PROXIMATE, MINERAL AND FATTY ACID COMPOSITIONS OF MELON (*Leganaria sphaerica*) Seed

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ABSTRACT

The chemical compositions of melon seed; *Leganaria sphaerica* were examined. Proximate, mineral and Fatty acid analysis were carried out on the shelled Cucurbit specie, Protein, fat content, ash content and moisture content respectively. The proximate compositions were determined by soxhlet extraction, AOAC, Kjeldhal and other standard procedure. Mineral contents were determined using Atomic Emission Spectrometry, Atomic Absorption Spectrophotometry and Vanado-molybdate method, while anti-nutrient determinations were carried out using standard procedures. The results obtained from proximate analysis showed: moisture content (7.61%), ash content (2.90%), crude protein (30.30%), crude lipid (43.35%), crude fiber (4.10%) and carbohydrate (11.41%). The mineral analysis revealed that potassium have the highest value (7.60mg/100g), followed by phosphorus (3.36mg/100g), zinc (0.04mg/100g) and magnesium (2.00mg/100g), calcium (2.00mg/100g) while iron was the least (0.01mg/100g). The fatty acid composition showed that alpha tocopherol has the highest 84.41, palmitic 58.10, linoleic38.11, oleic 16.23 and stearic was the least 10.00. The results of the study revealed that *Leganaria sphaerica* seed flour is a good source of important nutrients such as fat, protein, fiber and minerals. The high contents of protein and fat make these seeds valuable dietary supplements especially for the less previlage people that cannot afford meat and diary products.

Keywords: Melon, *Leganaria sphaerica,* Proximate, Mineral, Fatty acid.

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INTRODUCTION

Melon seed *Leganaria siceraria* are cucurbit crop that belong to the Cucurbitaceae family which consist of 119 genera and 825 species with fibrous and shallow root system. It is a creeping annual plant and an intercropping plant, mostly grown assubsidiary crops interplanted with early maize and yam in some savannah belt of Nigeria, West African. Melons are major food crops with several varieties which serve as a major food source (Mabalaha et al., 2007). Cucurbit species are among the economically most important vegetable

crops worldwide and are grown in both temperate and tropical regions.
The seed kernels of the Cucurbitaceae family found in markets through out West Africa are an important source of oil used for food. Those oil-rich seeds are found in a range of genera of which the most important are Citrullus (watermelon), Cucurbita (pumpkin), Lagenaria (bottle gourd), Cucumis (melon), Telfairia (fluted pumpkin) and Luffa (sponge gourd) respectively (Schipper 2002). The seeds are obtained either in shelled or unshelled forms in West African markets and are used greatly in West African cookery. The melon seeds can be milled and used to prepare a popular egusi soup where it acts as a food thickener. It can also be fermented to produce ogiri and used as condiments to season or flavor soup (Yusuf, Adewuyi & Lasisi, 2006 Achinewu, 1987). The fruits vary much in size and seeds can be removed and roasted as an edible commodity (Soliman, El Sawy, Fadel, Osman, & Gad, 1985), or as fried cake prepared from milled seeds (Okigbo, 1984; Odunfa, 1981). Egusi is very high in nutritional value. It is rich in protein, fat and vitamins A, B1, B2 and C.It is made up of 30 – 40 % protein, and about the same proportion of oil. The oil is cholesterol free. In terms of vitamins, it contains alpha-tocopherol, a component of vitamin E. It also contains palmitic, stearic, linoleic and oleic acids and very small amount of carbohydrate and calcium. 78 % of the fat is unsaturated fatty acid, which is protective to the heart. The alpha-tocopherol found in egusi is a component of vitamin E that helps in maintaining smooth young skin and good fertility. It also contains palmitic, stearic, linoleic and oleic acids important in protecting the heart. The egusi can also be an important supplementary baby food, helping prevent malnutrition. Blending the seeds with water and honey produces a milky liquid that can be used as formula if breast milk is unavailable. The egusi plant is also easy to grow. It is extremely resilient to pests and diseases and because it blankets the ground as it grows, it can help suppress weeds. Because of this, farmers often intercrop egusi with other crops, including sorghum, cassava, coffee, cotton, maize, or bananas. Mature egusi melons can also remain in the field for a long time without rotting, so crop loss and waste is rare. And once the seeds are harvested, they can be a reliable year-round food source because they store well.

MATERIALS AND METHODS

Collection of melon seeds

The sample was collected from farmer's field in ilodaada, Ondo state in september 2015. Ripe fruits were cut and the seeds separated. Seeds were cleaned using filter paper to remove the pulp and air-dried at room temperature. The dried seeds were ground to flour using a grinder, the flour was then packed in a clean dry plastic containers, sealed and stored at 10°C until the time for analysis.

Mineral analysis

Determination of mineral elements was done according to the method of AOAC (1990) 2.0g of the sample was ashed in a furnace at 550°C for 18hrs and the ash dissolved in 10ml of 0.1M HCl, filtered into a 100ml volumetric flask and made up to mark with distilled H20. This was used to determine the mineral content by the use of Atomic Absorption Spectrophotometer (AAS) using prepared standards of the different mineral elements to be analyzed.

Proximate composition

The moisture content and the fat content were determined according to the procedures described by AOAC (2000) while the ash content, crude fibre and crude protein were estimated using procedures described by Pearson,(1979). The nitrogen was estimated based on the Kjeldhal procedure and the percentage nitrogen was converted to crude protein by multiplying by a factor of 6.25 while carbohydrate was determined by simple difference as follows: Carbohydrate = 100 - (%Ash + %Crude protein + %Crude fat + %Crude fibre). Energy value was obtained by the summation after multiplying percentage carbohydrate, protein and fat by factors of 4, 4 and 9 respectively and expressed in Kcal/100g. All analyses were carried out in triplicates. All the proximate values were reported in percentage %.

Tocopherol Analysis

Determination of tocopherols (TOC) was done according to the method of American Oil Chemists Society (2003), a solution of 250 mg of oil sample in 25 ml hexane were directly used for analysis. The HPLC analysis was conducted using a Merck-Hitachi low-pressure system fitted pump, a Merck-Hitachi F-1000 Fluorescence Spectro- photometer (detector wavelengths 295 nm and 330 nm for em- mision) and a D-2500 integration system. A sample in volume of 4 µL was injected onto a normal phase silica column (HPLC mode: Shimadzu, column packing size: 150 cm x 4.6 mm). The column was eluted with a mobile phase of isopropanol : hexane (98 : 2). The flow rate was 1.0 ml per min and the absorption wavelength of 295 nm. Identification of the peaks for α tocopherol was done using pure α tocopherol standards. The tocopherol content was expressed as ppm.

Fatty Acid Composition

Fatty acid methyl esters (FAME) were prepared as described by Joseph and Ackman (1992). FAMEs were transferred into a separating funnel and 4 mL of hexane added. The contents were shaken vigorously at room temperature and left to stand. The hexane layer was collected and the aqueous layer was extracted again. The hexane fractions obtained were mixed together and washed with 3-4 por- tions of distilled water to remove acid present. Anhydrous sodium sulphate was added for dehydration purposes. The filtrate obtained was bubbled in nitrogen gas to concentrate it then about 0.5 mL was injected into the GC. The standard solutions were also injected and the procedure was repeated for all the samples, AOAC (2000).

RESULTS AND DISCUSSION

Proximate Analysis

The proximate composition of *Leganaria sphaerica* seed flour is shown in Table 1. The moisture content was 7.61% which is a little higher than what were reported for varieties of melon seeds; 4.78- 5.21% (Abiodun and Adeleke ,2010) and pumpkin seeds; 5.00% (Elinge *et al.* ,2012) , but lower than those reported for mango seeds; 12.50% Etong, et al. ,2013) and gardenia aqualla seeds; 49% (Dagogo *et al.*, 2011). The low moisture content in the melon will help to improve its lifespan. The ash content was 2.90% which is close to that reported for melon seed varieties; 3.35- 4.89% (Elinge *et al.* ,2012), but lower to that reported for melon seeds; 6.84-6.99% by (Bankole et al., 2005) . The high ash content in the

sample indicates the percentage of inorganic mineral elements present in melon seeds. High mineral elements in foods enhances growth and development, and also catalyses metabolic processes in human body. The crude fibre content was 4.10%, which is higher than those reported for four varieties of melon seeds, 1.66-2.16%(Abiodun and Adeleke, 2010) and Mangifera indica kernels, 2.22-3.95% cultivars grown in Western parts of Nigeria (Kayode *et al.*,2011), but a little lower than those of ripe and unripe Carica papaya seeds,7.85% and 7.40%; ripe and unripe Citrus sinensis seeds, 8.05% and 7.40% respectively (Abulude, 2000). It is believed that fibre reduces the level of cholesterol in human blood and decreases the likelihood of different cancers. The fat content was found to be 43.35% which is in agreement with that reported for four varieties of melon seeds, 40.26-45.21% (Abiodun and Adeleke ,2010) but lower than those reported for citrullus vulgarise 55.00% and Citrullus lanatus seeds from Southern Nigeria, 57.26%(Edidiong and Eduok, 2013) and Colocynthis citrullus seeds, 53.85% (Bankole et al., 2005) . The high value of fat in the melon seeds is the reason for it being referred to as the oils seed. Fat is very vital since it provides the body with tremendous amount of energy. The protein content is 30.30% which is comparable to those reported for Colocynthis citrullus seeds 28.63% (Bankole *et al.*, 2005) and Cucurbitapepo L seeds, 27.48% (Elinge *et al.*2012), thus *Leganaria siceraria* seeds could provide the necessary protein requirement for the rural populace. Carbohydrate value of the sample was found to be very low, 11.41%. From this result, melon seeds cannot be considered a good source of carbohydrate compared with other sources such as cereals which contain 65-75% carbohydrate.

Table 1: Proximate composition of Lagneria sphaerica seed flour.

Composition	% weight
Moisture	7.61
Ash	2.90
Fat	43.35
Crude fibre	4.10
Crude protein	30.30
Carbohydrate	11.41

Mineral Composition

The mineral composition of *Leganaria sphaerica* seed flour is shown in Table 2. The concentration of calcium was found to be 2.00mg/100g, calcium is a constituent of bones and helps blood to clot and the nerves to convey messages. The concentration of phosphorus in melon seeds was estimated as 3.36mg/100g. This value is very low in comparison with the phosphorus value of 47.68mg/100g reported for pumpkin

Fatty acid composition

The result showed that *Leganaria sphaerica* seeds contains 38.11 linoleic ,16.23 oleic, 58.10 palmitic and10.00 stearic acid .The linoleic acid content is similar to those reported for corn, cottonseed, sunflower, soya bean and sesame oils (linoleic acid is the most abundant) Fokou et al. (2009). Murkovic, et al (2004) reported 35.6-60.8% linoleic acid, 21.0-46.9% oleic acid, 9.5-14.5% palmitic acid, 3.1-7.4% stearic acid for styrian pumpkin seed oil. The nutritional value of linoleic acid is due to its metabolism at tissue levels which is precursor to hormones like prostaglandings, which activity includes constriction of smooth vesssels and lowering of blood pressure . The alpha-tocopherol is a component of vitamin E that helps in maintaining smooth young skin and good fertility. It also contains palmitic, stearic, linoleic and oleic acids important in protecting the heart.

Table 3: Fatty acid composition of *Lagneria sphaerica* seed flour.

Fatty acid	Composition%
Linoleic	38.11
Oleic	16.23
Palmitic	58.10
Stearic	10.00
Alfatocopherol	84.41

CONCLUSION

Leganaria spharica seeds are rich in oil, fibre and protein. The fatty acid profile, is similar to that from sesame, sunflower and soybean oils that are rich in polyunsaturated fatty acids. The seed oil can be considered as a new and valuable source of edible oil. The results of the study revealed that *Leganaria sphaerica* seed flour is a good source of important nutrients such as fat, protein and fiber. The high contents of protein and fat make these seeds valuable dietary supplements especially for the less previlage people that cannot afford meat and diary products.

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