TRANSPUBLIKA INTERNATIONAL RESEARCH IN EXACT SCIENCES (TIRES)

CHARACTERISTICS OF MORINGA LEAF POWDER (*Moringa oleifera* L.)

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Abstract

Moringa (Moringa oleifera) is a plant that originates from India but is now widely available in several countries in Asia, Europe, and Africa, including Indonesia. This plant can grow in tropical environments with hot, humid, and dry conditions, and in less fertile soil. To facilitate its use in food, Moringa leaves are processed into flour through a drying stage. The nutritional content of Moringa leaves (in dried flour form) can be beneficial for improving nutrition, containing protein equivalent to 9 times that found in yogurt, 15 times the potassium in bananas, 25 times the iron in spinach, 17 times the calcium in milk, 10 times the vitamin A in carrots, and half the vitamin C in oranges. Besides being easy to obtain, Moringa leaves are also an inexpensive ingredient. This research aims to determine the levels of protein, carbohydrates, fat, water, and ash content in the production of flour from Moringa leaves, which will then be tested for the characteristics of the produced Moringa leaf flour. The characteristics of Moringa leaf flour are as follows: it has a protein content of 23.37%, a carbohydrate content of 51.59%, a fat content of 6.74%, a water content of 6.64%, and an ash content of 11.67%.

Keywords: *Moringa Oleifera, Moringa Leaf Flour, Nutritional Content, Protein, Carbohydrates*

1. INTRODUCTION

Moringa (*Moringa oleifera*) is a plant that originated in India, but is now widely available in several countries in Asia, Europe, and Africa, including Indonesia. This plant is able to grow in tropical environments with hot, humid, dry conditions, and poor soil. Moringa is called the most economical plant and contains excellent nutritional value so that it can be used as an alternative in overcoming nutritional problems (Angelina et al., 2021).

Moringa plants are still underutilized as food. In general, people only utilize the leaves of this plant as vegetables. Moringa leaves can be processed into flour, powder, or extracts that can be used to increase nutrients in food products (Angelina et al., 2021).

The *Moringa oleifera* (Moringa) plant has a high nutritional content. Found in the dry tropics, Moringa oleifera is reported to be a rich source of protein and micronutrients. Moringa oleifera leaves can be harvested and dried cheaply with a solar dryer and ground to form a powder that can be stored for use in rural households (Berawi, 2022). The protein content of dried Moringa leaves reached 28.44%; fat 2.74%; carbohydrates 57.01%; fiber 12.63%; and calcium 1600-2200mg (Muliawati et al., 2019).

The benefits and properties of Moringa (Moringa Oleifera) are found in all parts of the plant including leaves, stems, roots and seeds. The high nutritional content makes

Moringa has functional properties for health and overcomes nutritional deficiencies. Therefore, Moringa is called Miracle Tree and Mother's Best Friend. In addition, Moringa has the potential as a raw material in the cosmetic industry, medicine and environmental improvement related to contamination and clean water quality. Bioactive compounds in Moringa cause Moringa to have pharmacological properties. In addition, it has been identified that Moringa leaves contain high antioxidant and antimicrobial properties. (Irwan et al., 2020).

According to Gita & Danuji (2018), the nutritional content of Moringa leaves (in their dried state, made into flour) can be beneficial for nutritional improvement. Moringa leaf flour contains protein equivalent to 9 times that in yogurt, 15 times the potassium in bananas, 25 times the iron in spinach, 17 times the calcium in milk, 10 times the vitamin A in carrots, and half the vitamin C in oranges. Additionally, Moringa leaves are easy to obtain and are also an inexpensive ingredient. To facilitate its use in food, moringa leaves are processed into food preparations in the form of flour through the drying stage. In general, there are various methods of drying moringa leaves, namely indoor drying, sun drying and drying with a drying machine (Paramita et al., 2021).

This study aims to determine the amount of protein, carbohydrate, fat, water, and ash content in making flour from moringa leaves which will then be tested for the characteristics of moringa flour that has been produced.

2. RESEARCH METHODS

2.1. Types of Research

This research is a type of experimental research, namely conducting laboratory tests aimed at analyzing the amount of protein content, carbohydrate content, fat content, water content and ash content resulting from the manufacture of moringa flour.

2.2. Research Sample

The samples used in this study were young moringa leaves/shoots obtained from Meunasah Blang Crum Village, Muara Dua District, Lhokseumawe City, on January 20, 2023. The number of samples used in this study was 1 sample.

2.3. Tools and Materials

The tools used in this research include a *tampah* (a traditional round bamboo tray), bucket, digital scales, an 80-mesh sieve, basin, and blender/crusher. The materials used in this research are Moringa leaves and water.

2.4. Making Moringa Leaf Flour

The manufacturing process begins with washing moringa leaves with running water, then draining, then drying with indirect sunlight (aerated), dried moringa leaves are mashed using a blender and then sifted / sifted using a sieve to obtain a uniform size of moringa leaf powder and become flour, then the resulting moringa leaf flour is weighed using a digital scale.

Figure 1. Dried moringa leaves and moringa leaf flour

2.5. Testing

Testing of protein, carbohydrate, fat, water, and ash content was carried out at the University of Syiah Kuala Laboratory.

a. Protein Content Test

The protein content test is intended to determine the protein content of the product that has been made. Protein is an important food substance for the human body, because it functions as fuel in the body (Nabila, 2017).

b. Carbohydrate Content Test

The carbohydrate content test is intended to determine the carbohydrate content of the product that has been made. Carbohydrates have an important role in determining the characteristics of food ingredients such as taste, texture and color.

c. Fat Content Test

The fat content test is intended to determine the fat content of the product that has been made. Fat serves as a source of flavor and gives a soft texture to the product.

d. Water Content Test

The water content test is intended to determine the water content of the product that has been made. Because the amount of water content in noodle products will affect the texture of the noodles.

e. Water Content Test

The determination of ash content is closely related to the mineral content contained in a material, the purity and cleanliness of the material produced.

3. RESULTS AND DISCUSSION

Drying is a series of processes in flour making, including the making of moringa flour, drying methods can be traditional drying or modern drying using electronic devices. In this research, the drying method used is the traditional way, namely by drying (aerated).

Table 1. Data on the Characteristics of Moringa Leaf Flour

No	Test Type	Results
1.	Protein (%)	23,37
2.	Carbohydrate (%)	51,59
3.	Fat (%)	6,74
4.	Water (%)	6,64
5.	Ash (%)	11,67

The protein content of moringa leaf flour in this study was 23.37%. The high protein content in the experimental results was also found by (Paramita et al., 2021) who suggested that the protein content of moringa leaves increased almost 3 times the content of wet moringa leaves.

The carbohydrate content of moringa leaf flour is 51.59. According to ((Yunita et al., 2022)carbohydrates are the main source of calories for humans, the carbohydrate content detected in moringa flour is 47.96%. This shows that carbohydrates in moringa flour are in the range of previous research results.

The fat content of moringa flour is relatively low at 6.74%. This result is not much different from the research (Kantja et al., 2022) which is with the results of 6.11% fat content produced in moringa flour.

The moisture content of moringa leaf flour in this study was 6.64%. According to (Paramita et al., 2021) the moisture content of fresh Moringa leaves is around 80% and will decrease to 15% if dried in a protected place.

Ash content describes the amount of minerals that do not burn into volatile substances. Mineral or ash content of food is usually determined by ignition or combustion which destroys organic compounds and only minerals remain (Yunita et al., 2022). The results showed that the ash content of moringa flour was 11.67%.

4. CONCLUSION

The process of making moringa leaf flour includes several stages, namely washing moringa leaves with running water, drying with indirect sunlight (aerated) until the leaves are dry and grinding moringa leaves with a blender, sieving 80 mesh, weighing using digital scales. The characteristics of moringa leaf flour are 23.37% protein content, 51.59% carbohydrate content, 6.74% fat content, 6.64% water content and 11.67% ash content.

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