

DIGESTIBILITY AND GROWTH RESPONSE WHEN TREE LEGUMES SOLELY FED TO SHEEP

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ABSTRACT

The evaluation of growth rate and digestibility on sheep which were fed single feed of tree legumes, *Gliricidia* (*Gliricidia sepium*), *Calliandra* (*Calliandra callothyrsus*), and *Leucaena* (*Leucaena leucocephala*) has been done for 4 months at Research Institute for Animal Production. Twenty four young sheep with an average live weight of 14.7 kg and 10 months of the age were randomly divided into 4 groups of 6 animals in each. Each group was offered by either 100% *Gliricidia*, *Calliandra*, *Leucaena*, or Elephant grass (*Pennisetum purpureum*) as control group, *ad libitum*. Sheep were weighted fortnightly for 3 months and digestibility values were estimates for 10 days following the growth studying in metabolism cages. There were significant differences ($P < .05$) on dry matter intake, digestibility and daily gain. The total dry matter intake was 41; 36; 33; and 32 gram/kgLW in sheep fed *gliricidia*, *calliandra*, *leucaena*, and elephant grass respectively. In the same order, the dry matter digestibility values were 69; 59; 62 and 57% respectively. Meanwhile the average daily gains were 44; 39; 47 and 19 gram/day, respectively. It is concluded that *leucaena* was the best followed by *gliricidia*, *calliandra*.

Key words: Tree legume, Sheep, Digestibility, Growth

INTRODUCTION

In developing countries, ruminant productivity is often affected by the low nutritive quality of grass and crop residues. Tree legumes, which have high nitrogen contents, can be used as protein supplement for poor quality foodstuffs. Panjaitan (1993) reported that supplementation of diet by tree legumes such as *Leucaena leucocephala*, *Gliricidia sepium*, *Sesbania sp* and *Calliandra callothyrsus* can improve the animal productivity.

Gliricidia, *leucaena*, and *calliandra* have been used widely as feed supplement for sheep and cattle in Indonesia. The high protein content (24 - 30 %) and high production (19 - 120 ton dry matter/ha/year) make those tree legumes are potential as feed for ruminant. Moreover, there is no report about the negative effect of the using tree legumes as feed supplement (Ilyas, 1986; Wina and Syahgiar, 1991; Tangendjaja *et al.*, 1992).

Some studies reported that supplementation of *gliricidia*, *leucaena*, and

calliandra increased daily gain of sheep (Ilyas, 1986; Wina and Syahgiar, 1991; Tangendjaja, *et al.*, 1992; Manurung and Muladi, 1997). However, there were no comparative studies when these tree legumes were fed individually. This study is part of a major experiment on how amino acids affecting profiles of reproductive hormones. This study was designed to investigate the dry matter intake and the digestibility value of *gliricidia*, *leucaena* and *calliandra* and also the growth responses of sheep when they were used as sole feed.

MATERIAL AND METHOD

Twenty-four young sheep weighing @ 14.7 kg and @ 10 months old were divided into four groups of 6 animals in a completely randomized design. Group 1 was fed 100 % chopped fresh elephant grass as control, group 2, 3 and 4 were fed 100 % chopped fresh *gliricidia*, *leucaena*, and *calliandra*,

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Table 1. The nutritive value of elephant grass, gliricidia, calliandra, and leucaena which were used in the experiment.

| Treatment | CP (%) | GE (Mj/Kg) | NDF (%) | ADF (%) | Cellulose (%) |
|----------------|--------|------------|---------|---------|---------------|
| Elephant grass | 5.22 | 16.6 | 74.96 | 48.73 | 40.33 |
| Gliricidia | 22.72 | 20.5 | 36.09 | 23.11 | 17.14 |
| Calliandra | 26.96 | 20.7 | 30.51 | 18.15 | 15.26 |
| Leucaena | 26.06 | 19.9 | 33.11 | 22.44 | 16.99 |

respectively. Feed was given twice a day, at 08.00 a.m. and 14.00 p.m. *ad libitum*. They were placed in individual pen. Water and salt were available at all time.

The evaluation of growth rate was started after 2 weeks adaptation period and sheep were weighted fortnightly for 3 months. Furthermore the digestibility value and dry matter intake were estimated in metabolism cages for 10 days following the growth study.

The daily gain was calculated by regressing body weight (kg) of individual animals measured fortnightly on time (in days). Then all data were analyzed statistically by the two-way analyses of variance using ANOVA and then the Least Significant Difference was used to show the differences among treatment means.

RESULT AND DISCUSSION

The nutritive value of elephant grass, gliricidia, calliandra and leucaena are shown in Table 1.

The protein content of gliricidia, calliandra, and leucaena are higher than that of elephant grass. On the other hand, the NDF,

ADF, and cellulose content of elephant grass are higher than those of gliricidia, leucaena, and calliandra.

Average daily gain and digestibility responses are summarized in Table 2.

Table 2 shows that there is significant differences ($P < 0.05$) among treatments on dry matter intake and digestibility values. The dry matter intake of animals fed gliricidia was higher significantly ($P < 0.05$) than that of animals fed elephant grass as control, calliandra, and leucaena. Meanwhile there is no difference between dry matter intake of the sheep fed calliandra and leucaena.

The digestibility value of gliricidia (69%) is higher significantly ($P < 0.05$) than that of leucaena (62%), calliandra (59%), and elephant grass (57 %). It also can be seen that the digestibility value of calliandra was similar to elephant grass ($P < 0.05$). Wina and Syahgiar (1991) have reported the higher digestibility value of tree legumes. They said that the digestibility of fresh gliricidia was 69%, fresh calliandra was 59% and fresh leucaena was 64%. The daily gain of sheep fed leucaena was highest than it was followed by the daily gain of sheep fed gliricidia, calliandra and elephant grass ($P < 0.05$). Based on the daily gain &

Table 2. Dry matter intake, digestibility values, and average daily gain of sheep fed 100 % elephant grass, gliricidia, calliandra, and leucaena

| Measurement kg | Elephant grass | Gliricidia | Calliandra | Leucaena |
|--------------------------|-----------------|-----------------|-----------------|-----------------|
| Dry matter intake (g/LW) | 32 ^c | 41 ^a | 36 ^b | 33 ^b |
| Digestibility value (%) | 57 ^c | 69 ^a | 59 ^c | 62 ^b |
| Daily gain | 19 ^c | 44 ^a | 39 ^b | 47 ^a |

Values with different superscripts in the same row, differ significantly ($P < 0.05$)

DMI values, leucaena was the most efficient used.

CONCLUSION

When fed solely, leucaena was the best followed by gliricidia, calliandra.

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