

## Original Review Article

## Nutritional Evaluation of Some Grains (Millet, Guinea-Corn, Wheat and Sorghum) In Bwari Area Council FCT Abuja

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**Abstract:** Four types of grains (millet, sorghum, guinea corn, and wheat) obtained from Bwari Area Council FCT, Abuja, were analyzed for their nutritional quality. They were chemically analyzed using the methods by Association of Analytical Chemist (AOAC). using flame Atomic Absorption Spectrophotometer (Thermo Scientific iCE AAS 3000 series). It was observed that the moisture content for the grains ranges between 6.01 to 9.7%, Crude fibre ranges from 2.54 to 4.95%, crude fat ranges from 2.34 to 4.21%, Ash content ranges from 3.54 to 3.56%, protein ranges from 11.2 to 14.24% and carbohydrate ranges from 64.18 to 25.43%. The grains are good sources of essential elements that are needed for body building and because of its great nutrient potentials, they can be used to formulate nutritious and more cost effective complementary foods as part of effort to improve child nutrition, and reduce morbidity and mortality rates.

**Keywords:** Bwari, Cereals, Proximate analysis, Mineral composition, Market.

### INTRODUCTION

**Bwari** is a town in Federal Capital Territory, Nigeria. The original inhabitants of **Bwari** are the Gbagyi speaking people. Cereals are edible seeds grains grass family, *Gramineae* (Williams P, 2012). Cereals are grown for their highly nutritious edible seeds, which are often referred to as grains. Some cereals have been staple foods both directly for human consumption and indirectly via livestock feed since the beginning of civilization. Cereals are the most important sources of food (FAO 2002), and cereal-based foods are a major source of energy, protein, B-vitamins and minerals for the world population. Generally, cereals are cheap to produce, are easily stored and transported, and do not deteriorate readily if kept dry.

The use of high nutrient dense foodstuffs such as cereals, legumes, vegetables and animal food products to prepare complementary foods for infants and children has been suggested by a number of researchers (Temple *et al.*, 1996; Onofiok and Nnanyelugo, 1998; Nnam, 2002). This class of foodstuff can therefore form a good supplement to cereals. It is however evident that cereals and legumes are low in trace minerals and vitamins (Osagie and Eka, 1998). Fruits and vegetables are valuable sources of

these micronutrients. They could therefore provide significant quantities of the nutrients if properly processed and blended with the staple foods. Animal foods like crayfish, egg and milk have further been suggested as sources of enrichment (Badamosi *et al.*, 1995; Temple *et al.*, 1996; Ladeji *et al.*, 2000).

The study therefore aimed at determining the types of food composition of some of these cereals found in the study area. The result will also provide information on nutritional quality of some of these grains consumed by the people.

### PROCEDURE

#### Sample Collection

Four different types of cereals commonly consumed by the people in the study area: wheat, sorghum, millet, and guinea corn were obtained from Bwari main market, collected in polythene bags and transported to the laboratory for analysis. They were mill to pass through a 500 nm sieve.

Proximate compositions of the whole food barley samples were determined according to the international analysis of official methods. The moisture content (MC) was determined by drying samples in an

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oven at 105°C for 24 hours to obtain %MC. Crude protein percentage was determined using the Kjeldahl method with the SBS 2000 analyzer unit (Food ALYT, Germany) and the percentage nitrogen (%N) obtained was used to calculate the percentage crude protein (%CP) using the relationship: % CP = % N X 6.25. Ether extract percentage was determined using Soxhlet system Tecator-1050 extractor technique. The percentage ash (%) was determined by incinerating the samples in a muffle furnace at 550°C for 4hrs. The ash was cooled in a desiccator and weighed. Crude fiber percentage (% CF) was determined by dilute acid and alkali hydrolysis. Carbohydrate was calculated by difference including fiber.  $CHO\% = 100 -$

$(MC\% + CP\% + Fat\% + Fiber\% + Ash\%)$ , where CP=crude Protein, CHO=Carbohydrate, MC=Moisture Content.

Standard methods by Association of Analytical Chemist (AOAC) were adopted in the analysis of metals.

Ten grams of each of the powdered sample were weighed into a 50 ml beaker was digested using 30 ml of HNO<sub>3</sub>-HClO<sub>4</sub> acid solution (2:1 volume) on a hot digestion system, heated until the samples turn colourless solution. After digestion was completed, the solution of each sample was filtered and transferred into a 50 ml volumetric flask and the solution was diluted to the mark with deionized water.

**RESULT**

Results of the proximate nutrient and mineral element composition of the cereals (millet, Sorghum, Guinea-corn and wheat) are illustrated in the chart below.

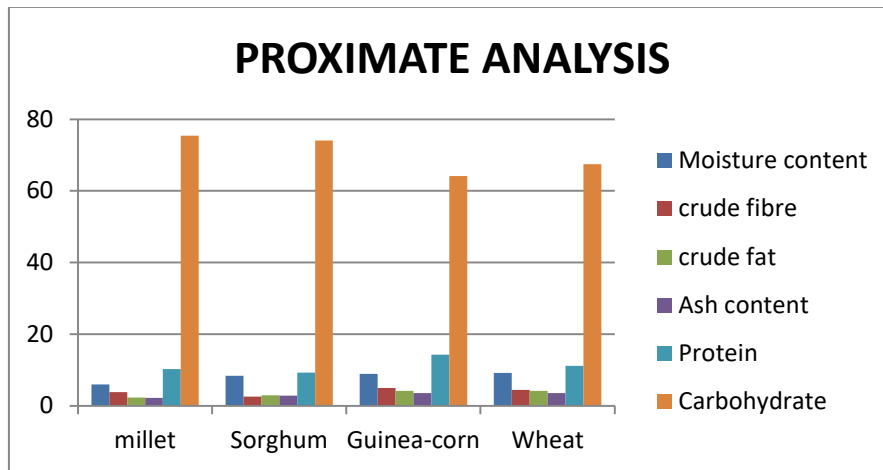


Figure 1: Proximate Analysis Of the grains

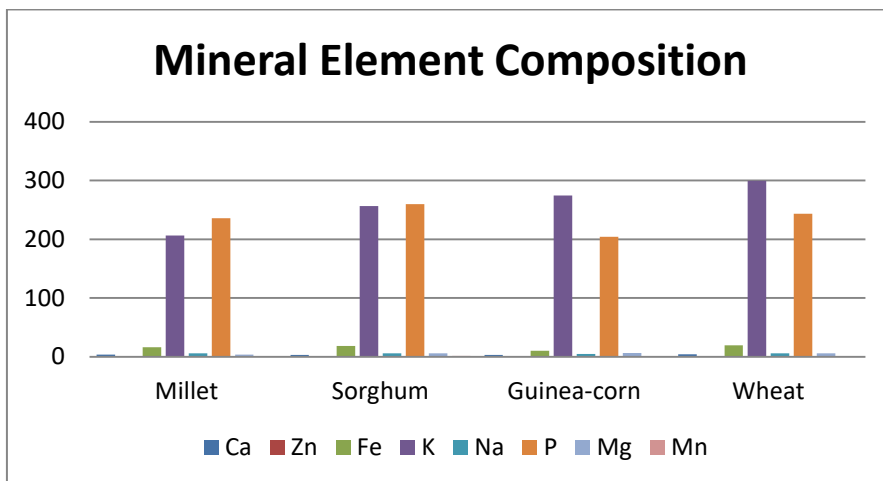


Figure 2: Mineral Composition of the grains

**DISSCUSSION**

The mineral composition of the samples as shown in Table 2. The analysis shows the level of sodium (4.88-6.10mg/100 g), potassium (206.2-299.3 mg/100 g), calcium (3.06-5.16 mg/100 g), magnesium (3.496-6.234 mg/100 g), iron (10.26-19.24 mg/100 g),

and zinc (0.123-0.331 mg/100 g). According to FAO/WHO [FAO/WHO, 2001], minerals such as iron and zinc are low in cereals but the addition of legumes can improve the iron content. Cereals that are particularly rich in iron and calcium will be useful in reducing prevalence of iron deficiency and assist in

bone development in children respectively. Potassium helps maintain fluid balance, and high intake improves blood pressure, according to the American Heart Association (Corleone J, 2011). However, sodium contents in these cereals are low. This is an added advantage due to the direct relationship of sodium intake with hypertension in humans (Okwu and Emenike 2007).

Protein being the body building nutrient was found to be the highest in wheat (11.12%) followed by millet (10.23%) and guinea corn (14.24%) and sorghum (9.27%) implying that the cereals are particularly useful in reducing the prevalence of kwashiorkor. Highest crude fat (oil) content was exhibited by wheat (4.21%) and lowest level of crude fat was observed in sorghum (2.91%). This low percentage of crude fat indicates that prolong storage of the grains may not affect the quality as poor storage causes rancidity (peroxidation of polyunsaturated fatty acid) that would impact unpleasant odour and reduced intake of food and nutrient. In the case of crude fibre, guinea corn has the highest (4.95%) followed by wheat (4.44%), millet (3.81%) and sorghum (2.54%). The high fibre content of these samples can have some biological beneficial effects such as laxative effect on the Gastrointestinal Tract (GIT), increased faecal bulk and reduction in plasma cholesterol level [Okoye, 1992]. The ash content, which is an index of mineral contents, was found in the range of 2.18% to 3.56%. Wheat having the highest value contained a greater proportion of non-endosperm material because ash values indicate the level to which non-endosperm components are present (Evers, 2012). High carbohydrate content of the foods provides the required energy for infants' rapid growth and development. Carbohydrate in this study ranges from 64.18 % in guinea corn and 75.43% in millet. They contribute about 60% of the total energy daily requirement of infants (Dewey, 2002). Starchy staples, usually rich in carbohydrates generally form the base for locally made complementary foods. The high moisture content observed in wheat (9.17%), guinea corn (8.94%), sorghum (8.41%), and millet (6.01%) implies that the infants would consume them in large quantities to meet their nutrient requirements which may be hindered by their small stomach size. The high moisture content also explained the semi-solid nature of the foods, making it suitable for infants. Complementary foods should be low viscous and semi-solid in nature with the consistency increased as the infant gets older (PAHO/WHO, 2003).

## CONCLUSION

In conclusion, it was observed that having these four grains process into the various food gives adequate nutrients in human body which is not just necessary but important. However, the content of carbohydrate has always come up higher than the rest (moisture content, crude fibre, crude fat, Ash content and protein). The implication now is the method of

combination with other food items which will lead to balance diet is of almost importance.

Since these grains are cheap and are good sources of essential minerals that the body needs for its day to day activities, this implies that the grains produced in this area of study are very useful, and is affordable to all class of life.

This study has contributed to the understanding that some staple grains cultivated in Bwari Area Council FCT have great nutrient potentials, and which can be used to formulate nutritious and more cost effective complementary foods as part of effort to improve child nutrition, and reduce morbidity and mortality rates.

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