

Indigofera Sp as a Source of Protein in Forages for Kacang Goat in Lactation and Weaning Period

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ABSTRACT: Study was conducted to investigate the effects of *Indigofera* as a sources of protein in forages for Kacang goat in Lactation and weaning goat. The research were performing by observing 12 heads of Kacang goat (lactation period) with three different treatments and five replications in Randomized Experimental Design. Treatment I (R1): 100% of natural grass, (R2): 60% of natural grass and 40% of *Indigofera* sp, (R3): 40% of natural grass and 60% *Indigofera* sp. Proximat analysis was found crude protein of *Indigofera* 27%, fat 6,15, crude fiber 15,25%, ash 6,41 %. Treatment of R3 showed the amount of average daily gain lactated Kacang goat is highest (90.74 gr/head/day) compare than R2 of 81.48 gr/head/day) while R1 is the lowest which only 32.59 gr/head/day. Meanwhile the that treatment of R3 is the highest in enhancing average daily gain of goat kids 75.88 grs/head/day while the treatment of R2 almost similar of 72.44 grs/head/day. It is, however, R1 is the lowest compare other treatments (56.66 grs/head/day).

Keywords: *Indigofera*, Kacang go at, forages, sources of protein,

INTRODUCTION

Kacang goat is indigenous breed and it has an important role in supplying meat in Indonesia. The benefits in rearing Kacang goat in Indonesia is based by several reasons. First, it has ability to adapt in dried climate and consume a low quality of forages. Second, it has a high level of litter size. Third, almost 80% of farmer rears Kacang goat in a dry land. It is, however, Kacang goat has not been explored optimally.

In South Sulawesi province, the population of Kacang goat increased moderately in a period of 2009 to 2013 from 437,918 to 644,583 heads (Indonesia National Statistic Services, 2013). The enhancement of Kacang goat in this area is supported by agro ecosystem and it can substitute the losses of farmers when harvest fail in main plantation occurred.

Low level quality of forages is said to be a major problem in rearing Kacang goat in dry land so introducing both grass and tree legumes, which consist a high level of nutrient such as *Indigofera* sp, as a way in enhancing the nutrient quality of forages. *Indigofera* is well known as tarum plant, has about 700 species, including *Indigofera zollingeriana*. These plants are leguminous species that have high nutrient content and production as well as tolerant to abiotic stresses. This plant originated in tropical Africa, Asia, Australia, and North and South America, then spread to arid zone of Africa and Asia. In early 1900, it was brought by Europeans colonial to Indonesia. *Indigofera* can grow well at altitudes between 0-2,200 m above sea level, with rainfall between 600-3,000 mm/year. It can be used as a fodder crop because it has high nutrient content and production. It can be harvested at the age of eight months with an average production of 2,595 kg of fresh biomass/tree, with a total production of fresh approximately 52 tons/ha (Herdiawan and Krisnan, 2014).

Ruminant productivity is largely determined by the quality of forage. Forage in Indonesia, particularly grasses contain lower crude protein (average 7%-11%) and TDN (50%-60%) than those nutrients required by animal. This means, farmers have to add other sources of nutritious feed in ration in order to meet nutritional needs and sustain their animal performance. Appropriate feeding management by introducing fodder legume such as Indigofera in ruminant ration may improve nutrient intake and animal production. Inclusion of Indigofera in ruminant ration needs to be considered due to its high nutritional value (Abdullah, 2008).

A research conducted by Kotten *et al*, (2014) that Indigofera sp contains a high value of nutrient (protein, calcium, and phosphor). They found that in one year plantation and three month of interval defoliation, crude protein contain average of 23.20%, 90.68 of organic matter, NDF, phosphor, and Calcium is about 36.72%, 0.83%, and 1,23% respectively. Similarly with research conducted by Yumiaty (2006), these forages are fitted as a source of protein, especially for goat lactation period.

MATERIALS AND METHODS

This research is performed in Gowa experimental farm (Assessment Institute of Agriculture Technology) by observing 12 heads of Kacang goat (lactation period) with three different treatments and four replications in Randomized Experimental Design. Treatment I (R1): 100% of natural grass, (R2): 60% of natural grass and 40% of Indigofera sp, (R3): 40% of natural grass and 60% Indigofera sp. Goats is placed in an individual stable and reared for three months which fed two times a day and ad libitum of water. Research goats reared in individual cages equipped with a feed and a drink. Feeding is done 2 times a day that is at 7 am and 17 pm. Kacang goat gets forage and indigofera research at 3.5 months during the study period of adaptation which divided the study for 2 weeks and retrieval of data for 3 months.

Data were analyzed by using a completely randomized design (CRD). The parameters are collected is the mother and the kid's body weight, daily weight gain, consumption and feed conversion, body weight gain mother and kid pre weaning.

RESULT AND DISCUSSION

Nutrition Value

Quality of nutrient of feeding is seen by chemical composition of forages which consisted such dry matter, crude protein, crude fiber, fat, and nitrogen free extract. Analysis resulted indicates that nutritive contents also similar to body of animal. In this regard, animal consumes natural grass which relatively low of nutrient so adding to such legume is said as a best way in enriching the value of nutrient.

The main forages used are natural grass available in field or in common land while add with legume which contain a high nutrition of crude protein. Table 1 shows proximate analysis of forages using in this research.

Table 1: Proximate Analysis of Forages

Material	Water	Crude Protein	Fat	Crude Fiber	Nitrogen Free Extract	Ash
Natural Grass	6.00	6.46	6.93	47.0	23.9	20,4
Indigofera sp	12	27.9	6.15	15.25	20.0	6.41

Based on proximate analysis on natural grass used in this research indicated that protein contain is very low (only 6.46%). Similarly, Ella *et al* (2004) also found the same result as the natural grass need to be added with legume which has a high level of protein such Indigofera sp. In this point, it will enhance nutritive value of feeding.

Average Daily Gain

The successful in rearing goats depends upon by the equilibrium of composited value of forages nutrient. Adding legumes such Indigofera sp is said to be a best way in enhancing the quality of feeding. Enhancement of daily gain as a one of few criteria in analyzing the quality of forages due to daily gain indicates the value of nutrient.

Goats in lactation period need a high protein compare to other period (about 14-16%) to recover post partum. The research was performe by Teh *et al*, (1994) that great amounts of nutrient goats in feeding during early lactation when the feed intake capacity is limited, leading the animals to mobilize their body energy reserves.. Thus, it is important to provide lactating goats with palatable feed containing a high protein energy density. Average daily gain of Kacang goats shows in table 2 is as follows:

Table 2. Average Daily Gain of Lactated Kacang Goats

Material	R1	R2	R3
Weight (beginning – kgs/head)	21.73	21.17	25.83
Weight (Ending – kgs/head)	24.67	28.50	34.0
Average Daily Gain (gr/head/day)	32.59 ^b	81.48 ^a	90.74 ^a

Different superscripts in the same row shows a significantly different effect (P <0.05)

Referring to table 2 above, treatment of R3 showed the amount of average daily gain is highest (90.74 gr/head/day) compare than R2 of 81.48 gr/head/day) while R1 is the lowest which only 32.59 gr/head/day. The average of daily gain of R2 and R3 is statistically not significant. Another research performed by Tarigan *et al*, (2011) found that the average daily gain of Boerka breed goats for 52.4 gr per head per day by feeding them with contain of 45% Indigofera. The benefits of Indigofera enhance milk production of Sannen goat breed (Morand *et al*, 1991).

Table 3. The Average Daily Gain of Kid Goats

	R1	R2	R3
Weight (beginning – kgs/head)	1.4	1.28	1.4
Weight (Ending – kgs/head)	6.5	7.8	9.6
Average Daily Gain (gr/head/day)	56.66 ^b	72.44 ^a	75.88 ^a

Different superscripts in the same row shows a significantly different effect (P <0.05)

Referring to Table 3 above indicated that treatment of R3 is the highest in enhancing average daily gain of 75.88 grs/head/day while the treatment of R2 almost similar of 72.44 grs/head/day. It is, however, R1 is the lowest compare other treatments (56.66 grs/head/day). These results indicated that the availability of milk for weaning goat is determined by score body condition of goat.

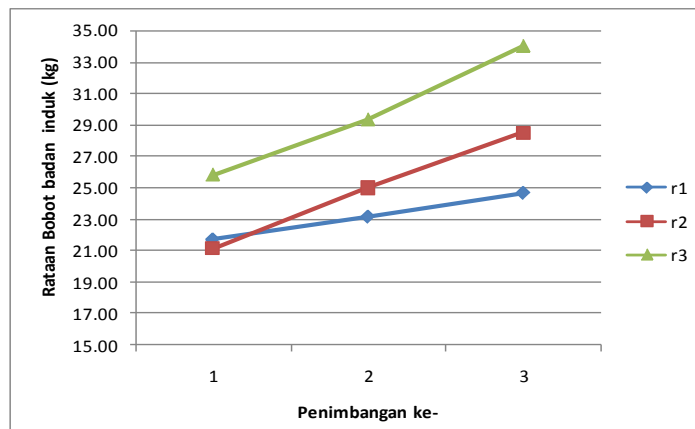


Figure 1. Average daily gain of Kacang goats lactation period of three months

As showed from figure 1 above, all treatments indicated the enhancement of daily gain which both R3 and R2 are the highest rather than R1.

Consumption and Feed Conversion

Productivity of animal is influenced by consumption and feed conversion. In this research, feed consumption in R1 is highest compare to R2 and R3. However the number of average daily gain in R3 and R2 is highest rather than R1. It means feeding which contains Indigofera enhancing daily gain rather than without adding it's legume.

Table 4. Consumption and Feed Conversion of Goat Lactation Period.

	R1	R2	R3
Feed consumption (grs/head/day)			
- Natural grass	724.5	363.5	210
- Indigofera	0	331	485.5
Total Amount	724.5	694.5	695.5
Average Daily Gain (grs/head/day)	56.66	72.44	75.88
Feed Conversion	12.80	9.58	9.16

As showed from table 3 above, the lowest level of feed consumption in R3 is of 695.5 grs/head/day followed by R2 is about 694.5 grs/head/day. Meanwhile, the highest level of feed consumption (724.5 grs/head/day) is in R2 treatment. The highest value of feed conversion (see table 4 above) is in R1 treatment followed by R2 and R3 (9.58 and 9.16 respectively). Feed conversion in this research is similar with research conducted by Siregar (2008) which found for 8.56 – 13.29. Another research performed by Mide (2007) that the lowest level of feed conversion for goats will efficiently enhance the amount of daily gain.

CONCLUSION

Based upon the results of the study concluded substitution indigofera of 60% on the Kacang goat feed are breastfeeding can increase body weight gain mother and kid pre weaning.

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