Tropentag 2006
University of Bonn, October 11-13, 2006
Conference on International Agricultural Research for Development

Preliminary Report on Nutritive Value of Some Tree Foliages Locally available in Myanmar

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Introduction

A major constraint in developing countries is the scarcity and fluctuating quantity and quality of the year-round supply of conventional feed. To meet the high demand of livestock products and to fulfill the future purpose for adequate consumptions needs better utilization of unconventional feed resources. Especially the capacity of ruminants to convert feeds that cannot be extensively used by monogastric animals into meat, milk and other products for human consumption is imperative. Thus to identify and introduce some of the non-recognized feed resources become vital for ruminant nutrition. The potentiality of unconventional feed must be selected by their crude protein content, high efficiency of microbial protein synthesis in the rumen, by-pass protein production along with high dry matter digestibility. Most of the research work reported that supplementation of tree foliages *(Leucaena leucocephala, Gliricidia sepium, Ziziphus mauritiana* etc.) in ruminant diets can improve the utilization of low quality roughages mainly through the supply of protein to rumen microbes. In addition, the feeding value of low quality roughages and grasses can be greatly improved by foliages from the trees (FAO, 1997). The mineral composition of tree foliages is also superior to that of tropical grasses (Norton 1994). Thus, in this present work, the nutritive values on dry matter (DM), organic matter (OM), crude protein (CP), neutral detergent fibre (NDF), and acid detergent fibre (ADF) of 30 tree foliages in Myanmar were estimated as preliminary study.

The objectives of this work are:

(1) to evaluate the nutritive values of locally available tree foliages
(2) to conduct feeding trials and assess the feeding values of tree foliages in large and small ruminants
(3) to observe the potential of tree foliages as partial replacement of commercial concentrates
(4) to introduce feeding tree foliages available in local areas at the time of scarcity of feedstuff for ruminants
(5) to find out the feasible and suitable feeding strategies for ruminants in Myanmar

Materials and Methods

Collection of tree foliages locally available from different areas were analysed for their nutritive values. Chemical analyses were carried out at the Nutrition Laboratory in the Department of Physiology and Biochemistry, University of Veterinary Science, Yezin, Myanmar.

The DM content was determined after 8 hours at 102° C, and ash was determined after 3 hours at 550° C. Nitrogen was determined by using Kjeldahl method (Foss 2020 digestor and

Foss 2100 Kjeltec distillation unit) and CP was calculated as 6.25 × N (AOAC, 1970). The reproducibility of results on dry matter basis was calculated.

Result and discussion

As shown in the table (1), the nutritive values were in the range of DM 8.30 – 86.50%, OM 66.89 – 98.05%, CP 8.03 – 32.43%, NDF 16.93 – 71.10%, and ADF 7.37 – 53.10%. These results showed that some of the tree foliages (e.g. *Albizzia lebbek, Fluggea leucopyrus, Leucaena leucocephala, and Glyricidia sepium* with CP levels 32.43, 28.78%, 22.00%, and 18.64% respectively) could be good sources of protein for ruminants. Tree foliages are likely to be significant sources of minerals when fed in high amount and also contain some vitamins. Norton (1994) had reported the concentration of minerals in the foliages of some forage of tree legumes. Therefore, it was already verified that the potential roles of tree foliages in ruminant nutrition are high quality protein content, high digestibility, provision of nutrients deficient in the diet for enhancement of microbial growth, as source of undegradable protein (by-pass protein), vitamins, minerals and also can be utilized for the partial replacement of commercial concentrates to give less cost of feeding.

However, Tannin compounds, the antinutritional factors, are generally present in high amount in tree foliages and agro-industrial by-products. High tannin content may indirectly affect the rumen function by reducing rumen ammonia level through decreased protein degradation in the rumen and depress the fibre digestibility (Leng, Jessop and kanjanapruthipong, (1993). The levels of tannins in the foliages of tree is highly variable and depend on the environmental factors such as species of plant , stages of growth, different parts of the plant, temperature, rainfall, soil type and fertility, etc.(Norton, 1994).

New leaves often have higher tannin content than older leaves (Vaithiyonathan & Singh, 1989). However, the level of tannin range (0-2 % of the diet) are harmless for the consumption by animals (Norton 1994).

Supplementation with dried foliages from 5 tree species *(Albizzia chinensis, Calliandra calothyrsus, Gliricidia sepium, Leucaena leucocephala*, and *Sesbania sesban*), all produced greater live weight gains in goats on a basal diet of poor quality forages than the same quantity of foliage fed fresh (Norton, 1994, after Robertson, 1988). In compare with dehydration, heat-treating, pelleting or treatment with chemicals, sun drying is more acceptable and feasible alternative for feeding tree foliages (Broderick, 1995). Drying might also removed anti-nutritive factors (Ahn, 1990, Norton,1994), including condensed tannins.

In addition, supplementation of foliages provided a valuable source of rumen ammonia& minerals and appeared to have synergistic effect in lifting the digestibility of the basal diet (Ndlovu & Buchanan, 1985). Robertson (1988) reported that supplementation with dried foliages from 5 tree species (*Albizzia chinensis, Calliandra calothyrsus, Gliricidia sepium, Leucaena leucocephala, and Sesbania sesban*) on a basal rice straw diet in goats was carried out and it was found that all produced greater live weight gains than the same quantity of foliage fed fresh(Norton,1994, after Robertson,1988). Comparing with dehydration, heat-treating, pelleting, or treatment with chemicals, sun-drying is more acceptable and feasible alternative for feeding tree foliages (Broderick, 1995). Drying might also removed anti-nutritive factors (Ahn,1990; Norton.1994), including condensed tannins.

Therefore, to conduct feeding trials and assess the feeding values of tree foliages in large and small ruminants and to observe the potential of tree foliages as partial replacement of commercial concentrates will be carried out in the future.

Table. Compositions of some tree foliages in Myanmar

No.	Name of Sample	DM %	OM%	CP%	NDF %	ADF %
1	Fluggia Virosa	52.5 ± 0.4	97.0 ± 4.6	25.0 ± 1.3	21.8 ± 2.3	7.4 ± 0.6
2	Moringa oleifera	25.0 ± 1.3	89.6 ± 3.2	23.0 ± 5.2	16.9 ± 1.2	9.4 ± 0.6
3	Cassia glauca	30.0 ± 2.4	88.9 ± 4.6	23.2 ± 1.2	26.1 ± 0.4	13.0 ± 2.2
4	Tamarindus indica	50.0 ± 1.8	96.0 ± 2.3	13.1 ± 2.5	24.9 ± 1.3	14.9 ± 1.0
5	Clausena excavata	30.0 ± 2.3	79.0 ± 4.5	22.1 ± 1.3	27.1 ± 0.3	16.0 ± 0.1
6	Leucaena	25.0 ± 1.7	91.2 ± 2.3	22.0 ± 0.3	22.9 ± 1.2	16.6 ± 4.6
7	Water hyacinth(Leaf) (Eichornia crassipes)	50.0 ± 2.0	92.1 ± 1.3	19.9 ± 0.3	53.1 ± 0.3	18.6 ± 0.8
8	Salmalia malabarica	8.3 ± 3.1	92.2 ± 4.2	15.2 ± 2.9	28.1 ± 0.5	18.9 ± 0.9
9	Fluggia Leucopyrus	45.0 ± 4.3	96.0 ± 3.4	28.8 ± 0.3	25.1 ± 1.2	19.0 ± 1.3
10	Jujbe tree (Zizyphus mauritiana)	50.0 ± 2.3	93.1 ± 2.1	18.7 ± 5.8	30.0 ± 1.5	19.8 ± 0.1
11	Mimosa pudica	50.0 ± 0.5	92.1 ± 1.3	24.0 ± 0.3	44.4 ± 2.3	21.0 ± 0.1
12	Neem (Azadirachtaindica)	71.4 ± 1.3	95.3 ± 0.5	15.6 ± 1.5	24.9 ± 2.6	22.5 ± 0.6
13	Wild liquorica (Abrus precatprious)	32.0 ± 1.7	90.8 ± 4.2	20.6 ± 2.9	30.5 ± 1.3	22.6 ± 2.5
14	Wendlandia glabrata	62.5 ± 1.2	95.1 ± 3.2	22.6 ± 2.6	32.7 ± 0.3	22.8 ± 0.4
15	Almond (Tenminalia catappa)	27.8 ± 0.5	95.0 ± 5.1	12.7 ± 3.4	28.3 ± 0.3	23.4 ± 0.3
16	Three leaved caper (Crataeva, religiosa)	50.0 ± 1.6	80.1 ± 2.0	27.7 ± 1.5	35.1 ± 2.5	23.4 ± 0.3
17	Ringworm Shrub (Cassia Siamea)	11.1 ± 1.3	98.1 ± 1.6	12.8 ± 2.6	45.9 ± 1.2	23.5 ± 0.4
18	Accaica Pennata	42.5 ± 0.4	94.0 ± 4.2	28.5 ± 3.1	35.3 ± 0.6	23.7 ± 0.5
19	Albezzia lebbek	42.5 ± 1.5	96.0 ± 3.4	32.4 ± 2.1	30.0 ± 0.2	24.4 ± 2.6
20	Bayan (fiscus spp)	16.6 ± 2.6	91.2 ± 5.0	17.7 ± 1.5	42.0 ± 0.4	25.0 ± 0.3
21	Gliridcidia	22.0 ± 3.5	89.3 ± 2.1	18.6 ± 0.6	39.9 ± 0.5	25.5 ± 0.5
22	Pigeon pea (Cajanus indicus)	50.0 ± 0.5	90.0 ± 1.0	19.6 ± 1.7	31.7 ± 1.2	26.5 ± 0.9
23	Water hyacinth(Bud) (Eichornia crassipes)	50.0 ± 2.3	88.0 ± 2.1	8.0 ± 2.0	58.0 ± 2.5	27.8 ± 1.4
24	Morinda persicaefolia	37.5 ± 2.4	98.0 ± 2.3	22.0 ± 1.3	36.0 ± 1.3	27.9 ± 1.3
25	Bastard myobalan (Terminalia belerica)	37.5 ± 1.3	94.1 ± 4.1	8.6 ± 2.9	28.2 ± 3.0	28.3 ± 0.2
26	Tatropha spp.	25.0 ± 0.5	86.1 ± 2.3	14.5 ± 3.1	39.3 ± 2.0	30.8 ± 0.6
27	Vouhaemia	40.0 ± 1.3	90.0 ± 1.7	17.2 ± 2.3	51.1 ± 0.5	34.2 ± 1.6
28	Ceylon oak (Kusum) (Schileichera oleosa)	30.0 ± 1.3	98.1 ± 1.2	13.4 ± 1.2	41.2 ± 0.9	36.0 ± 1.3
29	Dolicahndrone spathacea	37.5 ± 1.5	92.1 ± 3.4	14.3 ± 1.7	43.7 ± 1.3	38.2 ± 2.3
30	Bamboo leaf	86.5 ± 1.4	66.9 ± 2.3	13.06 ± 0.7	71.1 ± 1.2	53.1 ± 0.3

Acknowledgement

The authors would like to express their sincere gratitude to International Atomic Energy Agency (IAEA) for the support of laboratory equipments, essential chemicals, and technical knowledge for this work.

Profound thanks are due to all persons participated in any part throughout this work.

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