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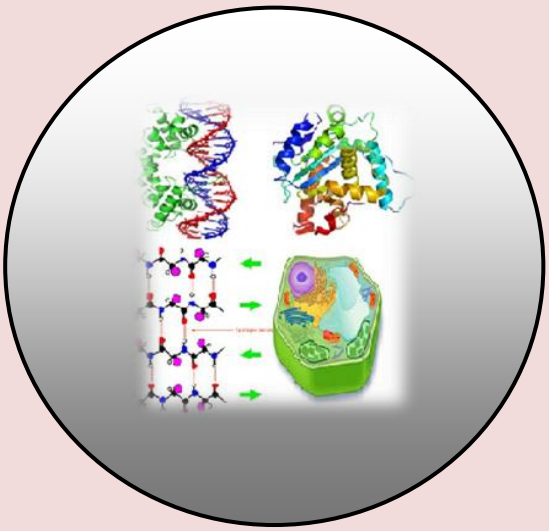

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RESEARCH PAPER

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The Effect of Concentrate Replacement Level with Gamal Leaf (*Gliricidia sepium*) in Ransum on Rument Metabolite Products and Blood Goat Profile

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ABSTRACT

This study aims to determine the effect of replacing concentrates with gamal leaves (Gliricidia sepium) in the ration on the product and the performance of rumen metabolites and the blood profile of PE goats. The experimental design used was the Latin square design, 4 x 4 that is 4 treatments with four 4 replications each experiment unit consisted of 1 animal. One treatment period for 2 weeks. The first week was adapted and the second week the data collection process was carried out. The treatment used is 3% BK required from animal body weight. The treatment given is as follows. The treatments are A (45% concentrate and 55% field grass); B (Gamal 15% with 30% concentrate and 55% field grass); C (Gamal 30% with 15% concentrate and 55% field grass); D (Gamal 45% and field grass 55%). The results of this study indicate that the effect of the rate of replacement of concentrates with gamal leaves (Gliricidia sepium) in the ration on rumen metabolite products PE goat was significantly different (P <0.05) total VFA concentration and VFA Parcial. The concentration of N-NH3, protozoan population the acidity of pH, methane production showed results that were not significantly different. Blood glucose, total protein and total cholesterol were not significantly different between treatments (P> 0.05) while blood urea and triglycerides were significantly different between treatments. The results showed that replacing the concentrate with 30% gamal leaves reduced total and partial VFA concentrations and decreased blood parameters, namely blood urea and triglycerides.

Keywords: Gamal (Giricidia sepium), Concentrate, Performance of Rumen Metabolites and Blood Profile.

INTRODUCTION

Meeting the needs of the animal protein community and the adequacy of national meat today is a very important aspect to consider .For this reason, the availability of livestock products as a source of animal protein of good quantity and quality is also sustainable. Goat has a high adaptability to various environments and cultures of the Indonesian people (Faozi et *al.*, 2013). In the goat breeding business, there are 3 things that must be considered, feed, breed and maintenance management. Good food contains carbohydrates, protein, vitamin fats, minerals and water to grow and reproduce production. (Sarwono, 2005). Field grass and foliage have a low nutritional content, consequently not fulfilling their basic living needs. Crude protein for weaning goat growth is around 13-14% (Murtidjo, 1993). Concentrates that contain protein and carbohydrates (Murtidjo, 1993).

Increasing livestock productivity requires the availability of concentrates that contain high nutrients and are easily digested and can be synthesized in large amounts of body tissue. However, if we look at it from its economic aspect, concentrating feed requires a high cost, therefore there needs to be an effort to replace feed with nutrients that are almost the same as the concentrate and easily digested in the rumen, one type of feed is gamal leaves (*Gliricidia sepium*). Gamal leaf (*Gliricidia sepium*) is a food that is easily degraded in the rumen degradable protein (RDP) and can be used as a basal feed for goats or mixed feed through the withering process. According to (Hartadi *et al*., 1993). Gamal nutrients (*Gliricidia sepiun*) namely 13.3% crude fiber, 4.0% BETN ash 8.4% ash and 25.7% crude protein. In addition to supporting production, good food must also be able to maintain physiological responses and blood profiles in normal circumstances. Some factors to assess the adequacy of nutrients in PE goats are by looking at rumen metabolite products and blood profile. Based on the description above, it is necessary to conduct research to determine the effect of replacing concentrates with gamal leaves (*Gliricidia sepium*) on rumen metabolite products and PE goat blood profile.

MATERIALS AND METHODS

Experimental design

This research uses a latin square design, consisting of 4 head of cattle where each animal gets all the same treatments in turn. Where one treatment consists of 2 weeks. The first week was adapted and the second week the data collection process was carried out. The treatment used in this study was 3% BK required from animal body weight. The treatment given is as follows.

A = 45% concentrate and 55% grass
B = Gamal 15% with 30% concentrate and 55% field grass
C = Gamal 30% with 15% concentrate and 55% pitch grass
D = Gamal 45% with field grass 55%

The feed given in this study consisted of field grass and gamal leaves and concentrate as additional feed. Giving field grass as basic feed, concentrate and gamal leaves 3% BK of livestock body weight. The concentrate is first given at 08.00 West Indonesia Time and then the Gamal leaves are given ad libitum field grass Feed given to livestock is first weighed then tomorrow morning the non-consumed feed is weighed again to find out the amount of consumption. Drinking water is given ad libitum and put into a 5 liter bucket

Location and time of research

This research was conducted in Karangasem Regency, Sidemen Village for 12 weeks. The first two weeks are for the preparation of tools and research materials as well as the adaptation of livestock to the feed given and 10 weeks for the research process. Rumen fluid samples were analyzed in the Nutrition and Animal Food laboratory of the Udayana Animal Husbandry Faculty and blood samples at the Mantra Medika laboratory, Denpasar.

Animal research

The experimental animals in this study were 4 PE goats, ranging in age from 1,5 - 2 years. Determination of age of livestock is based on the condition of goat incisors with an average weight of 40 kg / head. The cage to be used is the stage cage with a tin roof, the floorboards, the walls of the boards. The enclosure is made into 4 plots with a size of 1.0 x 1.70 meters each placed by a goat. Each plot is equipped with a feed tub made of boards and a bucket for drinking

Tools and materials

The research instruments that will be used are hanging scales, digital scales, tarps, plastic buckets, plastic bags, vacuum pumps, scythes and machetes, cameras and stationery. The materials used are the composition of the rations A, B, C and D.

Feed and drinking water

The feed is given during gamal (*Gliricidia sepium*) and concentrate as feed replacement and as the main feed field grass. Field grass is obtained from the edge of the road and around the rice fields with a variety of species that grow in these places. The concentrate given is in the form of flour based on the composition of food substances according to the recommendation of Kearl (1982). Drinking water is supplied from a spring (wellbore). The content of nutrients and ingredients can be seen in the following table:

Table 1. Table composition of concentrated, gamal (*Gliricidia sepium*) and grass material.

Concentrated Composition	Concentrated
Mpokjagung	30
Molases	5
Rice bran	30
Pollard	29
CaCO3 (Chalk)	2
Urea	1,8
Salt	2
Pignoq	0,2

Table 2. Table of concentrates of nutrients, gamal (*Gliricidia sepium*) and grass nutrients.

Nutrient content	Concentrate	Gamal(*Gliricidia sepium*)	Grass
Dry Ingredients (%)	85,75	82,64	20,97
Crude protein (%)	22,87	22,19	12,5
Coarse Fat (%)	3,29	18,93	3,89
Coarse Fiber (%)	9,17	3,32	23,71
TDN (%)	74,11	63,2	49,5

Source: Results of laboratory analysis of nutrition and animal feed of Udayana University 2019.

Table 3. Composition of treatment rations.

Feed	Treatment			
	A	B	C	D
Concentrate	45 %	30%	15%	0%
Gamal (*Gliricidia sepium)*	0 %	15 %	30%	45%
Grass	55%	55%	55%	55%

Research variable

Variables in this study include, rumen fluid pH, NH3 levels, total VFA levels, protozoan populations, blood profiles including glucose levels, triglyceride levels, total protein, total cholesterol and blood N urea levels.

Rumen liquid preparation

The process of taking rumen fluid is carried out 4 hours after morning feeding at the end of the total collection period by using a vacuum pump. As for the method of picking up as follows, firstly all tools such as plastic hose with a length of 250 cm, pipe paralon 40 cm, Erlemeyer scattered, pumps, film bottles, filters and whistles. Then the device is arranged in such a way.The tip of the plastic pipe is inserted into the mouth of the animal until it reaches the reticulorumen with the help of a paralon pipe to prevent animal bites. Suctioning is carried out several times to remove rumen fluid and it is accommodated in Erlemeyer kettles. After the rumen fluid is obtained around 50-100 ml the desludging is stopped and the plastic pipe is pulled out. The rumen fluid obtained is directly tested for its acidity (pH) using a pH meter, then filtered. Part of the filtered rumen was analyzed to determine the protozoan population with a part of H2SO4 drops of 2-3 drops per 50 ml. Furthermore, it is taken to the laboratory to analyze the concentration of remnant metabolites, namely total VFA and N-NH3

Value of rumen fluid pH

To know the pH value of rumen fluid in this study using a pH meter. Before being used is standardized by dipping the probe into the buffer until the pH value = 7. Feed is given first, after 4 hours the rumen fluid is taken immediately using a vacuum pump through the mouth of the cattle as much as 10 ml

Protozoa calculation

The calculation of protozoa using MFS (Methylgreen Formalin Saline) dye MFS solution consisted of 100ml 35% formaldehyde, 0.6g methyl green, 80 g NaCl and 900ml aquadest.

Stages of work are rumen fluid samples taken and then mixed with MFS solution. 1: 4 or 1: 8 ratio. Then 2 drops of the mixture are placed on a counting camber with a thickness of 0.1 mm and the smallest box area of 0.0625 mm2, the number of boxes 16 is mounted with glass cover. Protozoa population calculations using a microscope with 100 times proportions
Protozoa calculations use the formula:

$$\text{The amount of protozoa / m} = \frac{1}{0{,}1\ x\ 0{,}0625\ x\ 16}\ x\ 100\ xZxFp$$

Information
Z = Number of protozoa in the counting chamber.
Fp = dilution factor

Total VFA concentration
Determination of total VFA concentrations using the General laboratory procedure (steam distillation). Put into a distilled tube that has been heated with boiling water 5 ml of rumen fluid supernatant with a distillation flask. Close the tube tightly with 1 ml of 15% H2SO4 solution immediately added. Then the VFA will be pressed by the steam water pan that passes through the condensed cooling tube and will then be accommodated in an erlemeyer tube that has been filled with 0.5 N NaOH to a volume of 100-300 ml. Perform the titration process with 0.5 N HCL after adding 2-3 drops of the phenoplatin indicator. Titrate blank 5 ml NaOH first, titration ends if the starting point of the pink discoloration turns clear. Total VFA levels are calculated using the formula

Total VFA = (b-s) x NHCL x 100 / mM
Information:
s: Sample titration volume
b: Titration volume blank (ml)
N: The normality of HCL solution

Partial VFA concentrations (acetate, propoinate, butyrate)
VFA concentrations were measured by gas chromatography techniques (AOAC 1990).Rumen fluid samples were analyzed by centrifuging at 40C for 15 minutes at 10,000 rpm for 15 minutes. Supernatant is taken after centrifuged as much as ± 2 ml and put into a small plastic covered. Then 50 mg of C_6H_3 $(OH)SO_3$ $2H_2O$ (Sulphosalicylic acid) is added and then the bag is homogeneous. centrifuged the mixture again at 40c for 10 minutes at 300 rpm. Take the clear liquid as much as 1 ml after filtering by coating, inject the standard VFA solution of acetate (C2), proinate (C3) and butyrate (C4) into gas chromatography.
The partial VFA concentration is calculated by the formula:

$$VFAParsial(mM) = \frac{\text{high sample}}{\text{standard heigh}}\ xstandardconcentration$$

Methane Production
Estimated methane production can be done based on the formula: (Orskov and Ryle, 1990), which is as follows: Methane (mM) = 0.5 Acetate - 0.25 Propionate + 0.5 Butyrate

N-NH3 concentration
Determination of ammonia is determined by the amount of ammonia based on the color reaction in rumen fluid that can be read with the eye or with a spectrophometer. The operation phase is as follows: the equipment used will first be cleaned and arranged according to work procedures. Provide a bottle containing 4-5 drops of concentrated sulfuric acid and then add 15 ml of rumen liquid, then rumen liquid is diluted 100 times using distilled water. Then the rumen fluid to be analyzed is inserted into a test tube that has been filled with a standard solution that has been prepared. Add in succession 0.2 ml of phenol larvae, 0.2 ml of sodium nitriprusidde solution and 0.5 oxidising solution. Then for 5 minutes after blowing the oxidation solution using a spectrophometer, the color reaction reading is done

Blood sample

Blood samples were taken through the jugular vein 4 hours after the animals were fed at the end of the total collection using a vacuum tube and to separate centrifuge plasma at 500 rpm for 10 minutes. Furthermore, blood plasma is stored at 20^0C. As long as there is no laboratory analysis.

Statistical analysis

The data obtained were analyzed by analysis of variance if between treatments there were significantly different followed by duncan multiple distance testing (Steel and Torrie, 1995).

RESULTS AND DISCUSSION

The results of this study found that average VFA concentrations ranged from 91.76 mM-162.44 mM statistically showing significantly different results ($P < 0.05$) between treatments (Table 5.1). Treatment A had a high VFA concentration of 162.44 mM when compared to other treatments, while treatment D (45% gamal + 55% grass) had the lowest VFA concentration of 91.76 mM, this was due to the high quality of feed which was reflected in the fiber content low coarse or anti-nutrient substances in gamal leaves. Treatment A shows that the feed is very easily fermented by rumen bacteria and is able to ferment concentrates and grass components. The provision of 45% concentrate and 55% field grass resulted in high total VFA concentrations in treatment A, but the total VFA production of all treatments had fulfilled the maximum requirements for rumen microbial performance. The soluble carbohydrate content contributes to the increase in the concentration of VFA in treatment A which reflects good feed fermentability. Fermentation of carbohydrates from feed in the rumen is one instrument to determine the total VFA production which is related to livestock productivity. (Pamungkas *et al.,* 2008). According to *McDonald et al.* (2002) a high VFA value refers to feed ingredients having a high enough fermentability. The increase in the amount of VFA is an indication of the fast or slow feed fermentation by rumen microbes, the physical form and composition of the feed also affect VFA. The high concentration of VFA indicator is an adequate source of energy for livestock (Sakinah, 2005). VFA is the result of rumen fermentation which is very important besides rumen microbes (Kurniawati, 2007). VFA content contained in rumen fluid is a benchmark in seeing the efficiency of the fermentation process in the rumen of food (Suherman *et al.,* 2013). The level of concentration in this study is still in the normal range. According to (McDonald, 2010) the VFA range is 70-150 mM. According to Asikin, (2015) the total normal VFA between 108-117 mM means that it is still good for bacterial performance and VFA production.

There are three partial VFA concentrations analyzed in this study, namely acetic acid, propionic and butyric. Analysis showed that the concentrations between acetate, propionate and butyrate were significantly different ($P < 0.05$) between treatments. Goats that received treatment A, the average concentration of acetate was 58.84 mM higher than the average concentration of treatment D 44.77 mM. The highest propinic acid concentration was obtained in treatment B goats 38.85 mM. The D treatment got the lowest concentration of 20.9 mM. The highest butyric concentration in goat A treatment was 10.95 mM and the lowest was D 5.07 mM. Carbohydrates in feed determine the amount of VFA in rumen fermentation products. The high acetate concentration in treatment A is classified as having a highfiber content because there is grass and the feed source of energy is easily fermented in the concentrate. Fermented products in the rumen provide a useful source of energy for microbes and hosts that are optimal in treatment A with a higher amount of concentrate than other treatments. Ruminants basically consume more fibrous feed during the fermentation process which is converted to VFA with a ratio of C2 (70): C3 (20): C4 (10) which usually meets 70-80% of the energy needs for livestock (Fance and Djikstra, 2005). The production of acetic acid (C2), propionate (C3) and butyrate (C4) is largely dependent on fermentation of carbohydrate feed even though partly comes from feed protein (Van Houter, 1993). Ammonia concentration is determined by the content of feed protein, rumen pH, length of feed in the rumen, degree of degradability (Haryanto, 1994).

N-NH3 in treatment A was 5.84 mM, B was 9.38 mM, C was 5.10 mM and D was 6.36 mM statistically the results were not significantly different ($P > 0.05$) between treatments. Fluctuations in N-NH3 concentrations can occur due to the high value of crude protein in feed as contained in treatment B where the composition of feed ingredients consists of gamal, concentrate and field grass consumed.

The amount of feed protein consumed, the length of feed is in the rumen and the pH of the rumen is the degree of degradability, determining the level of ammonia concentration (Haryanto, 1994).N-NH3 concentrations in the normal range between treatments where optimal bacterial development is supported according to (McDonald *et al.,* 2002) the ideal range for bacterial growth of 6-12 mM. The results of the degradation process of amino acids and peptides produce N-NH3 which is very important in protein synthesis and protein degradation in feed (McDonald *et al.,* 2010).

Table 5. Rumen metabolites of PE goats fed with concentrates feed were replaced with gamal (*Gliricidia sepium*).

Parameters	Treatment				SEM
	A	B	C	D	
VFA Total (mM)	162,44^{a}	145,46^{ab}	129,47^{b}	91,76^{c}	11,22
Asetat (mM)	58,84^{a}	55,34^{a}	57,49^{ab}	44,78^{b}	4,4
Propinat (mM)	36,90^{a}	38,85^{a}	27,70^{b}	20,90^{b}	2,63
Butirat (mM)	10,95^{a}	6,95^{b}	7,35^{b}	5,07^{c}	0,7
N-NH3 (mM)	5,84^{a}	9,38^{a}	5,10^{a}	6,36^{a}	1,09
Protozoa (x10^{4}) sel/ml	30,79^{a}	26,81^{ab}	21,31^{ab}	19,31^{b}	3,57
Value Ph	6,42^{a}	6,41^{a}	6,24^{a}	6,20^{a}	0,08
MetanProduction (mM)	26,68^{a}	21,48^{a}	25,55^{a}	19,66^{a}	1,91

Note: (A) 45% concentrate + 55% field grass; (B) Gamal 15% + 30% concentrate + 55% field grass; (C) Gamal 30% + 15% concentrate + field grass. (D) Gamal 45% + field grass 55%. Lift followed by different letters on the same line shows significantly different differences (P> 0.05).

The highest protozoan population was found in treatment A 30.79 mM and the lowest was in treatment D 19.31 mM. The mean protozoan population values of all treatments showed results that were not significantly different (P> 0.05). Protozoa population is the lowest in cattle that are treated D with the treatment by giving large amounts of gamal where gamal contains anti-nutrient substances, one of which is saponin. According to Ozutsumi et al, (2005) microbial fermentation in the rumen is a very complex interaction because it is influenced by feed nutrients which will affect the rumen protozoan population. The effect of saponins is to reduce the number of protozoan populations. This makes it possible for the toxic nature of saponins to be protozoan populations (Santoso and Hariadi, 2007). Saponins are toxic to bacteria and protozoa in the rumen. Approximately 9-25% of methenogens are bersibiosis with protozoa by sticking to the surface (Santoso and Hariadi, 2007). Decrease in protozoan population by feeding gamal and field grass is a positive result where the decrease in protozoan population will be accompanied by an increase in bacterial population in the rumen including fiber-degrading bacteria. The degree of acidity (pH) in goats treated A, B, C and D is 6.42; 6.41; 6.24; and 6.20 which statistically showed results that were not significantly different (P> 0.05). In treatment D, goats get a low yield, because the most of all treatments given are 45% gamal and 55% field grass. The low pH of the rumen may have something to do with the content of anti-nutrient substances in treatment D which caused the rumen to become acidic. Low rumen pH can reduce protozoa population drastically, low pH will make the rumen condition acidic (Marison *et al.,* 2003). (Table 5.1). In this study the average pH of rumen fluid was still normal. To maintain rumen metabolic value (pH) between 6.0-7.0 (Sung *et al.*, 2007). According to Cardoso et al, (2000). Optimal pH value of rumen fluid is 6.4 and suboptimal pH is 5.5. The highest pH value is 7.0, low pH 5.1 and subotimal pH 5.5-5.4. The average results of this study showed the production of CH4 in PE goats in treatments A, B, C and D were 26.68, 21.48, 25.55 and 19.66 (Table 5.1). Statistically the results were not significantly different (P <0.05). Where treatment D of CH4 production is lower where livestock are more efficient in utilizing the food consumed. Treatment D illustrates the high utilization of feed with little energy wasted through the defaunation process. This is caused by feeding with 45% gamal and 55% field grass and the presence of antinutrients (saponins and tannins) in gamal helps the process of methane gas reduction in livestock.

The reduced concentration of methane gas is due to the reduced number of protozoa which are symbiotic sites of methanogenic bacteria. This is in line with the results obtained in this study where methane production was the lowest in treatment D, the number of protozoans was the lowest in treatment D. This may be due to the lack of development of acetogenic bacteria due to the presence of antinurition substances in the gamal so that the CO2 and H2 that is formed leads to the formation of methane. According to Arora (1995) methane gas is produced from CO2 which reacts with H2. CO2 and H2 gas are by-products of the digestive process of carbohydrates in the rumen. The process of methanogenesis is carried out by microorganisms in the rumen that utilize H2 and CO2 to produce methane gas. In addition, the production of acetate and propionate in treatment D tends to be higher so that it can spur an increase in CH4 (Angela *et al*., 2000).

In this study the results obtained average goat blood glucose in treatment A 112.97 mg / dL, B 91.07 mg / dL, C 83.47 mg / dL and D 82, 67 mg / dL. Statistically the results between treatments were not significantly different (P> 0.05). The high blood glucose in treatment A was caused by the presence of carbohydrate source of food in the concentrate where the highest amount of concentrate was given among the other treatments, so cattle were not optimally utilizing the energy sources contained therein. Manalu, 1999) High blood glucose concentration because the food consumed has undergone carbohydrate hydrolysis in the presence of carbohydrate-breaking enzymes into glucose. In ruminants to maintain blood glucose, namely through the endogenous process functions for essential tissue in the body (Arora, 1995). The results of this study indicate higher blood glucose levels compared to research (Yupardhi *et al.,* 2014) that goat blood glucose levels are at 64.67 mg / dL.

In this study the highest average blood urea in animals that received A treatment (45% concentrate + 55% grass) 22,25 mg / dl and the lowest in animals that received D treatment (45% gamal + 55% field grass) 17, 68 mg / dl which statistically shows significantly different results (P <0.05).The high blood urea in treatment A is due to the presence of an additional intake of protein from urea as a mixture of constituent compounds in the treatment as non-protein nitrogen (NPN).

Occurrence of rumen N-NH3 absorption and the amount of amino acids that are oxidized, absorbed affect the blood urea concentration in livestock. Blood urea is also associated with the needs of microorganisms in the rumen and reflects the level of nitrogen balance in the rumen (Rusdi, 2006).No influence of blood urea concentration between treatments because the amount of protein in the ration given to livestock is almost equal to an average of 22%. High blood urea levels indicate that the conversion of rumen NH3 to amino acids for microbial protein synthesis is not running optimally. Conversely low blood urea levels indicate that the conversion of NH3 to amino acids for maximal microbial protein synthesis. High blood urea concentrations make cattle inefficient in utilizing the energy they consume (Roseler *et al.,* 1993).As in the study (Manu, 2007) in goats normal blood urea levels between 13-44 mg / Dl. Inefficient use of energy consumed due to high blood urea levels (Roseler et al., 1993).

To convert the concentration of rumen ammonia into blood ammonia requires a large energy source and then continued in the form of urea in the urine (Purbowati, 2007).

Tabel 5.2. Blood profile of PE goats fed with concentrates feed were replaced with gamal (*Gliricidia sepium*).

Parameters	Treatment				
	A	B	C	D	SEM
Blood Glucose	112,97^{a}	91,07^{a}	82,67^{a}	83,47^{a}	6,09
Blood urea	22,25^{a}	21,02^{ab}	19,0^{bc}	17,68^{b}	0,65
Triglycerides	16,25^{a}	12,25^{ab}	11,0^{b}	9,5^{b}	1,23
Total Protein	7,86^{a}	8,28^{a}	7,57^{a}	8,14^{a}	0,47
Cholesterol Total	118,75^{a}	128,5^{a}	108,5^{a}	97^{a}	5,53

Note: (A) 45% concentrate + 55% field grass; (B) Gamal 15% + 30% concentrate + 55% field grass; (C) Gamal 30% + 15% concentrate + field grass. (D) Gamal 45% + field grass 55%. Lift followed by different letters on the same line shows significantly different differences (P> 0.05)

In this study the highest triglyceride was in treatment A 16.25 mg / dl and the lowest was at treatment 9.5 mM as in table 5.1. Statistically showed significantly different results (P <0.05). The high triglycerides in treatment A because of the sufficient nutrients present in the ration as stated by Gagah, (2016) The lipid content in the blood of ruminants is influenced by the feed given, if the feed consumed contains good nutrients will produce higher triglyceride values. Triglycerides are one of the body's energy reserves. The body will remodel triglycerides into energy, if the energy in the feed does not meet the body's energy needs (Cunningham, 2002).

The highest average total blood protein in this study was in the treatment D 8.41 mg / dL. Statistically the results were not significantly different (P> 0.05) between treatments. The total height of the protein is thought to be due to the administration of 45% gamal leaves where the legume as rumen degradable protein (RDP) is easily absorbed directly inside the rumen. Protein absorption in the treatment D diet is better. this is presumably because the feed protein is partially broken down in the rumen by rumen microorganisms into amino acids and peptides and some un-fermented protein is absorbed directly into the rumen wall, the excess amino acids brought to the liver and converted to ammonia. (Salido *et al.,* 2016) states that protein is absorbed by the animal's body in the form of amino acids and the availability of sufficient protein will increase the activity and growth of microorganisms so that the process of digestion and consumption also increases.

In this study the average total cholesterol in treatment A was 118.75 mg / dl; B 128.50 mg / dl, C 108.50 mg / dl, and D 97.00 mg / dl. Statistically showed no significant difference (P> 0.05). The low total cholesterol concentration in the D treatment was affected by the quality of the treatment ration containing antinutrient substances on the gamal leaves (tannins saponins and plavonoids) which inhibited the absorption of cholesterol in the intestine so as to reduce cholesterol concentration.

The tannin content of the gamal leaf can coat the intestine and bind to proteins so that it inhibits the absorption of carbohydrates, proteins and lipids. According to Oluremi et al, (2007) tannins and saponins result in inhibited absorption of cholesterol in the intestine so as to reduce blood cholesterol levels. Furthermore Kinsela, (1993) stated that plants containing plavonoids function as antioxidants in inhibiting oxidation, especially lipid compounds and lowering blood cholesterol. These results indicate a higher cholesterol content with research (Gagah, 2016) which is between 58 mg / dL - 81 mg / dL.

CONCLUSION

The effect of the rate of replacement of concentrates with gamal leaves as much as 30% (*Gliricidia sepium*) in the ration on the performance of rumen metabolites and blood profile Reducing total and partial VFA concentrations, has no effect on NH3, protozoa populations, pH and methane gas and significantly influences and decreases blood parameters in urea and triglycerides. Then it is recommended to replace the concentrate with gamal leaves (*Gliricidiasepium*) as much as 30%.

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