IOSR Journal Of Pharmacywww.iosrphr.org
(e)-ISSN: 2250-3013, (p)-ISSN: 2319-4219
Volume 7, Issue 10 Version. 1 (October 2017), PP. 34-38

Substitution Of Concencrate With Silage Of Cassava Leaf (*Manihot Esculenta*,Crantz) And Gliricidia (*Gliricidia Sepium*, Jacq.) Mixtures On Feed Consumption And Average Daily Gain Of Goat

Nolasco Da Costa
Faculty Animal Husbandry, Of UNITAL University De Timor Lorosa'e
Departemen Of Faculty Animal Husbandry (UNITAL),University De Timor Lorosa'e Rua liberdade de imprensa Becora, Cristo- Rei Dili Timor - Leste Phone +670 77010018

Abstract: *The purpose of this research was to study substitution of concencrate with silage of cassava leaf (Manihot esculenta, Crantz) and gliricidia (Gliricidia sepium,Jacq.) mixtures on feed consumption and average daily gain of Goat. Materials used in this experiment were 20 Goat at early average body weight 23.85 kg ± 4.75 and coeficient of variance 19.94%. They were arranged in Randomaized Block Design with 5 treatments that were replicated 4 blok. Feed used were Corn Leaf (CL), Concentrate (C) and cassava leaf and gliricidia mixture Silage (S), with ratio corn leaf and concentrate were 60%:40% dry matter basis. Five dietary treatments applied were: R_O: corn leaf 60% and concentrate 40% (Concentrate 100% and Silage 0%), K2: corn leaf 60% and concentrate 40% (Concentrate 75% and Silage 25%), K3: corn leaf 60% and concentrate 40% (Concentrate 50% and Silage 50%), K4: corn leaf 60% and concentrate 40% (Concentrate 25% and Silage 75%), K5: corn leaf 60% and C 40% (Concentrate 0% and Silage 100%). The variable's observed in this research were dry matter intake (DMI), Organic Matter Intake (OMI), Crude Protein Intake (CPI), and Average Daily Gain (ADG).The results showed that the treatments not significant different (P>0.05) on Crude Protein Intake, but significant different (P<0.05) on Dry Matter Intake (DMI), Organic Matter Intake (OMI) and Average Daily Gain (ADG) of Goat. The highest and the lowest value of DMI (g/kg^{0,75}/day) at K1 (68.73) and K4 (60.61); OMI (g/kg^{0,75}/day): K1 (64.16) and K4 (56.37); CPI (g/kg^{0,75}/day): K1 (11.11) and K4 (10.08). ADG (g/animal/day): K1 (168.90) and K5 (159.15). It was concluded that the substitution concencrate with silage cassava leaf and gliricidia mixture up to 100% could decrease feed intake and average daily gainof Goat. How ever, substitution concentrate on 25% silage of cassava leaf and gliricidia mixture showed same respon with treatment.*

Keywords: *Cassava Leaf, Gliricidia, Silage, Concencrate, Goat*

Date of Submission: 29-09-2017 Date of acceptance: 27-10-2017

I. INTRODUCTION

Livestock raising business ruminansia, several factors that contribute to increasing livestock productivity are genetically livestock, feed, health, management and environmental conditions. Livestock ruminans have a wide diversivikasi in utilizing the feed included in the use of agricultural wastes that contain lots of crude fiber as a source of feed.

Cassava (Manihot esculenta, Crantz) is one of the crops that can grow throughout the year in the tropics (Rukmana, 1997). The nutritional value of cassava forage is good enough as animal feed source, because it contains crude protein content of 23.22%, dry matter 24.34, crude fiber 21.38, crude 6.77 fat and ash 8.10 (Nolasco, unpublished)

In addition to the tree, gamal is also very potential as animal feed because it has a high enough nutrient content in which the content of Dry Material: 25.56%, Crude Protein: 24.61%, Crude Fiber: 20.56, Crude Fat: 3.15%, Ash: 10.00% (Matrif, not yet published).

Utilization of cassava and gamal (Gliricidia sepium) as additional feed for Goat is not optimal. This is because there are still many farmers who do not know that gamal can be used as ruminants feed. Though gamal is quite available in farmers' land that is used as a shade plant for plants.

Provision of green cassava planting as much as 2000 g per day in Goat can increase body weight Goat 67 g per day (Rukmana, 1997). Provision of forage cassava that has been withered for 24 hours before being given as much as 1500 g per tail can increase the body weight of goats about 23.30 g per cow per day. The addition of 25% cassava planting to paddy rice base and urea (100 g urea per kg of rice straw) can increase goat body weight by 84 g per head per day (Department of Agriculture, 1997)

Cassava leaves and gamal are forage and leguminous sources of protein, each of which has been widely used as ruminants feed. However, the simultaneous use of cassava leaves and gliricidia in ruminants feed has not been made and scientific information on its use has not been reported. In the application of tree and gamal leaves as the animal feed is inseparable from the various barrier or anti-nutrients contained in it, this is what causes the use of both feed ingredients are less popular and can cause adverse impacts to livestock consumption.

In this research will be tested 5 kinds of treatment consisting of: (RO) as control feed, maize and concentrate (0% silage cassava leaf mixture and gamal in concentrate / without substitution), (R1) maize and concentrate in substitution of 25% silage of forage mixture of cassava and gamal, (R2) maize and concentrate substituted 50% silage mixture of cassava and gamal forage, (R3) maize and concentrate substituted 75% silage mixture of cassava and gamal forage , (R4) maize bucket and 100% silage mixture of cassava and gamal forage. The observed responses include consumption, and the increase in body weight of Goat.

II. MATERIALS AND METHODS

This research was conducted from Juli toSeptember 2017 Research Station in Grati, Pasuruan East Java province and the material used in this study were:

1. Livestock

Fat tailed Goat male sex of 20 tail with the aged 12-18 months and the average body weight of 23.85 kg + 3.80. Prior to use in the experiments all animals were given fluconix worm medication for parasite control and vitamin B1 to maintain cattle's endurance due to stress on transport.

2. Stables

Metabolic enclosure made of wood with a length of 120 cm x 60 cm wide and 120 cm high, equipped with a feed, drinking water given ad libitum.

3. Feed

The feed used in this study consisted of: maize tebon (TJ), concentrate (K) and silage mixture of green cassava and glirisidia (S).

III. METHODS

The study was conducted using Group Randomized Design with 5 feed treatment and 4 groups of livestock. The cattle grouping is done randomly based on body weight. In vivo treatments were prepared as follows:

Composition the Concentrate

K1: 60% Corn leaf +40% Concentrate (R1)
K2: 60% Corn leaf +40% Concentrate (R2)
K3: 60% Corn leaf +40% Concentrate (R3)
K4: 60% Corn leaf +40% Concentrate (R4)
K5: 60% Corn leaf +0% Concentrate (R5)

2.Variable observations

1. Consumption (K) BK, BO and PK
2. Daily weight gain (PBBH)
3. Data Analysis

This research was conducted by using Randomized Block Design (RAK) of Steel and Yitnosumarto (1993). If showed significant effect (P <0.05) followed by the test of the Smallest Real Beda.

IV. RESULTS AND DISCUSSION

Consumption of BK, BO and PK

The substitution of concentrate with mixed silage forage of cassava and gliricidia given to Goat has been consumed in accordance with the allocation of treatment. The effect of feed treatment on the average consumption of BK, BO, and PK feed on fat tailed Goat (DEG) is presented in Table 1.

Table 1. Average consumption of BK, BO, and PK feed on fat tailed Goat (DEG) fed according to treatment

Treatment	Consumption			
	BK (g/kg weight^{0,75})	% weight	BO (g/kg weight$^{0,75)}$	PK (g/kg weight^{0,75})
K1	68,73 ± 1,61^{b}	3,03	64,16 ± 1,49^{b}	11,11 ± 0,13
K2	62,56 ± 3,82a	2,74	58,48 ± 3,60^{a}	10,29 ± 0,33
K3	62,38 ± 1,71a	2,73	58,13 ± 1,79^{a}	10,29 ± 0,14
K4	60,61 ± 1,21^{a}	2,67	56,75 ± 4,43^{a}	10,08 ± 0,49
K5	61,26 ± 4,99^{a}	2,64	56,37 ± 1,17^{a}	10,41 ± 0,89

Information: Notations which are different in same column were highly significant different at P<0.05.

Consumption of BK

The concentrate substitution by the silage of a mixture of green cassava and gamal given to the Goat has been consumed in accordance with the allocation of the treatment. Based on the result of the analysis of variance, it showed that the concentration substitution by silage of forage mixture of cassava and gamal was significantly different (P <0,05) to the consumption of BK, the higher the substitution level of silage, the lower the consumption level of BK. The consumption response of BK is due to the different nutrient feed quality, especially the content of the feed DM decreases and the SK increases as the silage substitution level increases with the concentrate.

Parakkasi (1999) states that the factors that influence the consumption of BK in ruminant livestock include nutritional composition of feed and physical properties of feed (palatability of feed). From the nutrient composition of the feed treatment it was seen that the content of the feed DM was lower at the increase of the silage substitution level. This is because silage has a lower content of BK (26.96%) while concentration of BK concentrate is higher (88.49%). In addition, the higher SK content also causes the palatability of the feed to be low and resulted in the limitation of feed consumption in livestock. The consumption restriction is related to the accommodating capacity in the rumen (rumen fill), where the silage has a higher SK content (21.48%) than the concentrate (9.19%). The low SK content determines the bulky nature of a feed material in accordance with the opinions of Greehalgh, Orskov and Froser (1976) and Pond et al. (1995) which states that the material and form ration (feed particle size) used will greatly affect the ability of feed consumption. Further Parakkasi (1999) states that The more voluminous a feed ingredients, the sooner the cattle feel full. Physically silage has a higher voluminous level with larger particle size when compared to concentrate, so the livestock will feel full faster. Forbes (1986) states that the consumption ability of BK has certain limitations, the limiting factor is the capacity or the capacity of the rumen. The rumen capacity will affect the degradation of high coarse grain feed, digesta transport and feeding rate (Weston, 1985). The high SK causes the feed outflow rate leaving the rumen low, the slow rate of emptying the contents of the rumen restricts the livestock to consume more feed. From Table 1 above also known the percentage of consumption of BK from the highest to the lowest are: K1, K2, K3, K5, K4. Lubis (1992) states that ruminant livestock consume BK 2-4% of body weight per day. Thus, the consumption of BK in this study is in accordance with the range of needs BK livestock.

Consumption BO

The same thing happened with the consumption of BO, based on the result of the analysis of variance showed that the concentrate substitution by silage of forage mixture of cassava and gamal was significantly different (P <0,05) to BO consumption, the higher the substitution level of silase hence the lower level of BO consumption. The consumption response of the BO is due to the different nutrient feed quality, especially the content of the feed DM decreases and the SK increases as the silage substitution level increases with the concentrate. This is because the consumption of BK is a barrier to be able to know the fulfillment of livestock needs for the substances of feed needed for basic life, growth and production. Consumption of DM determines the high consumption of BO and inorganic materials, BO consists of carbohydrates, fats, proteins and vitamins (Tillman et al., 1991).

Consumption PK

Substitution of concentrate by silage of forage mixture of cassava and gamal to PK consumption was not significantly different between treatments because the content of PK feed treatment was relatively the same. According Sutardi (1991) said that, the food is palatabel and good quality consumption level is higher than low-quality feed so that the quality of food is relatively the same level of consumption is also relatively the same.

Based on NRC recommended nutrient composition (1995) Goat with body weight ranging from 20 to 30 kg requires BK 1.0 - 1.3 kg and PK 167 - 191 g / head / day to produce a PBBH of 250 - 300 g. If the above standard requirement of livestock is calculated according to the weight of livestock body used in this study then the allocation of needs based on the average body weight of each treatment is as follows; K1: BB 26.90 kg need BK: 1.18 kg and PK 183.56 g, K2: 27.85 kg need BK: 1.18 kg and PK 185.84 g, K3: 27.74 kg need BK: 1.20 kg and PK 185.56 g, K4: 28.00 kg need BK: 1.21 kg and PK 186.19 g, K2: 27.90 kg requires BK: 1.18 kg and PK 185.95 g. Thus, the consumption of BK and PK from each treatment still has not reached the standard requirement of Goat as recommended by NRC (1995) where consumption of BK and PK highest at treatment K1 that is equal to 0.81 kg / head / day and 130 g / head / day while the lowest at treatment K4 that is equal to 2.64 kg / head / day and 120 g / head / day. Thus based on the results of this study there is a positive response between consumption and consumption of PK PK feed. The high amount of total consumption of BK determines how much PK is consumed. This is supported by the opinion of Tillman *et al*. (1991) that the consumption of BK is a barrier to whether or not the livestock needs for the feedstocks necessary for basic life,

growth and production are required. The consumption of dry matter determines the high consumption of organic matter and inorganic materials. Organic matter consists of carbohydrates, fats, proteins and vitamins.

Daily Weight Growth (PBBH)

One assessment indicator to evaluate the quality of a feed ingredient can be seen from the growth expressed by the corresponding weight of the livestock body. Livestock growth is very important because it is an accumulation of interactions of various factors including: feed nutrients, environment, genotype and also hormones (Spencer, 1985). The higher the weight gain of the livestock the more efficient and effective the feed material is used as the source of animal feed. Feed has an important role (Barry et al., 1982). The effect of silage substitution of a mixture of forages of cassava and gamal in concentrate on the Goat UNH is presented in Table 7.

Table 7 Mean of PBBH on fat tailed Goat (DEG) fed accordingly Treatment

Treatment	Average PBB (kg/tail)	Average PBBH (g/tail/day)
K1	6,93	$168,90 \pm 4,17^{b}$
K2	6,78	$165,24 \pm 5,41^{a}$
K3	6,70	$163,41 \pm 2,82^{a}$
K4	6,63	$161,59 \pm 5,03^{a}$
K5	6,53	$159,15 \pm 3,66^{a}$

Information: Notations which are different in same column were highly significant different at P<0.01.

The result of variance analysis showed that the level of substitution of silage with concentrate gave very significant different effect (P <0,01) to the Goat UNH (the full calculation is presented in appendix 11). This means that the average value of PBBH in Goat has a different response to control feed can be seen that the higher the substitution rate the lower the PBBH livestock. The highest PBBH is in livestock with feed treatment K1 (without substitution), whereas the lowest PBBH is in K5 treatment.

Different daily weight gain (PBBH) in each treatment was thought to be due to the different amount of BK consumption in each treatment. Consumption of BK is a limitation to be able to know the fulfillment of livestock needs for the substances of feed needed for basic life, growth and production (Tillman et al., 1991). The consumption of BK determines the low consumption of BO and inorganic materials. BO consists of carbohydrates, fats, proteins and vitamins. Feed is the most important factor affecting growth. According to Doyle *et al*., (1986) at the time of livestock growth requires nutrients that are high enough for the development of body tissue. Lack of feed will slow the growth and if the shortage of feed is very severe will cause the livestock lose weight (Tillman *et al.,* 1991).

The high UN at treatment of K1 is thought to be caused by the synthesis of microbial proteins in the rumen is very effective because the source of dissolved carbohydrates available in the concentrate is quite a lot. Putra (2004) states that to increase livestock growth is to use constituent feed which in fermentation will increase propionate. In the process of meat formation, livestock requires the availability of propionic acid in greater quantities. The propionic acid is obtained through the feed degradation process in the rumen and to increase the proportion of propionic acid in the rumen can be done by providing feed with high digestibility ie feed with low SK content and high protein. With the increased amount of protein in the feed it will further increase the formation of body protein or meat. Balance of protein and energy in the diet greatly determines the efficient use of nutrients that also affect the productivity of livestock that consume them. If referring to the recommended standard requirement of NRC (1995) Goat with a body weight range of 20-30 kg requires BK 1.0 - 1.3 kg and PK 167 - 191 g / head / day to produce a PBBH of 250 - 300 g. It is known that in this study (table 1) the consumption value of BK and PK is still not sufficient for livestock so that UNH target can not reach 250 - 300 g / head / day.

V. CONCLUSION

Substitution of concentrate with mixture of silage forage of cassava and glirisidia up to 100% caused a significant decrease (P>0,05) to PK consumption, and real decrease (P<0,05) to consumption of BK, BO and PBBH Goat tail fat.

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Nolasco Da Costa Substitution Of Concencrate With Silage Of Cassava Leaf (Manihot Esculenta,Crantz) And Gliricidia (Gliricidia Sepium, Jacq.) Mixtures On Feed Consumption And Average Daily Gain Of Goat." IOSR Journal of Pharmacy (IOSRPHR), vol. 7, no. 10, 2017, pp. 34-38.