

RESPONSE OF GOAT FED WITH *Indigofera* sp. AND *Pennisetum purpureum* cv. MOTT

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Abstract. This study evaluated the response of goat fed with *Indigofera* Sp. and *Pennisetum purpureum* cv. Mott. We randomly assigned fifteen goats with an initial body weight of ± 20 kg into three treatments and five replications using Completely Randomized Design (CRD). The treatments were T0= 0% *Indigofera* sp. + 100% *Pennisetum purpureum* cv. Mott T1 = 20% *Indigofera* sp. + 80% *Pennisetum purpureum* cv. Mott, T2= 40% *Indigofera* sp. + 60% *Pennisetum purpureum* cv. Mott. Data analysis was done with analysis of variance (ANOVA) test and Duncan multiple range test. We assessed daily weight gain, dry matter intake, digestibility of dry matter, and feed efficiency as study outcomes. Feeding of *Indigofera* sp. and *Pennisetum purpureum* cv Mott in different doses significantly affected ($p < 0.05$) dry matter digestibility, dry matter intake, daily weight gain and feed efficiency. In all variables, T2 significantly affected ($p < 0.05$) all study outcomes compared to T1 and T0. Mean dry matter digestibility ranged from 41.5 to 65.0%. Mean dry matter intake ranged from 260.2 to 466.6 g/head/day. Mean daily weight gain ranged from 22.30 to 72.4 g/head/day. Mean feed efficiency in this study ranged from 22.30 to 72.4 g/head/day. We found an optimal response of goat after feeding with 60% *Pennisetum purpureum* cv. Mott + 40% *Indigofera* sp.

Keywords: *Indigofera* sp., *Pennisetum purpureum* cv. Mott, daily weight gain (DWG), feed efficiency, dry matter intake (DMI), dry matter digestibility (DMG)

1 Introduction

Feed is an important aspect in livestock management. Previous studies showed that feed accounts for almost 70% of total cost in animal production and it greatly affects the quality and quantity level of livestock commodity. Ruminant livestock would produce well if sufficient and sustainable forage is available.

Forage is a combination of grass and legumes that essential to complement the nutritional elements needed by livestock. Mini elephant grass (*Pennisetum purpureum* cv. Mott) is one of the forages that has high productivity, high nutritional values and high palatability for ruminants [1]. We considered to utilize legumes along with grass due to its high nutritional value.

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Indigofera sp is a potential legume with high protein, minerals, and crude fiber, could increase feed efficiency, growth and productivity of livestock [2]. *Indigofera* sp. can be utilized as animal feed due its rich nitrogen, phosphorus and calcium [3, 4]. Edwards *et al.* [5] showed that *Indigofera* sp. is a good choice for forage and contains 27.9% of crude protein, 15.25% of crude fiber, 77% digestibility, 0.22% of calcium and 0.18% of phosphorus.

In this study, we evaluated the response of goat fed with *Indigofera* sp. and *Pennisetum purpureum* cv. Mott.

2 Materials and Methods

2.1 Experimental design

Feed ration used in this study composed of *Indigofera* sp. and *Pennisetum purpureum* cv. Mott. Fifteen goats aged 10 months were recruited in this study, with mean initial body weight of ± 20 kg. The goats were randomly assigned to one of three treatments and five replications of each treatment.

T0 : 0% *Indigofera* sp. + 100% *Pennisetum purpureum* cv.Mott

T1 : 20% *Indigofera* sp. + 80% *Pennisetum purpureum* cv.Mott

T2 : 40% *Indigofera* sp. + 60% *Pennisetum purpureum* cv.Mott

We measured DWG, DMI, DMD and feed efficiency as study outcomes.

2.2 DWG

DWG was obtained by the different between final weight with the initial weight.

2.3 DMI

DMI was measured from the multiplication of dry matter analysis with the difference between the offered feed and the discharged feed.

2.4 DMD

DMD was calculated with following formula

$$\text{DMD} = \frac{\text{DM of offered feed} - \text{DM of discharged feed}}{\text{DM of offered feed}} \times 100\%$$

2.5 Feed efficiency

Feed efficiency was measured by dividing the daily weight gain with feed consumption.

2.6 Statistical analysis

All data was analyzed with ANOVA test and Duncan's multiple range test.

3 Results and discussion

ANOVA test showed that the feeding with *Indigofera* sp. and *Pennisetum purpureum* cv Mott in different ratios significantly ($p < 0.05$) affected DMD. We found the mean DMD was 41.5% to 65.0%. This was like what Sandri [6] reported in his study, that the chemical composition of the given feed greatly affects the digestibility. Nutritive value of each three different treatments is shown in Table 1.

Table 1. Nutritive value of each ration for T0, T1 and T2

Nutritive value %	T0	T1	T2
Dry matter	19.19	20	21
Crude protein	10.2	15	28
Crude fat	1.6	1.5	1.4
Crude fiber	34.2	32.1	35

Table 2. Study outcomes goat fed with *Indigofera* sp. and *Pennisetum purpureum* cv. Mott in three different treatments

Treatments	DMD (%)	DMI (g/head/day)	DWG (g/head/day)	Feed efficiency
T0	41.5 ± 4.5 ^a	260.2 ± 21 ^a	22.30a ± 5.19 ^a	0.08 ± 0.01 ^a
T1	53.0 ± 1.0 ^b	320.3 ± 21.20 ^b	42.5 ± 6.86 ^b	0.13 ± 0.01 ^b
T2	65.0 ± 1.3 ^c	466.6 ± 10.10 ^c	72.4 ± 3.02 ^c	0.15 ± 0.08 ^c

Numbers followed by different superscripts in the same row indicate significantly different effect ($P < 0.05$)

In the treatment T2, the DMI significantly different ($p < 0.05$) than treatment T1 and T0. Mean DMI in this study ranged from 260.2 to 466.6 gram/head/day, quite high in the ration. This indicates that the palatability of *Indigofera* sp. in goats is relatively high. DMI directly affects the livestock nutrient consumption [7]. Crude protein content in *Indigofera* sp. is quite high (25.8%) [8]. An adequate and balanced supply of amino acids in goat feed increases the growth rate of microorganisms, elevates pH and ammonia-N level in rumen fluid, along with crude protein content. An increase of DMI in this study could also be related with increased protein intake that stimulates rumen microbial activity [9]

DWG and feed efficiency were significantly affected ($p < 0.05$) after feeding of *Indigofera* sp. and *Pennisteum purpureum* cv. Mott in different ratios. Treatment T2 produced the greatest DWG ($p < 0.05$) compared to treatment T1 and T0. In this study, the mean DWG ranged from 22.30 to 72.4 g/head/day. This value is lower than what Kaunang and Pudjihastuti [10] reported in their study, namely 50.66 to 110.40 g/head/day.

Treatment T2 produced the feed efficiency that significantly higher ($p < 0.05$) than treatment T1 and T0. Mean feed efficiency in this study ranged from 0.08 to 0.15. An increase of feed efficiency is a response to the increased feed consumption and digestibility. Feed efficiency numerically increased after the feeding of *Indigofera* sp. with greater concentration, and the highest feed efficiency was found in treatment T2. This increase of feed efficiency was a response to increased feed consumption and digestibility, thus elevating the nutrient availability, particularly protein and energy. This is in accordance with a study by Mui *et al.* [11]. In their study, they showed the tree legumes rations ranged from 30% to 50% in dry matter.

4 Conclusion

In this study we concluded that an optimal response of goat is obtained after feeding with 60% of *Pennisetum purpureum* cv. Mott + 40% of *Indigofera* sp.

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