our collective supervision in Department of Nutrition and Food Engineering, Daffodil International University, Bangladesh. It is further certified that the presented project report here is suitable and submitted for partial fulfillment of the degree Bachelor of Science in Nutrition and Food Engineering.



…… ……..

Professor Dr. Md. Bellal Hossain
Head of the Department
Department of Nutrition & Food Engineering
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Effat Ara Jahan
Lecturer (senior scale)
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LETTER OF TRANSMITTAL

Date: 19 December 2019

Professor Dr. Md. Bellal Hossain

Head

Department of Nutrition& Food Engineering

Daffodil International University

Subject: Submission of Project report.

Dear Sir,

I would like to thankful to you for the concern and core support you have provided me during the course of this report. Without your kind heart, this report would not have been possible to complete. I would also like to thank those respective persons of Daffodil International University who has helped me a lot in NFE Lab during my project report.

To prepare this project report appropriately, I have collected the related knowledge of the project work and learned about the analytical experiment to get the fruitful result of the project. I have also followed the previous study and articles which are related to my project and helped me a lot to learn about that.

I would really appreciate if you consoled me with your thoughts and views with reference to the report.

Therefore, I would like to place this report to your judgment and suggestion. Your kind information will inspire me to perform better contribution in future.

Sincerely Yours,

Md. Sazzadur Rahman.

ID no: 163-34-564

Department of Nutrition and Food Engineering

Daffodil International University

LETTER OF AUTHORIZATION

19th December 2019

To

Professor Dr. Bellal Hossain

Head

Department of Nutrition & Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

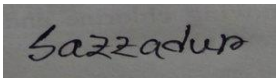
Subject: Declaration regarding the validity of the Project Report.

Dear Sir,

I hereby declared that the "**Project Report**", I have prepared is not a copy of 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



……

Md. Sazzadur Rahman

ID: 163-34-564

Department of Nutrition and Food Engineering

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ACKNOWLEDGEMENT

At first, I would like to express my gratitude to my creator the almighty Allah for enabling me the strength and opportunity to complete the report in time successfully.

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.

My Deep gratitude and sincere thanks to the honorable ma'am, senior lecturer, Department of Nutrition and food engineering, **Effat Ara Jahan, my project supervisor** for his kind cooperation and to accept this Degree.

I am deeply indebted to my Prof**. Dr. Md. Bellal Hossain**, Head of DepartmentofNutrition& Food Engineering, Daffodil International University for his whole-hearted supervision during my organizational attachment period.

I would also like to express my great respect & warmest thanks to my project Co-supervisor, Senior Scientific Officer ,Fish Technology Research Section (BCSIR) &another Co-supervisor, Lecturer of Department of Nutrition & Food Engineering for her whole-hearted help and supervision during my project work and organizational attachment period.

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

I would also like to give thanks to my seniors, juniors and my classmates for their help, advice, and suggestions, inspiration and support.

I also thankful to , Scientific Officer, Fish Technology Research Section of BCSIR for her cordialhelp.

Finally I wish to express immense gratitude & humble convey my heart-felt respect.

DECLERATION

This project entitled "Determination of **Studies on the development and sensory evaluation of Noodles enrich with Beetroot powder** is being submitted to the Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences, Daffodil International University Dhaka-1207, Bangladesh as a part of partial fulfillment of the requirements for the degree of Bachelor of Science in Nutrition & Food Engineering. This project report is unique and done by Md. Sazzadur Rahman's authentic hard work.

Submitted by

Md. Sazzadur Rahman

ID NO: 163-34-564

Department of Nutrition & food Engineering.

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Supervised by

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DEDICATION

I would like to dedicate this report to my beloved parents and all of my teachers in my education life.

ABSTRACT

The study was on the base of enrich Beetroot powder in Noodles with the percentage of three sample S1, S2, S3. Beetroot powder has produced from the fresh beetroot, by following drying and grinding method. Preparation of noodles has followed by the previous articles on noodles enrichment. Standard temperature and time have considered during the preparation of noodles. After the preparation of noodles, sensory evaluation, proximate analysis of noodles took place in the project and has shown the analytical report of S1, S2 S3. Moisture (14.40%), protein (8.75%), fat (10.8%), ash (0.72%), carbohydrate (79.73%) in S1, Moisture (13.98%), protein (10.93%), fat (11.1%), ash (0.83%), carbohydrate (77.14%) in S2, Moisture (10.63%), protein (13.12%), fat (11.5%), ash (0.96%), carbohydrate (74.42%) in S3. The sensory evaluation of noodles was carried out by 40 panelists on a nine-point hedonic scale for different sensory parameters such as appearance, flavor, taste, texture and overall acceptability. In quality parameter test S3 showed a positive result and it was approved to be the best in all sensory attributes by the panelists.

Key words: Beetroot, Noodles.

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CHAPTER-01

INTRODUCTION

1.1 Introduction

Noodles are under the category of cereal foods where most commonly, it's made from wheat. The basic raw materials of noodles production are flour, salt and water. The nutritional value of noodles basically come from flour, cause flour is the main raw material in producing noodles where noodles may contain protein, carbohydrates and trace amount of fat and mineral. Therefore, noodles also can be consumed as a complete meal to serve some nutritional requirement (Ojure and Quadri, Zhang and Ma,, , 2012; 2016). However, Ojure and Quadri (2012) stated that there is little study and evidence on the nutrient content of noodles and the process, wheat flour refinement which is carried out during production of noodles can cause the lost in some of the nutrients like B vitamins, certain minerals and dietary fiber. It can be considered that the most economical energy foods are cereal foods, because they most probably served the main energy contributor to human body. Therefore, noodles also widely recognized as staple food in many Asian countries (Zhang and Ma,, 2016).As known, China has the most significant consumption rate of noodles because as suggested by the study of Zhang and Ma (2016), China had sold a total of 8.6 billion Yuan to 20.26 billion Yuan of noodles, showing amazing sales, consumption and production rate. In other segment, China was the largest consumer of noodles as of 2016 (Zhang and Ma,, 2016).Significantly, noodles is earning popularity and acceptability worldwide especially in Western countries, such as Australia due to their convenience, different cooking methods and fast cooking characteristics, simplicity as simple and little time needed for preparation, organoleptic taste, cost and satiety .

1.2. REVIEW OF LITERATUR

Beetroot (Beta vulgaris L.) hasseveral varieties from yellow to redwith the range of bulb colors and beetroot is botanically classified as an herbaceous biennial from Chenopodiacae family. Bright red-colored beet roots are mostly acceptable for human consumption, as consideration for both cooked and raw as salad and juice. Tend to use of natural food color is growing up, because the consumers are becoming more conscious to assess the synthetic dyes. But in food processing, with a comparison anthocyanins and carotenoids, betalains are less commonly used, although between pH 3 and 7these water-soluble pigments are stable. Nowadays, peoples prefer to consume fruit- and vegetable-based products with high levels of bioactive phytonutrients. Red beetroot (Beta vulgaris L.) is preferred as a rich source of betacyanin, having the group of reddish to violet betalain pigments which are majorly composed of betanins and isobetanins. In red beetrootbetalains and phenolic compounds that exist have been reported to increase the resistance of low density lipoproteins (LDL) to oxidation and to prevent cancer and cardiovascular diseases by reducing the oxidative effect of free radicals on lipids. From the previous study on Beetroot(Beta Vulgaris L.) powder making, at first they were washed fresh Beetroot with tap water, chopped itinto small pieces. They were dried the beetroot in an air-circulated oven(60°C) to complete dryness for about 11-12 hours .Then grinded the dried beetroots win a grinder. The ground beetroot powder were passed through 65 mesh size of ASTM standard and packed in air tight colored glass bottles for further use (Shikha Srivastava and Kanchan Singh, 2016).

Another study on Beetroot, washed and chopped beetroots were separately dried in an air-circulated oven at 40°C to complete dryness. The dried material was separately transferred into powder form as much as possible and added as 5% for preparation of biscuit fortified with beetroot powder (AOAC, 1997). By using a blender for 1 min at average speed 270 g of fresh red beet roots were chopped mixed with 300 ml ethanol. At the 4ºC.the mixture was macerated forv24h. After that, passing through 0.45 μm pore size cellulose acetate membrane filter resultingextract was filtered. The resulting extract was added as 2.5% in preparation of biscuit

fortified with beet extract (Amnah, M. A. Alsuhaibani.Life Sci J 10(3): 1579-1584, 2013). On the noodles enrichmentmany studies have been performed and from the addition of compounds the on final product quality has been reported.The knowledge about noodles production should be known with proper standards. And therefore, for thepurposes offortification or enrichment noodles could be a suitable food.In addition, tofulfill the consumer expectations enriched product should be economically affordable, nutritive and satisfactory.But they are indigent and less concerned about their protein quantity and amino acid balance.By enrichment of noodles and protein rich foods consuming could be a step to solve the deficiency problem. Especially in Asia recently, enriched noodles with nutritive compounds have become available in food market. When AKF addition level was increased Noodles had shown the lower sensory scores. Interms of mouthfeel (firmness) property t white salted noodles are soft (not very soft) (Kim, . , 1996).Whereas the difference was not significant ($p>0.05$) 5% AKF added noodle got the highest score for appearance. The study results, up to a level of 15%, flour weight basis,suggest that AKF incorporation seems suitable in terms of physicochemical and sensory properties. An alternative utilization of AK makes an important notice for producer and processors as flour substitute in noodle preparation. To evaluate undersize or broken kernelsit is most probably possible to obtain flour.(E.Ebru and H .Mehmet , November,2008). From a lot of Noodles research here is an article about Xanthangum used in Noodles. Significant difference has shown in color, starchy mouth feel, stickiness, firmness, from plain flour and with Xanthangum(PNO) used flour($P<0.5$). PN3 was found to be very smooth within the range of 1.5-4.2in terms of smoothness. PN3 was adjudged to be very firm among the noodle samples from plantain flour andthe range of firmness values was (2.2-4.1).PN3 was found not to be as sticky as other noodle samples produced from plantain flour and the range of values for stickiness was (1.4-4.3) also.PN3 was found to have the least starch mouth feel, range of values for starchy mouth feel was (1.6-4.2).Noodles produced from plantain floursexamined and the result shown that there was no significant difference ($p>0.05$) in all the sensory attributes (like appearance, flavour, taste, texture and colour). Between the plantain noodle samples and the commercial branded noodlesit has shown significant difference ($p<0.5$).(Ojure M.A and Quadri J.A, . December 2012)

1.3. Origin of the study:

Thesis or project report is a graduation requirement for all university students. Daffodil International University & Department of NFE provide thesis opportunity for students in the university laboratory.

Purpose of this study about Cabbage Powder is as follows:

1. To find out unique information about Noodles enrich with beetroot powder.
2. To find out the nutritional value of noodles and beetroot.
3. Determine the proximate analysis of noodles enrich with beetroot powder.
4. Differentiate Noodles with Beetroot powder and without Beetroot powder.
5. To learn about kjeldahl method.
6. To learn about Soxhlet method.
7. To fulfill graduation requirements
8. To learn about apparatus related to this project.
9. To learn how to use theoretical knowledge in practical,

1.4 Objective of the study:

Two types of objectives are required for this study

1. General objectives
2. Specific objectives

General Objectives

It is a universal call to develop National Food Composition Database. National food Composition table of Bangladesh is incomplete. As a result, food scientist works for several years to enrich the table. Therefore, study about noodles enrich with beetroot powder will help to fill up gaps of the food composition table. Different institute organizes many investigations about newly foods. Noodles enrich with Beetroot powder will enrich the National Food composition table of Bangladesh.

Specific Objectives

Specific objectives of the study are following

1. To analyze proximate nutrient profile.
2. To estimate protein and fat of Noodles enrich with Beetroot powder.
3. .

1.5 Limitations of the Study:

Everything has some limitations. Therefore, this study also has some limitations.

Main limitation was time. Because of insufficient time, it was not enough to conduct the research properly. To make a perfect and clear research high technology and machineries required.

CHAPTER-02

METHODS & MATERRIALS

2.1 Collection of Sample:

The research conducted on Noodles enrich with beetroot powder to estimate the proximate composition (Such as Moisture content, Protein, Fat). The experimental sample was collected from Local Market, Dhaka, Bangladesh.

Sample: Beetroot.

Figure: 3.1.Fresh Beetroot (*Beta Vulgaris L.*)

This sample was collected as fresh as possible and used in NFE Lab for sample preparation and analysis.

2.2. Raw materials:

Flour, Beetroot powder, Salt, Egg, Veg. Oil

S1=Flour (82.5%), Beetroot powder (5%), Salt (1.9%), Egg (4.40%), Veg.Oil (6.20%)

S2=Flour (82.5%), Beetroot powder (10%), Salt (1.9%), Egg (4.40%), Veg.Oil (6.20%)

S3=Flour (82.5%), Beetroot powder (15%), Salt (1.9%), Egg (4.40%), Veg.Oil (6.20%)

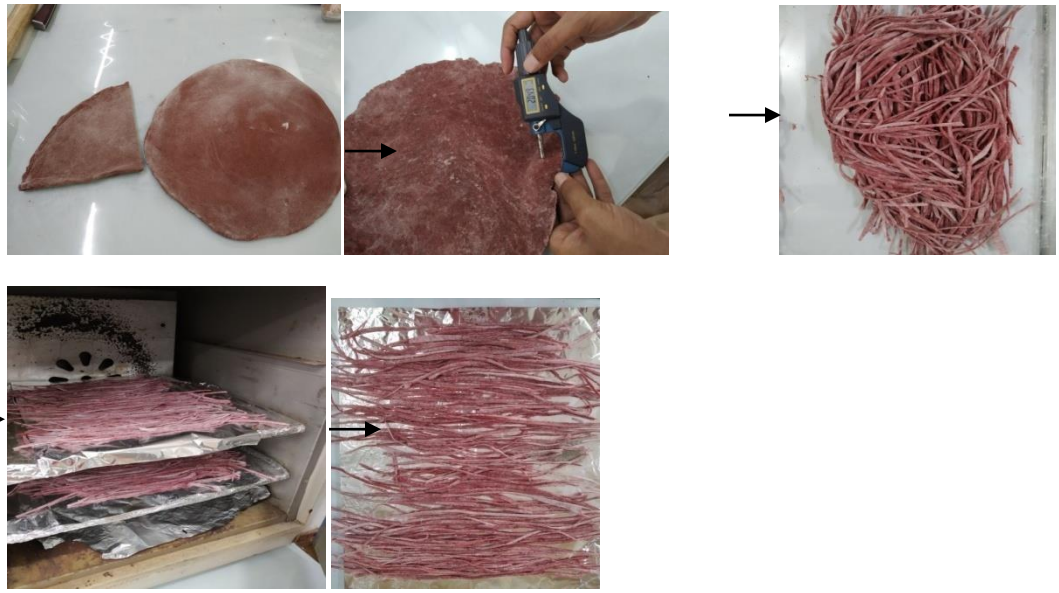
2.3 Preparation of Sample:

Beetroot powder:

Fresh Beetroot was collected and then washed with tap water and then beetroots were sliced into small pieces. The pieces of Beetroots were blanched in hot water at 75 to 85° C for 1 to 2 min. After blanching the beetroots were baked in a baking oven for 2 hours at 70°C. Then beetroots were shifted in a drying oven at 85° C for 4-5 hours. Dried beetroots were cooled in a decicator for 30 min. Cooled beetroots were ground in a grinder and then sieved in 65 mash. Ground beetroot powder was preserved in a PP bag for temporary

Preparation of Noodles enrich with Beetroot powder (S1, S2, S3):

Noodles were prepared with the percentage of three samples (S1, S2, S3). S3 has shown the acceptance to the assessors with the reference of appearance, color, texture, flavor and taste. From the previous study knowledge of noodles, preparation of sample was followed with standards. Sample percentage was added on the base of flour weight as main ingredient. All the materials were weighed accurately and mixed the dough with required (100ml) hot (70-75°C) water for 303gm sample. The dough should not be too much sticky and hard, it should be elastic. Rest the dough for 10 minutes to get well firmed sticks. Then dough were shaped in a plain bread, and the thickness maintained in 2 mm. After that procedure dough has been cut into pieces as sticks manually. Then sticks were dried into a drying oven at 85°C for 3 hours. Then the dried noodles were kept in a desiccator for temporary stored. 25gm sample were cooked for sensory evaluation. Enrichment of beetroot powder in noodles causes increasing the cooking time of noodles. But the bright red color of beetroot in noodles little bit affected for powder form. From the analysis the results express that the nutritive value is increased as protein, antioxidant etc.



Chapter-03

Proximate analysis of Samples

3.1 Protein, fat, carbohydrate:

Main proximate nutrients of Noodles enrich with beetroot powder are protein, fat and carbohydrate. These nutrients provide energy. They work for growth and metabolism. Protein is essential for building and repairing tissues. These nutrients also regulate the body processes.

Protein

For daily calories intake we need to take 15-20% from protein containing food. Noodle can be a great source of protein.

Fat

Fat is another essential nutrient, which we need to take every-day through fat, containing food. We should consume 30 % or less than 30% calories daily. Fat has different types such as saturated fat, polyunsaturated fat and monounsaturated fat. Saturated fat increases the blood cholesterol level, which is bad for our health. However, polyunsaturated fat decrease the blood cholesterol level. Monounsaturated fat also decreases the LDL cholesterol. LDL (Low-density lipoprotein) is known as bad cholesterol. It increases the risk of heart attacks.

Carbohydrate

Carbohydrate provides fuel and energy to our body. It is necessary to carry our daily activities. Our body requires Carbohydrate to perform its function continuously. Purple-fleshed sweet potato has great amount of carbohydrate. Therefore, we should take it regularly.

3.2. Determination of moisture:

Determination of moisture content of flour, beetroot powder and Noodles samples were conducted by AOAC method (AOAC, 1979).For this intention materials were taken as sample and weighed taken. The samples were allowed to dry into the oven dryer at 130°C for 24 hours in order to remove the moisture from the samples. Drying, cooling, and weight were recognized. Moisture content was calculated by using following formula:

Calculation of moisture (%)

$\%of\ moisture$ =Weight of loss sample / weight of the sample taken ×100

Procedure of the moisture estimation:

a) Weigh crucible accurately.
b) Weighed the sample (2-3 gm).
c) Placed into the drying oven at 130°C for 1 hour.
d) Removed from the oven, cooled in a decicator.
e) Calculation of moisture percentage.

3.3 Determination of Ash:

In dry ashing sample used a high temperature muffle furnace of maintaining temperatures between 500-600°C.Water and volatile materials are vaporized and organic substances are burned in the presence of oxygen in air to CO2, H2O, and N2. The food sample is weighed before and after ashing to determine the concentration of ash present.

$$\%of\ ash = weight\ of\ the\ dry \frac{sample}{original} weight\ of\ the\ sample\ taken \times 100$$

Procedure of the ash estimation:

a) Weigh crucible accurately.
b) Place the crucible in a drying oven for 1 hour at 130°C.
c) Cool the heated crucible in a decicator and weigh it.
d) Place 3-5 gm Sample in the crucible accurately.
e) Place the sample in a muffle furnace at 600°C for 6 hours.
f) Remove from furnace and cool in a decicator.
g) After that again weigh the sample and calculate the percentage of ash.

3.4. Determination of proteins:

Proteins are complex nitrogenous substances formed by the sub unit of amino acid through peptide bond. Protein occupies a central position in the architecture and function of the living matter. The crude protein of Noodles enrich with beetroot powder was determined by micro kjeldhal method (Pearson, 1999). In the Kjeldahl procedure, proteins and other organic food components in a sample are digested with sulphuric acid in the presence of catalyst. The total organic nitrogen is converted to ammonium sulfate. The digest will be neutralized with alkali and distilled into aexcess hydrochloric acid or sulphuric acid solution (back titration method). The unreacted acids are titrated with standardized alkali. The result of the analysis represents the crude protein content of the food since nitrogen also comes from non-protein components (the Kjeldahl method also measures nitrogen in any ammonia and ammonium sulphate).

Preparation of sample solution:

Solid foods are ground to pass a 20 mash screen. Samples for analysis should be homogeneous. No other special preparations are required.

Preparation of digestion Solution:

- Take 0.4 gm sample, H2SO4 10 ml and digestion mixture (2gm CU2SO4+98gm K2SO4) 2gm.
- Put it on the digestion flask.
- Use two digestion flasks for this procedure so that average value can be taken.
- At first heat slowly, then increase the heat and heat about 3-4 hrs.
- The end point will be no white smoke of H2SO4 and the solution will be crystal clear.
- Cool it for some time.

Distillation:

- Pour the solution in a volumetric flask and make it 100ml level using distilled water.
- Take 10 ml from that volumetric flask to the distillation flask.
- Take 150 ml distilled water and 10 ml of 40% NaOH to the distillation flask.
- Take 50 ml of distilled water and 10 ml 0.1N HCL and 2 drops of methyl red(1%) in the trapping conical flask
- Use three distillation flask for this procedure where one of them will be blank i.e. no sample only take 150 ml distilled water with 10 ml 40% NaOH.
- Use three trapping solution in three trapping conical flasks remaining the same thing.
- Set up the condenser and start it.
- Run for 30 min.

Titration:

- Fill the burette with 0.1N NaOH.
- Do the titration with 3 trapping solution.

The end point will be color changes from pink to light yellow.

Calculation:

(B-S) × 1.4 × 10 × 6.25 × 0.1 / sample weight

= Result




3.5. Determination of Fat content (%):

Fat is extracted, semi continuously, with an organic solvent. Solvent is heated and volatilized, then is condensed above the sample. Solvent drips onto the sample and soaks it to extract the fat. At 15-20 min intervals, the solvent is siphoned to the heating flask, to start the process again. Fat content is measured by weight loss of sample or weight of fat removed.

Calculation of Fat (%) :

% of fat=weight of residue /weight of sample taken ×100

Estimation of Fat content:

a. Sample weight taken.
b. Weighted of the blank flasks and thimble.
c. Filter the sample solution soaked in solution for 6 hrs.
d. Cool in desiccator.
e. Weigh of the flasks and thimble containing sample.
f. Record the weighted fat that getting.

3.6. Antioxidant activity assay:

In foods, antioxidants have been defined as substances that in small quantities are able to prevent or greatly retard the oxidation easily oxidisable materials such as fats. In the biological system, the definition for antioxidant has been extended to any substance that, we present in low concentrations compared to those of oxidisable substrate, significantly delays or prevent oxidation of that substrateNatural antioxidant, such as those derived from herbs, vegetables other plants have many advantages over chemical antioxidants (and processing procedures) currently used. They are readily accepted by consumers as considered to be safe not a chemical. Thus no safety taste use required for legislation if a component of food is generally recognized as safe (GRAS). Natural antioxidants may function a) as reducing agent b) as free radical scavengers c) as complexes of per oxidant metals d) as quenchers of formation of singlet oxygen. They can be use in food industry and there is evidence that they exert their antioxidant effects within human body.In response to the growing consumer demand, investigation on antioxidant from natural sources gained interest.

Chapter 4

RESULTS & DISCUSSION

4.1. Table of proximate analysis: Proximate Analysis report of S1, S2 and S3.

Parameters	S1	S2	S3
Moisture (%)	14.40%	13.98%	10.63%
Protein (%)	8.75	10.93	13.12
Fat (%)	10.8	11.1	11.5
Ash (%)	0.72	0.83	0.96
Carbohydrates (%)	79.73	77.14	74.42

Figure-4.1.1 Proximate Analysis report of S1, S2 and S3.

Table 4.1 shows that- carbohydrate (79.73%) and moisture (14.40%) percentage is higher in S1 among S2 and S3. Protein (13.12%) and fat (11.5%) percentage is higher in S3 among S1 and S2.

4.2 Sensory evaluation:

I conducted a survey among 40 students of Daffodil International University. Total data are submitted below:

Name:	**Product:**
Panelist no:	**Date:**

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

Sample code-S1, S2, S3

Score	**Appearance**	**Flavor**	**Taste**	**Texture**	**Overall acceptance**	**Appearance**	**Flavor**	**Taste**	**Texture**	**Ovl-acceptance**	**Appearance**	**Flavor**	**Taste**	**Texture**	**Ovl acceptance**
Like extremely -9	**8**	**14**	**13**	**10**	**12**	**14**	**12**	**15**	**16**	**14**	**10**	**9**	**14**	**12**	**10**
Like very much -8	**12**	**12**	**13**	**17**	**15**	**16**	**14**	**15**	**14**	**13**	**24**	**26**	**20**	**20**	**23**
Like moderately -7	**20**	**14**	**14**	**13**	**13**	**10**	**16**	**10**	**10**	**13**	**6**	**5**	**6**	**8**	**7**
Like slightly-6															
Neither like nor dislike-5															
Dislike slightly-4															
Dislike moderately-3															
Dislike very much-2															
Dislike extremely-1															

Figure 4.2.1 Table of Sensory Evaluation

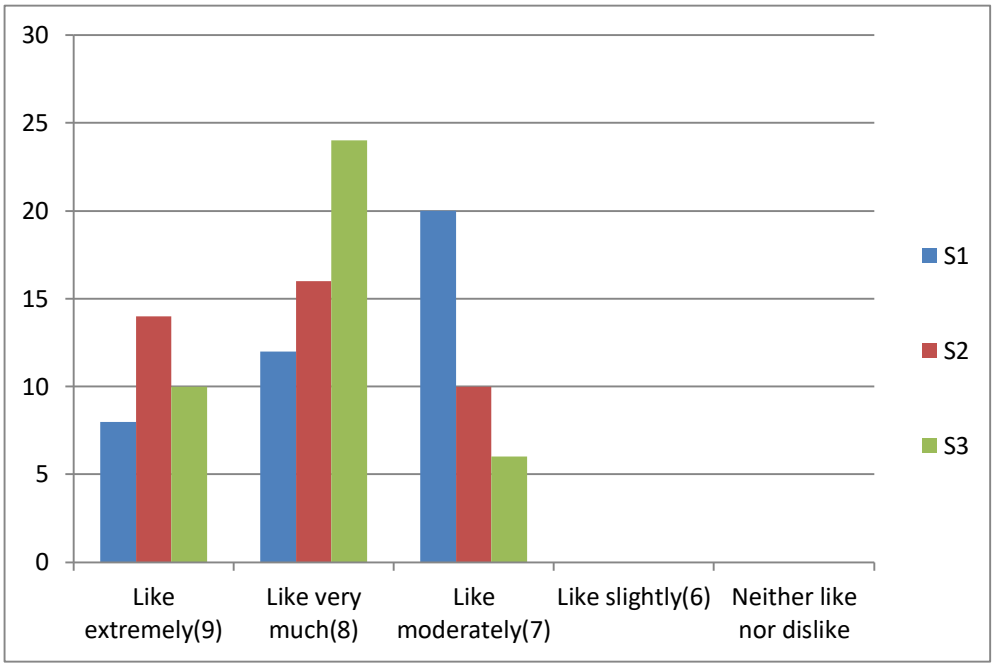


Figure 4.2.2-Bar chart of sensory evaluation-Appearance preference.

Figure 4.3 Shows the appearance attributes of S1, S2, S3 bar charts in 9 point hedonic scales. The bars showed that sample-S3 got the highest score as liked very much.

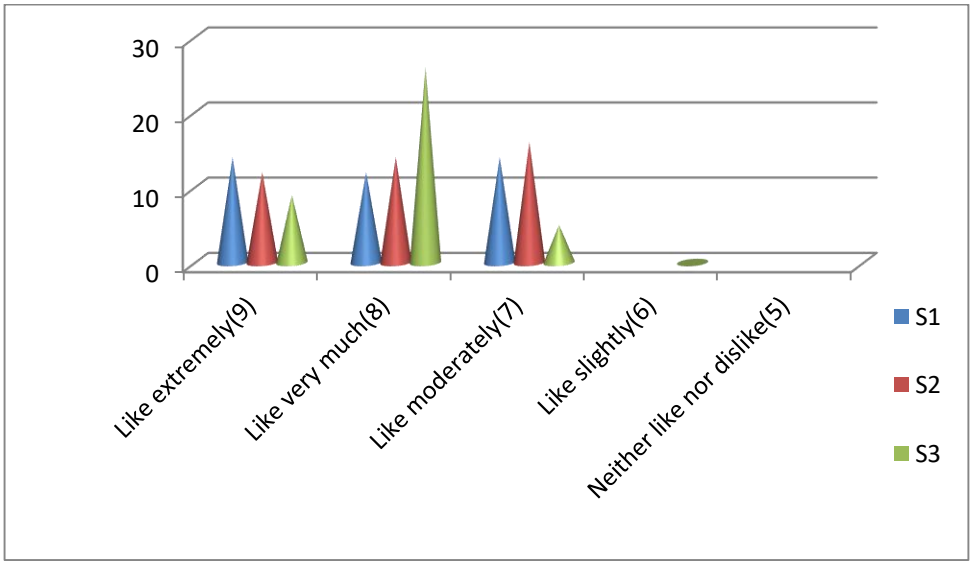


Figure 4.2.3- Column chart of sensory evaluation- Flavor preference.

Figure 4.4 Shows the flavor preference attributes of S1, S2, S3 bar charts in 9 point hedonic scales. The bars showed that sample-S3 got the highest score as liked very much.

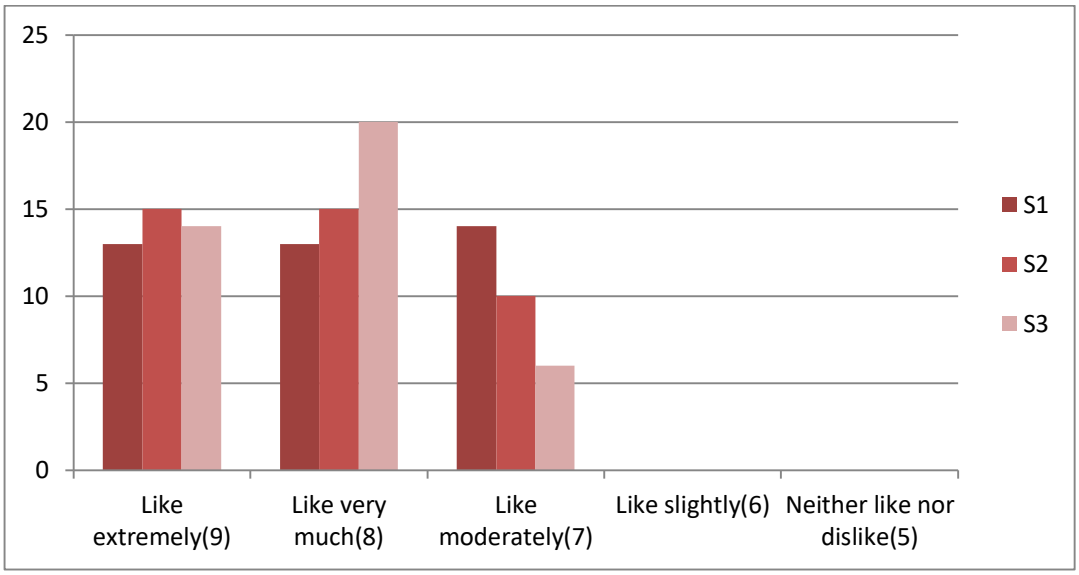


Figure 4.2.4- Bar chart of sensory evaluation- Taste preference.

Figure 4.5 Shows the Taste preference attributes of S1, S2, S3 bar charts in 9 point hedonic scales. The bars showed that sample-S3 got the highest score as liked very much.

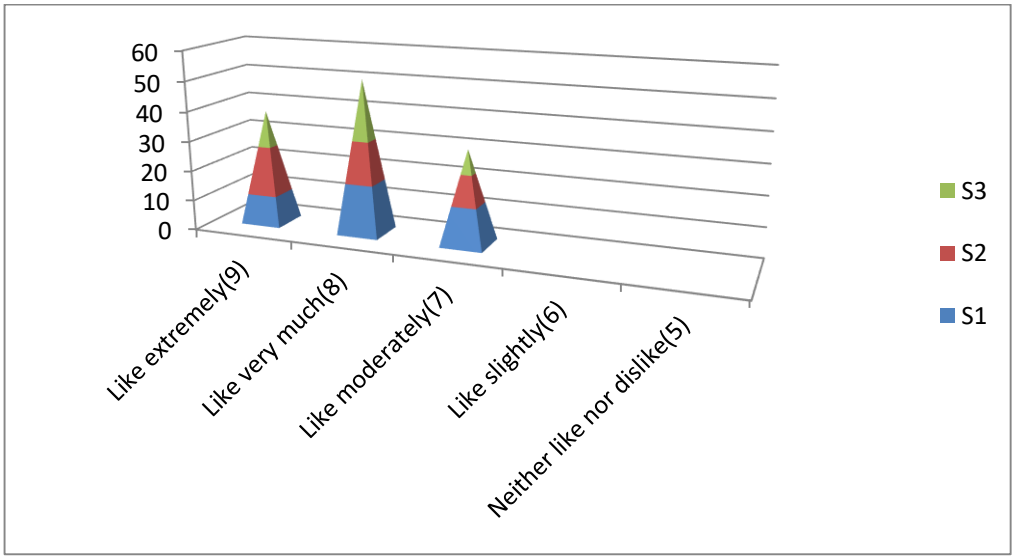


Figure 4.2.5 - Column chart of sensory evaluation- Texture preference.

Figure 4.6 Shows the Texture preference attributes of S1, S2, S3 bar charts in 9 point hedonic scales. The bars showed that sample-S3 got the highest score as liked very much.

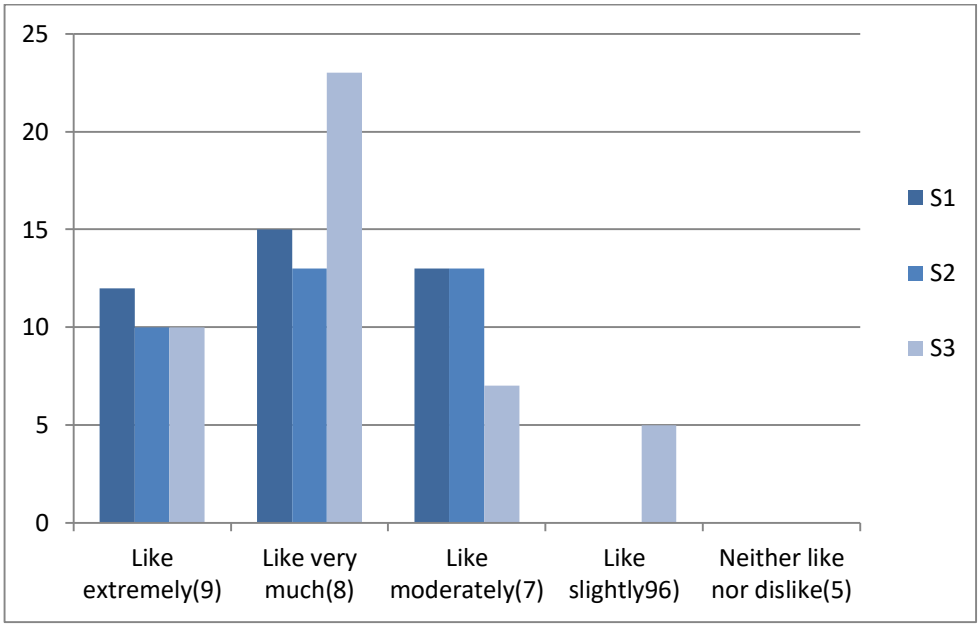


Figure 4.2.6 - Bar chart of sensory evaluation- Overall acceptance preference.

Figure 4.7 Shows the Overall acceptance preference attributes of S1, S2, S3 bar charts in 9 point hedonic scales. The bars showed that sample-S3 got the highest score as liked very much.

Chapter 5

Conclusion

The study was revealed that sample S3 was higher in protein and fat content It was quite clearly depicted that S3 was the most acceptable in terms of overall acceptability and had gained maximum score in sensory characteristics as liked very much by the panelists. The study revealed that usage of beetroot powder in noodles to provide attractive color and to improve nutritional aspects. The purpose of this investigation was to extensive study of proximate composition such as moisture, ash, protein, fat, carbohydrates of samples further studies were required to determine total phenolic contents and total antioxidant properties of all samples.

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