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NUTRITIVE VALUE OF LOCAL GRASS AND LEGUMES

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ABSTRACT: Local grass (*Brachiaria mutica*) and legumes (*Leucaena leucocephala*, *Sesbania grandiflora* and *Mimosa pigra* L.) were liberally fed to sheep in a balance trial so as to detect the voluntary intake, apparent digestibility, nitrogen balance and other nutritive values.

The results of this experiment showed that there were no statistical significant differences in voluntary feed intake. On the contrary dry matter and organic matter digestibility of *Sesbania* and *Para* grass were higher ($p < 0.05$) than the others. The average dry matter digestibility of *Leucaena*, *Sesbania*, *Mimosa* and *Para* grass were 54.5, 67.0, 53.2 and 63.3 percent while the average organic matter digestibility were 55.7, 68.8, 55.3 and 66.3 percent, respectively.

It was, however, concluded from the nutritive values investigated from the experiment that all of these local grass and legume trees could be used as ruminant feeds but *Sesbania* seemed to have the highest palatability. Therefore, further experiments should be conducted in order to get more information from these feeds.

INTRODUCTION

Para grass (*Brachiaria mutica*) has been used as dairy feed for a long time. Though it is not a native grass, it can be grown and adapted itself well to every regional condition of Thailand, consequently, most farmers accepted it as local feed. It has a very low nutritive value but it's widely used among farmers.

Mimosa pigra L., a legume tree, is now classified as a noxious weed because of its rapid infestation. It causes much problem to arable lands especially in the North. And it can be seen in some places in central region of the country. If there is no proper control measurement, damage in agricultural areas will be visible in the near future.

Other fast growing legume trees such as *Leucaena leucocephala* and *Sesbania grandiflora* are being used as plants for reforestation. *Leucaena* itself plays an

important role in feed industry because it is widely used in animal feeds and has high protein content. *Sesbania* also is another interesting plant which can possibly be used as animal feed. Apart from its rapid growth it also has a very high palatability.

This experiment had an aim to compare the nutritive values of local legumes with grass which was used as a control feed. Therefore, next experiments of these feedstuffs will be based on the results of this research.

MATERIALS AND METHODS

Four male castrated sheep had the average weight of 40.1 ± 1.9 kilograms were used in a 4×4 latin square design to perform an *in vivo* digestibility trial. Each animal was randomly received one of the four local feedstuffs which were *Brachiaria mutica* (Para grass), *Leucaena leucocephala* (LEU), *Sesbania grandiflora* (SES) and *Mimosa pigra* L. (MIM).

All of the sheep were kept in the metabolic cages from January to April 1988. Feeding was taken twice daily at 8 a.m. and 4 p.m.. Water and mineral lickstone were freely available. These roughages were chopped to approximately 3-6 cm long in order to break down the hard lignified stems. The amount of feed given during the collection period of 7 days was fixed according to the intake measured in the preliminary period of 14 days (Schneider, 1975).

In the collection period, fresh grass and legumes were cut 2 times a week and the fixed amount of them for all individual feedings were kept in the refrigerator. In the same time a sample was taken and immediately determined for dry matter (DM) in hot air oven at 135°C . Mixed samples of the same feeds from 2 cutting time were dried for further chemical analysis.

Total feces was collected twice a day before feeding time while urine was collected only once before morning feeding time. In order to prevent nitrogen loss, 50 ml of 18 N HCL was added in the collected urine.

Weende analysis was used to analyse nutritive values which were dry matter (DM), ash, ether extract (EE), crude protein (CP) and crude fibre (CF) of feed, feces and feed refusal. Feed was also examined for neutral detergent fibre (NDF), acid detergent fibre (ADF) and acid detergent lignin (ADL) by Goering and Van Soest's method (1970). Nitrogen content was determined in the collected urine.

Duncan's new multiple range test together with SAS-program were used to measure the differences between all of the treatment means.

RESULTS

Chemical composition of the feeds was presented in Table 1. It was found that Sesbania had the highest in crude protein content (26.3 percent) and, on the other hand, had the lowest in crude fibre content (14.5 percent) while Para grass consists of only 14.2 percent of crude protein which was the lowest content among the groups.

Voluntary intake, apparent digestibility coefficients of the investigated feed components, nitrogen balance and percentage of dry matter intake per bodyweight⁷⁵ are showed in table 2. It was found that there is no statistical significant difference in voluntary intake and nitrogen - retention but Sesbania and Para grass had statistically higher dry matter and organic matter digestibility. Sesbania and Para grass gave better crude protein and crude fat digestibility than the other feeds except ether extract digestibility which Sesbania gave the lowest value.

Although there is a difference in percentage of intake per bodyweight of the animal, the percentage of digestibility per bodyweight shows no significant differences.

Table 1. Chemical composition of the experimental feeds.

Feed (%DM)	Leucaena	Sesbania	Mimosa	Para grass
DM	38.7 ± 4.4	27.7 ± 5.7	35.3 ± 6.8	18.9 ± 3.3
OM	91.9 ± 0.9	91.0 ± 0.7	94.0 ± 0.4	87.3 ± 1.5
CP	20.3 ± 0.3	26.3 ± 4.6	22.3 ± 2.3	14.2 ± 3.6
EE	6.4 ± 1.1	3.6 ± 0.5	2.4 ± 0.8	2.1 ± 0.5
CF	19.2 ± 0.5	14.5 ± 1.1	22.8 ± 0.7	28.1 ± 2.2
Ash	8.1 ± 0.9	9.0 ± 1.7	6.0 ± 0.4	12.7 ± 1.5
ADF	20.6 ± 1.3	18.7 ± 1.9	28.4 ± 1.4	31.0 ± 2.9
ADL	9.6 ± 0.4	9.0 ± 1.0	8.8 ± 1.3	2.3 ± 1.5
NDF	25.5 ± 1.0	20.0 ± 1.0	33.2 ± 1.4	53.6 ± 4.0

Table 2. Voluntary intake, apparent digestibility coefficients, N-balance and percentage of DM intake per bodyweight⁷⁵

	LEU	SES	MIM	GRASS
Voluntary Intake (g)	1050 a ±419	952 a ±203	1064 a ±218	943 a ±222
Variation of VI (%)	40	21	20	24
DMD	54.5 b ±1.6	67.0 a ±1.2	53.2 b ±4.3	63.3 a ±3.0
OMD	55.7 b ±1.4	68.8 a ±0.8	55.3 b ±3.6	66.3 a ±1.3
CPD	74.6 a,b ±11.9	82.0 a ±6.7	64.5 b ±11.6	84.9 a ±4.6
EED	18.0 b ±13.5	-29.2 c ±23.3	33.6 b ±25.3	50.7 a ±12.8
CFD	24.1 c ±2.6	39.5 b ±8.1	41.6 b ±8.1	62.7 a ±3.3
AshD	40.3 a ±8.9	49.4 a ±5.6	20.6 b ±16.0	41.6 a ±22.8
N-retention (g/day)	9.2 a ±7.3	4.3 a ±6.5	0.8 a ±11.7	5.4 a ±4.2
N-retained/N-intake (%)	22.4 a ±13.8	9.3 a ±15.7	2.4 a ±29.0	22.6 a ±21.1
% DM intake/ Bodyweight ⁷⁵	6.6 a	6.1 a	6.8 a	6.1 a

Means on the same row with different superscript indicated statistical significant difference (P > 0.05).

DISCUSSION

Crude protein content of *Leucaena* and *Sesbania* in this experiment were lower than the reports from Vearasilp (1981) and Sampet and Pattaro (1987) which showed that the former averagely had 24 percent while the latter had 29.1 percent crude protein. It can be explained that there was a difference in method and age of cutting and time of conduction this research was in dry season.

The digestibility of Para grass had the same results as reported by Cheva-Isarakul (1987). *Sesbania* gave the highest digestibility this was because it had a very low crude fat content, NDF and ADF.

Leucaena had a very high variation in voluntary intake because of its palatability, the animals themselves or the effect of mimosine. However, Cheva-Isarakul (1987) reported that the native ruminants showed no detorious effect after eating *Leucaena* for 3 months.

Table 3. Apparent digestibility coefficients and dry matter intake per bodyweight^{.75} for individual animal.

Sheep No.	1	2	3	4
DMD	60.3 a	58.4 a	59.0 a	59.0 a
OMD	59.9 a	61.3 a	62.5 a	62.3 a
DCP	79.3 a	79.8 a	72.9 a	74.0 a
CFD	39.7 a	45.0 a	41.8 a	41.4 a
%DMI/BW ^{.75}	6.4 a,b	8.0 a	5.6 b	5.6 b

Means on the same row with different superscript indicated statistical significant difference ($P > 0.05$).

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