NUTRITIONAL AND PHYTOCHEMICAL SCREENING OF MELON (*Citrullus vulgaris*) SEED HUSKS

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ABSTRACT

The nutritional and phytochemical screening of melon (*citrullus vulgaris*) seed husks was investigated. The nutritional analyses involve proximate analyses and anti-nutrient composition. The phytochemical parameters carried out were alkaloids; saponin and tannin. the proximate analyses showed that the sample has high level of carbohydrate 61.98%, high amount of crude fibre and ash 11.75 and 8.84%, respectively and appreciable amount of protein content 5.95% and crude fat 4.50%. Also a considerable level 6.98 % of moisture was shown. This composition shows that the sample could be a good source of carbohydrate, dietary fibre and protein. The anti-nutrient composition presents are in negligible amount. The parameters are oxalate (0.19 %), phytate (1.28 %) and cyanide (0.02 %). The result also shows a high level of tannin (4.09 %), moderate level of saponin (1.45 %), alkaloids were present in considerable amount 0.54 %. This showed that melon seed husks can be used for compounding livestock diets without having any deleterious or lethal effect on the animals

INTRODUCTION

Livestock industry globally has undergone remarkable growth over the years. However expansion of this industry has been hampered by inadequacy in the supply of quality feed. This is due to the competition for feed ingredients between man and livestock making them more expensive and their inclusion in livestock diet also increases cost of production particularly for monogastric animals (Ogbe and George, 2012). This has led to low level of animal protein production which is not adequate in meeting animal protein need of Nigerians. According to Abu *et al.* (2008), the Food and Agriculture Organization (FAO) recommends a minimum of 70 g of protein daily per caput, out of which at least 35 g (50 %) should come from animal proteins, but the average Nigerian consumes less than 10 g of protein with only 3.2 g of this amount from animal protein. Pathetically, Nigeria with a population of about 140 million, the highest in Africa, has the highest number of under-five mortality. Low animal protein intake was reported to be one of factors responsible for these deaths (Abu *et al.*, 2008). This necessitates the use of low cost agro industrial wastes such as melon seed husks in order to reduce feed costs and increase the profit margin of livestock producers. Information on the nutritional composition of melon seed husks and its potential as a feed ingredient for livestock is scarce. Limitation in agricultural by-product/waste use in monogastric diet stems from its high fibre content, low metabolizable energy resulting in lower digestibility and poor utilization of the dietary nutrients. Also the utilization of non-conventional feedstuffs of plant origin such as melon seed husk had been limited as a result of the presence of alkaloids, glycosides, oxalic acids, protease inhibitors, cyanoglycosides, to mention a few despite their nutrient values and low cost implications (Sogbesan *et al.* 2006).These anti-nutritional factors negate growth and other physiological activities at higher inclusion levels (Oresegun and Alegbeleye, 2001).The findings of Ogbe and George (2012), revealed that melon seed husks contain anti-nutritional factors such as phytates, oxalates, saponins, tannins, trypsin inhibitors and hydrogen cyanide which limit its use in monogastric diet. The low nutritive values of these by-products could be improved by, autoclaving, boiling in water, water soaking, steaming, radiation and treatment with acid or alkaline and recently the use of exogenous enzyme. The aim of this research is to determine the nutritional qualities, anti- nutritional contents and pytochemical components of melon seed husks as alternative feed ingredient for livestock.

MATERIALS AND METHODS

Collection and processing of melon husks

Dried melon seed husks (shells) were collected from the women who process melon seeds for commercial purpose in Kaduna Central market. The melon seed husks were sun-dried and then milled into powder form.

Proximate and mineral analysis

The melon seed husks powder samples (in duplicates) were analyzed for their proximate composition, according to the methods of AOAC(2005) for determination of moisture, crude fibre, nitrogen for protein evaluation, fat and cyanide content. Total soluble carbohydrate was determined by the difference of the sum of all the proximate composition from 100%.

Phytochemical analysis and anti-nutrients

The methods of Sofowora (2006) were used for the quantitative phytochemical and anti-nutrients analysis of the melon seed husks. All determinations were done in duplicates.

Statistical analysis

All data generated were analyzed using descriptive statistics such as mean and percentage.

RESULTS AND DISCUSSION

Proximate Composition of Melon Seed Husks

The results of proximate (nutrients) analysis in Table 1 showed that melon seed husks (MSH) has dry matter value of 93.02 % and contained appreciable amounts of crude protein (5.95 %), carbohydrates 61.98 % This showed that melon seed husks have a higher percentage of carbohydrate and can be used as source of energy in feed. The MSH has appreciable amount of crude fibre, crude protein and ether extracts. It means that MSH can be used as a source of protein or fibre in livestock diets. The values obtained for carbohydrate, crude fibre and ash agreed with the values of carbohydrate (61.01 %), crude fibre (8.12 %) and ash (7.73 %) reported by Ogbeh and George (2012) for melon seed husks but does not agreed with the results of Bamikole *et al.* (2008) that reported lower range of values for carbohydrate (32.37- 37.78 %) and ash (3.06- 5.66 %) but higher range of values for crude fibre (40.73- 45.24 %) for three varieties of melon seed husks. The crude protein value was in agreement with the range of crude protein values (5.19-7.99 %) reported by Bamikole *et al.* (2008) for three varieties of melon seed husks but does agreed with the result of Ogbeh and George (2012) who obtained a higher crude protein value of 19.14 % in their study.

Phytochemical Composition and Anti-nutrients of Melon Seed Husks.

Results of phytochemical analysis and anti-nutrients showed that melon seed husks (shells) contained tannins (4.09 %), phytates (1.28 %), saponins (1.45 %),oxalates (0.19 %), alkaloid (0.54 %) and cyanide (0.02 %) as shown in Table 2. The result of phytochemical and anti-nutrient components of MSH was generally very low. The values were lower than the recommended maximum safe level stated by Kumar and Amit (2010); ICM (2012) and EFSA (2012). The low values showed that MSH can be used for compounding livestock diets without having any deleterious or lethal effect on the animals. The values obtained were in agreement with the values of phytochemical and anti-nutrients components reported by Ogbeh and George (2012) for MSH sample except for the value of oxalate (0.19 %) that was lower than 0.71 reported by the author.

CONCLUSION

In conclusion, the result of this study showed that melon seed husks contained appreciable amounts of carbohydrate, protein, fibre and low amount of anti- nutritional factors. It can therefore be used as source of energy, protein and fibre in livestock diets. Adequate processing and enzyme treatment could be carried out to improve utilization of melon seed husks as an alternative feed ingredient in place of conventional feed ingredient like maize, soya bean and groundnut in livestock diets.

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Table 1 Proximate composition and energy value of melon seed husks

Parameter	Percentage (%)
Dry matter	93.02
Crude protein	5.95
Crude fibre	11.75
Ether extracts	4.50
Ash	8.84
Nitrogen free extracts	61.98
Energy ME in Kcals/kg	3122.20

Table 2 Phytochemical and anti-nutrient components of melon seed husks.

Parameter	Percentage (%)	Recommended safe level Percentage (%)
Alkaloid	0.54	0.80*
Cyanide	0.02	0.50**
Oxalate	0.19	0.30***
Phytate	1.28	11.30***
Saponin	1.45	3.39***
Tannin	4.09	15.07***

*Source: - ***Kumar and Amit (2010); **ICMI (2012) & *EFSA (2012)*
ICMI:-International Cyanide Management Institute. EFSA: - European Food Safety Authority.