Blood Protein And Blood Urea Of Lactating Dairy Due To Feeding Of Total Mixed Ration Based On Ammoniated Corn Straw

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Blood Protein And Blood Urea Of Lactating Dairy Due To Feeding Of Total Mixed Ration Based On Ammoniated Corn Straw

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ABSTRACT

Total mixed ration (TMR) is pattern of feeding by forage and concentrate feed simultaneously. Experiment were conducted to evaluate the effect of feeding TMR based on ammoniated corn straw on blood protein and blood urea lactating dairy. A total fifteen lactating dairy cows Friesien Holstein (initial body weight 410.33± 27 kg) were used in a 45-d experiment). Lactating dairy cows were blocked by month oflactation. Experiment arranged in a randomized block design. Dietary treatment include : T0 (non TMR ration), T1 (TMR ration based on corn straw) and T2 (TMR ration based on ammoniated corn straw). The data obtained were subjected to analysis of variance and continue to analyzed of Orthogonal Contrast. No significant different on protein and blood urea due to feeding of total mixed ration based on ammoniated corn straw. The treatment can produce normally blood protein and blood urea, 6.09 to 6.30 g/dl for blood protein and 56.05 to 60.79 mg/dl for blood urea. In conclusion, both treatment of TMR based on corn straw without ammoniated and with ammoniated increased the blood protein and blood urea of lactating dairy cattle.

Key words : Ammoniated corn straw, Blood protein, Blood urea, Dairy cattle, TMR

INTRODUCTION

Problem of limitation forage into obstacles often interferes with the development of dairy farm business in Indonesia. Forage agricultural waste can be used as an alternative feed for dairy cattle. One of which is corn straw, but the limiting factor is high lignin content. High lignin content can decrease digestibility, therefore it is necessary to apply a treatment to improve the quality of corn straw. Ammoniation technologi using urea is one of that applied. Crude protein corn straw can be increased up to two fold by ammoniation treatment can be increased up to two-fold by ammoniation treatment (Chiquette et al. 1992), however, urea use should not be excessive because it can interfere with the reproductive system of cattle (Butler et al., 1996). The use of TMR in dry form is able to overcome the limiting factors for the development of enterprises faced by farmers in general that the ability to provide forage each day (Atwood et al. 2001). Practicality and economic factors on the TMR can help alleviate breeder expenses because it can reduce the cost of labour (Terra et al. 2010) which is expected to increase farmer income and farm business can be more developed. Giving TMR can also stabilize rumen pH (Caplis et al. 2005), so as to prevent the occurrence of acidosis (Moya et al. 2011). The objectives of this study were to compare the effect of blood protein and blood urea by different feeding system.

MATERIAL AND METHODS

Experimental

A total of fifteen (Friesien Holstein) lactating dairy cows with an initial body weight of 410.33±27 kg were used in a 45 days experiment and were blocked by month of lactation. Experiment arranged in a randomized block design. The three dietary treatment were as follows : T0 (Non TMR ration), T1 (TMR ration based on corn straw) and T2 (TMR ration based on ammoniated corn straw). The ingridients and chemical composition of experimental diets are shown in Table 1. The lactating dairy cows were fed twice daily and water was provided ad libitum.

Table 1. Ingredients and chemical composition of experimental diets

Ingredients (% DM)	T0	T1	T2
Corn straw	40	40	-
Ammoniated corn straw	-	-	40
Cassava waste	6	6	6
Pollard brand	16.05	16.05	16.05
Salt	0.6	0.6	0.6
Rice brand	24	24	24
Peanut Shell	4.2	4.2	4.2
Copra meal	6	6	6
Premix	0.15	0.15	0.15
Mollasses	0.6	0.6	0.6
Calsium	0.6	0.6	0.6
Soyxyl®	1.2	1.2	1.2
Go pro®	0.6	0.6	0.6
Chemical composition			
Crude Protein	10.1	10.1	11.9
Crude fiber	38.5	38.5	36.0
Crude fat	2.9	2.9	2.6
Ash	16.3	16.3	17.0
NFE	32.2	32.2	32.5
TDN	49.4	49.4	50.9
Calcium	0.5	0.5	0.5
Phosphorus	0.4	0.4	0.4

DM : dry matter; NFE : nitrogen free extract; TDN : total digestible nutrient

Sampling and Analysis of Blood

Blood was sampled from each cow by puncture of the jugular vein at the end of research. Samples were collected into separate evacuated tubes containing sodium heparin or EDTA and were immadiately placed on ice. Blood protein levels were measured using photometric test by the biuret method (Alikhan and Youngs, 1973). Analysis of blood plasma urea concentration was done with the Berthelot method (Chaney and Marbach, 1962).

Statistical Analysis

The data of experimental subjected to variance analysis and then analyzed further with Orthogonal CONTRAST.

RESULT AND DISCUSSION

Average blood urea concentration in each treatment during the study is listed in Table 2. Feeding treatments did not significantly affect the concentration of blood urea in lactating dairy cows (P>0.05). blood urea concentration was not significantly different, this is because concentration af amonia in the rumen on all treatments were not significantly different, T0 6.89; T1 6.90 and T2 7.08 mM. There is a tendency that the highest concentrations of blood urea is T2 due to proteins are degraded in the rumen which is characterized by high concentration of NH_3 at T2 compared to T0 and T1 treatment. The high protein content of the ration on T2 also cause blood urea concentration T2 is higher tha the T0 an T1. Huntington (1989), found that the more protein degraded in the rumen resulting in increasing higher concentrations of blood urea.

Blood urea concentration obtained at each treatment is still in the normal range is from 56.05 to 60.79 mg/dl. Bondi (1987), stated that the maximum amount of blood urea concentration was 80 mg/dl. These limits indicate that the animals were in a state of intoxication. Toxication occurs when the blood urea concentration above 80 mg/dl, while when the blood urea concentration in the range below 80 mg/dl livestock is under normal conditions. Blood urea derived from rumen ammonia and the residue of amino acid catabolism. If the rumen ammonia concentration increases, will make the blood urea concentration also increase.

Table 2. Average blood urea and blood protein in experiment

Parameter	Treatment		
	T0	T1	T2
Blood Urea (mg/dl)	56.05±18.03	56.23±18.11	60.79±21.57
Blood Protein (g/dl)	6.09±0.57	6.18±0.52	6.30±0.46
Rasio Blood Urea/Crude Protein Intake	0.042±0.01	0.042±0.01	0.038±0.01
Efficiency Blood protein to Crude Protein Intake (%)	0.45±0.04	0.46±0.04	0.40±0.03

Ammmoniation treatment resulted in increased levels of crude protein corn straw, this led to the crude protein conte of T2 is higher than T1. Crude protein ration can affect blood urea concentration as blood urea is the end product of protein metabolism in the animal body and excreted through urine. The higher level of crude protein ration indicates that blood urea concentrations even higher. Blood urea ratio to crude protein intake is 0.042 obtained for T0 and T1, while T2 is 0.039. the smaller value of the ratio indicates that the same crude protein intake can result in blood urea concentrations less. Smaller the ratio value, indicates that the better efficiency. Kohn et al. (2005), reported that urea content in the blood is a product that has not be utilized by livestock, the smaller the value of blood urea ratio suggest that the better utilization of feed protein.

Average blood protein concentrataion in each treatment during the study is listed in Table 2. Based on the Table 2 it is know that feeding treatment did not significantly affect blood protein concentration lactation dairy cows (P>0.05). Protein concentrations were not significantly different due to the ability of livestock to absorb amino acids are relatively the same. Blood protein concentrations obtained in each treatment is still in the normal range is 6.09 to 6.30 g/dl. Duncan (1986), stated that the protein in cow's blood range from 6 to 8 g/dl. In addition,

the protein concentration of the blood will be kept under normal conditions in the presence of homeostatic processes in the animal body.

high or low blood concentrations of total protein are highly dependent on the extent of protein or amino acid those are absorbed through the intestinal wall and the level of the protein component uses. In this case, phsyological animal protein components in the blood are absorbed in relatively equal amounts. These components are stored and released under the order of central nervous system via hypothalamus to be utilized. Protein absorbed the highest found in the amount of 1300.08 g at T2, therefore T2 produces the highest concentration of blood protein as well. Efficiency of blood protein to crude protein intake result of the study have the same relative value is 0.4% for T0 and T2, while T1 is 0.5%. Park (1985) found that the greater efficiency of the formation of a blood protein to crude protein intake results the better utilization of protein. Greater efficiency shows that the same crude protein intake can result a blood protein concentration greater.

CONCLUSION

In conclusion, both treatment of TMR based on corn straw without ammoniated and with ammoniated increased the blood protein and blood urea of lactating dairy cattle.

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