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Proximate, Mineral and Anti-Nutrient Evaluation of Pumpkin Pulp *(Cucurbita Pepo)*

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Abstract: *Proximate, minerals and anti-nutritional concentration of Pumpkin pulp (Cucurbita pepo) were investigated using standard analytical methods as stipulated by AOAC (1990), Agte el al; (1995), Chapman and Pratt, (1961), Kadhakrishna and Sivaprasad (1980), Nelson (1968),Day and underwood, (1986). The proximate composition (%) showed that pumpkin pulp contained Total ash 15.988 ± 0.10, Moisture 0.532 ± 0.10, Fat extract 2.300 ± 0.01 Crude fibre 11.463 ± 0.10, Crude protein 3.070 ± 0.01 and Carbohydrate by difference 66.647 ± 0.01% .The mineral element were Mg, Ca, Mn, Fe, Cu, Pb, Ni and P with values of 189.91 ± 0.2, 179.01 ± 0.2, 0.502 ± 0.1, 1.370 ± 0.1, 3.910 ± 0.1, 0.290 ± 0.1, 0.110 ± o.1 and 11.83 ± 0.2 mg/kg respectively also Na and K with values of 159.01 ± 0.2 and K 160.31 ± 0.1 mg/l00kg were estimated using Flame Emission spectrophotometer. The anti-nutritional analysis of pumpkin pulp gives Phytates 0.618 ± 0.100mgl100kg, Oxalates 16.297 ± 0.100 mg/100kg and Tannins 0.358 ± 0.100 mg/100kg. The results obtained above goes a long way to proof that pumpkin pulp is highly nutritious and at the same time can be used as food formulation for infant due to its nutritional composition.*

Key Words: *Cucurbita pepo, cucurbitaceae, pumpkin pulp, proximate analysis, mineral*

I. Introduction:

The word pumpkin locally called "Elegede or Agbeje" in Yoruba land (Western part of Nigeria) originates from the pepon which is Greek for "large melon." The French adapted this word pompon, which the British changed to Pumpion and later the American Colonists changed it to the word we use today "pumpkin". The origin of pumpkin is not known, although pumpkins are said to have originated in North America. The oldest evidence, related to pumpkin seeds dated between 5500 and 7000 BC were found in Mexico. Pumpkins are squash-like fruit that range in size from less than 1 pound to over 1,000 pounds (Michael *el al* 2000). Since some squash share the same botanical classification as pumpkins, the names are frequently used interchangeably. In general, pumpkins have stems which are more rigid, prickly and angular than squash stem which are generally softer, more rounded and more flared where joined to the fruit. Pumpkins are grown all round the world for a variety of reasons ranging from agricultural purposes (such as animal feed) to commercial and ornamental (Wolford *et al.,* 2008). Pumpkins generally weigh 9 – 18 lbs (4-8kg) with the largest of the species (*Cucurbita maxma)* which is capable of reaching a weight of over 75 lbs (34kg).The pumpkin varies greatly in shape, ranging from oblate through oblong. The rind is smooth and usually light ribbed. Although pumpkins are usually orange or yellow, some fruits are dark green, orange yellow, white red gray as the case may be. They were cultivated from the Hubbard squash genotype, crossed with Kabocha pumpkin types by enthusiast farmers through intermittent effort since the early 19th century. Giant pumpkin is the fruit of the species *Cucurbita pepo, Cucurbita mixta, Cucurbita maxima or Cucurbita moschata,* which are all of the genus Cucurbita and the family cucurbitaceae.

The aims of the present studies are to determine the proximate, mineral and anti-nutritional composition of pumpkin pulp *(Cucurbita pepo)* and the importance to humanity.

II. Materials and Methods

Sample collection and treatment

Pumpkins, locally called Elegede or Agbeje that is used for this research work was obtained at ojuelegba market in Iree, Osun State, Nigeria. The seeds were removed from the pulp using knife, then the pulp were washed thoroughly with distilled water and then dried in an oven at 60^0C for 24 hours and were powdered with amechanical grinder, packaged and kept for further analysis.

III. Methodology

The sample was subjected to proximate analysis (moisture, ash, crude protein, crude fat, and crude fibre, using the method of AOAC (1990). Carbohydrate content was determined by difference. The minerals; zinc, iron, cobalt, magnesium, calcium, copper manganese, lead, were determined by Atomic Absorption Spectrophotometry (Agte *el al;* 1995). AAS (Perkin, Elmer, Model 2380, USA). Sodium and potassium were

determined using Flame Photometry (Chapman and Pratt, 1961). Phosphorus was determined by the Vanodo-Molybdate method (AOAC, 1990). Tannins was determined by the method of Kadhakrishna and Sivaprasad (1980), Phytic phosphorus was determined by the method described by Nelson (1968) and oxalate was determined according to the procedure of (Day and underwood, 1986).

IV. Results And Discussions

Table 1: Proximate Composition of Pumpkin Pulp

Parameter determined	Composition (%)
Total ash	15.988 ± 0.10
Moisture content	0.532 ± 0.10
Fat ether extract	2.300 ± 0.10
Crude fibre	11.463 ± 0.10
Crude protein	3.070 ± 0.10
Carbohydrate by difference*	66.647 ± 0.10

Results of triplicate determinations ±S.D

***Calculated value**

Table 1 showed the proximate composition of pumpkin pulp with the moisture content of 0.532%, a value considered lower to 3.92 ±0.01% reported for *Vitellaria paradoxa* seed by Amoo and Adebisi (2009).The low value obtained is highly desirable in that the shelf life of the sample would be long and it will prevent microbial attack. The ash content of the sample (15.988%) was higher than the value reported for watermelon pulp of 0.21 ±0.02 by Fila *et al* (2013). Higher than 8.05±0.04% reported for *Solanum nigrum* by Akubugwo *et al.*,(2007). The higher ash content of the sample was an indication of high inorganic matters since ash content indicates the levels of inorganic matter in any sample (Adeyeye and Ajewole, 1992). The crude Fibre content of pumpkin pulp was 11.463 ± 0.10%, this value was compared with Ginger 16.36 ± 0.03 (Javid *et al*, 2010).The value obtained was desirable since a diet low in fiber is undesirable as it could cause constipation and such diets have been associated with disease of colon like pile, Hemorrholds ,appendicitis and even cancer (Johns, 1987). However, the value could lead to lower digestibility and overall decrease in nutrient utilization since fibre slows down the rate at which nutrients enter the blood stream (Ludington and DiehI, 2005). The value obtained could also help to smooth out the ups and downs of blood sugars levels and provides more consistent energy throughout the day.

The protein content was found to be 3.070 ± 0.10% a value considered lower than 9.08 ±0.02% reported for *Baphia nitida* by Amoo and Adebisi (2009). It can be deduced that pumpkin has a considerable range of protein which help in tissue building. The crude Fat content of the pumpkin pulp observed in the study was 2.3 ± 0.019% which was higher than 1.29±0.1% for carica papaya by Oloyede (2005) from the obtained values. Pumpkin pulp is not a rich source of oil and therefore be recommended to patient whom high fats content is a risk factor. Carbohydrate content was to be 66.64 ± 0.10%, compared to the energy content of value of 43.54 ± 0.19% for *S.nigrum* (Akubugwo *et al.*, 2007). Pumpkin pulp is a very good source of energy.

Table: Mineral Composition of Pumpkin Pulp mg/kg

Parameter determined	Mean value ± S.D
Na	159.010 ± 0.20
K	160.310 ± 0.11
Mg	189.910 ± 0.30
Ca	179.010 ± 0.10
Mn	0.502 ± 0.10
Fe	1.370 ± 0.40
Cu	3.910 ± 0.12
Ni	0.290 ± 0.10
P	11.830 ± 0.10
Pb	0.290 ± 0.10

Results of triplicate determinations ±S.D

The Mineral element analysis as shown in Table 2 indicated that pumpkin pulp contained high level of the analyzed mineral elements of Mn, Fe, Cu, Pb, Ni and P whose values were 0.502 ± 0.02, 1.370 ± 0.10, 3.910 ± 0.10, 0.290 ± 0.01, 0.110 ± 0.01 and 11.83 ± 0.02 mg/L respectively and Na, K, Mg and Ca were 159.01 ± 0.02, 160.31± 0.10, 189.91 ± 020 and 179.01 ± 0.2 mg/100g respectively. The level of lead Pb is within the range of WHO acceptable daily intake of 0.21 – 0.25 mg/day (FAO, 1993). Pumpkin pulp is not detrimental to health. The range of Ni obtained in this study was lower than 0.05 – 5 mg/Kg/reported for plant food by the National Academy of sciences. This shows that the level of Ni in the sample is not hazardous to human health. The level of copper is within the acceptable range set by WHO of 2 – 5 mg intake per day (WHO, 1998, Cantilli

et al, 1994). It shows that pumpkin pulp is not detrimental to health. The level of iron (Fe) outlined by WHO is about 10 – 30 mg/day (Cantill *et al*, 1994).Pumpkin pulp is not up to the recommended value, although not very low to be recommended for consumption since lack of iron on the body results to fewerned corpuscles as it is the chief constituent of hemoglobin. Potassium is an essential nutrient and has an important role in the synthesis of amino acid and protein (Malik, 1982). Calcium and Magnesium play significant roles in photosynthesis, carbohydrate metabolism, nucleic acids and binding agents of cell wall (Russel, 1973). Calcium assists in teeth development (Brody, 1994). Magnesium is an essential mineral for enzyme activity and like Calcium and Chloride, Magnesium also plays a role in regulating the acid alkaline balance in the body. Phosphorus is needed for bone growth, kidney function and cell growth. It also plays a role in maintaining the body acid alkaline balance. (Fallon, 2001).

Table 3: Anti nutrient Composition of Pumpkin Pulp

Parameter determined	Composition mg/kg
Phytates	0.618 ± 0.110
Oxalates	16.297 ± 0.200
Tannins	0.358 ± 0.100

Results of triplicate determinations ±S.D

The result of the anti-nutritional analysis (mg/100g) in Table 3 revealed the values for phytates 0.618 ± 0.100, Tannins 0.358 ± 0.100 and Oxalates 16.297± 0.100. The values obtained will make the detected nutrient in the sample available for full utilization by the body for both its metabolic and physiological activities. The level of tannins in the sample was very low and so could limit the absorption of the vital nutrients i.e. iron and protein (Lewis and Theodore, 1996)

V. Conclusion

From all indications, it could be concluded that pumpkin, (*Cucurbita pepo*) pulp is a good supplement of protein, carbohydrate and fat with low anti nutrient. This coupled with high mineral content which is advantageous for man and animals. From the results of this research work and the conclusion drawn therefrom, I wish to recommend the use of pumpkin pulp as a food additive so as to enhance the exploitation of the full potentials of the plant.

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