THE EFFECT OF DIFFERENT RATION TREATMENT ON THE DIGESTIBILITY CRUDE PROTEIN AND CRUDE FIBER IN ETTAWA GOAT GRADE

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Abstract

This research aims to determine the effect of different treatments on the digestibility of the ration crude protein and crude fiber digestibility in ettawa goat grade males. The research was conducted in February - April 2017 in Field Laboratory of Animal Nutrition and Feed Department of Animal Husbandry, Faculty of Agriculture, University of Lampung. This study uses a Randomized Block Design. The group is based on body weight of goats. Each group using three goats with an average weight ranging from 15 to 26.2 kg. Treatments include: R1 (15% of elephant grass + 85% concentrate (cassava, bran, pulp, molasses, premix, urea)); R2 (15% of palm oil leaf fermentation + 85% concentrate (cassava, bran, pulp, molasses, premix, urea, oil cake fermentation); R3 (R2 + mineral organic micro-lisinat 40 ppm Zn)). Data were analyzed variance at 5% significance level or the very real 1%, significantly different results further tested using Duncan test 5% or 1%. The results showed that the digestibility of crude protein are R1: 70.74 ± 2.06 (%) highly significant (P <0.01) with R2: 61.85 ± 2.03 (%) and R3: 60.11 ± 2.70 (%), while R2 was not significantly different (P> 0.05) with R3. However, the value of crude fiber digestibility was not significant (P> 0.05) in each treatment, while the efficiency ration R1: 15.08 ± 1,33a (%) was not significantly different (P> 0.05) with R3: 0,11a ± 13.67 (%) but were significantly different (P <0.01) with R2: 6.86 ± 1,02b (%).

Keywords: different ration, crude protein digestibility, crude fiber digestibility, feed efficiency, ettawa goat grade

INTRODUCTION

Palm oil waste utilization as animal feed can reduce the dependence on forage availability. However, palm oil waste has a limiting factor in the high crude fiber and low protein content, so there needs to be a touch of feed processing technologies such as silage-making to improve the quality of feed. Efforts to improve utilization of feed for ruminants in addition to improved feed quality before consumption also be supported with supporting bioprocess improvement in the rumen and post-rumen. Bioprocess in the rumen is strongly influenced by rumen microbes. The maximum rate of rumen microbial growth achieved when the precursor supply all the nutrients available in the optimum concentration. Therefore, feed processing technology must be combined with nutritional supplementation as a precursor for the synthesis of biomass such as nitrogen, sulfur, branched chain fatty acids, organic micro minerals (Zn-lisinat), and energy.

The use of organic micro minerals (Zn lisinat) is one supplement that can be used to help optimize the utilization of palm oil waste, for allegedly exploiting feed using palm oil waste containing a zinc deficiency. Provision of a zinc can stimulate microbial growth and improve the appearance of cattle (Muhtarudin et al., 2003). According to the research Fath et al. (2003) the addition of Zn-lisinat into as many as 10 ppm ration dry matter yield of 80.77% and can improve the process of ration dry matter. Based on the above, the authors are interested in doing research on the influence of different rations treatment on digestibility of crude protein and crude fiber male goats.

MATERIALS AND METHODS

Time and Location

The research was conducted from February to May 2017, in Field Laboratory Department of Animal Husbandry, Faculty of Agriculture, University of Lampung. Proximate analysis to determine nutrient content of faeces and feed ingredients was conducted in April and May at the Laboratory of Animal Nutrition and Feed, Department of Animal Husbandry, Faculty of Agriculture, University of Lampung.

Materials

Materials used in this study were 9 goats, scales were used that Iconix brands scales capacity of 1 ton with a precision of 0.10 kg, Onix brand digital scales capacity of 5 kg with an accuracy of 0.01 kg, and analytical balance brands HWH with a capacity of 300 g with a precision of 0.0001 g, drums, tubs, plastic bags, sickle mower and machetes, ropes, shovels, buckets, tarpaulins, hoes, nets pedestal feed and feces, chopper, plastic, termohigrometer, and a water hose. The tools used for proximate analysis is a set of tools proximate analysis.

Materials used are elephant grass, stem and leaves of palm oil, palm kernel cake, cassava, bran, pulp, Effective microorganisms (EM-4), premix, urea, molasses, and water, materials proximate analysis.

Study and Research Design

The design used is a randomized block design and grouping based on body weight using goats ettawa grade male consisting of 3 treatments and 3 replications as a group. The treatments tested were as follows:

R1 : rations based Elephant Grass (Cassava waste, Tofu Dregs, Fine Bran, molasses, urea, minerals);

R2 : rations based on fermented of palm oil waste (Cassava waste, Tofu Dregs, Fine Bran, molasses, urea, Premix, Kernel Oil fermented, fermented palm fronds and leaves);

R3 : ration based on fermented of palm oil waste + Mineral Micro Organic Zn-lisinat 40 ppm (cassava waste, Dregs Know, Bran Fine, molasses, urea, Premix, Kernel Oil fermented, fronds and leaves Palm fermented + Mineral Micro Organic Zn-lisinat 40 ppm).

Table 1. Nutrient content of feed ingredients

Feed ingredient	Nutrient feed ingredient (% dry matter)					
	DM	CP	Fat	CF	ash	NFE
Elephant Grass	17,67	12,29	1,83	24,42	17,87	43,60
Fermentation of palm leaf sheaths	35,66	8,20	4,94	43,84	10,81	32,21
fermentation oil cake	94,53	12,83	5,15	11,58	38,23	32,20
Fine brand	90,79	8,07	13,69	12,97	11,78	53,48
Cassava waste	85,16	3,53	3,77	8,92	10,60	73,17
Tofu waste	86,34	22,45	18,53	21,48	2,64	34,90
Molasses	43,69	3,94	0,30	0,40	11,00	84,36
Urea	100,00	261,87	-	-	-	-
Premix	100,00	-	-	-	-	-

Source: The results of proximate analyzes Animal Feed Nutrition Laboratory, University of Lampung (2017)
Description: DM (dry matter) , CP(crude protein), Fat, CF (crude fiber), NFE (nitrogent free extract)

Table 2. Nutrient content of the concentrate treatment (R1, R2, and R3)

Nutrisi	Perlakuan		
	R1	R2	R3
		-------------------------------%-------------------------------	
Dry matter	90,92	92,50	92,23
Crude Protein	18,02	17,39	17,45
Crude fiber	11,14	13,28	13,31
Fat	8,37	5,48	5,50
Ash	7,68	19,35	19,40
Nitrogen Free Extract	54,81	44,50	44,34

Source: The results of proximate analyzes Animal Feed Nutrition Laboratory, University of Lampung (2017)

Table 3. The content of nutrient ration

Ration		Nutrient content (% Dry matter)					
		DM	CP	CF	Fat	Ash	NFE
R1	**Forage**	17,67	12,29	24,42	1,83	17,87	43,60
	Concentrat	68,38	18,02	11,14	8,37	7,68	54,81
Total (15%F+85% C)		**60,77**	**17,16**	**13,13**	**7,39**	**9,20**	**53,13**
R2	**Forage**	35,66	8,20	43,84	4,94	10,81	32,21
	Concentrate	55,55	17,39	13,28	5,48	19,35	44,5
Total (15%F+85% C)		**52,57**	**16,01**	**17,87**	**5,4**	**18,07**	**42,66**
R3	**Forage**	35,66	8,20	43,84	4,94	10,81	32,21
	Concentrate	52,11	17,45	13,31	5,5	19,4	44,34
Total (15%F+85% C)		**49.64**	**16,06**	**17,89**	**5,42**	**18,11**	**42,52**

Description: DM (dry matter), CK (crude protein), fat, CF (crude fiber), NFE(nitrogen free extract)

Variables

Crude protein digestibility

Digestibility of proteins on ration is measured by calculating the difference in dietary protein consumed with a protein out with feces, then divided by dietary protein consumed, and then multiplied by 100%

Digestibility of protein :

$$\frac{(\sum \text{ feed intake (g)x crude protein ration (\%))} - (\sum\text{feces (g)x feces crude protein)}}{\sum \text{ feed intake (g) x crude protein ration(\%)}} X100\%$$

Crude fiber digestibility

Digestibility of crude fiber ration examined was measured by calculating the difference between the crude fiber rations consumed by the crude fiber out with feces, then divided crude fiber rations were consumed, and then multiplied by 100%

Digestibility of crude fiber:

$$\frac{(\sum \text{ feed intake (g)x crude fiber ration (\%))} - (\sum\text{feces (g)x feces crude fiber)}}{\sum \text{ feed intake (g) x crude fiber on ration (\%)}} X\ 100\%$$

Consumption Value

Data was obtained by counting the number of rations given reduced by the amount of rations remaining in the b ahan dry. The calculation is performed every day during the study period and is expressed in kg / head / day. Feed intake calculated as follows:

Feed consumption = amount of feed given (g) - the rest of the feed (g)

Daily weight

Data were obtained from the weighing results during the study. The weighing is done before the goats were fed and given in units of kg/tail/day. Goat body weight gain is calculated as:

$$\text{Daily body weight gain} = \frac{\text{final body weight (g)} - \text{initial body weight (g)}}{\text{day}}$$

Ration Efficiency

Data obtained by calculating the body weight divided by the number ration consumed within the same time interval. Efficiency ration is calculated by:

$$\text{Efficient use of ration} = \frac{\textit{body weight gain}\ \text{(g)/time}}{\text{feed consumed (g)/ time}}$$

RESULTS AND DISCUSSIONS

Effect of separate ration on feed consumption

Rations based fermented palm oil waste are added mineral organic micro-lisinat 40 ppm Zn has not been able to increase the ration dry matter intake significantly. Based on the Table 4, the consumption of dry matter ration R1: 709.98 ± 82.19 (%) highly significant ($P < 0.01$) with R2: 506.69 ± 68.89 (%) and R3: 533.43 ± 57 , 04 (%), whereas R2 significantly different ($P < 0.05$) with R3. Feed consumption will increase faster if the flow ration. This is in accordance opinions (Arora, 1989) that the smaller the particle size of the feed, the greater the surface area and more space microbial attack so easily digested feed. The high consumption of ration R1 suspected use of forage grass has a better digestibility than fermented palm leaf. This is due to the high content of crude fiber in the fermented palm leaf midrib (43.84%) compared to the elephant grass (24.42%) led to a decline in consumption in R2 and R3. However, the average consumption is higher than R2 R3 due to the addition of Zn-lisinat in the ration. This is regarding to the opinion Larvor (1983) which states Zn as metalloenzim involving multiple enzymes include DNA polymerase, carboxy peptidase A and B, and alkaline phosphatase. These enzymes each play a role in the proliferation of DNA that subsequent effect on protein synthesis, protein digestion and absorption of amino acids, as well as energy metabolism (Church and Pond, 1976). The activity of these enzymes would be disturbed if there is a deficiency of zinc.

The addition of micro organic mineral Zn-lisinat 40 ppm in the ration based on palm oil waste can stimulate microbial growth so that the digestibility of goat becomes better with implications for the increase in feed consumption. This is in accordance opinions (Muhtarudin and Widodo, 2003; Putra) that the granting of a zinc can stimulate microbial growth and improve the appearance of cattle (Muhtarudin and Widodo, 2003). However, the addition of micro organic mineral Zn-lisinat 40 ppm in the diet of fermented palm oil-based waste is still lower than the ration R1 using elephant grass. This is due to the high content of ash in the ration R2 (17%) and R3 (19.17%) than R1 (9.20). High ash content in rations R2 and R3 due to the high ash content in fermented oil cake (38.23%). The high ash content in the diet causes a decreased digestibility in cattle. The ash content tercernanya slow or inhibit the ration dry matter. As a result, the consumption of feed ration R3 decreases. Slow digestibility of feed which causes a decrease in consumption. Therefore, the feed rate of digesta in the digestive tract becomes obstructed.

Table 4. Average feed intake, digestibility of crude protein and crude fiber digestibility, average daily gain, and efficiency

Parameter	Treatment		
	R1	R2	R3
Feed Intake (g/tail/day)	709,98±82,19[a]	506,69±68,89[b]	533,43±57,04[b]
Crude protein digestibility (%)	70,74±2,06[a]	61,85±2,03[b]	60,11±2,70[b]
Crude fiber digestibility (%)	48,15±3,53	44,56±4,24	46,44±2,46
Average daily gain (g/tail/day)	106,67±11,55[a]	35,11±9,46[b]	72,88±7,35[c]
Feed efficiensy (%)	15,08±1,33[a]	6,86±1,02[b]	13,67±0,11[a]

Description: Values with different superscript in the same row indicate significantly different (P <0.01)

Effect of different diets on the digestibility of crude protein

Protein needs on cattle are generally referred to in the form of crude protein (CP). The protein requirement of livestock affected by a period of growth, physiological, pregnancy, lactation, body condition and the ratio of protein energy. The condition of normal body needs protein in sufficient quantities, deficiency of protein in the diet will slow emptying of the stomach resulting in lower consumption (Rangkuti, 2011).

Based on the results of the study (Table 4) show that the highest protein digestibility obtained on R1 treatment compared R2 and R3. This is caused by the protein content of the ration showed the dietary protein R1 (17.16%) was higher than R2 (16.01) and R3 (16.06%) so that the R1 protein digestibility is higher. Duncan Test Results showed that the digestibility of crude protein in the ration R1 treatment highly significant (P <0.01) the digestibility of crude protein ration R2 and R3, while R2 digestibility of crude protein were not significantly different (P> 0.05) with R3. The high crude protein content than the ration R1 R2 and R3 caused by the use of elephant grass with a crude protein content of 12.29% higher than the fermentation of palm leaf midrib on R2 and R3 which has a crude protein content of 8.20%. In addition, the ration R1 using the tofu waste of 18% with a crude protein content of 22.45%; rice bran by 42% with a protein content of 8.07%, whereas R2 and R3 using tofu waste 15%; rice bran 9%; 30% of oil cake with a crude protein content of 12.83%.

In addition to crude protein ration, the difference in ash content in each ration was also suspected of causing the R1 protein digestibility significantly different (P <0.01) compared to R2 and R3. This is evidenced R1 protein digestibility of 70.74 ± 2.06 (%), while the R2 protein digestibility of 61.85 ± 2.03 (%) and R3 amounting to 60.11 ± 2.70 (%). Crude protein digestibility R1 highly significant compared to R2 and R3 allegedly due to the high ash content in rations R2 and R3 resulting in decreased protein digestibility. The high ash content in the diet causes a decreased digestibility in cattle. Based on the results of the proximate analysis (Table 3) shows that the ash content of the ration R1 = 9.20%; R2 = 18.07%; and R3 = 18.11%. The ash content of the ration R3 high due to the high ash content in fermented oil cake is 38.23%. According Puastuti et al. (2014) that the ash content in the oil residue fermented with various types of fungi are from 4.64 to 5.34%. The ash content is much lower than the ash content of palm cake of research results.

The ash content slow the digestibility ration of dry matter. As a result, the digestibility of crude protein was also decreased. Sudarmadji and Bambang (2003) that the ash content in the feed associated with mineral content contained in the feed. Increasingly the higher ash content of minerals. But the fulfillment of minerals for livestock too high is not recommended because the minerals and vitamins required by the body in micro amounts. Although the terms of the ash content of nutrients is not so important, but in the gray proximate analysis of data necessary to calculate or measure the value NFE (Nitrogen Free Extract). NFE is a source of energy for the rumen microbes, if the ash content in the diet is high then NFE will decrease and it will reduce the source of energy for the rumen microbes. Rumen microbes needed to digest proteins into simpler compounds, that can benefits by rumen microbes who has a positive impact on the digestibility of crude protein.

The content of crude fiber in the ration R1 = 13.13% lower than R2 = R3 = 17.87% and 17.89% also thought to be the cause of low digestibility of crude protein in R2 and R3. The high crude fiber content of the ration R2 and R3 due to the use of fermented palm leaf midrib ration R2 and R3 are affecting the digestibility of crude protein male goats. Palm leaf midrib containing crude fiber by 43.84%, while 22.42% elephant grass (Table 1). Crude fiber digestibility depends on the content of crude fiber in the diet and the amount of crude fiber consumed. High fiber content which can interfere with the digestion of other substances such as proteins. The higher the crude fiber, it can lower the digestibility of dry matter, crude protein and digestible energy (Price et al., 1980). This is due to efficiently digest crude fiber, micro-organisms need sufficient energy source of food that goes into the rumen. The content of crude fiber in this study ranged from 13 to 17.89% decrease the digestibility of crude protein, but did not affect the digestibility of crude fiber. Therefore, the digestibility of fiber is basically influenced by the rumen microbial activity.

R2 protein digestibility were not significantly effect ($P > 0.05$) with R3 caused by the nutrient content of the ration R2 and R3 are not much different so as to provide the same effect on the digestibility of protein in the male goats. Moreover, the addition of organic micro mineral Zn-lisinat 40 ppm in the ration R3 is not significantly different ($P > 0.05$) with ration R2 (without Zn-lisinat). It is thought to need a zinc to spur the growth of microbes digesting protein has been fulfilled so that no significant increase in the digestibility of the protein. The statement proved their opinions Arora (1989), that the requirement of a zinc to ruminants of 40-50 ppm and by Khalil et al. (2014) that the zinc content in ruminant feed in Indonesia ranges from 31.3 ± 5.5 mg / kg. The range of a zinc content in the feed as well as having experienced an increase of 40 ppm is alleged to have sufficient Zn minerals for animals that do not provide an increase in the digestibility of crude protein significantly. Mineral Zinc is the activator variety of enzymes that can stimulate microbial growth. Larvor (1983) suggests a zinc as metalloenzim involving multiple enzymes include DNA polymerase, carboxy peptidase A and B, and alkaline phosphatase. These enzymes play a role in the proliferation of DNA that subsequent effect on protein synthesis, protein digestion and absorption of amino acids, as well as energy merabolisme (Church and Pond, 1976).

Effect of different diets on the digestibility of crude fiber

Crude fibers are used as the primary energy source and rough fat is an efficient source of energy and play an important role in the body's metabolism so you need to know digestibility in animal body (Suprapto et al., 2013). Results of analysis of variance (Table 4) show that the rationing of treatment did not significantly (P <0.05) on the digestibility of crude fiber male goats. The average crude fiber digestibility R1 each treatment which amounted to 48.15 ± 3.53 (%); R2 of 44.56 ± 4.24 (%); and R3 amounted to 46.44 ± 2.46 (%). Statistically demonstrated that the digestibility of crude fiber each treatment showed no difference or not significant (P> 0.05), meaning that all treatments were equally influence on the digestibility of crude fiber male goats.

Digestibility of crude fiber in ruminant feed is fully influenced by the role of rumen microbes. Ruminants are unable to digest coarse fiber directly, so that aided by crude fiber digesting bacteria cellulolitic. This is in accordance opinions Erwanto (1995), the fiber feed digestibility in the rumen is essentially a work ezim fiber-digesting enzyme produced by rumen microbes. Optimal rumen microbial growth is influenced by precursor nutrient requirements that must be available in an optimum concentration in the rumen eg crude protein content. This is in accordance opinions Budiman et al. (2006), fiber-digesting microbe-eating is not a single against the substrate fiber alone, but in reality the fiber-digesting microbes also need other metabolites of other microbial degradation results.

If the feed protein or protein deficiency resistant to degradation in the rumen, the concentration of NH_3 in the rumen will be lower and will slow the growth of rumen microbes that cause decreased feed digestibility (Mc Donald et al., 2002). VFA is the main source of energy and carbon for growth of the host animal and maintain living microorganisms in the rumen (Hungate, 1966). The optimal number of NH3 in rumen fluid can also increase the amount of VFA. It is caused NH3 used by microbes as agents for growth. Crude fiber digestibility was not significant (P> 0.05) in each of these treatments has been insufficient thought to relate to the needs of NH_3 and VFA as a precursor fiber digesting rumen microbial growth. Based on the results Sineba (2007) that the range of 11-15% dietary protein and crude fiber rations ranged from 13 to 18.71% yield concentrations ranging from 5.01 to 10.01 Mm NH3 and VFA production ranges from 71-120 mM ettawa grade goats. The research results are within the normal range, the statement is supported by the opinion Sutardi (1979) which states that the ammonia concentration range that is pretty good for rumen microbial growth that is 4-12 Mm, while according to Mc Donald et al. (2002) which states that a good VFA production to meet the rumen microbial synthesis that is 70-150 Mm.

When viewed from the research Sineba (2007) which use 11-15% dietary protein and crude fiber ration 12 to 19.05% yield NH3 and VFA levels that have sufficient energy for the rumen microbes alleged use of dietary protein research at 16- -17% and from 13 to 17.90% crude fiber diet has sufficient energy for the rumen microbes digest fiber-digesting fiber in the rough so that the microbes digesting crude fiber have the same ability to digest fiber. This indicates that the rumen microbes digest crude fiber ration R1, R2, and R3 have the same ability. The addition of organic micro mineral Zn-lisinat 40 ppm in the ration R3 R3 produce crude fiber digestibility (46.44 ± 2.46) was not significant (P> 0.05) on the digestibility of crude protein male goats. This is presumably due to the high ash content in the ration R3. The addition of organic micro minerals in the ration Zn-lisinat R3 is expected to spur the growth of microbes in the use of palm oil waste-based rations that increased fiber digestibility. However, the addition of organic micro mineral Zn-lisinat 40 ppm in the diet showed R3 is not significant (P> 0.05) in improving the digestibility of crude fiber. It is thought to need a zinc to spur the growth of microbes digesting crude fiber has been fulfilled so that no significant increase in the digestibility of crude fiber. The statement proved their opinions Arora (1989), that the requirement of a zinc to ruminants of 40-50 ppm and by Khalil et al. (2014) that the zinc content in ruminant feed in Indonesia ranges from 31.3 ± 5.5 mg / kg. The range of a zinc content in the feed as well as having experienced an increase of 40 ppm is alleged to have sufficient Zn minerals for livestock. Mineral Zinc is the activator variety of enzymes that can stimulate microbial growth.

In addition, the high ash content in the ration R3 also suspected of causing the digestibility of crude fiber in R2 and R3 do not give a significant increase in the digestibility of crude fiber male goats. High ash content in rations R2 and R3 due to the high ash content in the palm of fermented residue of 38.23%. It is thought the additional oil palm shells on the cake so that the lignin content and silica increased the lead to increasing ash content in the oil cake. Sudarmadji and Bambang (2003) that the ash content in the feed associated with mineral content contained in the feed. Increasingly ash content of minerals. But the fulfillment of minerals for livestock too high is not recommended because the minerals and vitamins required by the body in small amounts. It's that indicate the addition of organic micro mineral Zn-lisinat not been able to improve the digestibility of crude fiber because of the high ash content in rations.

Effect of different diets on body weight gain and feed efficiency

Average daily gain is a reflection of the accumulated consumption, fermentation, metabolism and absorption of nutrients in the body. Young calf increasing growth is one of the important objectives to be achieved. Excess food that comes from the basic necessities of life will be used to increase body weight. Body weight gain is a reflection of the quality and biological value of feed given to cattle (Simanhuruk et al., 2010).

The average daily weight gain during the study was 106.67; 53.33; and 85.56 g / head / day in a row for the treatment of R1, R2, and R3 (Table 4). Based on the results of Duncan test (Table 4), daily weight gain R1: 106.67 ± 11.55 (%) highly significant ($P < 0.01$) with R2: 35.11 ± 9.46 (%) and R3 : 72.88 ± 7.35 (%), whereas R2 significantly different ($P < 0.05$) with R3. However, the highest body weight gain was obtained by treatment of R1 which has the highest feed consumption amounted to 747.49 g / head / day, while the lowest body weight gain in treatment R2 with the lowest feed consumption amounted to 506.69 g / head / day. This is in accordance opinions (Kartadisastra, 1997), the body weight of cattle is always directly proportional to the level of feed consumption. The higher the body weight, the higher the level of consumption of the feed.

Cheeke (1999) stated that the quality and quantity of feed greatly affect body weight gain. Daily body weight gain in males is more efficient in converting food into body weight of dry matter compared to female animals. High testosterone secretion cause high androgen secretion resulting in faster growth, especially after the appearance of secondary sex characteristics in male (Soeparno, 1998). Goat for producers of meat or to be used as seed, need to achieve maximum weight when cut or used for stud. Talib (2004), states that the body weight gain of ruminants is strongly influenced by the quality and quantity of feed, meaning ratings body weight gain of cattle comparable to the rations consumed, whereas according to the National Research Council (2006) weight gain is influenced by several factors, such as total protein obtained each day, type of animal, age, genetic state of the environment, the condition of each individual and governance management.

The average efficiency of the ration R1: 15:08 ± 1:33 (%) was not Significantly different (P> 0.05) with R3: 13.67 ± 0:11 (%), but were Significantly different (P <0, 01) with R2: 6.86 ± 1:02 (%). Feed efficiency can be calculated based on the ratio of body weight (kg) with a total dry matter intake (kg) Multiplied by 100%. Feed efficiency is very important for farmers so as not to suffer losses due to too much food or feed shortage (Anggorodi, 1994). Efficiency ration R1 are not Significantly different (P> 0.05) with R3 shows that rationing based oil palm waste is added mineral organic micro-lisinat 40 ppm Zn in the same effect by rationing use of forage in increasing body weight of goats ettawa grade male. Although the addition of 40 ppm Zn-lisinat in rations based palm oil waste has not been able to improve the digestibility of crude protein and crude fiber digestibility significantly, but in terms of daily weight gain and feed efficiency turns male goat is very efficient in the use of ration R3. This is indicating that the provision of 40 ppm Zn-lisinat role in the metabolism of nutrients. In cattle that lack of protein and energy in the rations, in addition to stunted growth, will also have a poorer feed efficiency.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions in this study is different ration treatment was highly significant (P <0.01) on feed intake, digestibility of crude protein, average daily gain and feed efficiency, but had no effect (P> 0.05) on digestibility crude fiber male goats. Ration treatment using elephant grass give the best effect on feed intake, digestibility of crude protein, and daily weight gain, compared to fermentation of palm leaf midrib treatment as well as after the addition of organic micro minerals (Zn-lisinat). However, treatment-based rations added oil palm waste mineral organic micro-lisinat 40 ppm Zn in the same effect on the efficiency of rations for male goats.

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