NUTRITIONAL CONTENT OF *DIOSCOREA HISPIDA* DENNST (KOROT) FOUND IN LAVEZARES, NORTHERN SAMAR, PHILIPPINES

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ABSTRACT

This study aimed to determine the nutritional content of *Dioscorea hispida* Dennst found in Lavezares, Northern Samar, Philippines in terms of its moisture content, ash content, fat content, fiber content, protein content, carbohydrate content, color, odor, texture and pH.The detoxified, dried and pounded Korot was used in this study for the determination of its nutritional content. From the results of this study, Korot obtained 22% of moisture content and 2.67% of ash content and 9.67% of crude fat content and 10% of crude fiber and 2.99% protein and 62.67% carbohydrates. The color of Korot is white, odorless and coarse texture. While its pH is 7.03 which showed that it is neutral.Results revealed that Korot is a high source of carbohydrates. It also shows that its moisture content is low which another good thing because it cannot be easily contaminated with bacteria and it is good for preservation

Keywords: *Dioscorea hispida* Dennst, nutritional content

No: of Tables: 8 **No: of References: 14**

INTRODUCTION

Nutritional content of every food we eat is important for us to ensure proper diet. Awareness of the food's nutritional content is essential to know what particular food we need to take to maintain good health. *Dioscorea hispida* Dennst (Korot) is already known to Samar residents. It just grows anywhere.

Nutritional awareness of every food we ate has important role to our health. It gives us knowledge about the food we eat and can sustain the balance diet needed for our body. This study brings us the knowledge about the nutritional content of a particular food which is Korot that will help the people make Korot as a good source of healthy food. This study offers every household a source of food found in our own place or even found anywhere in Northern Samar.

Korot can be substitute for rice especially when unexpected drought comes to our place. People easily replace rice to Korot since it is very available and accessible to the local place. This may solve the hunger of the people once drought or rice shortage occurs. This study informs people to learn how to detoxify Korot since it is toxic.

Nutrition of the food we eat must be known in order for us to take only what is needed for the diet. Enough knowledge for the food we eat has significant effect to everyone since doctors and nutritionists are giving advice for their patients or clienteles to take how many grams on certain food must be taken. Each nutritional content has corresponding effect to humans whatever the food is eaten. For example, the food that is rich in protein like meat is good for developing our tissue and is needed for the formation of the new cells and other related functions.

The researchers is interested in this study to determine the nutritional content of *Dioscorea hispida* Dennst to be able to help the community to develop the product into useful products so people benefit from this plant and can sustain the people needs in terms of food.

METHODOLOGY

Preparation of Korot Sample

The korot was collected from Lavezares, Northern Samar and the researchers used the local method on how to detoxify the korot. The skin of the korot is peeled off, sliced into small pieces in basin, put sea water in the sample in a basin to remove the extract contents and soak it for 3-4 days. After 3-4 days the Korot was washed repeatedly with water until it becomes clear. Korot was sun dried. The dried sample was ready for determination of nutritional content.

Determination of Physical Properties

The different physical properties of korot were determined using the following procedures:

Color

The color of Korot was evaluated by the five respondents using their sense of sight. Evaluation forms were given to each

with sample description. They write the observed color in the evaluation form.

Odor

The odor of Korot was evaluated by the five respondents using their sense of smell. The evaluation forms were given to the evaluators with sample description.

Texture

The texture of Korot was assessed by five respondents using their sense of touch. Evaluation forms were given. The respondents describe the color, the odor and the texture of korot and the results were shown in Appendix C.

pH

The pH is determined by using digital pH meter. One gram of ground korot was mixed in 100 mL distilled water and used digital pH meter. pH meter was calibrated by buffer solution at 7.0 before it was used. Digital pH meter was dipped into the sample. After one minute, the reading of digital pH meter was recorded. Three trials were made.

Determination of Nutritional content

For the determination of nutritional content of Korot the following procedures and analysis were used:

Moisture Content (Cockerell, et al, 2000)

To determine the moisture content of Korot, ten grams (10g) of ground sample was placed in the preheated, cooled and weighed crucibles in the drying oven for 12 hours at 105°C. The crucibles were cooled in desiccator for 30 minutes and were weighed. Three trials were made.

Moisture content was calculated by the following formula:

$$\text{Moisture Content (Percent)} = \frac{(B-A)-(C-A)}{(B-C)} \times 100$$

Where:

A – Weight of clean, dry crucible (g)

B – Weight of clean crucible and sample (g)

C – Weight of crucibles and dry sample (g)

Ash Content (Horwitz, et al, 2000)

To determine the ash content of korot, three crucible were marked, with five grams of korot, heated in the oven for three to four hours and the temperature was lowered. Before putting into the desiccator for 30 minutes, the crucibles were weighed and recorded. The sample was burned using the Bunsen burner until it becomes completely ash. It was followed by cooling the sample into the desiccator for 30 minutes and was weighed.

Ash content is calculated using the formula below:

$$\text{Ash content (Percent)} = \frac{(W3-W1)}{(W2-W1)} \times 100$$

Where:

W1 – Weight of crucibles (g)

W2 – Weight of crucibles and sample (g)

W3 –Weight of crucibles and ash (g)

Crude Fat (Horwitz, et al, 2000)

To determine the fat content of the sample the researcher used Soxhlet Method. Crude fat content is determined by extracting the fat from the sample using a solvent.

The glassware was washed with benzene, dried in oven for 30 mins. at 102°C. The 150 mL bottom flask was cooled, weighed and recorded and placed with 100 mL benzene. Ten grams of korot was weighed and covered with filter paper and placed in the assembled extraction unit. The solvent was heated in the flask until it boiled. Extraction was continued for six hours maintained by high temperature that solvents dripped from condenser into the sample for about six drops per second. The flask was detached and heated until solvent was evaporated. The flask was placed in oven at 102° for 1 hour then placed in the desiccator and the flask was weighed.

The fat content of the sample was measured using the equation below:

Crude Fat (Percent) = $W2 - W1 \times \frac{100}{s}$

Where:

W1 – Weight of empty flask (g)

W2 – Weight of flask and extracted fat (g)

S – Weight of sample (g)

Crude Fiber (Cockerell, et al, 2000)

The determination of crude fiber has two steps. In first step, the sample was defatted using soxhlet method. One gram of defatted sample was weighed. In step two, it was placed in the flask and added 67 mL boiling sulfuric acid solution using fume hood. Boiling chips were used as antifoam. It was boiled for exactly 30 minutes maintaining the volume of distilled water constant and swirling the flask periodically to remove particles adhering to the sides of flask. Buchner funnel was lined with the Wattman filter paper and preheated by boiling water. At the same time, at the end of the boiling period, the flask was removed, cooled for one minute, and the contents were filtered carefully suction in the Buchner funnel with Wattman filter paper. Filtration was carried out in less than ten minutes. The Wattman filter paper was washed with the residue of boiling water. The residue was transferred to the flask using retort containing 67 mL of boiling NaOH solution and was boiled for 30 minutes as in step 2.

The filtration crucible was preheated with boiling water carefully. Hydrolyzed mixture was filtered after cooling for one minute. The residue was washed with boiling water, with HCl solution, and then again with boiling water, finishing with 3 washes of hexane. The crucible was placed in a drying oven at 105°C for 1 hour then cooled in desiccator. The crucible was weighed quickly with the residue. . It was burned in Bunsen burner for 3 hours, then placed in the dissector for 30 minutes and was weighed.

Crude fiber content was calculated by the following formula;

Crude Fiber (Percent)= $\frac{A-B}{C} \times 100$

Where:

A – Weight of the crucible with dry residue (g)

B – Weight of the crucible with ash (g)

C – Weight of the sample (g)

Carbohydrates (Wang et, al. 2006)

Calculation of carbohydrates for korot was determined by adding the moisture content, protein, fat and ash and the result was subtracted in 100.

Calculation in carbohydrates contents of korot used the equation below:

Total Carbohydrates = 100 – (% moisture + % protein + % fat + % ash)

RESULTS AND DISCUSSION

This study determined the nutritional content of Korot also the physical properties. It was found to be good source of carbohydrates. It can substitute other food which is rich in carbohydrates such as rice.

In this study the researcher used different methods in determining the nutritional content of korot in Northern Samar. These are: moisture content, protein, fat, carbohydrates, and fiber.

Physical Properties

The color, odor and texture of Korot were assessed by five respondents. Each respondent was given an evaluation form with sample description. They wrote the described physical properties. In the determination of pH of sample, one gram of ground Korot was mixed with 100mL of distilled water and used digital pH meter to determine the Korot's pH. The results of physical properties of Korot were showed in table 1.

Table 1. The physical properties of Korot

Physical Properties	Interpretation
Color	White
Odor	Odorless
Texture	Coarse
pH	7.03 neutral

Nutritional Content of Korot

Moisture Content

Moisture content of korot was determined using Oven-drying Method. The ground korot inside the crucible was weighed and dried in the drying oven at 105°C for twelve hours, and then it was cooled and weighed again. Table 2 is the result of the analysis in three trials.

Table 2. Total Moisture Content Korot

Trials	Weight of Crucible	Weight of Crucible + weight of sample	Weight of Crucible + weight of dry sample	Percent Moisture
1	18.8 g	28.8 g	26.5	23 %
2	17 g	27 g	24.8 g	22 %
3	17.1 g	27.1 g	24.9 g	21 %
			Average	22 %

Table 2 showed that korot have the average moisture content of 22 %. This indicated that korot is not watery. This further implies that korot cannot be easily contaminated by fungi, bacteria and insects and it is good for preservation. The moisture content for korot supports the study of Kendall (2003) where he concluded that at a range of 5 - 25% moisture content in food is good to be preserved.

Ash Content

Ash content was determined using Dry Ash Method. The sample inside the crucible was weighed and it was burned in crucible using Bunsen burner and weighed again once korot become ash. Table 3 showed the result of analysis in three trials.

Table 3. The Total Ash Content of Korot

Trials	Weight of Crucible	Weight of Crucible + weight of sample	Weight of Crucible + weight of ash	Percent Moisture
1	25.2 g	30.2 g	25.4 g	4 %
2	23.2 g	28.2 g	23.3 g	2 %
3	23.4 g	28.4 g	23.5 g	2 %
			Average	2.67 %

Table 3 showed that korot has the average ash content of 2.67 %. The ash content of korot is higher compared to the obtained result of the study of Bai, Shu Liang (2008) in which he determined the ash content of korot was 0. 69 %. This further implies that the korot have high mineral and vitamin content such as calcium, potassium and sodium compared to korot studied by Bai, Shu Liang. Minerals and vitamins of korot are good for the resistance and immune system of the body compared to the study Bai, Shu Liang in korot.

Crude Fat Content

The determination of crude fat used Soxhlet Method. The korot sample was extracted using benzene. Table 4 showed the result of the analysis in three trials.

Table 4. Total Crude Fat Content of Korot

Trials	Weight of Empty Flask	Weight of Flask and extracted Fat	Weight of Sample	Percent Crude fat
1	91 g	92.2 g	10 g	12 %
2	92.3 g	93.1 g	10 g	8 %
3	92 g	92.9 g	10 g	9 %
			Average	9.67 %

Table 4 showed that korot has the average crude fat of 9.67 %. The results obtained indicates that korot has high percent of crude fat compared to purple ubi which is 0.97 %

and appari is 0.73 %. This further implies that korot can give more energy supply for the body according to its fat content compared to purple ubi and appari and korot can give more energy reserve for the body compared to purple ubi and appari.

Crude Fiber

Crude fiber is determined by boiling the ground sample in diluted sulfuric acid and NaOH. Korot residue was dried in the oven at 105°C for twelve hours and it was burned in Bunsen burner. Table 5 showed the result of the analysis in three trials.

Table 5. Total Crude Fiber Content Korot

Trials	Weight of Crucible with dry sample	Weight of Crucible with ash	Weight of sample	Percent Crude Fiber
1	19 g	18.9 g	1 g	10 %
2	18.3 g	18.2 g	1 g	10 %
3	20.5 g	20.4 g	1 g	10 %
			Average	10 %

Table 5 showed that korot has the average crude fiber of 10 %. The results obtained indicates that korot has higher percentage of crude fiber compared to purple ubi which is 1.67 % and appari is 2.34 %. This implies that korot cannot be easily eliminated by the body and korot cannot be easily digested by the stomach for human which is good for bowel movement compared to purple ubi and appari. It indicated that if we eat korot we will not get easily hungry.

Carbohydrates

The determination of carbohydrates content of korot was determined by adding the gram contents of moisture, protein, fat and ash and the result was subtracted by 100 (Wang et, al. 2006) and the result showed in Table 6.

Table 6. Total Carbohydrates Content of Korot

Total % Moisture	Total % Protein	Total % Fat	Total % Ash	Total % Carbohydrates
22 %	2.99 %	9.67 %	2.67 %	62.67 %

Korot has an average carbohydrate content of 62.67 %.This data indicated that korot has higher content of carbohydrates. This implies that korot as food can give more energy to the body needed for daily activity and good fuel for the brain

Table 7. Summary of Nutritional Content of korot.

Nutritional Content in terms of:	Total %
Moisture	22.00
Ash	2.67
Crude Fat	9.67
Crude Fiber	10.00
Protein	2.99
Carbohydrates	62.67

Korot has the highest crude fiber and fat. This means that korot is good for those who want to diet or maintain its weight because of the fiber content. Also, korot has a higher fat content which is a good source of energy. (Quinne, Elezabeth, 2014).

Table 8. Comparison of Korot, *Dioscorea alata* (PurpleUbi) and *Dioscorea esculenta* (Appari)

Nutritional content in terms of:	**Total % of Korot nutritional content**	**Total % of Purple Ubi's nutritional content** (Harijono et. al., 2013)	**Total % of Appari's nutritional content (**Polycarp et. al., 2012)
Fat	9.67 %	0.97 %	0.73 %
Fiber	10 %	1.46 %	2.34 %
Protein	2.99 %	1.67 %	5.73 %
Carbo-hydrates	62.67 %	18.53 %	80.05 %

Table 8 showed that korot high fat is good for the storage of energy for the body compared to ubi and appari. Korot cannot be easily eliminated and digested by our body due to its high fiber content compared to purple ubi and appari. Korot has higher protein compared to ubi which is good for the formation of cells and muscle contraction. Korot is lesser in protein than appari which indicate that korot is less good in the formation of cells compared to appari. Korot is good for the energy to our body and brain fuel compared ubi. Korot is lesser to appari in

carbohydrates content which indicates that korot can give less energy as compared to appari.

CONCLUSIONS

Based on the findings of this study, the researcher formulated the following conclusions: The pH of korot is neutral which is safe to be eaten. The color of korot is white, odorless and coarse texture. The nutritional content of korot is suitable for human food, and korot has a higher fat and fiber content compared to appari and ubi.

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