Project Report

on

"Preparation and Proximate Analysis of Fiber rich Banana Pseudo-stem Noodles"

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Date of Submission: 17-10-2022

Letter of transmittal

17.10. 2022

To
Associate Professor and Head
Department of Nutrition and Food Engineering
Daffodil International University

Subject: **Project report submission**

Dear Sir,

Working on the project **"Preparation and Proximate Analysis of Fiber-Rich Banana Pseudo-stem Noodles"** is a pleasure and an excellent opportunity for me. Under your invaluable guidance, I have done everything possible to ensure that the project report is of the best standard. I appreciate your thoughtfulness, and I hope you find everything I've said to be abundantly incorrect.

Sincerely yours,

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Nawrin Jahan
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Letter of Authorization

17.10. 2022

To
Associate Professor and Head
Department of Nutrition and Food Engineering
Daffodil International University

Subject: Project Report Submission.

Dear Sir,

I honestly believe that I prepared the project report myself. There is no copy of any thesis paper. I honestly believe that I prepared the project report myself. There is no copy of any thesis paper.
Also, express my sincere approval for the aforementioned thesis project, which has never been used before. It will not be submitted in the long run to fill those certain course-related the participant is an authority.

Sincerely yours,

Nawrin Jahan
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Certificate of Approval

The report I attest that on **"Preparation and Proximate Analysis of Fiber Rich Banana Pseudo-stem Noodles" received by Nawrin Jahan, ID: 182-34-794, Department of Nutrition and Food Engineering. Daffodil International University** has been approved for presentation & defense for the academic degree.

We are pleased that **Nawrin Jahan** good bear strong character and is an obedient person. It is pleasure to work with her.

Wish her a successful life in the future.

Dr. Nizam Uddin
Associate Professor & Head In-Charge
Department of Nutrition and Food Engineering
Daffodil International University

Effat Arra Jahan
Lecturer (Senior Scale)
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Acknowledgment

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Furthermore, I am grateful to those who assisted me with my project work.

The research work is dedicated to my beloved parents…

Abstract

This study was conveyed to prepare banana pseudo-stem noodles and specify its quality parameters by different percentage. The banana pseudo-stem was collected from local market. At first banana pseudo-stem powder was made and then four samples of noodles with different percentage of flour were prepared. As S1 was 100% flour, S2 10% banana pseudo-stem powder and 90% flour, S3 20% of banana pseudo-stem and 80% of flour and S4 30% of banana pseudo-stem powder and 70% flour. The moisture content of banana pseudo-stem powder was 3.36% and wheat flour moisture 6.39%. The ash content of banana pseudo-stem powder was 2.38% and wheat flour 1.50%. The protein content of banana pseudo-stem powder 17.6% and wheat flour 10.85%. Fiber content of banana pseudo-stem powder 2.20% and wheat flour 1.55%.After cooked noodles, 10% people liked S1(100% wheat flour). But 60% of the people liked S3 (S3 20% of banana pseudo-stem and 80% of wheat flour).They liked S3 noodles color, texture mostly. 20% people liked S2 (S2 10% banana pseudo-stem powder and 90% wheat flour) noodles color. And S4 (30% of banana pseudo-stem powder and 70% wheat flour) 10% liked this too much because of it dark color and texture.

Keywords: Banana pseudo-stem powder, Banana pseudo-stem noodles, Fiber rich food.

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CHAPTER 1

INTRODUCTION

1.1 Introduction:

Bangladesh Bureau of Statistics currently has a population of 16.17 crore people. Bangladesh has a total population of 14 crore 96 lakh 72 thousand 374 people, according to the most recent census in 2021. The amount of arable land decreases as the population increases. Bangladesh is primarily an agricultural country. Many families are still reliant on agricultural labor. Many people in Bangladesh continue to live in poverty. As a result, many people are going hungry, suffering from malnutrition, and contracting a variety of diseases.

In our country, there are many trees in the village from which we can fill the food shortage. Which are many of us may not know.

Noodles are generally prepared from unleavened dough of wheat flour, refined wheat flour or buckwheat flour. About three parts of flour were usually mixed with one part of salt solution to form crumble dough which was compressed between the rolls to form a dough sheet.

Banana is used as cattle feed in Thor village. But no one has any idea about the nutritional value of this Banana stem. A food that is very beneficial for the human body. It could be process in many ways and take it as food [1].

Nowadays noodles are a very popular dish in Asia. It is being marketed in many ways now, and everyone likes it. Noodles can be improving health fiber resources.

So, it could be trying to made noodles with Banana stems. A portion of food is rich in fiber at the mouth of the banana.

1.2 Banana pseudo-stem in Bangladesh:

The pseudo-stem is the bulk-like part of the banana plant. The actual stem is underground, and the pseudo-stem grows above it. The tightly overlapping leaf sheaths form it. Banana Pseudo-stem is cut down from the base after it bears bananas because it will never bear fruits again and is a waste. After a while, a new pseudo-stem grows from the actual stem, and the cycle repeats itself. Banana pseudo-stem is also used as an ideal feed for cows. It is also used in village agriculture [2].

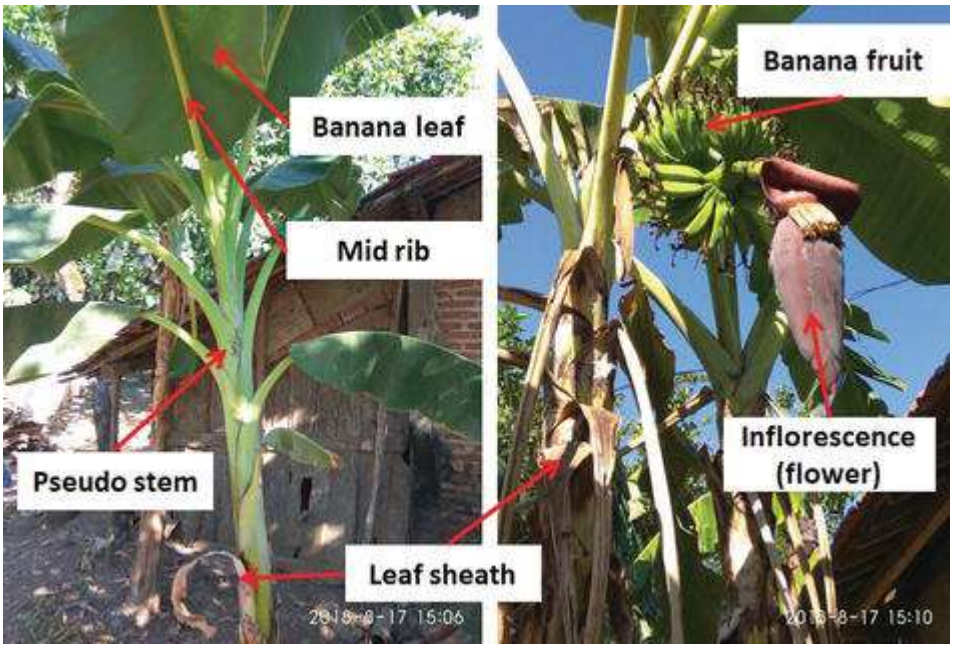


Figure 1.1: Part of Banana tree

1.3 Physical properties of banana pseudo-stem:

The banana pseudo stem had numerous layers. These are the outer bark, the middle bark, and the inner bark. Banana pseudo stem physical and bioextraction revealed detailed fiber characteristics. Cellulose, hemicellulose, lignin, pectin, and ash were determined through chemical analysis of pseudo-stem sheaths. The dry weight of the banana pseudo-stem sheath is approximately 60%-85% ignocellulose, with cellulose accounting for approximately 50%. Except for minor differences in hemicellulose, lignin, and ash content, fiber physical and bioextraction are comparable to their chemical and physical propertie [3].

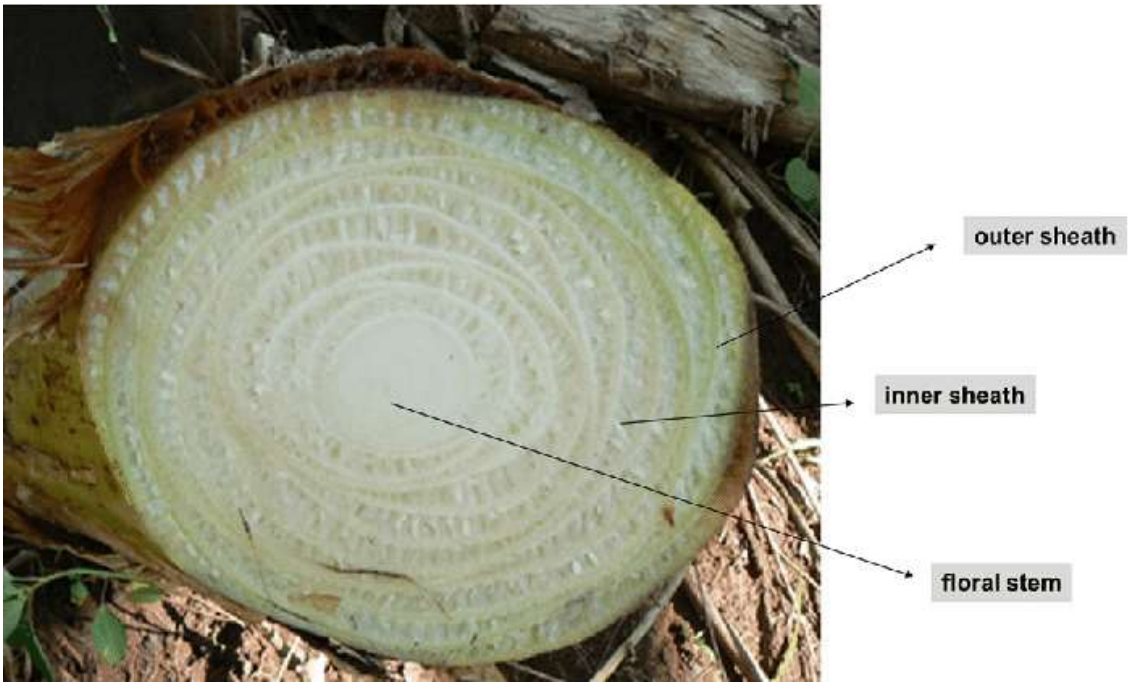


Figure 1.2: Banana pseudo- stem trunk cross section and it's parts

1.4 Use of banana pseudo-stem: [3]

There have been numerous applications for banana pseudo-stem. Textiles, papers (bank notes), and sanitary products such as baby pampers are all very useful in our daily lives. Because the banana pseudo-stem fiber is resistant to sea water and has buoyancy properties, it can also be used for ropes (such as marine rope). Different types of delicious curries are cooked in the villages of our country.

Any part of the banana plant can be used to make food. Banana pseudo-stem has high fiber content. It is fit for human consumption and scrumptious. The pseudo-stem of a banana is a source of vitamin B6, calcium, and potassium. It assisted in the treatment of high blood pressure and cholesterol. It primarily aids in the elimination of toxins from the human body.

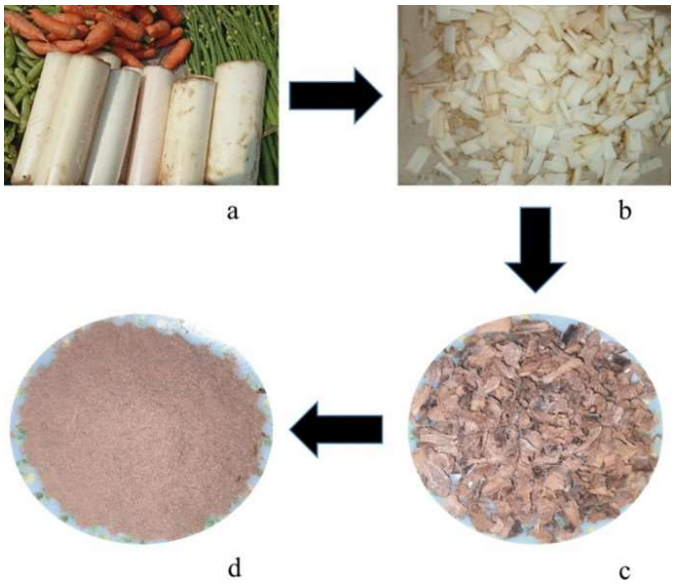


Figure 1.3: Banana pseudo-stem raw to pseudo-stem powder making process

CHAPTER 2

METHODS AND MATERIALS

2.1 Laboratory:

The preparation and analysis of banana pseudo stem noodles was carried out at the Food processing and Food Analytic laboratories of Daffodil International University's Department of Nutrition and Food Engineering in Ashulia, Dhaka.

2.2 Collection of Raw Materials:

To collected all the raw materials from local market. Banana pseudo stem, good quality wheat flour, iodized salt, starch all are local branded. And water as per need.

2.3 Apparatus:

Chopping board, knife, chopping board, bowl, tray, oven dryer, grinder machine, for powder storing box.

2.4 Methodology:

Firstly, need to make banana pseudo-stem core powder. To make banana pseudo-stem powder, collected banana pseudo-stem at local market. Then cleaned and cut it with knife small cube. Then dried it and grinded and prepared this powder. Made sample with banana pseudo-stem powder and compared other sample noodles [3].

Figure 2.1: Cutting raw banana pseudo-stem

2.5 Banana pseudo-stem powder making process:

After purchasing the banana pseudo-stem at the market. Then cleaned it or wash it very well. Then cut it with knife very small size. Small size because dry it very firstly. Then all the cutting banana pseudo-stem took it on tray.

Dry it by oven for 120°C for 40 min. After drying it cool it. Then it was grained with grinding machine. Than store it at box.

Figure 2.2: Dried into oven

Figure 2.3: Dried banana pseudo stem

Figure 2.4: Grinding dried banana pseudo stem powder

2.6 Raw Materials for noodles:

- Wheat flour,
- Banana pseudo-stem powder
- Iodized salt,
- Starch
- Water

2.7 Design of experiment:

This experiment was done by using percentage of sample. Without using of banana pseudo-stem powder, there was use 100% of wheat flour. Other sample made using banana pseudo-stem powder 10%, 20% & 30%.

Where,

BPP = Banana Pseudo-Stem Powder
WF = Wheat flour

S_1 = 100 % WF
S_2 = 10 % BPP + 90 % WF
S_3 = 20 % BPP + 80 % WF
S_4 = 30 % BPP + 70 % WF

Table 2.1: Formulation of noodles

Ingredients	S1 (100% Wheat flour)	S2 (10 % BPP + 90 % WF)	S3 (20 % BPP + 80 % WF)	S4 (30 % BPP + 70 % WF)
Banana Pseudo-Stem Powder (%)	0	10	20	30
Wheat flour (%)	100	90	80	70
Corn Starch (%)	4.50	4.50	4.50	4.50
Salt (%)	1.65	1.65	1.6	1.65
Water (ml)	100	110	110	110

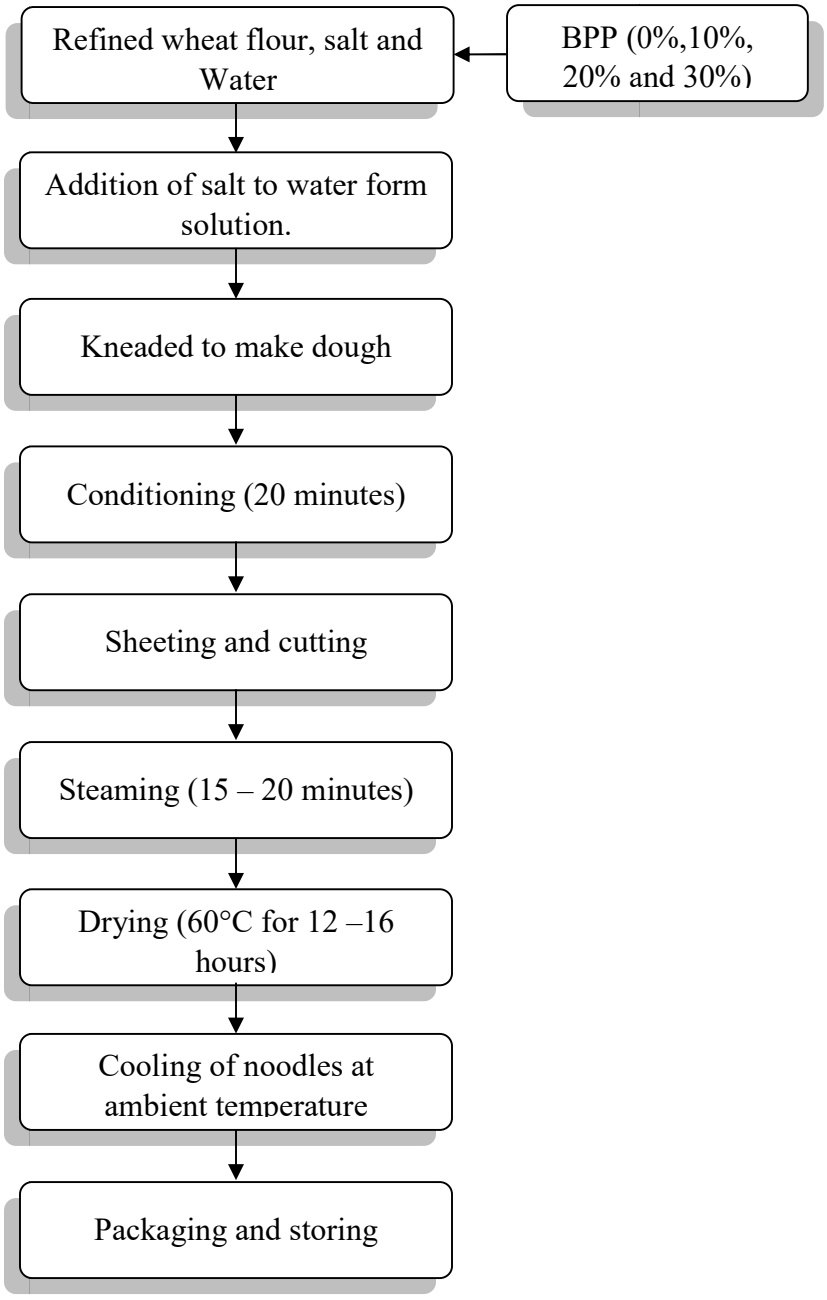
2.8 Noodles making process:

Took all ingredients processed 0%, 10%, 20% & 30% and make four samples. For the dough mixture, 4.65% salt, 4% corn starch, and 1.9% water were used. With all the ingredients make sample 1 fully 100% of wheat flour was taken. Same procedure was making sample 2 with 10% of banana pseudo-stem powder. Then 20% & 30% of banana pseudo-stem powder use with the other ingredients. The dough mixture was created through a two-stage mixing process. It is unfortunate that the smoothness of noodles is dependent on how well the dough was mixed. During the procreating of the trial sample, the banana pseudo-stem powder was replaced with wheat flour in percentages of 10%, 20%, and 30%, but only enough water was added to make the dough. The dough was covered with a wet cloth and left for 20 minutes to achieve consistent moisture and balance. After preparing the dough ball, the dough was covered with a wet towel to allow the sulfide bond to form. Dough sheet was then completely ready and compelled to noodle cutting tools. The dough sheet was then completely ready and

compelled to noodle cutting tools. Nearly it had 1.5 mm (thickness) x 1.5 mm (width). After trimming, it must have been dried at a temperature of 60°C for 12 –16 hours. After that collected sample in air tide jar & mark with percentage usage of sample.

Figure 2.5: Dried Noodles Samples

2.9 Process flow diagram:



Flow chart 1: The preparation of noodles [3]

CHAPTER 3

CHEMICAL ANALYSIS OF BANANA PSEUDO-STEM NOODLES

3.1 Analyses of Noodles sample:

Moisture analysis, Protein test, fiber test, ash test & carbohydrate analysis.

3.2 Determination of moisture:

Determination of banana pseudo-stem powder moisture, Used digital moisture machine. At first took 10 gm sample in digital moisture machine, and then wait for few minutes. After that, we will get the value of moisture and record or note the Value of moistures.

The result of moisture content Sample 1: 8.14%, Sample 2: 7.68%, Sample 3: 7.53% and Sample 4: 7.37%

Figure 3.1: Moisture Analyzer

3.3 Determination of Protein:

Assimilation with strong acid in food using titration technique, which releases nitrogen. (AOAC, 2005) [4].

There are three steps Kjeldahl method:

- Digestion of sample,
- Distillation &
- Titration.

Figure 3.2: Protein test

Materials:

- Distilled water
- 0.1N NaOH
- Methyl red indicator
- 0.1N HCL
- 40% NaOH
- Digestion Mixture (2g CuSO4 +98g K_2SO_4)
- H_2SO_4

Procedure:

First, a 0.2-.0.5 gm dried clean digestion tube was collected. Then, in the mixture digestion, add 10 mL concentrated sulfuric acid. The mixture was then heated until it became clear. The digestion vooled and produced a volume of 100 ml.

The diluted sample and 40% sodium hydroxide were then transferred to a Kjeldahl distillation flask. The essence was then collected in a conical flask by distillation, followed by 10ml of 0.1 N HCl and 1 to 2 drops of methyl red. The sample was then titrated with 0.1 N NaOH.

Calculation:

% of protein = (Bt − St) × 1.4 × 6.25 × strength of NaOH (.099) × 10÷SW

Where,

Bt = Titration Value of Blank

St = Titration Value of Sample

SW = Sample Weight.

3.4 Determination of Ash (AOAC 942.05):

The total amount of minerals in food is expressed as ash content. It is critical to look for ash content in food. As a result, it has also been observed in ash-rich noodles. Sample 3 is richer in minerals than Sample 1. The addition of banana pseudo-stem powder to noodles has also improved their quality. This is reflected in the sample 1 (1.74), sample 2 (1.75), and sample 3 (1.83) ranking.

The ash content was determined by burning and removing all carbon from a known weight of food in a 700°C muffle furnace. The remainder of the sample after this process is referred to as ash, and it was chosen to represent the inorganic constituents of food. (AOAC, 2005) [5].

Apparatus:

- Muffle furnace, Metal tong
- Spatula
- Analytical balance
- Desiccators
- Porcelain crucible
- Heat resistant gloves
- Marker pen
- Crucible

Figure 4: Ash Test

Procedure:

- Firstly 150°c for 20 min. dry crucible.
- Then cooled crucible at desiccators.
- Noted weight of crucible and sample.

- Then burn crucible at 600°c for 6 hours in muffle furnace.
- After that muffle furnace cooled at desiccators.
- After cooling took again weight of muffle furnace.
- Calculation

Calculation:

w1= Weight of the crucible + Sample before furnace

w2= Weight furnace

ws = Weight of sample taken

$$\%\ of\ ash = \frac{w2 - w1}{ws} \times 100$$

3.5 Determination of Fat:

Fat was estimated as crude ether extract of dry material (AOAC, 2003) [7].

Apparatus:

- Conical flask
- Drying oven
- Desiccator with silica gel
- soxhlet
- Analytical balance.
- Thimble
- N-Hexane 95%
- Cotton plugs

Figure 3.4: Fat Test

Procedure:

- Take weight 2 – 4 (g) sample into the thimble
- Flask weight measure
- Soxhlet apparatus set the flask
- In the flask give N-Hexane
- Water circulation turn on
- Then run for six hours the apparatus
- After that off the apparatus
- Contain fat of the flask take weight.

Calculation:

$$Crude\ of\ Fat\ \% = \frac{w1 - w2}{ws}$$

Where,

w1 = Weight of the empty conical

w2 = Weight of the conical with fat

ws = Original weight of sample

3.6 Determination of carbohydrate:

The sample's carbohydrate content was calculated by difference rather than direct analysis. Other constituents of the sample (protein, fat, moisture, ash) were determined individually, summed, and subtracted from the total weight of the sample using this method. (FAO, 1998; Pearson, 1976).

Calculation:

% of carbohydrate = 100 - (Moisture + Ash + Protein + Fat + Crude fiber)

The cooking noodles evaluation using AACC methods 66-50 measured increased noodles, water absorption, volume, and cooking loss. A fresh sample of 10 gm noodles is taken to determine the rate of water absorption. After that, I cooled it for a few minutes in 150 ml of water. Cool it for five minutes in a cold water bath before removing it for 30 seconds. Measure the absorb water after drying the cooking loss for 24 hours at 1050°C. I used 10gm fresh noodles and cocked them in a 500ml cylinder with 300ml water. All of the analyses are triplexes.

The absorption formula is –

- Water absorption (%) = (weight of cooked noodles - weight of fresh noodles) ÷ weight of fresh noodles × 100
- Cooking loss (%) = (remaining solid content after drying ÷ weight of fresh noodles) × 100
- Volume increase (%) = [(volume of cocked noodles - volume of fresh noodles) ÷ volume of fresh noodles] × 100

3.7 Determination of Fiber Test by (AOAC 978.10) Method:

Apparatus & equipments:

- Balance Machine
- Muffle Furnace
- Hot Plate
- Hot air oven
- Measuring cylinder
- Conical flask
- Beaker
- Funnel
- Cotton cloth
- Spoon

- Crucible

Reagents:

1. **0.128M Sulfuric Acid:** 3.49ml H2SO4 (98%) diluted in 500ml distilled water.(Boiling in Acid)
2. **0.313M Sodium Hydroxide:** 6.25gm NaOH palate dissolved in 500ml distilled water. (Boiling Base)

Procedure:

Step 1: Boiling In Acid

- Measure 200ml of 0.128M sulfuric acid pour into conical flask
- Take 2g sample transfer into conical flask to mix with acid solution
- Place the conical flask on hot plate and boil the sample for 30 min.
- Sake the flask periodically to ensure the sample proper boiling of sample
- After 30min later filter the boiled sample. Wash the flask with hot water

Step 2: Boiling in Base

- Then measure 200ml of 0.313M NaOH solution pour into the conical flask with sample and boil again for 30 min.
- Then filter again with hot water and collect filtrate in clean and dried crucible till on filtrate is left

Step 3: Drying Fiber

- Place the crucible on hot plate evaporate the excess water
- Then place the crucible into hot air oven & set temperature 230°c for 2 hours
- After 2 hours take out crucible from oven & cool in desecrator
- Again after 20min later take weight of crucible containing fiber, note the weight and then cover the crucible with it's lid

Step 4: Incineration of Fiber

- Place the crucible inside of Muffle furnace and set temperature at 550°c for 2 hours
- After that took out crucible and cooled in desiccators
- 20min later took weight of the crucible containing ash and noted the weight

Step 5: Calculation

- Weight of sample = ws
- Weight of crucible with fiber = w1
- Weight of crucible with ash = w2

$$\text{Crude Fiber \%} = \frac{w1-w2}{ws} \text{x } 100$$

CHAPTER 4

RESULT AND DISCUSSION

4.1 Result and Discussion:

Table 4.1: Banana pseudo stem powder and Wheat flour chemical composition

Sample Name	Banana pseudo stem powder (BPP)	Wheat flour(WF)
Moisture	3.36	6.39
Ash	2.38	0.38
Fat	2.62	1.27
Protein	17.6	10.85
Fiber	1.20	1.19

Table 4.1 shows Banana pseudo stem powder and wheat flour comparison. Here moisture content of banana pseudo-stem powder is 3.36% and wheat flour is 6.39%. Ash content of banana pseudo-stem powder is 2.38% and wheat flour is o.38%, Fat content of banana pseudo-stem powder is 2.62% and wheat flour is 1.27%. Protein content of banana pseudo-stem powder is 17.6% and wheat flour is 10.85%. And the fiber content of banana pseudo-stem powder is 1.20% and wheat flour is 1.19%. Banana pseudo-stem powder is more effective than wheat flour composition.

4.2 Proximate analysis of four samples:

Table 4.2: Proximate analysis of four samples of Banana pseudo stem & Wheat noodles

Samples Test	S 1 (100% Wheat flour)	S 2 (10 % BPP + 90 % WF)	S 3 (20 % BPP + 80 % WF)	S 4 (30 % BPP + 70 % WF)
Moisture	8.14%	7.68%	7.53%	7.37%
Ash	1.69%	1.75%	2.10%	3.60%
Fat	1.37%	1.16%	0.97%	0.84%
Protein	9.27%	10.82%	12.19%	14.18%
Fiber	0.15%	0.48%	0.62%	0.70%
Carbohydrate	79.38	78.11	76.59	73.31

Table 4.2 shows allover result of product samples. Here moisture content are S1> S2> S3> S4. Highest moisture content is present in S1. And the lowest is S4. Then Ash content of noodles samples are S1<S2<S3<S4. During test of ash content S3 & S4 are higher amount have. But there is not much difference between other samples. In table 4.2 Fat content are S1> S2> S3> S4. Hare S1 is high fat founded and the lowest fat present in S4. Protein in S1 is lower other samples and the high amount is present in S4. Most important content fiber is highly present in S4. S1<S2<S3<S4 protein amount are present in noodles samples. Carbohydrates are founded with calculation of other components (moisture, Ash, Fat, Protein & Fiber). Here S1> S2> S3> S4, S1 carbohydrate have high and S4 is lower than others. So all over the result S3 is better than others, because of its color texture. Though S4 is more nutrient able but it looks so dark color for using of 30% banana pseudo stem powder.

CHAPTER 5

CONCLUSION & REFERENCE

5.1 Conclusion:

Banana steam noodles are healthy than normal flour noodles. People like noodles texture. Banana pseudo stem have so many nutrients though reduce human body's toxicity. All age's people can eat this noodles. These noodles can make very low cost price. These noodles are full of protein, fiber & less cooking loss. Banana pseudo stem is full of fiber source [12]. On the other side's it works as ant-aging. It also solves so many problems in human's bodies. Banana pseudo-stem powder moisture is less than wheat flour composition (3.36%>6.39%). Fiber of wheat flour is less than banana pseudo-stem powder (1.19 %< 1.20).So banana pseudo-stem is more fiber rich than wheat flour. After making noodles it becomes more effective. According to the noodles samples noodles 60% of the people S3 (20 % BPP + 80 % WF) liked most. Because of it color texture. To get better results further research can be done in the future.

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