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Proximate Food Analysis on Moringa Oleifera Seeds

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Abstract: ***This study was carried out to determine the moisture, protein and ash content in moringa oleifera seed. Due to time factor and the resources available these determinations were done using the proximate analysis. The method carried out in the lab during the analysis was ghaphmatic method. Nowadays moringa oleifera is mainly found in the middle east and in African and Asian countries but due to adaptability, it is spreading to other areas especially tropical and sub-tropical lands affected by drought.Research has shown that the seed contains 36.7% of edible oil which is much healthier as compare to most oils in the market, high content of protein which can be used as a protein supplement to traditional diets. The seed also has high content of cysteine and methionine. The seed with other parts of the plant are used for medicinal purposes.***

Keywords: moringa oleifera seed, ash, protein and edible oil

1. Introduction

Moringa oleifera seed is a fast growing softwood tree indigenous to sub-himalayan tracts of northern India. It is one the 13 species within the same genus and has become the most diffuse in tropical and sub-tropical areas at altitudes up to 200m, Nowadays moringa oleifera is mainly found in the middle east and in African and Asian countries but due to adaptability, it is spreading to other areas especially tropical and sub-tropical lands affected by drought.

Oil is the main component of the seed and it represent 36.7% of the seed weight. Among the rural dwellers, the edible oil is extracted by boiling the de-husked seeds with water, and collecting the oil from the surface of the water. Apart from the oil the seed has high protein content. Thus the defatted seed of moringa oleifera could provide an economical source of protein for use as a food supplement to traditional diets to increase protein intake. The seeds have high content of methionine and cysteine, close to that reported for milk and eggs therefore they can be consumed together with legumes which are deficient in sulphur amino acids. Moreover, the seed seems to be free of trypsin inhibitors and unrease activity confirming the high protein digestibility

2. Methodology

2.1 Study Area

This study was conducted in tamale metropolis in the northern region of Ghana.

2.2 Moisture Analysis

2.2.1 Materials and Tools

1) Can
2) Oven
3) Electronic scale
4) Tray
5) Tongs
6) Desiccator
7) Powered sample

2.2.2 Methods

Steps;

1) Can with known id number was pre-heated for 20 minutes in an oven at a temperature of 105*C
2) Can kept in a Desiccator to prevent the gaining of moisture from the surrounding
3) Weight of can was taken and recorded
4) 3.0g of composite sample was weighed in the can
5) Sample in the can was carried to the oven with the help of a tray to be heated at a temperature of for 4hours
6) Weight of can with sample was taken after the 4hours

2.2.3 Precautions

Some precautions to take in order to obtain accurate, reproducible results

1) Can should be picked with tongs to avoid the transfer of moisture from our hands to the pre-heated can
2) Can should be kept in a Desiccator to avoid gaining or losing moisture to the environment
3) Weight from the electronic scale should be recorded if only star on the scale appears. The star signifies the exact measure of the object
4) Measurement should be repeated
5) Can gentle placed in the oven to avoid losing some sample
6) Pause mill to avoid moisture lost during milling

2.3 Ash Analysis

2.3.1 Materials and tools

1) Crucible
2) Oven
3) Desiccator
4) Electronic scale
5) Dried sample
6) furnace

2.3.2 Method

Step

1) Crucible with known id number pre-heated for 10 minutes
2) Weight of crucible taken and recorded
3) 3.5g of composite dried sample was weighed in the crucible
4) Crucible with the sample placed in a furnace at a temperature of 530*C until sample completely burnt to ash
5) Cool the crucible and the content(ash) in a Desiccator for 5 minutes
6) Weight to constant weight and calculate ash content

2.3.3 Precautions

1) Repeat measurements to be sure of an accurate weight of the sample to be ashed
2) Make the temperature in the furnace is high enough to burn all organic matter of the sample
3) Gentle place the crucible in the furnace to avoid sample lost

2.4 Protein Analysis

2.4.1 Material and equipment's

1) Kjedahl apparatus
2) Kjedahl tablet
3) Test tube
4) Distillation apparatus
5) Conical flask
6) Block digester
7) Washing bottle
8) Gloves
9) Boric acid
10) Grease proof paper
11) Sulphuric acid
12) Distilled water
13) Sodium hydroxide

2.4.2 Method

Steps;

2.4.2.1 Digestion stage

- 1.0g of composite dried sample was weighed in grease proof paper and tied up
- The sample was kept in a test tube with a known Id number
- 2 tablets of kjedahl tablets were added to act as catalyst
- 15mls of concentrated sulphuric acid was added and light blue color was observed
- The test tube with the solution placed in the digestion rack heated until clear solution is obtained

2.4.2.2 Neutralization and digesting

- 50mls of distilled water was added to the digested sample
- 50mls of sodium hydroxide was gently added to the digest to prevent corrosive explosion
- The solution was then put into the distillation machine and boil for 13 minutes
- The distillate was collected in a volumetric flask which contain 25mls of boric acid
- A color change from violet to green is observed as ammonia is trapped in boric acid
- The distillation continue few minutes after the color changed

2.4.2.3 Titration

- The boric acid –ammonia solution was titrated against sulphuric acid until the green color disappears
- Volume of acid at which green color disappears was recorded

2.4.3 Precautions

1) Ensure ammonia is not lost to the atmosphere during distillation by ensuring the tip of the delivering tube is in the boric acid
2) The need to be extra careful since it involves strong acid and bases to avoid explosive corrosion
3) For accuracy make sure all nitrogen in the sample has been converted to ammonium
4) Ensure the complete conversion of ammonium to ammonia by altering the ph of the solution

3. Results

Proximate Analysis

This analysis is a convenient way to analyze food materials although the system is not accurate. It involves analyzing the food material for %moisture, %crude protein, %crude fat, %crude fiber, %ash, %non-fiber. The moisture, ash and crude fat content of our sample were analyzed. Below are the result obtain from the analysis

3.1 Proximate Analysis of Moisture

Table 3.1: The table below shows result from the proximate analysis of moisture

Moringa oleifere seed	Can code	Can weight	Sample weight	Dried weight
Measurements	0234	10.8	3.5	13.14

Moisture = $\frac{\text{weight of wet sample} - \text{weight of dried sample}}{\text{Weight of wet sample}} * 100$

Moisture =3.5-2.34/3.5 * 100

Moisture=33.14%

3.2 Proximate Analysis of Ash

Table 3.2: The table below shows result from the proximate analysis of ash

Dried sample	crucible code	Crucible weight	Sample weight	Ash weight
	130	29.44	3.504	0.14

Ash percentage in moringa oleifera seed =ash weight/sample weight *100

Ash =0.14/3.504*100=3.99%

3.3 Proximate Analysis of Crude Protein

Below is the result obtain from the proximate analysis of crude protein

Tittered volume=51.4

Blank result=1.0
Calculation = (V_A-V_B) X N_A X 0.01401 X 10/weight of sample
V_A= volume of acid in titration of sample
V_B = volume of acid in titration of blank
N_A = normality of acid
Nitrogen = (51.4-1.0)x0.1x0.01401/1.0 =51.39
Crude protein =nitrogen x factor
Crude protein = 51.39 x 6.25 =321.2

3.4 Results on Protein, Ash and Moisture

The table below shows the results from proximate analysis of moringa oleifera on moisture, ash and protein content.

Table 3.4: Results on protein ash and moisture

Analysis	Results
Moisture	33.14%
Ash	3.99%
Crude protein	321.2

4. Discussions

From the result obtain from the analysis, for every 3.5g of moringa oleifera seed contains 33.14% of moisture in it.this make its preservation easier, also the moisture content does not encourage microbial growth.

For every 3.504 dried sample of moringa oleifera seed there is 3.99% of ash into it. Since ashing is a quality control tool the result from the analysis indicates that the seed does not contain toxic metals, so products from the seed are healthy for consumption

In conclusion for every one gram of moringa oleifera seed there is 321.2 crude protein in it. The defatted seed is an economical source of protein, this protein can be used as a protein supplement our traditional diet to increase our protein intake.

5. Conclusion

Moringa oleifera seed are obtain from the pods of the moringa plant. Moringa oleifera is the widely cultivated species in the genus moringa. The seed contains high content of edible oil (Ben oil), protein methionine cysteine. The seed has a lot of benefits used for medicinal purposes. Low ash content indicating the seed has less toxic chemical in it. High content of protein which can be used as a protein supplement to traditional diets. The analysed result from the analysis of moringa oleifera seed are moisture =33.4%, ash= 3.99%, crude protein =321.2.

6. Recommendation

1) The seed contains high content of healthy oil (ben oil) this should be replaced with the unhealthy ones
2) High content of protein in the seed can be used as a protein supplement to those who cannot afford expensive protein foods
3) The cultivation of moringa oleifera should be increased since all parts of the plant has a lot of benefits.

References

[1] Cohen, J. B. (1910). Practical Organic Chemistry.
[2] Kjeldal, j. (1993). New method of determination of nitrogen in organic substances. 22.
[3] McClements, J. (2007). Analysis of Protein. https://en.m.wikipedia.org/wiki/kjeldahl-method