

A SIMPLE AND FEASIBLE APPROACH TO DETERMINE THE FIBER, MOISTURE AND ASH CONTENT IN KONJAC FLOUR PRODUCED FROM LOCAL *AMORPHOPHALLUS KONJAC*

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Abstract: Several experiments have been performed to measure some physical parameters in line with the determination of fiber content in konjac flour obtained from tubers of locally grown *Amorphophallus Konjac* available in Bangladesh. Konjac flour (*Amorphophallus konjac* flour) contains 'Glucomannan' which is water soluble polysaccharide and is being considered as a dietary fiber. The principal aim of this work was to determine the dietary fiber content in konjac flour by separating the fiber through chemical method. The konjac flour was subjected to both acidic and basic hydrolysis resulted in the removal of carbohydrates and all other components from the flour except the fibers. The fiber content determined by this experiment was 6.6 %. The moisture and ash content (dry basis) of the flour were found to be 10.05 % and 4.5 % respectively.

Keywords: Konjac flour, Dietary fiber, Hydrolysis, Moisture content, Ash content.

Introduction

Konjac flour can be obtained from the tubers or roots of various species of *Amorphophallus*. The konjac flour chiefly contains the polysaccharide Konjac glucomannan (KGM) which is a type of neutral heteropolysaccharide. It is a soluble dietary fiber that is similar to pectin in structure and function. Chemically, KGM has β -(1 \rightarrow 4) linked *D*-mannose and *D*-glucose units in a molar ratio of 1.6:1 as the main chain, with branches joined through C-3 of the *D*-glucosyl and *D*-mannosyl residues and a low number of acetyl groups (approximately one acetyl group per 17 residues) at the C-6 position.¹ The chemical structure of KGM is shown in Figure 1. KGM has long been used as a healthy food in south-east Asia. Glucomannan does not remain in the stomach upon eating to digest and it is effective in the absorption of cholesterol and bile acid. Thus it inhibits the intestinal absorption of cholesterol and bile acid. Since it cannot be absorbed with saliva due to pancreatic amylase hydrolysis digestion and absorption, glucomannan is able to offer the following body benefits: lipid-lowering, blood pressure lowering, stomach cleansing abilities, constipation alleviation, prevention of cancer and other functions. KGM and its derivatives have characteristics of low cost, high viscosity, excellent film forming ability, good biocompatibility and biodegradability, as well as gel forming properties. They have been used widely in various fields, such as food and food additives and the pharmaceuticals, biotechnology and fine chemical industries.²⁻⁷

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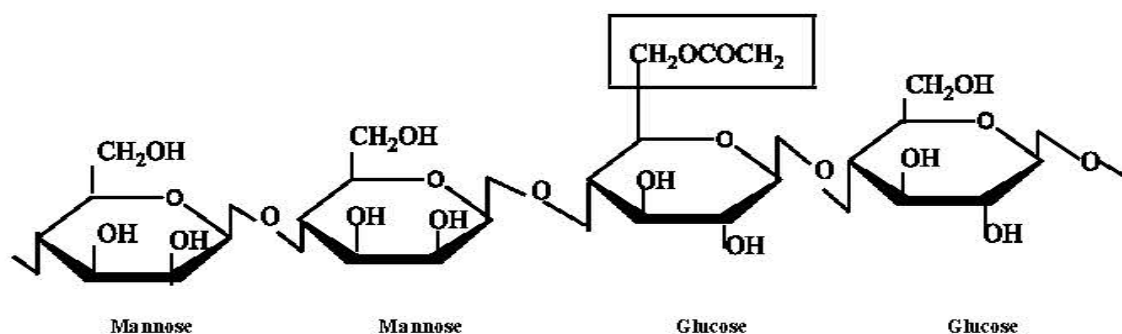


Figure 1. Chemical structure of Konjac Glucomannan



Figure 2. Konjac root

The purpose of this work was to determine fiber, moisture and ash contents etc. in konjac flour which may be useful for further extensive analyses.

Materials and methods

Konjac tubers were procured from local shop in Dhaka, Bangladesh. Cleaning was done manually in order to remove dirt, mud, top buds and roots.

Cleaned konjac tubers were sliced and dried. The dried flakes were ground into powder called 'konjac flour'. The later was then sieved and separated to get konjac fine flour.

Determination of moisture content

About 5 gm. of the sample was weighed and was dried in an oven at $105 \pm 2^\circ\text{C}$ for 4-5 hours. It was then cooled in a desiccator and reweighed. The process of drying, cooling, and weighing at 30 minutes interval was repeated until the difference in two consecutive weighing is less than 1 mg. The lowest weight was recorded.

Determination of pH

After calibrating the pH meter with two standard buffer solutions, the probe of the pH meter was placed in the 10% suspended solution of konjac flour in water. The stable pH reading was taken with continuous stirring of the mixture.

Determination of fiber content

Two stages chemical hydrolysis (acid & base) was applied to determine the fiber content. About 5 gm. of the sample (konjac fine flour) was taken in a beaker containing 1% sulphuric acid and heated at 100°C for 30 minutes. The resultant solution was then filtered and the residue was washed several times with subsequent checking of the filtrate by using litmus paper for the removal of any traces of sulphuric acid. The resultant was then treated with 1% sodium hydroxide in the same manner as done with sulphuric acid. Washed residue was then dried in an oven at 105°C for an hour. Dried content was cooled in a desiccator and weighed.

Determination of ash content

About 2gm. of konjac fine flour sample was weighed accurately into a porcelain crucible. The crucible was placed on a clay pipe triangle and heated first over a low flame till all the material was completely charred, followed by heating in a muffle furnace for about 3-5 hours at about 600°C. It was then cooled in a desiccator and weighed. To ensure completion of ashing, the crucible was again heated in the muffle furnace for half an hour, cooled and reweighed. This is repeated till two consecutive weights are the same, the ash was almost white or greyish white in color.

Results

The data for the analysis showed that produced konjac flour contained 6.60 % (0.33gm. fiber in 5 gm. konjac flour) fiber, 10.05 % moisture and 4.5 % ash. Remaining portion may contains carbohydrates, protein, fat materials etc. The whole experiment was repeated thrice and the average value is shown in the Table-1.

Table-1. Parameters of konjac flour

No	Parameter	Experimental value (average of 3 readings)
01	Fiber	6.60 %
02	Moisture	10.05 %
03	Ash	4.5 %
04	Others	About 78.85%
05	pH	7

Discussion

Values of the present analysis on konjac flour produced from konjac tubers of *Amorphophallus konjac* grown in Bangladesh revealed that konjac flour is a source of fiber. It can be used as raw materials in different food processing. Foods that contain konjac flour could be a wealthy source of dietary fiber. The ash content of konjac flour which was 4.5% is very close to the value available in literature⁹. However baking performance of foods containing ash does not affect its performance⁸, thus this flour could be used in making high quality composite flours for making quality baking products. The moisture content of the flour is important as the higher the moisture content, the lower the amount of dry solids in the flour. Flour specifications usually limit the flour moisture to 14% or less⁸. The moisture content of the flour produced was 10.05% which was not high. Thus there would be no mould problem during storage and delivery of the flour.

Conclusion

Konjac flour obtained from the locally grown *Amorphophallus konjac* by such a simple procedure has the potential to become a new source of dietary fiber. Dietary fiber has a number of health benefits such as it prevents constipation, lowers blood cholesterol and might help us in weight loss. Also it might be an acceptable substitution of wheat flour and beneficial in the production of various food

products. *Amorphophallus konjac* grows rapidly in the hilly area of our country. Production of the konjac flour and its application in various food products along with the preparation of noodles could be of economic benefit to the native population of the areas where *Amorphophallus konjac* can be cultivated.

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