COMPARATIVE NUTRITIONAL AND ANTI–NUTRITIONAL COMPOSITION IN CUCUMBER (*CUCUMIS SATIVUS*) AND SPONGE GOURD (*LUFFA AEGYPTICA*) SEED MEALS.

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ABSTRACT

The proximate, anti-nutrient and amino acid concentrations of *Luffa aegyptica* and *Cucumis sativus* decorticated seed meals were determined using methods described by Benitez (1989); Anhwange *et al*. (2004) and AOAC (2006). Results of the investigation revealed the moisture content 3.75-4.43%, protein (32.18-33.92%), crude fibre (6.01-7.42%), crude fat (29.38-34.37%), ash (4.55-4.89%) and NFE (15.3-23.79%) respectively. The anti-nutrient components for *C. sativus* are low for oxalate (0.05%), alkaloid (1.38%),phytate (0.05%) and tannin(15.38%) except for saponin (1.29%) compare with values of 0.08% oxalate, 2.98% alkaloid, 0.07% phytate, 24.64% tannins and 0.33% saponin) obtained for *L.aegyptica seed meal.* The amino acid compositions of *C.sativus* and *L.aegyptica* seed meals were comparable with arginine (6.54-7.37g/100g) and leucine (6.60-6.89g/100g) the most concentrated essential amino acids while the glutamic acid (12.57-13.47g/100g) was the most concentrated non-essential amino acid. The study shows that *C.sativus* and *L aegyptica* seed contain sufficient amount of nutrients and minimal constituents of anti-nutrients. These seeds are potential sources of food and feed for human and livestock.

Keywords: Proximate composition, Anti-nutrients, Amino Acid, *Luffa aegyptica, Cucumis sativus seed*

INTRODUCTION

The family *Cucurbitaceae* consists of members commonly known as melons and gourds that include cucumbers, squashes, luffa and melons (Azzez, *et al*., 2013), consisting of climbing and scrambling herbs with either simple or branched tendrils. *Luffa aegyptica* grows well in a well-drained soil that is rich in organic waste. The leaves are oval, simple, deeply five to seven lobed- dentate, dark green and frequently hairy. The fruits are smooth and cylindrical shaped with white flesh. The mature fruits are the source of the spongy reticulated material used for sponges and filters and for stuffing pillows, saddles and slippers, for bathing and cleaning dishware (Oboh and Aluyor, 2009). Several studies on the nutrient and anti-nutrients have been reported in *Luffa aegyptica* seed meal (Dairo, 2008; Abitogun *et al*. (2010). The *Cucurbita pepo'L* (commonly known as Cucumber fruit*s)* has been essential crop in the Andes since the pre-columbian era. It is a seasonal crop used as human food, the fruit is eaten fresh, processed in different ways as dried, frozen, fried, candied or pickled (Teotia, 1992) while the seeds are utilized directly for human consumption as snacks after salting and roasting in Arabian countries (Al khalifa, 1996). Studies have shown that fruits and vegetables contain among other vital nutrients, an appreciable quantity of carbohydrate, proteins, fats, fibers, and phytochemicals (Kubola *et al*., 2011). Despite the numerous nutritional benefits from fruits only a small portion of plant material is utilized directly for human consumption (El-Adawy *et.al*.1999), the remainder part may be converted into nutrient for either food or feed or into fertilizer. However, there is paucity of information on the amino acid and anti-nutrients of the luffa seeds grown in the study area. Hence this study was designed to determine the proximate, amino acids and the anti-nutrient contents of luffa and cucumber seed meals to encourage the utilization by human and as animal feed to reduce large quantity of waste seeds.

MATERIALS AND METHODS

Luffa aegyptica fruits were collected from experimental plots of department of Forestry and Wildlife management and its environs while *cucumber* fruits were collected from the Department of Crop Protection both in Federal University Wukari, Taraba State. The fruits were opened and seeds removed, washed with water and sun-dried before decorticated manually and grounded into powdered form. The powdered seeds were kept in an air-tight container and stored in a refrigerator prior to the analysis. The decorticated sponge gourd and cucumber seeds were analyzed in duplicate for proximate composition of moisture, crude protein, crude fibre, ash, ether extract and nitrogen free extract using

AOAC (2006) methods. The anti-nutritional factors for saponin, Phytate, Oxalate, alkaloids, and tannins were determined using methods described by Anhwange *et al*.(2004).The Amino Acid profile of decorticated seed meals were determined using methods described by Benitez (1989) and AOAC (2006).

RESULTS AND DISCUSSION

The results in Table 1 shows that cucumber moisture content of 4.44%, 34.37% (fat), (33.92% (crude protein) and 7.42% (crude fibre) are higher compared with *L.aegyptica* seed values of 3.75% moisture, 29.38% ash, 32.18% CP and 6.01% CF. *L aegyptica* result is similar to earlier reports by Amoo *et al.* (2008) and Dairo *et al*. (2013) except for ether extract which is above these authors. The analyzed cucumber seed results are in agreement with those reported by Uruah *et al.* (2011) and Niyi *et al.* (2019) but disagreement with lower values reported by Abulude *et al.* (2007).The analyzed results of *C.sativus* and *L.aegyptica* seed meal were higher than those reported for water melon by Fila *et al.* (2013).

Table 1: Proximate composition of decorticated Cucumber and Sponge gourd seed meals (% DM)

Seed meal	Moisture	Protein	Crude Fibre	Ether exyract	Ash	NFE
Cucumber	4.43	33.92	7.42	34.37	4.55	15.31
Sponge gourd	3.75	32.18	6.01	29.38	4.89	23.79

Table 2 shows the anti-nutrients in dehulled cucumber and sponge gourd seed meals. The results revealed that *L. aegyptica* seed has higher values of oxalate (0.08%), alkaloids (2.96%), phytic acid (0.07%) and tannins (24.64%) compared with cucumber seed with values of 0.05% oxalate, 1.38% alkaloids, 0.05% phytic acid and 15.38% tannins. The saponin concentration in cucumber (1.29%) seed was higher compared with L.aegyptica (0.33%) seed meal. The anti-nutrients in *C.sativus* is similar to previous study by Gomathi *et al*. (2016) and Johnson *et al.* (2012) for water melon seeds

Table 2: Anti-nutritional factor of decorticated Cucumber and Sponge gourd seed meals (% Dm)

Seed meal	Oxalate	Saponin	Alkaloids	Phytic acid	Tannins
Cucumber	0.05	1.29	1.38	0.05	15.38
Sponge gourd	0.08	0.33	2.96	0.07	24.64

Table 3 shows the amino acid profile of *L. aegyptica and C. sativus* seed meals. The most concentrated non-essential amino acid in the seed meals was glutamic acid with values of 13.47g/100g for *C. sativus* and 12.57g/100g for *L. aegyptica* while arginine and leucine (7.57 and 6.60 g/100g for *C. sativus* and 12.57 and 6.84 g/100g for *L.aegyptica}* were the most concentrated essential amino acid. Aremu *et al*. (2008) and Oyetayo *et al.* (2012) made a similar observations in *L. cylindrica* seed kernel. The methionine content in the samples of 1.28 to 1.44g/100g is found to be higher than that of soyabean (0.9g/100g) (Akintayo *et al.*, 2002) while the lysine content (3.24 - 3.61g/100g) is higher than that reported by Aremu *et al*.(2008) for *L. cylindrica* seed kernel (2.9g/100g).

Table 3: Essential and non-essential amino acids composition of decorticated Cucumber and Sponge gourd seed meals

S/N	Parameters	DCSM	DSSM
1.	Leucine	6.60	6.89
2.	Lysine	3.61	3.24
3.	Isoleucine	3.21	3.27
4.	Phenylalanine	3.90	4.08
5.	Tryptophan	1.02	0.79
6.	Valine	3.92	3.39
7.	Methionine	1.28	1.44
8.	Histidine	2.17	2.17
9.	Threonine	3.41	3.00
10.	Arginine	7.57	6.54
	Non essential		
1	Proline	3.05	2.264
2	tyrosine	3.92	2.23
3	Alanine	4.32	3.87
4	Glutamic acid	13.47	12.57
5	Glycine	4.23	3.47
6	Serine	3.56	4.11
7	Aspartic acid	8.31	8.00

DCSM = Dehulled cucumber seed meal
DSSM = Dehulled Sponge gourd seed meal

CONCLUSION AND RECOMMENDATIONS

The results obtained from this study have shown that the cucumber and luffa seeds are sources of fat, crude protein, crude fibre and ash contents. The seeds contain a relatively low amount of saponin, alkaloid, phytate and oxalate except for tannin. The seed meals are rich sources of essential and non-essential amino acids .Hence the seeds could be used to encourage the developing countries like Nigeria to shift from cultural practice of sticking to the known food sources for human and livestock and embrace other food materials especially sponge gourd.

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