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# Nutritional potential of lentils (*Lens culinaris* Medik) grown in Northwestern Nigeria

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ABSTRACT

*The nutritional values of Lens culinaris lentil such as moisture, protein, carbohydrate, fat, fiber and ash as well as minerals such as Ca, K, Zn and Mg content were experimentally determined. Proximate composition were determine using standard methods of Association of Official Analytical Chemists (AOAC) and minerals analysis was carried out using Atomic Absorption Spectrophotometer (AAS). The values are as follows; moisture (8.0 %), crude protein (25.35 %), crude fiber (30.00 %), fat (8.33 %), ash (5.00 %) and carbohydrate (23.32%) while that of minerals are; Ca (126.28 mg/kg), Mg (351.21 mg/kg), Zn (4.10 mg/kg) and Fe (9.45 mg/kg). The result obtained reveal the nutritional value of Lens culinaris (lentil) and it's important to serve as nutritional supplement as it is chipper and easy to grow in Nigeria*

*Keywords: Lens culinaris, Proximate analysis, Minerals content and Nutritive value.*

## INTRODUCTION

*Lens culinaris* is predominantly grown in south East Asia and recently introduced into Nigeria particularly in Sokoto amd Zanfara State. The whole of this plant are commonly used in the preparation of thick soup, commonly referred to as 'dhal, seeds can also be fried and seasoned for consumption. the Flour obtained from the seeds used to make soup, stew, and purees and can be mixed with cereals to make bread and cake and as food for infants [1]. It is use in culinary dishes in the Indo-Pakistan Sub-continent and in the Middle East. In the western Countries Lentils may be used in casseroles and as meat substitute in the vegetarian diet. Lentil although referred to as a 'poor man's meat' is equally liked by all socio-economic groups in South-East Asia [2]. Lentils are excellent source of protein and also rich in important vitamins, minerals, soluble and insoluble dietary fiber. The unsaponifiable lipid fraction of lentil is a potential source of bioactive compounds such as phytosteroles squalene and tocopheroles. Lentils contains saponins (triterpene glycosides), which have been implicated in hypercholesterolemia in animal [3], and phenolic compounds with high antioxidant activity [4]; [5]. Beside this, it is a valuable green manure and used as a forage crop Husk, furthermore dried leaves and stems are used as livestock feeds [6]. The aforementioned factors have contributed to place the cultivation of lentils at the same economic level with that of cereals, with additional value that its cultivation is more environmentally friendly as it adds to soil fertility by symbiotic nitrogen fixation [7].

Lentil is the second largest grown legumes crop in Pakistan after chikpear (*Cicer arietinum*) both in quality and quantity [8]. In 2006 lentils was grown on 4, 34000 ha with 259, 000 tones production and average yield of 597kg/ha, [9]. In recent years, Lentil production in Pakistan has increased substantially, this has been brought about by the development of new Lentil cultivation techniques with high yield, [10]. Beside improved adaptation to local\ agroclimatic conditions and better acceptability through improved nutritional status such as fatty acid and Antinutritional factor profiles (ZIA-UL-HAQ, [11]. Additional contributory factors by the expansion of report markets and through a keener appreciation of the benefits of crop

rotation and alternative cropping system. In perspective of nutritional benefit and multicentre attribute of lentils, characterization and compositional analysis of its seed are of great importance. Current food database contain limited or dated compositional data and antioxidant activity by different assay procedures on different lentils cultivars.

This research work is aimed at investigating the proximate composition of *Lens culinaris* (lentils beans) such as protein, Moisture, Carbohydrate, protein, Ash, fat and fiber. As well as selected minerals content such as Calcium (Ca), Magnesium (Mg), Zinc (Zn) and Iron (Fe).

## MATERIALS AND METHOD

### Sample collection

The seeds of *Lens culinaris* cultivars were procured from the Sabon-birni market in Sabon-birni Local government, Sokoto State Nigeria. Seeds of all the varieties were stored in stainless steel containers at 40 $^{o}$C prior to analysis.

### Preparation of sample

The lentils seed were ground into fine powder the ground sample were then examine for moisture content. Sample was prepared according to the standard of the International Union of Pure and Applied Chemist (IUPAC) method (Anonymous, 2000) and analysed on the gas chromatography machine hamadan17A with flame ionization detector. Separation was done on capillary column SP2330, (30 m ≥ 0.32 mm≥ 0.25 µm; Supelco; Bellfonte, Pa USA) Nitrogen was used as carrier gas at flow rate of 0.30 ml/min. Column temperature was programmed from 180 to 220 $^{0}$C at the rate of 3 in/mm. Initial and final temperature was held for 2 and 10 minutes respectively. Injector and detector were kept at 230 and 250 $^{0}$ C respectively. A sample volume of 1.0 µL was injected with the split ratio of 1:75.

### Proximate and Mineral composition

Moisture was determined using oven method, Fat was determined by Soxhlet fat extraction method, crude fiber was determined by acid base digestion, where the decanted solution in the extraction was taken and heated for 30 minutes with 200 mL of a solution containing 1.25 g 0f $H_2SO_4$ per 100 mL of solution, Carbohydrate was calculated by difference (100- fiber, protein, fat and ash) crude fiber by incineration after acid base digestion, using kjeldahl method as described by AOAC (1990) and minerals was determined using Atomic Absorption Spectrophotometer (AAS)Buck scientific 210

RESULTS AND DISCUSSION

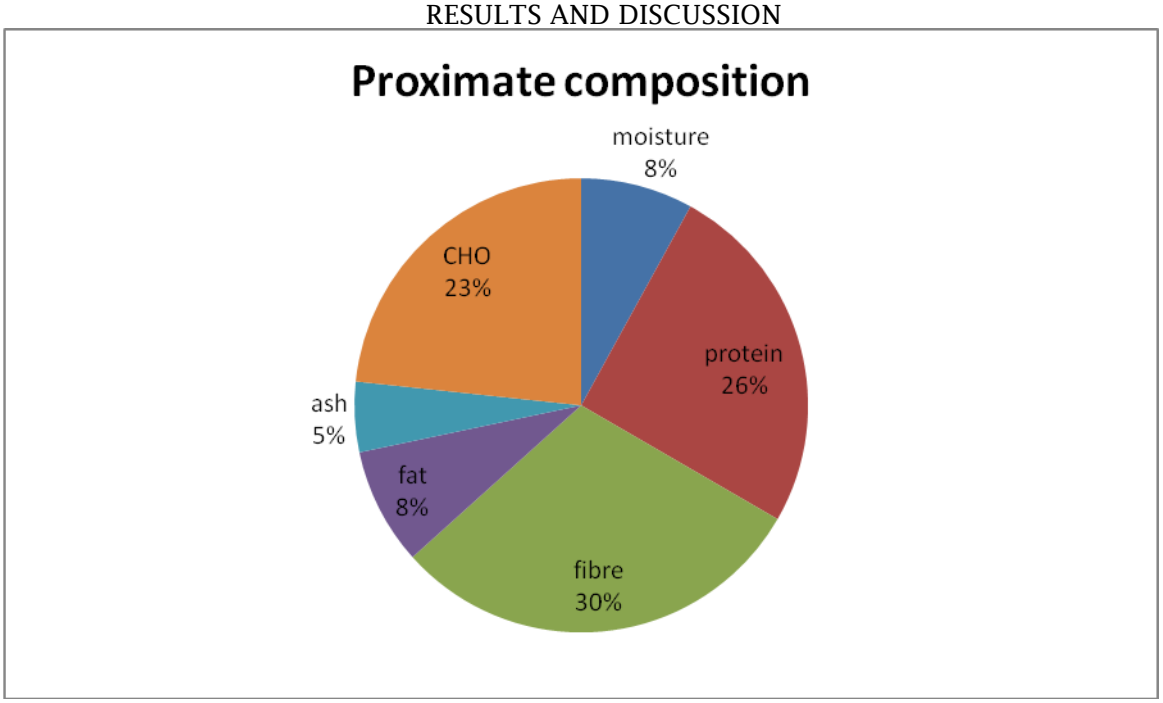


Figure 1.

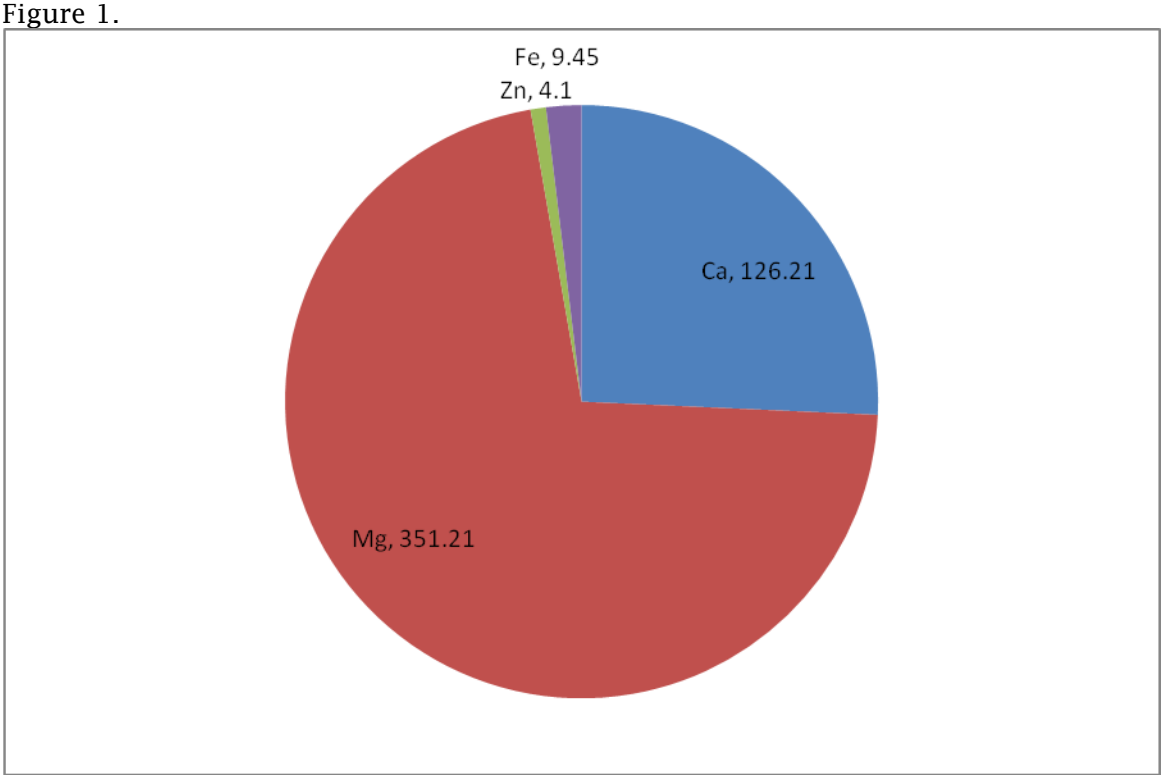


Figure 2.

The finding of the analysis of the proximate composition and selected minerals in *Lens culinaris* are shown and presented in figure 1 and 2 respectively; The result of the proximate composition ranged from 5.0 to 30.0 %, the protein content was 25.35 % and the result is in agreement with protein content that have been reported by several other workers [12]. The crude fiber which refers to the indigestible plant material, the content recorded or observed in the current study was 30 % this findings are in line with values reported previously [13]. Moisture content estimates directly the water content and indirectly the dry

matter content of the sample. It is also an index of storage stability of the flour, the moisture content was found to be 8.0 %. The result obtained in the current study corroborates the recommended moisture content for flour [14]. For Ash content the value obtained was 5.0 %. And this affirms the value reported earlier by [15]. The fat content was found to be 8.33 %, and the result supports the findings reported by [16]. The carbohydrate content was found to be 23.32 %. The result is in line with findings of [17], while it is slightly different from those reported in other cultivars [3]. Variations in protein content can be attributed to different environmental conditions. In addition protein content is also sensitive to rainfall, light intensity, length of growing season, day duration, temperature and agronomic practice. The low content in carbohydrate may be attributed to the elevation of the protein and fat content in the seed [7].

The results for the minerals content are shown in table 2. Several minerals namely Ca, Mg, Fe and Zn were determined with elemental ranged from 4.10 to 351.21 mg/kg and therefore corresponds to those already reported for Lentils in Pakistan by [9]. The result suggest that *Lens Culinaris* if consumed in sufficient amount would contribute greatly towards meeting human nutritional requirement for normal growth and adequate protection against diseases arising from malnutrition. From the result obtained, indicate that *Lens culinaris* has numerous health benefits because it is high in magnesium (Mg) and magnesium plays an important role in the action of hundreds of different enzymes. It also helps the body to metabolize carbohydrate, protein and fat and also helps to synthesize protein from amino acids in the body [11]. Zinc also helps the immune system running by playing a role in the production of white blood cells, which fights off potentially harmful substances and foreign invaders. Iron on the other hand allows the body to build haemoglobin which is the protein center of red blood cells which delivers oxygen to cells and remove carbon dioxide from the body; calcium also is another important mineral which performs a number of basic functions in the body. The body uses 99 % of its calcium to keep the bones and teeth strong, thereby supporting skeletal structure and function, [15]. Thus, consuming *Lens culinaris* will no doubt increase and balance the nutritional value which the body required.

Usually, the proximate composition of plant and crop seed varies depending on cultivars, agrogioclimatological conditions, maturity and collection times of seed, water and fertilizers application as well as acceptability selectively and soaking up of nutrients by plants and crop [8]. The study will pave path for further detailed investigation.

## CONCLUSSION

The proximate composition and selected minerals contents of *Lens culinaris* has been experimentally analyzed. The result indicated that *Lens culinaris* if consumed in sufficient amount would contribute greatly towards meeting human nutritional requirement for normal growth and adequate protection against diseases arising from malnutrition. Also from the result obtained for mineral content, *Lens culinaris* showed significant health benefits due to its elevated amount of magnesium. So consuming *Lens culinaris* will increase and balance the nutritional values which are daily required for the body function.

## RECOMMENDATION

Based on the result obtained for the nutritional potential in lentils the following recommendations are therefore made:

1. There is need for the government to encourage the cultivation of *Lens culinaris* jn order to boost its availability in Nigeria,
2. Furthermore, there is need for continuous assessment of the nutritional status of *Lens culinaris* in Nigeria for the benefit of citizenry.

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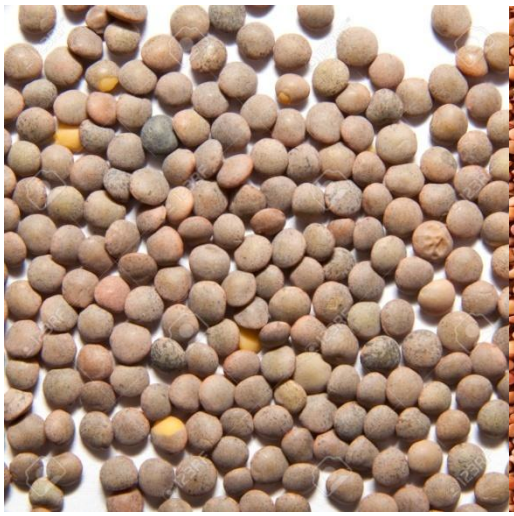


Table 1: Proximate composition of lentil

| Moisture% | Crude protein% | Crude fiber% | Fat % | Ash% | CHO% |
|---|---|---|---|---|---|
| 8.0 | 25.35 | 30.0 | | 8.33 | 5.0 |
| 23.32 | | | | | |

Table 2: Minerals contents in lentils

| Calcium mg/kg | Magnesium mg/kg | Zinc mg/kg | Iron mg/kg |
|---|---|---|---|
| 126.28 | 351.21 | 4.10 | 9.45 |