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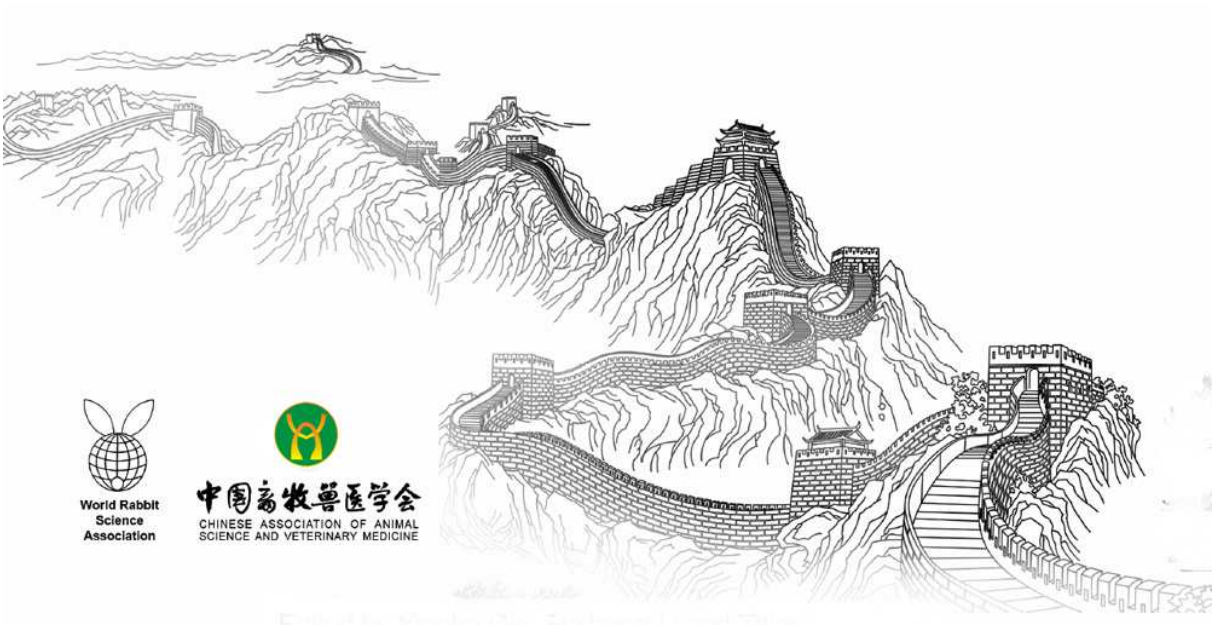

CHEMICAL COMPOSITION OF SOME TROPICAL FORAGES AND COEFFICIENT OF PREFERENCE IN RABBITS

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ABSTRACT

The suitability of seven forages (*M. oleifera, F. thonningii, L. leucocephala, E. cyclocarpum, G. sepium, A. saman* and *A. indica)* as feed resources for dry season feeding domestic rabbits was studied. The acceptability was determined by cafeteria method using five adult rabbits weighing 700-750g. The acceptability of the forages was best in *M. oleifera* followed by *F. thoninngii. G. sepium, L. leucocephala* and *E. cyclocarpum* had similar acceptability while *A. indica* and *A. Saman* had low acceptability. The order of acceptability was: *M. oleifera, F. thonningii, L. leucocephala, E. cyclocarpum, G. sepium, A. indica, and A. saman.* The chemical analysis of the five most acceptable forages showed that *F. thoninngii* had the least CP of 10.3% compared to the others forages that had CP ranging from 24 -30%. *M. oleifera* also had the least CF of 9.0% compared to the other forages CF which range 14 -19% *F. thonningii* and *L. leucocephala* also had low EE of 6.0 and 8.0 % respectively. The ADF and NDF fractions of the five most acceptable forages fell within the same range. In conclusion, the five most acceptable forages (*M. oleifera, F. thonningii*, *L .leucocephala, E. cyclocarpum, G. sepium)* are possible legume feed resource for rabbits especially during the dry season.

Key words: caecum, crop-livestock system, feed resources, sustainability, wet and dry seasons,

INTRODUCTION

Forages are coarse livestock feeds that are composed of leaves, stem and sometimes grains (Onwuka; 1983, Adeloye; 1994). Maize, soya bean cake, full fat soya and fish meal are quite expensive but are still the major sources of protein in finished feeds (Babayemi and Bamikole 2006). Forages are often available in both dry and wet seasons and can be preserved as leaf meals, hays or silages. Forages rank amongst the high value crop in many countries and contribute to sustainability of crop-livestock system (Odedire and Babayemi 2007). A study on forage legumes showed that most leguminous plants contained an average crude protein of about 17.2 %, crude fiber 12-18%, xanthophylls 500-600ppm and a dry matter of about 90% . Legumes have higher concentration of lignin but lower concentrations of cell wall carbohydrates compared to grasses. The feed intake and digestibility is however greater for legumes when compared to grasses. The rabbit has an enlarge caecum inhabited by bacteria which enables the caecum function like the rumen in ruminants. Rabbit production has been reported to play an important role in livelihood of resource-poor households (Lukefahr 2007). Most forages cheap and are available during the wet and dry seasons. Rabbits are termed non-ruminant herbivores and have a special ability to utilize plant fiber effectively, it is therefore important to assess the acceptability and suitability of some of these forages for feeding of rabbits. This study was conducted to determine proximate composition, crude fibre fractions and acceptability of seven leguminous tree forages by rabbits

MATERIALS AND METHODS

A pre-experiment was carried out acceptability of seven selected leguminous forages by rabbits. These forages were selected because they survive both wet and dry seasons. The forages included; *Leucaena leucocephala, Moringa oleifera, Albizia saman, Gliricidia sepium, Azadirachta indica, Enterolobium cyclocarpum* and *Ficus thonningii.*

Acceptability study

The acceptability study was carried out in the Small Animal Room, Department of Animal Science for a period of 5 days. The aim of the test was to determine the four most acceptable forage legumes. Five rabbits weighing 750g ± 80g were fed with concentrate diets for an initial two days after their arrival then the forages were introduced gradually until the concentrates was totally withdrawn. The rabbit were fed the forages randomly placed in a cafeteria feeding system allowing all the rabbits equal access to all 7 forages (in replicates of two) at the same time. The rabbits were given water *ad-libitum*. The forages were harvested overnight for each of the 5 days so that it could wilt overnight before it was fed to the rabbits. This was done to reduce moisture content, to reduce the microbial load on the forages and to reduce any toxin or anti-nutritional factors present in the forages.

Co-efficient of preference and proximate analysis of selected forages

The forage preference was determined from the co-efficient of preference (COP) value, calculated from the ratio between the intake of individual forages, divided by the average intake of the seven forages (Karbo *et al*., 1993). On this basis, forage was taken to be relative preferred if the COP value was greater than unity that is 1.00. The five most acceptable forages among the seven selected forages were analyzed for their chemical compositions by the methods of AOAC (1995) and Neutral detergent fibre (NDF) and Acid detergent fibre (ADF) by the methods of Van Soest (1991).

RESULTS AND DISCUSSION

M. oleifera had the highest average feed intake of 70.75% followed by *F. thonningii* with 54%, *L. leucocephala* (41.7%), *E. cyclocarpum* (40.5%), *G. sepium* (35.0%) and *A. indica* (34.7%). *A. saman* had the lowest average feed intake of 25.68%. Results are presented in Table 1

Table 1. Intake (%) of selected forages by rabbits

	LL	MO	AS	GS	AI	EC	FT
Days	% FI	% FI	% FI	% FI	%FI	% FI	% FI
1	53.3	57.5	25.0	37.5	22.5	25.0	37.5
2	12.5	31.25	12.5	37.5	56.25	62.5	37.5
3	25.00	75.00	25.3	25.0	25.01	25.0	25.0
4	87.51	90.00	30.29	39.9	29.60	35.0	65.0
5	30.00	100	35.34	34.9	39.99	55.0	80.0
Total	208.	354	128.	175.	173.	201	270.
Mean	41.7	70.8	25.7	35.0	34.7	40.5	54

Co-efficient of preference

Results of the coefficient of preference (COP) and preference ranking (PR) are presented in Table 2. *M. oleifera* recorded the highest acceptability with a COP of 1.51, and this was followed by *F. thonningii* (1.32), *G. sepium* (1.00), *L. leucocephala* (1.00), *E. cyclocarpum* (1.00), *A. indica* (0.75) and *A. saman* (0.63) recorded the lowest value meaning that they were not acceptable have COP value of 1.0. The leaves of *M. oleifera* are known to be highly nutritious, and a rich source of some vitamins and minerals, this could be responsible for the higher intake compared with the other forages. *G. sepium* and *L. leucocephala* have been documented to contain growth inhibiting factors (Raharjo *et al*., 1987), but this could be minimized by wilting before feeding the animals (Hawkins *et al*., 1990). Lowry (1990) also reported that *G. sepium* acceptability is affected by the volatile compounds released from leaves *A. indica* acceptability was also low compared to *M. oleifera*, *F. thonningii*, *L. leucocephala* and *E. cyclocarpum*, which could be due to the bitter taste of neem leaves as was also observed by Sokunbi and Egbunike (2002). The reduced intake of leaves of *A. saman* could be a result of the non-succulent nature of the leaves. On the first two days of the acceptability trial, it was observed that the urine of the rabbits turned reddish brown. Onwudike (1995) reported that New Zealand White rabbit fed Leucaena produced reddish brown urine.

Table 2: Mean coefficient of preference and preference ranking of the five selected forages

FORAGES	COP	PR
M. oleifera	1.51	1
F. thonningii	1.32	2
G. sepium	1.00	3
L. leucocephala	1.00	4
E. cyclocarpum	1.00	5
A. indica	0.75	6
A. saman	0.63	7

Chemical analysis and Crude Fiber fractions

The results of the chemical analysis (Table 3) showed that *F. thonningii* had the highest dry matter (31.4%) compared to *L. leucocephala* (28.5%), *E. cyclocarpum* (27.6%) and *M. oleifera* (26.6%), while *G. sepium* had the lowest dry matter (17.09%) which is significantly different to what was obtained by Devendra and Mcleroy (1982). The low dry matter content of *M .oleifera* is an indication that it has a high moisture content hence a larger volume would be needed to feed the Animal to meet up with it dry matter requirement of the animal. On the other hand, *F. thonningii* had the lowest crude protein (10.3%) which cannot meet up to the protein requirement of rabbits which ranged 12-16 % depending on the stage of production. *leucocephala* had the highest crude protein of 29.8% followed by *E. cyclocarpum, G. sepium* (28.7%) and *M. oleifera* (24.5%).This shows that they can be used as supplement to replace grain legumes such as soyabean and groundnut in concentrate feeds or in low quality diets. The chemical analysis showed that L. *leucocephala, G. sepium, E. cyclocarpum and F. thonningii* had a crude fiber range of between 14-19%, which is acceptable has crude fiber requirement for rabbits fall between 12-16 % (Lebas, 1979; Lang, 1981). *M .oleifera* had the lowest crude fiber (9.0%) which means it would not be a good fibre supplements and rabbit require a crude fiber supplement of between 12-14%. *M. oleifera* had the highest ether extract value of 23%. Although *M. oleifera* is low in CF it could l server as a good source of protein and energy since it contains ether extract represent the fat content which is a source of energy. Foidl *et al*. (2001) also reported that the high ether extract in *M. oleifera* is associated with the rich source of carotene and pigment. *E. cyclocarpum* and *G. sepium* had EE values of 17 and 14% respectively while *L. leucocephala* and *F. thonningii* had the lowest values at 8 and 6%. *F. thonningii* had the highest NFE (53.72) this could be responsible for the low crude protein content and the leaves may have sugar fraction stored due to the hard nature of the leaves. *L. leucocephala* had an NFE of 39.38%, *M. oleifera* 34.50%, *G. sepium* 30.09% and *E. cyclocarpum* had the lowest NFE 18.34%. All the five selected forages had high ADF and NDF values indicative of high content of cell wall and lignin (Van Soest *et al*., 1991).

Table 3. Chemical composition (%) of selected forages

Sample	% DM	% CP	% CF	% EE	% ASH	% NFE	ADF	NDF
LL	28.5	29.8	14.0	8.0	9.1	39.3	39.4	55.8
MO	26.6	24.5	9.0	23.0	9.2	34.5	34.4	56.3
GS	17.1	26.9	18.0	14.0	11.0	30.1	36.3	57.3
EC	27.6	28.7	19.0	17.0	23.0	18.3	31.9	53.9
FT	31.4	10.3	19.0	6.0	11.0	53.7	34.3	55.9

LL- *Leucaena leucocephala,* **MO**- *Moringa oleifera,* **GS**- *Gliricidia sepium,* **EC**- *Enterolobium cyclocarpum,* **FT**- *Ficus thonningii*

CONCLUSION

The assessment of the acceptability and nutritive characteristics of five selected dry season forages: *M. oleifera, F. thonningii, E. cyclocarpum, L. leucocephala* and *G. sepium* for their possible utilization in rabbit feeding have revealed that they all have good levels of nutrients particularly protein and fiber, although *F. thonningii* had a low protein and *M. oleifera* had a low fiber. They could still be used has feed supplement but feeding trials are important for a conclusive deductions about the use of these selected forages.

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