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Comparative Nutritional values of Selected Curcubit Seeds in Minna, Niger State, Nigeria

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Abstract: *The proximate and anti-nutritional contents of the seeds of the selected curcubits were determined. The samples were collected from twenty different farms from the suburbs of Minna. They were treated appropriately for analysis using standard methods. The seeds had high crude protein (21.11±0.83 - 42.65±1.60%) and total lipid (36.00±1.30 - 53.20±1.93) contents but low crude fibre (1.50±0.01-5.00±0.03%). The moisture contents ranged from 3.10±0.20 to 7.00±1.05%. The values of anti-nutritional factors obtained ranged from 0.06±0.01 to 0.29±0.05% for the cyanide and 0.19±0.01 to 0.75±0.03% for the phytates. The oxalate contents ranged from 6.77±0.07 to 12.10±0.13% while the saponins ranged from 9.60±0.07 to 13.30±0.09%. Considering the levels of anti-nutritional contents of these seeds, their consumption may have no significant toxic effect on humans or his animals.*

Key words*: suburb, aphideus refupes, proximate, curcubit seeds, antinutritional factors.*

I. Introduction

In Nigeria, as in other parts of the world, fruits are mostly consumed during dry season and early part of the raining season [1]. Among these fruits are the cucurbits which are climbing or trailing plants of the gourd family with large, fleshy tough or hard skinned fruits. They are native to the tropical or subtropical regions and they include cucumber, watermelon and squash which all belongs the family cucurbitaceae.

Considerable interest, over the years, has been generated by studies on the chemical compositions of these and other wild plants and many of them have been found to have high nutritional values [2]. However, some may contain toxins and anti-nutritional factors which when in large quantities can be harmful to the body and even interfere with nutrient utilization. Thus accumulation of these factors in human body may cause anaemia, haemolysis of red blood cells and retardation of the actions of digestive enzymes [2]. This study therefore, sought to investigate the presence of some of these anti-nutritional factors and the nutritive values of the selected cucurbits in order to suggest their possible use by man and his animals. This is because most of their seeds are just allowed to waste after the harvest of the gourds for their primary uses.

II. Materials and Method

Sample Collection and Treatment

Fresh Lagenaria siceneria, Cucumis melo L, Cucurbit maschata and Citrulus lanatus gourds were obtained from twenty different farms in the suburb of Minna, Nigeria. The seeds were extracted washed with plenty of water and cracked to remove the kernels inside. The kernels were air-dried and pounded into fine powder using porcelain mortar and pestle. These were then sieved with 1mm sieves [3]. The ground and sieved samples were put in airtight bottles for further use. All the chemicals used for the analysis were AR grade manufactured by M&B and BDH Chemicals of England.

Analysis

The moisture and crude protein contents of the samples were determined using standard methods of AOAC [4]. The ash contents of the samples were determined according to the method described by Ceirwyn [5]. The crude fibre and total lipid were quantified according to methods described by AOAC [4]. The oxalate levels in the samples were determined according to the method described by Day and Underwood [6] while the phytate contents were determined by the method of Reddy et al., [7]. The saponin and cyanide contents were determined according to the methods described in AOAC [4].

III. Results and Discussion

Table 1: Proximate composition (%) of the selected cucurbit seeds

Parameter (%)	Cucumis Melo	Citrulus Lanatus	Cucurata Muschata	Lagenena siceveria
Moisture	4.50±0.30^{bc}	3.10±0.20^{a}	7.00±1.05^{d}	4.60±0.20^{bc}
Crude protein	36.53±1.44^{c}	21.11±0.83^{a}	34.79±1.37^{b}	42.65±1.60^{d}
Total Lipids	53.20±1.93^{d}	36.20±1.31^{ab}	36.00±1.30^{ab}	40.20±1.67^{c}
Crude fibre	1.5±0.01^{ab}	5.00±0.03^{d}	1.85±1.12^{ab}	3.50±0.02^{c}
Ash	2.00±0.01^{ab}	4.00±0.03^{c}	5.00±0.03^{d}	2.00±0.01^{ab}

Results are presented as means of triplicate determinations ± S.D.

Table 2: Phytochemical composition (%) of the selected cucurbit seeds

Parameter (%)	Cucumis Melo	Citrulus Lanatus	Cucurata muschata	Lagenena siceveria
Saponin	12.70±0.09^{b}	9.60±0.07^{a}	12.90±0.09^{b}	13.30±0.09^{c}
Phytate	0.19±0.01^{a}	0.75±0.03^{d}	0.32±0.013^{b}	0.44±0.002^{c}
Oxalate	8.62±0.09^{c}	6.77±0.07^{ab}	6.83±0.07^{ab}	12.10±0.13^{d}
Cyanide	0.09±0.01^{c}	0.06±0.01^{ab}	0.06±0.01^{ab}	0.29±0.05^{d}

Results are presented as means of triplicate determinations ± S.D.

The moisture contents of the cucurbit seeds analyzed as shown in Table 1 were between 3.10±0.2 (Citrulus lanatus) and 7.00±1.05 (Cucurbita muschata). Higher moisture contents will make the cucurbit seeds more susceptible to bacterial attack. Thus these low moisture values of the samples gave them good shelf lives [3].

The lipid contents of the samples ranged from 36.00±1.30 (C. mustchata) - 53.20±1.93% (C. melo) which indicated that C. melo had the highest lipid followed by L. siceveria while C. lanatus and C. mustchata had the lowest values. These values were higher than the 0.74% reported for I. batatas leaves by Asibey-Berko and Taiye [8]. Since lipids provide energy and transport fat soluble vitamins like vitamins A, O, E and K [9], these seeds can serve as good sources of fats for these purposes. In addition, they can provide supplementary dietary fat needed in feeds formulation for animal husbandry.

In this work the highest ash content of 5.00±0.03% was obtained for C. muschata which was lower than the 12.38±1.06% reported for M. oleifera by Idris et al. [3] and the 6.70% reported for and Adenanthera povonina seeds by Ogbuagu et al. [10]. However, the seeds of these cucurbits could serve as a fair source of mineral elements useful, particularly, for children, pregnant and lactating women.

The highest crude protein value of 42.65±1.60% found for L. sicereria was far higher than the 6.30±0.27% reported for I. aquatica Forsk by Umar et al. [11] and the 26.46% reported for Adenanthera povonina seed by Ogbuagu et al, [10]. In fact, only Citrulus lanatus with the lowest crude protein value (21.11±0.83% for Citrulus Lanatus) in this work had a lower value than that reported by Ogbuagu et al. [10] for African seed. Since dietary proteins are required for the synthesis of new cells, repair of worn out tissues, enzymes, hormones, antibodies and other substances necessary for the healthy functioning and development of the body [12] and for the treatment of protein energy malnutrition [13], the seeds of these cucurbits could serve as a good source of protein for growing children, pregnant and nursing mothers as well as all those at risk of protein deficiency due to diseases.

The crude fibre contents of the samples which ranged from 1.50±0.01 (C. melo) to 5.00±0.03% (C. lanatus) were all lower than the 11.80% reported for cowpea by Ene-Obong and Cornorale [14]. Thus although the fibre content of a given food influences its metabolism in the gastro intestinal tract thereby reducing such adverse conditions as appendicitis, haemorrhoids and too much blood sugar [15], these seeds may not be as good sources of dietary fibre as cowpea.

Table 2 shows the results of anti-nutritional contents of the selected cucurbit seeds in this work. The highest saponin content of 13.30±0.09% recorded for L. sicereria was higher than the 2.16% reported for A. povonina seed by Ogbuagu et al. [10]. All other samples in this work also had higher values than the one reported for the A. povonina seed above.

Since saponins are generally used in the treatment of cardiovascular diseases [16], L. sicereria could also serve as a good source of this phytochemical which can be used as remedy for these diseases as all the samples had fairly high amounts of these compounds. The phytate content of Citrulus lanatus was 0.75±0.03% (for Citrulus Lanatus) which was the highest value obtained in this work. Phytate is one of the antinutritional factors commonly found in plant sources. The cyanide contents of the samples analyzed were within the range of 0.06±0.01 and 0.29±0.05%. The consumption of these samples may not pose any toxicity problem as these values are lower than the toxic cyanide levels for an adult human being as reported by Conn [17].

Oxalate is known to combine with some useful metallic elements in diets thus causing them to be deposited in solid forms. This makes them unavailable for adsorption in human system [18]. Oxalate can bind to

calcium present in the food thereby rendering calcium unavailable for normal physiological and biochemical roles such as the maintenance of strong bone, teeth, nerve impulse transmission and cofactors in enzymatic reactions as well as clotting factors in the blood [19]. The highest oxalate contents of 12.10±0.13% was recorded for L. sicereneria followed by 8.62±0.09% for C. melo seeds and 6.83±0.07% for C. moschata seeds while C. lanatus had a value of 6.77±0.07%. The oxalate contents obtained from this work suggested that, they could be safe for consumption as far as their oxalate contents were concerned since they all fell below the lethal dose limit.

IV. Conclusion

This study revealed that C. melo, C. lanatus, L. seceneria and C. moschata seeds have the potentials of serving as good sources of protein and lipids for both man and his animals. Also, all the seed samples had low phytate and cyanide levels which give them a good advantage as alternative cheap protein sources for man and his animals. Considering the relatively high saponins and oxalate levels in the samples, one may assume that these seeds may be hazardous to human but it has not been locally noticed that the consumption of these seeds has caused any harm either man or his animals.

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