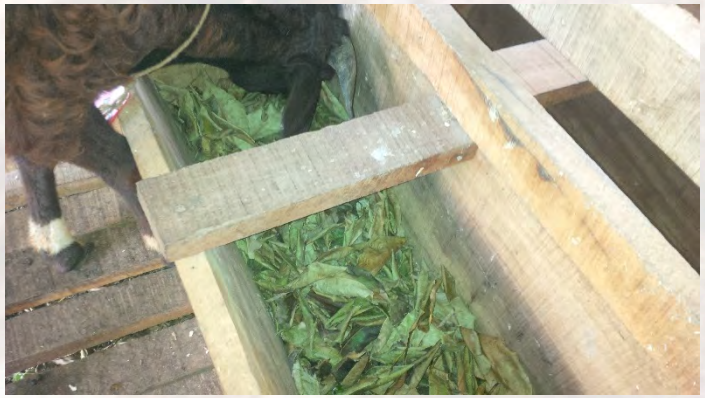


Effects of cassava peel mash on chemical composition, nutrient intake and rumen fermentation parameters of West African dwarf rams supplemented with dried *Ficus thonningii* foliage

Ojo Victoria Olubunmi A.,

Bakare Bazit Adebare,

and Onifade Olufemi Sunday

DEPARTMENT OF PASTURE & RANGE MANAGEMENT, FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA.

INTRODUCTION

- Improving animal productivity is generally hampered by diseases, poor nutrition and bad management practices (Peacock, 1996)
- It is therefore imperative these animals are fed with diet that will maintain a conducive rumen ecosystem for the survival of an imal.
- This albeit would necessitate the use of unconventional feedstuf fs such as cassava wastes and browse plants as a provision for b alanced animal diets.
- *Ficus thonningii* a tree of high value has been identified as an important fodder plant for staying green and thus productive throughout most of the year (Tegbe *et al*., 2006).
- As a browse plant, feeding it alone cannot meet the nutrient requirement of ani mals that are kept in intensive system of animal production,

INTRODUCTION

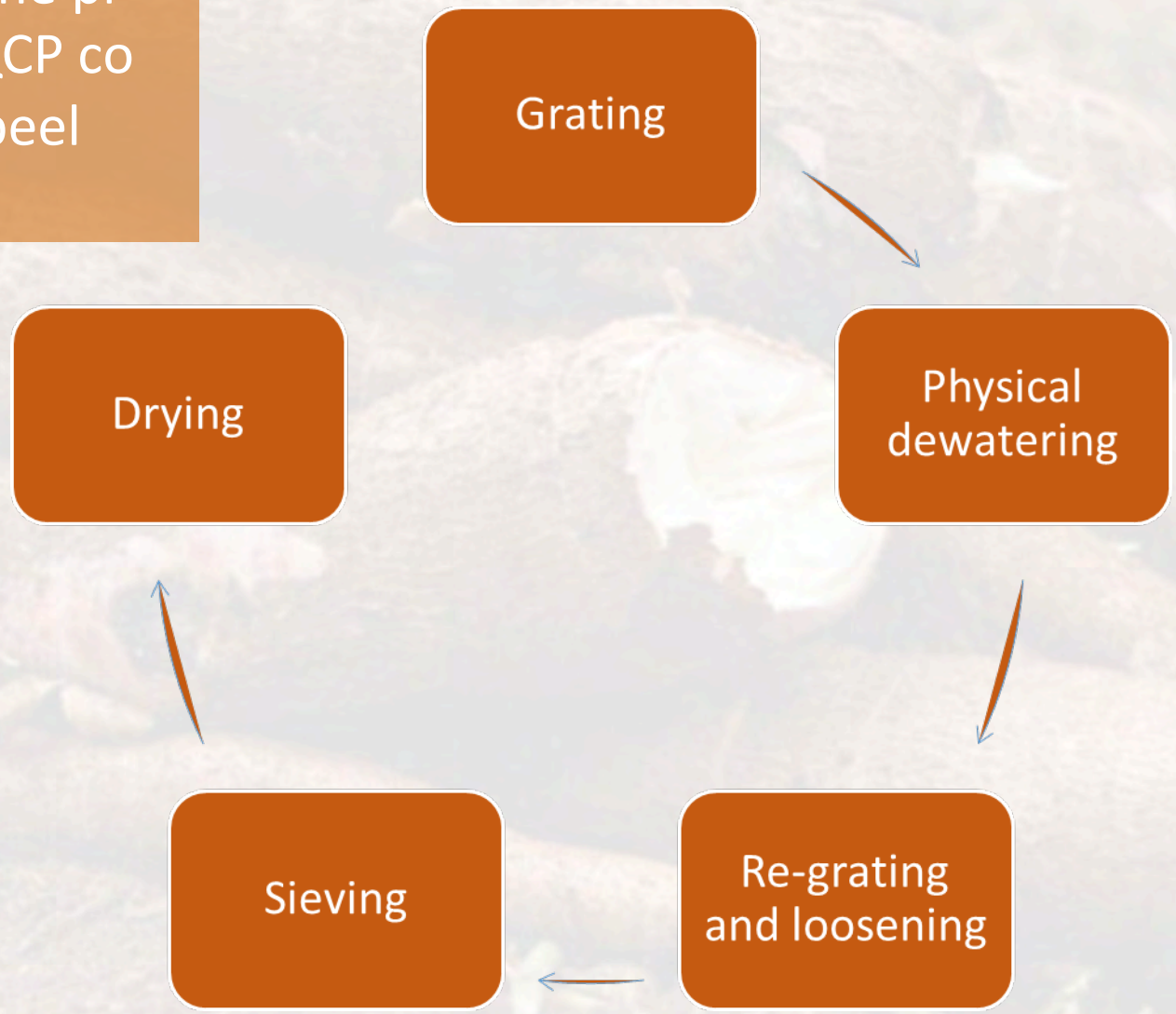
- Cassava peels are normally left to rot and become a source of environmental pollution due to improper disposal. Its usage has been reported in ruminant livestock production with beneficial effect on performance
- Its utilization is however hampered by its short shelf life, low protein content and presence of ANFs such as hydrocyanic acid (HCN) (Oduguwa *et al*., 2012).
- The reliability of its utilization thus will to a large extent depend on how well it can be processed and stored into safe consumable forms (Bokanga, 1995).
- The present study is therefore designed to determine the effects of feeding different levels of dried MPT species (*Ficus thonningii*) as supplement to dried cassava peel mash on the performance of West African dwarf rams

MATERIALS AND METHODS

- Location of the study area
  - Small Ruminant Experimental Unit, College of Animal Science and Livestock Production
  - Laboratory of Pasture and Range Management
  - Federal University of Agriculture, Abeokuta (FUNAAB) Nigeria.

- Sources of feed materials
  - Foliage of *Ficus thonningii* was harvested by pruning the branch of the tree fr om the University environs.
  - Harvested fresh foliage was wilted, dried, packed in sacks and stored.
  - Cassava peel mash (CPM) was obtained from the Cassava Peel Processing De monstration Factory of International Livestock Research Institute (ILRI).

Brief description of the processing steps of HQCP coarse mash (cassava peel mash)



Experimental animals, management and feeding

- Twenty West African dwarf (WAD) rams were used for the experiment and adapted to the experimental area for 21 days.
- Animals were fed CPM supplemented with cowpea haulms and fresh water was offered *ad libitum* during adaptation
- After adaptation, animals were housed intensively in well-ventilated individual pens
- A 14 days adjustment period in the experimental was accorded to the animals during which they were fed experimental diets
- The experimental animals were divided into four (4) groups of five (5) rams per treatment and randomly allotted to the experimental dietary in a completely randomized design

Experimental animals, management and feeding

- A basal diet of CPM was offered with fresh water *ad libitum* daily while the supplementary diet (DFF) was offered at 0.6, 1.2 and 1.8 % body weight.
- The control diet was enriched with 2 % urea.
- During the 90-days experimental period, quantities of feeds offered an d refused were measured daily to compute feed intake on DM basis.
- At the end of feeding trial, three animals per treatment were transferre d into metabolic cages for a digestibility trial for 7 days.
- Ruminal fluids were collected before feeding in the morning using oeso phageal suction tube to determine pH, ammonia nitrogen and volatile f atty acids.

Chemical analyses

- Sub-samples of CPM and DFF were dried milled and analysed for proximate composition (dry matter, crude protein, ether extract, Ash and organic matte r contents) according to the method of AOAC (2010).
- Fibre fractions analysis (acid detergent fibre, neutral detergent fibre and acid detergent lignin) were determined as described by Van Soest *et al*. (1991).
- Anti-nutritional factors such as tannins was determined according to the procedures of Jaffe (2003).
- Metabolizable energy was calculated according to (MAFF, 1984), while hydro cyanic acid content was determined by the alkaline titration method (AOAC, 2010).
- pH and temperature of the rumen fluid were measured immediately with the use of pH meter Rumen ammonia nitrogen and volatile fatty acids were anal ysed using AOAC (2010) and Samuel *et al*. (1997) procedures respectively.

RESULTS

Table 1: Chemical composition (% DM) of dried foliage *Ficus thonningii*, cassava peel mash and cassava peel mash +2 % urea

Parameters (%)	Dried *F. thonningii* foliage	Cassava peel mash	Cassava peel mash + 2 % urea
Dry matter	90.00	90.00	87.53
Crude protein	10.12	1.99	10.35
Ash	12.38	2.70	3.72
Organic matter	87.62	97.30	96.28
Neutral detergent fibre	37.80	22.50	19.53
Acid detergent fibre	20.40	14.40	13.09
Acid detergent lignin	6.00	7.80	6.51
Cellulose	14.40	6.60	6.58
Hemicellulose	17.40	8.10	6.44
Tannin (mg/100g)	5.60	4.80	4.00
HCN (mg kg^{-1})	_	1.32	1.02
ME (MJ kg^{-1} DM)	9.99	11.21	12.43

Table 2: Nutrient intake of West African Dwarf rams fed cassava peel mash (CPM) supplemented with dried *Ficus thonningii* foliage (DFF) at different levels (g/day)

Parameters (g/day)	Ad libitum CPM+2% urea	Ad libitum CPM + DFF at 0.6% BW	Ad libitum CPM + DFF at 1.2 % BW	Ad libitum CPM + DFF at 1.8 % BW	SEM
Dry matter intake	247.94^{b}	316.99^{ab}	316.69^{ab}	377.00^{a}	31.18
Crude protein	25.66^{a}	11.04^{b}	13.70^{ab}	18.66^{ab}	2.12
Ether extract	10.79^{b}	9.04^{b}	12.95^{ab}	18.88^{a}	1.23
Ash	15.44^{b}	14.18^{ab}	17.34^{ab}	23.45^{a}	1.89
Neutral detergent fibre	48.42^{b}	80.21^{a}	85.16^{a}	105.81^{a}	7.27
Acid detergent fibre	32.45^{b}	49.13^{ab}	51.05^{ab}	62.52^{a}	4.57

a,b...Means along the same rows with different superscripts are significant ($p<0.05$).
SEM: Standard error of mean

Table 3: Volatile fatty acid, pH and ammonia concentrations of West African Dwarf rams fed cassava peel mash (CPM) supplemented with dried *Ficus thonningii* foliage (DFF) at different levels

Parameters		Ad libitum CPM+2% urea	Ad libitum CPM + DFF at 0.6% BW	Ad libitum CPM + DFF at 1.2 % BW	Ad libitum CPM + DFF at 1.8 % BW	SEM
pH	Before	6.72^{c}	6.66^{c}	6.83^{b}	7.00^{a}	0.01
	After	6.16^{b}	6.32^{b}	7.01^{a}	7.07^{a}	0.04
	Variation	-0.56^{c}	-0.34^{b}	0.18^{a}	0.08^{a}	0.03
Temperature (°C)	Before	28.38^{c}	29.11^{b}	30.56^{a}	28.78^{bc}	0.09
	After	26.44^{b}	26.39^{b}	27.06^{a}	26.75^{ab}	0.07
	Variation	-1.94^{a}	-2.72^{b}	-3.50^{c}	-2.03^{a}	0.05
NH_3-N (%)	Before	25.52^{b}	23.81^{b}	21.26^{b}	24.92^{a}.	0.76
	After	40.82	29.62	28.07	31.47	2.00
	Variation	15.31^{a}	5.81^{ab}	6.81^{ab}	8.55^{b}	2.19
Total VFA (%)	Before	0.65^{b}	0.94^{a}	0.96^{a}	0.99^{a}	0.01
	After	0.47^{bc}	1.20^{ab}	1.24^{c}	1.38^{a}	0.02
	Variation	-0.18^{d}	0.26^{c}	0.28^{b}	0.39^{a}	0.01

a,b...Means along the same rows with different superscripts are significant ($p<0.05$).
SEM: Standard error of mean

CONCLUSION

- In addition to CPM that could be fed to ruminant animals as a basal diet, DFF could as well be incorporated as up to 1.8 % BW of the animals to serve as dry season supplement.
- Livestock owners should take advantage of the large available quantities of cassava peels waste produced at harvest for processing in order to increase its shelf life and serve as a feed source alongside a protein source supplement for improved animal performance and productivity.

REFERENCES

Anele, U. Y., Arigbede, O. M., Olanite, J. A., Adekunle., I. O., Jolaosho, A. O., Onifade, O. S. and Oni, A. O. (2008) Early growth and seasonal chemical composition of three indigenous multipurpose tree species (MPTS) in Abeokuta, Nigeria. *Agroforestry System* 73:89-98.

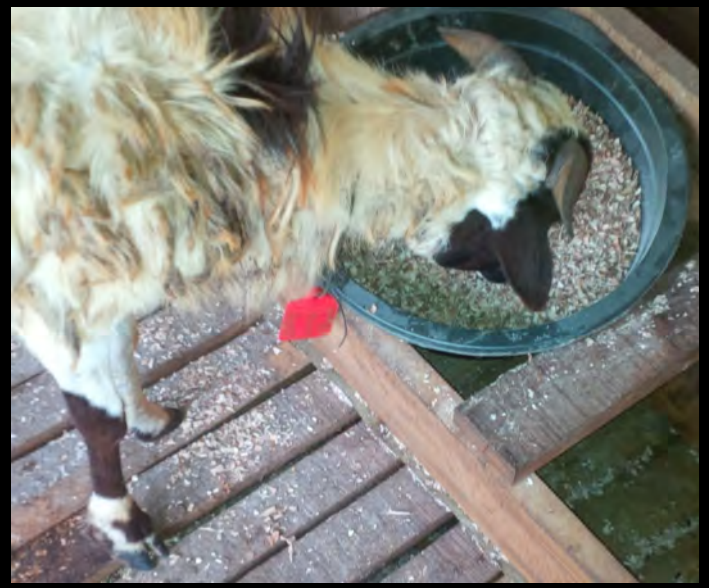
AOAC (2010) Official Methods of Analysis. 18th Edition, Revision 3, Association of Official Analytical Chemists, Washington DC.

Jaffe, C. S. (2003) Analytical Chemistry of food. Blackie Academic and professional, New York, 1:200.

Leng, R. A., Kempton, T. J. and Nolan, J. V. (1977) Non protein nitrogen and bye bass protein in ruminant diets. *AMRC Review* 33: 785-790.

Preston, T. R. and Leng, R. A. (1987) Matching ruminant production systems with available resources in the tropics and sub-tropics. Penambul Books Armidale, Queensland 4380, Australia. Pp. 117-118.

Reed J. D. (1995) Nutritional toxicology of tannins and related polyphenols in forage legumes. *Journal of Animal Science* 73: 1516.



THANK YOU ALL FOR LISTENING