



QUANTITATIVE DETERMINATION OF TANNIN CONTENTS OF SOME UNCONVENTIONAL FEEDSTUFFS

*G.O. ADEYEMO, O.A. ADEBIYI AND O.A. SOKUNBI

Animal Science Department, Faculty of Agriculture and Forestry, University of Ibadan, Nigeria

Summary

The experiment was directed toward quantitative determination of tannin contents of some unconventional feedstuffs which are gradually finding use in monogastric nutrition. The result revealed that cassava leaf has a crude protein (CP) of 35.10%, crude fibre (CF) 11.4% and nitrogen free extract (NFE) of 41.60% while neem leaf and moringa leaf have CP contents of 8.88% and 35.98% respectively. The CF of neem and moringa leaves are 32.65% and 11.09%, the NFE are 44.52% and 34.55% respectively. Gross energy and metabolisable energy calculation revealed that cassava have the highest values of 381.64 kcal/kgDM and 3451.46 kcal/kgDM respectively among the three feedstuffs being considered. Quantitative determination of tannin contents of these unconventional feedstuffs showed that cassava leaf has 0.39% tannin above 0.36% and 0.32% that were observed for neem leaf and moringa leaf respectively.

© 2008 Nigerian Society for Animal Production. All rights reserved

Introduction

The increasing demand for food to feed a growing world population has highlighted the importance of maximizing animal population. However, one of the ultimate objectives of any livestock industry is the conversion into animal products of feed which are either inedible by man, or surplus to his immediate requirement (Wilson and Payne, 1999). The sharp rise in price of locally produced feedstuff is a direct result of increasing competition between man and livestock for conventional feedstuff. Thus the need arise to find alternative non-conventional feed ingredients for livestock and subsequently increasing animal protein. Of such unconventional feedstuff are Cassava leaf, Moringa leaf and Neem leaf. Cassava leaves have one of the highest protein level of any green plant material (30% on dry weight basis) Vitamins B1, B2, C and minerals (Abonafirmin, 1989). He reported that simple drying eliminate 95% of total cyanide in leaves of cassava. The leaf meal of these feedstuffs have been introduced at different levels in the diets of livestock but the quantitative determination of the tannin contents of these leaf have not fully established. The objective of the study is therefore to establish the quantitative value of tannin in the leaves of these unconventional feedstuffs.

Materials and Method

The proximate composition of leaves was carried out using the procedure of A.O.A.C (1990) while gross energy determination was carried out using the procedure of Ekanayake *et al* (1999) as follows.

$$GE (kJ/100gDM) = (\% cp \times 16.7) + (\% lipid \times 37.7) +$$

$$(\% carbohydrate \times 16.7)$$

% carbohydrate was estimated based on Miller and Tobin (1980)

The metabolisable energy was calculated using Pauzenga (1985) procedures as follows:

$$ME (kcal/kgDM) = (37 \times \% CP) + (81.8 \times \% fat) + (35.5 \times \% NFE)$$

Procedure for tannin determination

20mg of each sample was weighed into a screw top glass tube and 10ml of 50% methanol was added and heated in water bath at 80 °C for 30 minutes. After cooling, the samples were transferred to centrifuge tubes and whiz for 5 minutes at top speed. 200ml of the supernatants were pipetted and 2.5ml of distilled water was added plus 0.25ml of folin cloacaltau reagent plus 1 ml saturated sodium carbonate (Na₂CO₃) all into 4ml pipette. The samples were allowed to sit for 15 minutes before reading through spectrophotometer at 760nm.

Results and Discussion

The proximate compositions of the three unconventional feedstuffs are shown in Table 1. The result showed that Moringa leaf have the highest CP (35.95%) content, although EE and CF of cassava leaf and moringa leaf are not widely different. The percentage carbohydrate of neem leaf was however higher than either cassava leaf or moringa leaf. The table also revealed the ME and GE of cassava leaf and moringa leaf to be closely related compared to the lower value observed for neem leaf.

Table 1:- Proximate Composition of Cassava, Moringa And Neem Leaves

Parameter (%)	Cassava	Neem	Moringa
Dry matter	31.78	69.82	33.64
Crude protein	25.10	8.88	35.98
Crude fibre	11.40	32.65	11.09
Ether Extract	12.70	8.45	9.50
Ash	9.00	5.50	8.87
Nitrogen Free Extract	41.80	44.52	34.56
Metabolisable			
Energy kcal/kgDM	3451.46	2600.23	3335.24
Gross Energy kcal/kgDM	381.64	289.43	364.33

Table 2: quantitative values of tannin of unconventional feedstuff

Feedstuffs				
Tannin content (%)	Cassava	Neem	Moringa	SEM
	0.39 ^a	0.36 ^b	0.32 ^c	0.007

Table 2 showed the quantitative determination of tannin content of cassava, neem and moringa leaves. Cassava leaf had significant ($p < 0.05$) value of 0.39% compared to 0.32% that was recorded for moringa and 0.36% in neem leaf.

The high CP content of moringa with its low tannin value can serve as an indicator for replacing the expensive conventional legume protein sources like soyabean. The high CP of cassava leaf observed in this study agrees with the range 29.8 to 33.7% reported by Tewe and Iyayi (1976) Crude fibre content of neem was relatively high which implies that for neem leaf to be used in monogastric nutrition, some form of treatment (Physical, chemical and biological) has to be introduced in order to reduce the fibre and increase the CP level Salawu *et al* (1999) reported that small amount of condensed tannin (20 40g/Kg DM) can exert beneficial effect on protein metabolism in ruminant by slowing rapid microbial degradation of dietary protein and increasing protein outflow from the rumen thus increasing absorption of amino acids in the small intestine of the animal. The tannin content of cassava leaf when consumed by ruminant could serve as coat for protein thus enhancing by-pass protein and effective feed utilization. Salawu *et al* (1999) also reported that feeding tannin to sheep reduced the risk of bloat and parasite. However, feeding cassava leaf meal up to 20% in poultry has been reported to decrease weight and feed efficiency. The decrease in efficiency might not only be connected to HCN but high consumption of tannin.

The tannin contents of neem (0.36%), and moringa (0.32%) are relatively low to other browse legume and therefore monogastric animals can effectively utilize these feedstuffs without deleterious effect.

Conclusion

The experiment has been able to establish the quantity

of tannin present in cassava, neem and moringa leaf and this will enable feed nutritionist to be conscious the amount of these feedstuffs that should be incorporated into diets of animal for efficient feed utilization.

References.

- A.O.A.C. (1990). Association of Official Analytical Chemist. Official methods of Analysis, (4th ed.) Washington, DC U.S.A
- Abourafirmin (1989). Producing "Sakasaka" from cassava leaves in Ivory coast. In cassava newsletter CIAT-Caliocolombia. Vol 13, pp11
- Ekanayeke, S; Jansz, E.R; Nair, B.M (195) Proximate composition mineral and amino acid content of mature (*Canavalia gladiata*) see Food Chemistry 66: 115-119.
- Miller, H.G. and Tobin, G. (1980). Nutrition and feed processing. Croom Helm Ltd. London. Pp 302
- Pauzenga (1985): Feeding Parent Stock. 2 Technical International, pp 22-23
- Salawu, M. Acamovie, T. and Stewart (199) Assessment of the nutritive value and *Calliandra calothyrsis*: in sacco degradation and in-vitro gas production in the presence quebracho tannin with and without browse Animal feed science and technology 69, 207-2
- Tewe, O.O and Ajayi, S.S (1976). Utilisation of so common tropical feedstuffs by the African Gir rat (*Cricetomy gambianus*) on house hold waste of some local feedstuff. Journal of the Instituté Animal technician 31 (1): 61-68
- Wilson and Payne (1999). An Introduction to Animal Husbandry in the Tropics. 3rd ed. Tropical Agriculture Series, London Longman Group Ltd, 1978.