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Chemical and Nutritional Value of Melon Shell as Possible Fish Feed Ingredient

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Abstract: ***A study to evaluate the chemical and nutritional value of melon shell as fish feed ingredient was carried out. Samples of melon shell were collected from Asaba market and taken to the lab for proximate analyses. Result shows moisture content value was 8.9%, crude protein 10.2%, crude fiber 4.5%, Ether extract 16.03%, while the ash content 6.23%. Crude protein value of melon shell shows no appreciable difference when compared with maize value 10.0%.This study shows that melon shell can conveniently replace maze in the formulation of fish feed.***

1. Introduction

Worldwide, aquaculture is developing, expanding, and intensifying. In Africa, aquaculture output has been increasing rapidly, especially during the last 15 years. Recently, the production from capture fisheries has leveled off, and most of the main fishing areas have reached their maximum potential, and therefore, in order to meet the growing global demand for aquatic food, aquaculture appears to have the potential to make a significant contribution to this increasing demand (FAO, 2006). However, in order to achieve this target, the sector will face significant challenges (FAO, 2006). Among these, the quantity and quality of feed is a major constrain. Feed is the principal cost in the cultivation of most fish species and this cost has tended to increase with the rising competition of maize meal by other sector. The feed cost had increased by 73 % in 2013 compared with the price in 2005 (Hishamunda *et al.*, 2014). This is a challenge for thousands of small-scale producers that form the backbone of the aquaculture sector (Rana *et al.*, 2008).

Energy-providing feed such as maize or corn carbohydrate sources are used for fish feed production. However, this feedstuff is stable food for many people. In Nigeria, maize is utilized for making snacks, drinks, roasted, boiled and eating with coconut or peer which is a delicacy by many people. Maize are not readily available (Mutayoba, et al., 2011). Maize is expensive and is scarce, thereby limiting the availability of the feed ingredients. Thus, there is competition for this feed ingredient between animals and humans, making them more expensive and their inclusion in aquaculture diet also increases the cost of fish production. Under normal conditions the cost of fish feed have been reported to account for about 70% of the total cost of fish production (Mutayoba, *et al.*, 2011). This proportion has been on the increase as a result of the volatibility of the feed market and the competition for feed resources between human food sector and animal feed industries (Mutayoba, *et al.*, 2011). Fish feed ingredients can be supplemented with amino acids, but the amino acid sources are also scarce and expensive. Consequently, nutritionists and research scientists are turning attention to alternative sources of feed ingredients such as agricultural by-products.

Melon shells are discarded after processing or shelling of melon seeds (Colocynthis *Citrullus*). Melon is a cucurbit crop belonging to the family cucurbitaceae (Abiodun and Adeleke 2010). Melon (seed) crops are grown, harvested and processed in large tonnage in Nigeria. The seeds are removed from the fruit, washed, sun-dried and sold in large quantities (tonnage) annually for commercial purpose (as a special soup condiment). They are also used as domestic remedy for urinary tract infection, hepatic congestion, intestinal worms and abnormal blood pressure (Moerman, 1998). The freshly shelled seeds were reported contained 34.24% crude protein, 45.95% fat, 7.18% crude fiber, 4.05% ash, 8.03% moisture and 0.56% carbohydrate (Fagbohun et al., 2011). Storage for long duration can decrease the percentage fat, ash, fibre and mineral contents (Fagbohun *et al*., 2011).However, large quantities of the melon shell are discarded and burnt, which pollute the environment. While the aquaculture industry is threatened with acute shortage of conventional feed ingredients leading to low productivity. It may be possible to utilize melon shell as non-conventional source of feed ingredient for fish feed production. Information in literature on the proximate composition of melon shell and its potential as a feed ingredient for aquaculture is scarce.

The aim of this study therefore was to determine the proximate composition of melon shell. The main objective was to evaluate its potential as possible feed ingredient for aquaculture.

2. Material and Method

The present research work was carried out in the Fisheries unit of the Teaching and Research laboratory of the Faculty of Agriculture, Delta state University Asaba Campus. Melon shell which would have been discarded was collected from the local market women in Asaba metropolis grind to powder. The collected melon shell samples were analyzed for their proximate composition i.e. crude protein, crude fiber, lipid and moisture using the standard methods of AOAC (2000)

2.1 Moisture Content

The moisture content was determined by drying to constant weight in an oven at 105˚C for 4 hours.

2.2 Crude Protein

Crude proteins were determined using the kjeldahl method. The crude proteins obtained were converted to crude protein by multiplying with a conversion factor of 6.25 (AOAC, 1990).

2.3 Crude Fibre

These were determined as the materials that were left after acid / alkaline digestion.

2.4 Crude Lipid

Crude lipids were determined using the soxhlet method. Ether extract were used as the refluxing solvent for 6 hours (AOAC, 1990).

2.5 Nitrogen Free Extract, NFE

NFE was determined by subtracting the sum of moisture, ash, crude protein, ether extract and crude fibre (all expressed as g/kg) from 1000.

NFE = 1000 – (moisture + ash + crude protein+ ether extract+ crude fibre) (g/kg)

2.6 Ash Content

Ash was determined by burning weighed samples inside porcelain crucibles in a muffle furnace at 450˚C for 12 hours. The residue were weighed and determined as ash content.

3. Result and Discussion

To meet the demand for fish by the world growing population and to ensure food security it is necessary to increase food fish production through aquaculture, since production from capture fisheries is already fully exploited and unlikely to expand further (FAO, 2004). The culture of fish in Nigeria is still on the developing stage and has not been able to meet the ever increasing population (Ojutiku, 2008). Fish feed is used in aquaculture especially the extruded feed which is expensive and accounts for about 60% of the capital cost (Eyo 2001). For fish farming to be successful in Nigeria there is need for cheap and quality fish feed. This can encourage small scale farmers in the field and ensure sustainable production to bridge the demand – supply gap for fish.

The Proximate composition of melon shell in table 1 revealed that melon shell has crude protein content 10.2, close to that of maize 10.0 reported by Ijabadeniyi and Adebolu (2005) The percentage protein of melon shell in the current study is slightly differ from the findings of Obi et al (2011) that found higher crude protein (13.83) of melon shell and the findings of Orire *et al*., (2013) who report lower percentage crude protein (6.56) of melon shell. The variation could be attributed to melon shell variety used.

Table 1: Proximate Composition of Melon Shell

SN	Parameter	Value
1	%MOISTURE	8.90%
2	% Ash	6.90%
3	% Crude Fiber	4.50%
4	Ether Extract	16.08%
5	Crude Protein	10.02%
6	Nitrogen Free Extract	53.60%

4. Conclusion

This research has shown that Melon shell can conveniently be used to replace maize as an energy source in fish feed formulation which is an important information especially for some-poor small scale farmers.

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