



“Project Report”

DETERMINING PROXIMATE ANALYSIS FROM THE
“(MCSTD DEHYDRATED AND OIL FRIED CASSAVA CHIPS)”

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LETTER OF TRANSMITTAL

Date:

Professor Dr. Md. Bellal Hossain

Head

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Subject: Submission of project report

Dear Sir,

I would like to take this opportunity to thank you for the guidance and support you have given me during this report. Without your help, it was impossible to complete this report. Daffodil International University has more related people for my maximum supervision during my thesis.

To prepare the report I collected the most relevant information as much as possible to report as analytical and reliable to me. I have tried my best to achieve the purpose of the report and hope that my efforts will be fulfilled. The real knowledge and experience involved in the preparation of the report will help me in my future professional life. I request you to forgive me for any mistakes that may happen in the report despite my best efforts. If you enlighten me about my opinion and the opinion of the report, I would really appreciate it

So I want to keep this report in your judgment and advice. Your kind advice will encourage me to do better planning in the future.

Sincerely yours,

Zerin Akter

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DECLARATION

This restriction "Determining proximate analysis from the "(MCSTD dehydrated and oil fried cassava chips)" Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences Faculty of International University Dhaka-1207, Bangladesh as part of Nutrition and Food Engineering University's Bachelor's Degree Partial supplement Report of this project is unique and Zer in akter has worked really hard.

Submitted by:



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Finally, I want to thank my managing director with gratitude and sincere respect.

ABSTRACT

Cassava (*Manihot esculenta*) Hot-climate is a complex crop that also increases in the cooler regions of the Highland Tropics and Thriptics, where the yield decreases. In all cultures, compared to warm-climatic sites, light-synthesis of cold-climatic cassava has decrease.

Knowing the nearest majority of sweet potato is important because Bangladesh is a developing country. Here are the nutritious subjects of the rural areas especially in rural areas. Cassava potato so the poor people in rural areas can afford it. So it is important to know the elements of cassava woody plant potato nutrients.

This study uses oil fried cassava chips MCSTD method. Solar drying method is used for storage. Because raw fresh potatoes may be affected by the microbes, which can reduce the storage life.

But the researchers said that the dry potato MCSTD can be preserved for several years if it is properly preserved. Proximate analysis was made from dried sweet potato moisture, ash, protein, fat. Protein kjeldahl method is used to calculate the total estimate of the product. And fat is estimated to be used for the method of Soxhlet. Moisture content used by oven method.

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Chapter 01: Introduction

1.1 Introduction:

Cassava (*Manihottan Esculenta Cruncus*) is a tropical tree for its underground starchy tuberose roots and a small tree grown in colonies. Also known as Kasawa Ridge, Kasava Kanda, is a major food for 800 million people worldwide (Eakrop, 2011; Lebot, 2009).

Cassava Plant Wooden Plant puts stem branches and thin leaf stalks and leaves up to 30 cm in length. The plant produces less flowers of petals on a resin. Edible roots of plants are usually cylindrical and flexible and white, brown or red color. Kashawat trees can reach 4 meters in height and are usually cut after 9-12 months after planting. Cashews can be referred to as Brazilian air butt, manik, euka or tapioca, and the source of the plant is unknown.

Bangladesh generally practice sun drying techniques in dry products. However, the process is largely dependent on the weather and the rain is very difficult. Moreover, traditional methods generally produce products with high microbial loads. As a result of the large losses caused by air and weather exposure mechanisms and distortion, the result of the lack of uniformity in the final product and the development of unwanted flavors.

Investment and operation costs are cheaper than other available commercial mechanical dryer. At the same time the efficiency and healthy product dries. Due to small microbial pollution, the quality of dry products is stored. Even in light months agricultural production is approved; Easy to install / maintain and maintain; Useful and gender friendly

Analyzes near MCSTD dehydrated and oil fried cassava chips for determining the protein, fat and moisture from the oven. Muffle furnace used for determine the ash Kjeldahl method is used to determine the protein. Kjeldahl method requires digestion, dissociation and compression. Soxhlet method is used to determine the fat from multi commodity solar tunnel dryer dehydrated and oil fried cassava chips.

1.2 Origin of the study:

Thesis or project report requires a bachelor's degree for all university students. Daffodil International University and NFE University offers thesis opportunity for students in the university laboratory

Purpose of this study about multi-Commodity Solar Tunnel Dryer dehydrated and oil fried cassava chips are as follows:

- Solar Dryer To Find Out The Unique Information About solar dryer Oil Fried cassava Chip
- How to learn to identify humidity, ash, protein and fat
- To meet the graduation requirements
- Learn about the machinery related to this project
- How to actually learn to use theoretical knowledge in
- Become shelf-dependent

1.3 Objective of the study:

Two types of objectives are required for this study

1. General objectives
2. Specific objectives

General Objectives:

This is the universal call for the development of National Food Composition database. National Food Coordination Table of Bangladesh is incomplete. As a result, the food scientist worked for a few years to enrich the table. Newly introduced oil frozen cassava chips in Bangladesh. So research about it will help to fill the table gaps in the formation of food. Various investigations about new foods are organized by different organizations. Solar Dryer Oil Fried Cassava Chips Components will enrich the National Food Structure table in Bangladesh

Specific Objectives:

Specific objectives of the study are following:

1. Analysis of the nearest nutrient profile
2. Purple-flavored sweet potato protein and fat assume
3. Know about the method of Multi Commodity Solar Tunnel dryer.

1.4 Limitations of the Study:

Everything has some limitations. So there are some limitations in this study. The main limitation was time. Due to insufficient times it was not enough to conduct research properly. A perfect and clean research is high technology and equipment which the laboratory was not enough.

The technical support was not enough to properly manage this research. The equipment and other necessary things were not enough for current research.

Chapter 02: Literature

2.1 Origin & Botanical description:

Cassava, *Manihot Esculenta*, an ever-fountain in the family. Euphorbiaceous is largely eaten as a vegetable, which is grown for its storage roots. Cassava plant wood plant keeps the stem branches and stems of thin leaves and leaves up to 30 cm in length. The plant produces less flowers of petals on a resin. The edible roots of plants are usually cylindrical and flexible and white, brown or red color. Cassau trees can reach 4 meters in height and are usually cut after 9-12 months after planting. Cashews can be referred to as Brazilian air butt, manic, euka or tapioca, and the source of the plants is unknown. The plant is not known to be wild but may first be cultivated in Brazil. Cassava is the third largest source of food carbohydrate in the crop after rice and corn. It is a major food in the developing world, with more than half of the people being provided basic food. This is one of the most famine tolerant crops, which is growing in small soils.

2.2 Nutritional importance of cassava chips:

Cassava is a calorie-rich vegetable that contains large amounts of carbohydrate and key vitamins and minerals. Cassava is a good source of Vitamin C, Thiamine, Riboflavin and Niacin. If a person cooks them or is dry in the sun, then the leaves can also be eaten, it can contain 25 percent protein. Cassava have many amount of starch.

2.3 Health benefit of cassava chips:

Ever came across a single element that can take care of your skin care, hair and health? And if that element is also toxic? Annoying, do not you? Well, we're talking about Cassava here. Just imagine how it benefits your skin, hair and healthy.

And its apparently toxic nature is coming in, certain foods and ingredients that are supposed toxic, but can give a number of benefits when eaten right. Casaba is one of them.

Chapter 03: Method and Materials

3.1 Collection of sample:

Cassava is one type of potato and woody plant. Cassava is grown in Brazil, American and also its grown in Bangladesh. The research was conducted on cassava woody plant potato grown in Bangladesh to estimate the proximate composition (such as Moisture, Ash content, Protein, and Fat). The experimental sample were collected from Madhupur, Bangladesh. The sample was collected as fresh as possible and processed in both in NFE lab sample preparation and analysis.



3.2 Preparation of sample:

1. After collect fresh woody plant cassava potato sample then peeled and remove is outer membrane.
2. Then it was washed properly and sliced into small pieces.
3. These small pieces of potato some small pieces were passed through steam blanching and some pieces are non-blanching.
4. After these sample are drying in Multi-Commodity Solar Tunnel Dryer.
5. After drying these sample are make the oil fried cassava chips.
6. Seasoning powder added
7. Then sample are sent the NFE lab for proximate analysis.



3.3 Materials:

3.3.1 Chemical reagents:

- H₂SO₄
- CuSO₄
- HCL
- CuSO₄
- Methyl red indicator also used

3.3.2 Equipment's:

- Multi commodity solar tunnel dryer
- Electrical balance
- Bowl
- Knife

3.4 Methods of proximate analysis:

Analytical method or techniques for proximate analysis for the proximate analysis are given in the following table:

Table: Analytical method or techniques for proximate analysis:

Proximate analysis	Methods
Moisture	Oven drying
Ash	Electric muffle furnace
Protein	Kjeldahl method
Fat	Soxhlet method

3.5 Estimation of Proximate Composition:

According to the official analytical chemist (AOAC, 1984) of the Society, moisture, ash, protein, total fat is done from solar dryer and oil fried cassava chips. Moisture oven is used for the estimation of dried method. Electric muffle furnace is used to estimate ash from solar dryer and oil fried cassava chips. Kjeldahl method is used to estimate protein from solar dryer and oil fried cassava chips. Approximate process is done in the NFE laboratory. Fatty estimates were used in NFE laboratories and in the societal system.

Chapter 04: Proximate analysis of MCSTD dehydrated oil fried cassava chips

4.1 Moisture test:

Plant foods differ from plant to humidity plant. It is important to know about the moisture content, because it affects the formation of food. The content of the moisture of the MSCTD dehydrated and oil fried cassava chips is determined by the amount of water to move from it. Oven drying method is used to remove water.

Apparatus:

- Crucible lid
- Oven
- Balance machine
- Desiccator

Procedure:

- First of all set the oven at the temperature of 105 °C
- Then weight crucible lid
- Then emit the MCSTD and oil-fried cassava chip weight
- Then the crucible + sample weight
- Then sample the oven in 1 hour at 105 °C temperature heat
- After 30 minutes cool on the sample
- Then again weight crucible lid + sample
- Then count it for a result

Calculation: MCSTD dehydrated and oil fried blanching cassava chips

Before heat,

Crucible lid weight (x) = 27.628g

Sample weight (i) = 5 g

Crucible + sample weight (y) = 32.628g

After heat,

Crucible+ sample weight (q) = 32.423g

$$\begin{aligned}\% \text{ moisture} &= \left(\frac{y-q}{i}\right) \times 100 \\ &= \left(\frac{32.628-32.423}{5}\right) \times 100 \\ &= 4.1\%\end{aligned}$$

So 5g solar dryer dehydrated and oil fried blanching cassava chips is 0.459g moisture content and 5g cassava chips is 4.1% moisture.

Calculation: MCSTD dehydrated oil fried non blanching cassava chips

Before heat,

Crucible lid weight (x) = 23.813g

Sample weight (i) = 5g

Crucible + sample weight (y) =28.813g

After heat,

Crucible + sample weight (q) =28.583g

$$\begin{aligned}\% \text{ moisture} &= \left(\frac{y-q}{i}\right) \times 100 \\ &= \left(\frac{28.813-28.583}{5}\right) \times 100 \\ &= 4.6\%\end{aligned}$$

So, 5g MCSTD dehydrated and oil fried non blanching cassava chips is 4.6% moisture

4.2 Ash test:



Apparatus:

- Crucible lid
- Muffle furnace
- Weighting machine
- Desiccator

Procedure:

- First set all 600 °C temperatures on the muffle furnace
- Then measure the crucible lid
- Then sample weight
- Then the crucible + sample weight
- Then heat temperature of 600 °C at muffle furnace within 6 hours
- After sample 1 hour cool sample on
- Then again weight crucible lid + sample
- Then count it for a result

Calculation: MCSTD dehydrated and oil fried blanching cassava chips.

Before heat,

Crucible lid = 25.053g

Sample weight = 5g

Crucible + sample = 30.053g

After heat,

Crucible + sample weight = 25.123

Ash content = (after heating ash – crucible lid)

$$= (25.123 - 25.053)$$

$$= 0.07\text{g}$$

$$\% \text{ of ash} = \left(\frac{\text{ash sample}}{\text{main sample}} \right) \times 100$$

$$= \left(\frac{0.07}{5} \right) \times 100$$

$$= 1.4\%$$

Calculation: MCSTD dehydrated and oil fried non blanching cassava chips

Before heat,

Crucible lid = 25.125g

Sample weight = 5g

Crucible + sample weight = 30.125g

After heat,

Crucible lid + sample weight = 25.178g

Ash content = (after heating ash – crucible lid)

$$= (25.178 - 25.125)$$

$$= 0.053\text{g}$$

$$\begin{aligned}\% \text{ ash} &= \left(\frac{0.053}{5}\right) \times 100 \\ &= 1.06\%\end{aligned}$$

4.3 Protein test:

Materials/apparatus:

- Conical flask
- Volumetric flask
- Condenser/heater
- Balance machine

Reagent:

- H₂SO₄
- Digestion mixture (2g CuSO₄ + 98 K₂SO₄)
- 40% NaOH
- 0.1 HCL
- Methyl red indicator
- 0.1 NaOH
- Distilled water

Principle:

The nitrogen estimation system was made by the revised Kjeldahl method (Gopalan, 1971). This method is digested with concentrated sulfuric acid in the presence of organic nitrogen catalyst (K₂SO₄: CuSO₄.5H₂O = 98: 2). This solution was transformed into ammonium sulphate [(NH₄)₂ SO₄]. This solution was synthesized by the Alkaline Illuminated Ammonia (NH₃) Standard Volume (H₂SO₄) volume, which was later linked to Alkaline (NaOH).

Procedure:

The Kjeldhal procedure is in 3 steps. They follow:

1. Digestion of sample
2. Distillation
3. Titration

Digestion:

0.4gm sample is taken in a foil paper or a weight paper. Sample was to pour a flavored flask. 10ml H_2SO_4 it has been added. Then the 2gm lip mixture is taken in the flask. The average price can be taken so that the two citrus flasks are used. Then the flasks were heated in a Kjeldahl digestive chamber. The first temperature was $40^\circ C$. After temperature rise $60^\circ C$ waiting for 3-4 hours solitary color. Then flasks are cool and thin with 100 ml damp water.

Distillation:

The solution that is taken from the flask to 10 ml dull flask. The water dissipated 150 ml is flask. Then 40% NaOH' is 10ml distillation flask has been added. The solution was colorless.



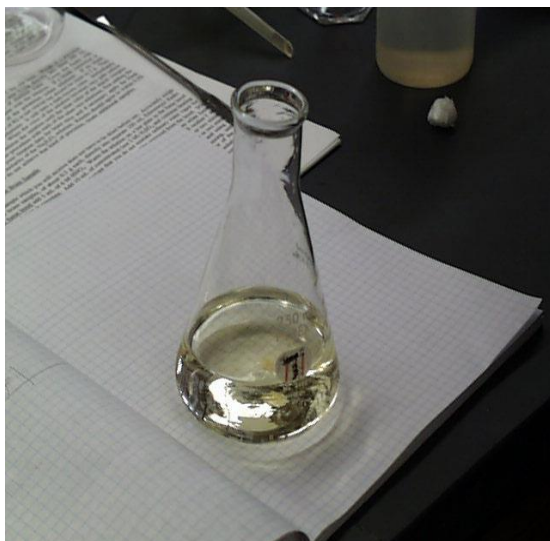
For this method three distillation flights were taken, where there was a blank in them. The third distillation was taking only reagents into the flask and there was no sample. On the other side, 50 millimeter distilled water and 0.1N HCL 10 millimeter trapped droplets are taken. 2 drops of methyl red is taken into the cone shower. The solution becomes pink color.



Three trap cone flasks were used and the same thing was included. Then the condenser's dissolving process is run for 30 minutes full. Then cone flasks are prevented and nominated with NaOH.

Titration:

The burette for the titration was filled with NaOH 0.1N. Then the cone flasks under the burette for the title are pre-set. NaOH drop-wise from the Burette and was added to the cone flask trapped by cone flask, slowly shaken. NaOH has been added to color change. The last point was to change the colors of light yellow to pink.



**Calculation of protein: MCSTD dehydrated and oil fired cassava
Blanching cassava chips**

Table: Burette reading for titration

content	Burette reading		Average
	Initial	final	
Sample 1	4.6	5.3	4.94
Sample 2	5.3	6.1	5.7
sample 3	0	4.6	4.6

Here for blanching solar dryer sample

$$a=5$$

$$b=4$$

$$c=5.4$$

$$d= 0.1$$

$$\text{Percentage of protein} = \frac{(5.2-4) \times 14 \times 0.1 \times 6.25 \times 100}{5 \times 1000} \times 100$$

$$=21\%$$

So the ratio of blanching solar dryer is 21%

For non-blanching solar dryer sample:

Here,

$$a=5$$

$$b= 4$$

$$c=5.4$$

$$d=0.1$$

$$\% \text{ of protein} = \frac{(5.4-4) \times 14 \times 0.1 \times 6.25 \times 100}{5 \times 1000} \times 100$$

$$=24.5 \%$$

So the ratio of blanching solar dryer is 24.5%

4.4 Fat test:

Sample powder form is used to estimate fat by the sociological method. N-Hexane is used with sample extraction samples.

Materials:

- Boiling flask
- Soxhlet flask
- Condenser/thermostat heater
- Thimble
- Balance machine

Procedure:

5G pre-dried powder sample is taken with dry extraction theme, quickly approved N hexane dry. A dry boiling sculpture is taking weight. Then hexane 200ml is taken in a measurement cylinder.

Warm shower, Soxhlet gill and condenser are properly assembled. The sampled sample was placed in the sociological framework and n- hexane was poured into it. N-hexane soxhlet was passed through flask through warm floss.

Then the condenser was set to lock and heat the soccer flask. All the fat in 6 hours is removed.



Then the soxhlet flask is removed and the footprint is heated in 1000 cents for 30 minutes. After that warm trunk is cold and weighing. Sample fat is calculated using boiling sculpture and initial weight of boiling cover.

Calculation: MCSTD dehydrated and oil fried blanching cassava chips.

Thimble weight = 5.652g

Sample weight = 5g

Initial weight of flask = 105.37g

Final weight of flask = 105.823 g

$$\begin{aligned}\text{Total fat} &= (105.823 - 105.37) \text{ g} \\ &= 0.453 \text{ g}\end{aligned}$$

$$\begin{aligned}\% \text{ of fat} &= \left(\frac{\text{total fat}}{\text{sample}}\right) \times 100 \\ &= \left(\frac{0.453}{5}\right) \times 100 \\ &= 9.06 \%\end{aligned}$$

So, 5g sample is 9.06% fat

Calculation: MCSTD dehydrated and oil fried non blanching cassava chips

Thimble weight = 5.753 g

Sample weight = 5g

Initial weight of flask =106.47g

Final weight of flask =106.928g

Total fat = (final weight of flask – initial weight of flask)

$$= (106.928 - 106.47) \text{ g}$$

$$= 0.458 \text{ g}$$

$$\% \text{ of fat} = \left(\frac{\text{total fat}}{\text{sample}} \right) \times 100$$

$$= \left(\frac{0.458}{5} \right) \times 100$$

$$= 9.16 \%$$

So 5g sample is 9.16 % fat

Chapter 05: Result & Discussion

5.1 Local English and scientific name of cassava:

In order to estimate its proximate analysis, it was studied to find the chemical structure of the MCSTD dehydrated and oil fried cassava chips. Non blanching solar dryer oil fried cassava chips are bitter test and blanching cassava chips are so testy.

The English, local and scientific name of cassava are shown table in Bangladesh:

English	Cassava
Local	Simul alu
Scientific	<i>Manihot esculenta</i>

5.2 Proximate analysis of MCSTD dehydrated oil fried cassava chips results in table:

Proximate composition 5g of oil fried cassava chips:

Proximate analysis %	Blanching solar dryer oil fried cassava chips %	Non blanching oil fried cassava chips %
Moisture	4.1	4.06
Ash	1.4	1.06
Protein	21	21.4
Fat	9.06	9.16

5.3 Moisture test: MCSTD oil fried blanching and non-blanching cassava chips

Result: blanching oil fried cassava chips-4.1%

Non blanching oil fried cassava chips-4.06%

Discussion: this result is not accurate cause measurement problem or drying problem.

5.4 Ash test: MCSTD oil fried blanching or non-blanching cassava chips

Result: blanching chips-1.4%

Non blanching chips -1.6%

Discussion: in internet source is 1% this result is applicable for this test. That's why is applicable for this result.

5.5 Protein test: MCSTD oil fried blanching and non-blanching cassava chips

Result: blanching chips- 21%

Non blanching chips -21.4%

Discussion: this protein value is accurate cause internet value 21-25 %

5.6 Fat test: MCSTD dehydrated oil fried blanching and non-blanching cassava chips

Result: blanching cassava chips-9.06

Non blanching cassava chips-9.16

Discussion: this result is also not applicable because internate source result is 38-40%. Sometime equipment problem that's why it's not applicable.

Chapter 06: Conclusion & Reference

6.1 Conclusion

Cassava is one type of woody plant cassava potato. Its scientific name is *Manihot esculenta*

Current research shows that there is high content of oil fried of cassava chips proteins. Bangladesh is a developing country where malnutrition among children and adults is a common problem. So MCSTD dehydrated and oil fried cassava chips can be helpful in reducing protein power malnutrition (PEM), which usually occurs between children and adults

Root crops are gained in importance as food and cash crops. Extremely involved in the cultivation and processing of women (especially cassava).

Africa and S. The first bread spreads to crops and quantities Second bread cropping in Asia and Yemen Africa.

MCSTD dehydrated and oil fried cassava chips market is occasionally available in Bangladesh. The lack of awareness of the sweet nutritional value of chips is still far from its health benefits.

Previous studies about cassava chips show that cassava chips has high phenolic compounds and antioxidant properties. It is known that antioxidant can act as an obstacle for cancer. It is our duty to increase the awareness of the cassava health benefits among the people of all classes.

Their supply can earn a lot of money which will increase our economic status.

6.2 Reference

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