

DISPLAY LEVELS OF FAT, PROTEIN, AND LACTOSE OF COW'S MILK DUE TO ELEPHANT GRASS SUBSTITUTION WITH AMMONIATION RICE STRAW SUPPLIED TAPE TREE LEAVES

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ABSTRACTS

Research Objective is to evaluate what extent is XP, Living XP Fat, protein, and lactose levels Milk milk dairy Due Granting amber rice straw Supplemented Wood and Soyxyl Cassava leaves as a replacement of Elephant grass. Material used are 16 lactating dairy cattle on the 1st, 2nd, 3rd and 4th moons, elephant grass (RG), concentrate, ammonia rice straw (JPA), cassava leaves (DUC) and protein by pass brands This research was conducted using a randomized block design (RAK). Treatment applied: T0 = concentrate 65% + RG. 35%; T1 = Concentrate 65% + RG. 20% + JPA 5% + DUC 5% + Soyxyl 5%; T2 = Concentration 65% + RG. 15% + JPA 10% + DUC 5% + Soyxyl 5%; T3 = Concentration 65% + RG. 10% + JPA 15% + DUC 5% + Soyxyl 5%. Grouping is based on lactation Month 1, 2, 3 and 4 parameters Observed include: Feed consumption (BK), Fat content, protein and milk lactose level. The data obtained were processed statistically by using the variance analysis and if any differences would be continued with Duncan's test. The results showed that there was no real difference ($P > 0.05$) between the treatments T0, T1, T2 and T3. In addition, bypass proteins can be used to make up the elephant grass in lactase dairy cattle rations. **Key words:** Elephant grass, rice straw, and Cassava leaves

INTRODUCTION

One of the problems that are often faced in livestock business is the provision of forage feed ingredients. In the rainy season the quantity of forage exceeds the needs of livestock and vice versa in the dry season the quantity is very limited (Utomo, 2003), therefore it is necessary to look for other alternative efforts to replace elephant grass with other sources of fibrous feed ingredients by utilizing agricultural residues. The success or failure of the livestock business, especially in terms of overcoming the problem of providing feed ingredients. Elephant grass as forage for dairy cows in the dry season has experienced difficulties because its production has decreased.

Rice straw (*Oryza sativa*) is a by-product of agriculture that has the potential to overcome forage shortages. Pure et al. (2008) stated that the estimated remaining yield of rice straw farming with grain production in 2004 amounted to 54,088,468 tons was 54 million tons of straw. Syamsu (2008) added that the use of rice straw as animal feed has only reached 31-39%, while that which is burned or returned to the ground as fertilizer is 36-62%, and about 7-16% is used for industrial purposes. Syamsu (2008) stated that for the purpose of increasing the value of the benefits of rice straw, efforts are needed that are directed to reduce the limiting factor of its utilization, so that its great potential as animal feed can be used. improved, so it is necessary to have a touch of technology in rice straw processing. The easiest and most environmentally friendly

processing is ammonia using urea. Furthermore, it was explained that the use of urea in ammoniation could improve the nitrogen content of rice straw which at the same time could increase its consumption and digestibility as animal feed. The increase in nitrogen levels is possible because urea is a source of ammonia (NH₃), then a hydrolysis process occurs which is then followed by the urease enzyme, urea can be decomposed into ammonia and CO₂. In order for the nutritional needs to be met, additional feed ingredients containing protein are needed. Feed ingredients that have a high protein content are cassava leaves (DUK) and Soyxyl (by-pass protein supplement). Cassava leaves contain branched amino acids (BCAAs) which are quite high and have the potential to be used to increase the digestibility of fibrous feed (Zain, 2007). Furthermore, Zain et al. (2002) stated that the addition of BCAA in the ration was able to increase the addition of cellulolytic bacteria which was reflected in the increase in dry matter digestibility (BK) and acid detergent fiber (ADF) of the ration. Soyxyl is an engineered protein supplement that has high biological value and is resistant to rumen degradation in the form of xylose protected soybeans from black liquor's (BL), so that the supply of quality protein to post-rumen organs increases (Prasetiyono et al., 2007). This study aims to evaluate the extent to which the fat, protein, and lactose content of dairy cows' milk due to elephant grass substitution with ammoniated rice straw supplemented with DUK and protein by pass.

MATERIALS AND METHODS

Research on the appearance of fat content, protein content and lactose content of dairy cows due to elephant grass substitution with ammonium straw supplemented with Cassava Leaves and Soyxyl (source of protein by pass) in dairy cows.

Cattle

FH Dairy Cows as research material were selected from a number of 16 cows grouped into 4 (four) based on the criteria: 1) 1 (one) month lactating cows, 2) 2 (two) month lactating cows, 3) 3rd month lactating cows. 3 (three) and 4) lactating cows in the 4th (fourth) month with a body weight of 398 ± 31.61 kg with CV = 7.66 and an average milk production of 10.40 ± 1.80 kg/head/day with CV = 21.22.

Ration

The ration materials used in the study were 1) elephant grass, 2) ammoniated rice straw (JPA), 3) Berkah Intan Fed (BIF) concentrate and Soyxyl protein by-pass protein supplement made by UD. Berkah Intan Sentosa Indonesia, 4) cassava leaf supplement (DUK). Analysis of feed ingredients was carried out at the Nutrition and Animal Feed Laboratory, Faculty of Animal Husbandry, Diponegoro University, Semarang. The composition of the treatment ration material is presented in Table 1. The nutritional content of the treatment ration is presented in Table 2.

Table 1. Composition of Treatment Ration Materials

Material	treatment			
	T0	T1	T2	T3
	----- % -----			
Elephant grass	35	20	15	10
Straw Am.	0	5	10	15
Protein by pass	0	5	5	5
DUK	0	5	5	5
Consentrat	65	65	65	65
Total	100	100	100	100

Table 2. Nutritional Content of Treatment Ration

Nutrien	T0	T1	T2	T3
	----- % -----			
PK	13.77	15.67	15.38	15.09
Fat	4.10	5.15	5.20	5.25
TDN	56.71	54.46	52.61	50.76
SK	29.22	28.18	28.33	28.49
BETN	40.11	39.04	38.96	38.88
Ca	2.61	2.76	2.73	2.71
P	0.38	0.35	0.33	0.31
BK	64.51	74.53	77.91	81.29
Abu	12.80	11.95	12.12	12.28

Equipment

The equipment used in the study included: 1) Weighing capacity of 100 kg, sensitivity 0.2 kg, 2) Lactoscan; 3) Centrifuge, 4) Grass chopper, 5) Dairy bucket with 5 liter capacity, 6) Milk quantity from plastic with 1000 ml capacity with sensitivity 10 ml, 7) Plastic sheet, 8) Plastic bag, 9) Cow drinking bucket with 34 liter capacity , and Thermos ice.

Experimental design

This research was conducted using a Randomized Block Design (RAK) with four treatments and 4 (four) groups. The treatment applied is as follows:

T0 = Concentrate 65% + Elephant grass 35%

T1 = Concentrate 65% + Elephant grass 20% + JPA 5% + DUK 5% + Soyxyl 5%

T2 = Concentrate 65% + Elephant grass 15% + JPA 10% + DUK 5% + Soyxyl 5%

T3 = Concentrate 65% + Elephant grass 10% + JPA 15% + DUK 5% + Soyxyl 5%

As a group is a group of dairy cows in the 1st, 2nd, 3rd and 4th months of lactation.

Research procedure

This research was conducted in 3 stages, namely 1) The preparation stage includes: a) Preparing the cage and equipment; b) Measuring body weight and classifying by month of lactation; c) Placing cows based on a randomized treatment chart in a predetermined experiment (Illustration 1); d) Prepare rations. 2) Preliminary stage for 3 weeks for treatment adaptation and eliminating the effect of previous maintenance by giving lactating dairy cow rations based on the treatment group according to the amount that has been determined to be used to measure ration consumption. 3) The data collection stage for 23 days includes: a) Recording daily ration consumption; b) Record the rest of the ration the next day; c) Record milk production in the morning and evening; d) Taking milk and blood samples for analysis.

Observed parameters

1. Consumption of ration

The ration consumption here is the dry matter consumption, the dry matter consumed by livestock is known by calculating the dry matter of the feed given minus the dry matter of the remaining feed for 23 days.

2. Milk production

Daily milk production, obtained by adding up the results of the morning and evening milking, for 23 days. The quality of milk which includes protein content, lactose content, fat content and specific gravity of milk was analyzed by lactoscan at the Veterinary Public Health Service Center, KESMAVET Laboratory Boyolali 4 times.

3. Blood glucose concentration

Blood samples were measured once in the third week (end of the study), ie three hours after feeding. 10 ml of blood was taken from the jugular vein, then centrifuged for 15 minutes at 2,500 ppm. After that, blood serum was taken to be transferred to a serum tube, then stored in a temporary freezer before continuing analysis at the Yogyakarta "LPPT-UGM" testing laboratory.

Data analysis

Data analysis used additive linear model in RAK. The data collected were analyzed by analysis of variance (F test) and if there is an effect of treatment, it will be continued with Duncan's test.

DISCUSSION

The results showed that the effect of replacing elephant grass with ammoniated rice straw (JPA) supplemented with DUK and soyxyl on BK ration consumption, milk fat content, milk protein content, milk lactose content, did not show a significant difference ($P > 0.05$).

Consumption of Dry Matter (BK) Ration

The ration consumption for T0 treatment was 11.43 kg BK (Table 3). Consumption of cow ration treatment T1, T2 and T3 was 11.65; 11.54 and 11.42 kg were higher than the consumption of BK rations for T0 treated cows.

Statistical analysis showed that the average consumption of BK rations for cattle at treatment T0, T1, T2 and T3 was not significantly different ($P > 0.05$). This was because the content of the rations' nutritional value in the form of crude protein (PK), crude fiber (SK), crude fat, extracts without nitrogen (BETN) were not significantly different.

The addition of DUK as a protein source and Soyxyl as a protein source by pass was thought to increase the nutritional value of ammoniated rice straw in the ration of lactating dairy cattle so as to increase the palatability of the ration and ultimately cause the number of treated BK to be no different. Agus (1997) stated that the type of concentrate and the rate of degradation of the ration in the rumen can affect the consumption of BK rations. This is in accordance with the opinion of Baiyila et al. (2002) which stated that the nutritional composition of the same ration between treatments would also cause insignificant differences in the consumption of BK, PK and TDN.

Table 3. Effect of substitution of elephant grass with ammoniated rice straw supplemented with DUK on BK rations, fat, protein, and lactose content of milk.

Variable	Treatment			
	T0	T1	T2	T3
Dry ingredients	11,43 ± 0,26	11,65 ± 0,40	11,54 ± 0,37	11,42 ± 0,47
Ration (kg)				
Level	3,80 ± 0,47	3,90 ± 1,74	3,74 ± 1,82	3,78 ± 1,40
Milk fat (%)				
Level	2,58 ± 0,06	2,61 ± 0,08	2,63 ± 0,31	2,71 ± 0,10
Fat of Protein (%)				
Level	3,70 ± 0,04	3,72 ± 0,14	3,72 ± 0,17	3,82 ± 0,12

Milk Protein Level

Milk protein content in T0 treatment was 2.58% (Table 3). Milk protein levels in treatment T1, T2 and T3 were 2.61; 2.63 and 2.71% higher than milk protein content in treatment T0. Statistical analysis showed that the average milk protein content between treatments T0, T1, T2 and T3 were 2.58%, 2.61%, 2.63% and 2.71%. not significantly different ($P > 0.05$). This was due to the crude protein content in the T0, T1, T2 and T3 treatment rations, namely 1.58 kg, 1.83 kg, 1.79 kg and 1.73 kg were not significantly different. The results showed that the milk protein content in T3 treatment was higher than T1 and T2. The addition of the percentage of JPA is thought to cause an increase in milk protein levels in T3 treatment so that it is higher than T1 and T2 treatments.

The addition of DUK and protein by-pass in the ammonium rice straw, the available energy becomes more for the formation of amino acids derived from microbes. The increased

availability of these amino acids will contribute to an increase in milk protein synthesis (Sukarini, 2006). Umiyasih et al. (1997) stated that improving feed quality could increase real production, while milk quality (fat, specific gravity, casein, and acidity) was not significantly different. Sudjatmogo (1998) reported that the quality of milk production produced by the udder gland is largely determined by the number and performance of epithelial cells that synthesize milk.

Milk Fat Content

Milk fat content in T0 treatment was 3.80% (Table 3). The fat content of cow's milk in treatment T1 was 3.90% higher than the fat content in treatment T0 while milk fat content in treatment T2 and T3 was 3.74 and 3.78% lower than T0.

Statistical analysis showed that the mean milk fat content between treatments T0, T1, T2 and T3 was not significantly different ($P>0.05$). This was due to the crude fiber content of the rations in the T0, T1, T2 and T3 treatments, which were 3.32; 3.28; 3.29 and 3.27 kg did not show a significant difference.

This is in accordance with the opinion of Wikantadi (1978) which states that the main ingredients of milk fat that are absorbed by the udder are acetate, glucose, beta hydroxy butyric acid (BHBA) and blood triglycerides. Larson (1995) also stated that milk fat consists of triglycerides (the dominant component), diglycerides and monoglycerides, fatty acids, sterols, carotenoids, vitamins (A, D, E and K) and other ingredients. Hanifa (2005) stated that the availability of substrates for the synthesis of milk fat (acetic acid, butyric acid, and blood triglycerides) were not significantly different, so the levels and production of milk fat were not significantly different either.

Milk Lactose Level

Milk lactose content in T0 treatment was 3.70% (Table 3). Milk lactose content in T1, T2 and T3 treatments was 3.72; 3.72 and 3.82% higher than the lactose content of milk at treatment T0. Statistical analysis showed that the average lactose content of cow's milk in treatment T0, T1, T2 and T3 was not significantly different ($P>0.05$). This was due to the fact that the replacement of elephant grass with ammonium straw supplemented by DUK and Soyxyl in the ration did not cause a significant difference in the content of the nitrogen-free extract (BETN). BETN is a glucose-forming material, while glucose is a blood glucose-forming material. The concentration of blood glucose that did not differ caused the lactose level of milk to be the same. Blood glucose is the main precursor ($\pm 80\%$) for the formation of lactose in milk.

The synthesis of lactose in the Golgi apparatus is catalyzed by the enzyme lactase synthetase. Lactose is formed from the condensation of one glucose and one galactose, where 2 moles of glucose are needed by the epithelial cells of the udder gland, where 1 unit of glucose is converted to galactose (Sukarini, 2000). The lactose levels in this study were T0 (3.70%) respectively, T1 (3.72%), T2 (3.72%) and T3 (3.82%). According to Sudono (1999), the lactose content of FH dairy cow's milk is 4.65%.

CONCLUSION

Based on the results and discussion of the research, it can be concluded that ammoniated straw supplemented with cassava leaves and protein by pass (Soyxyl) can be used to partially replace elephant grass in FH dairy cow rations. Based on the results of the study, it is still necessary to do further research on replacing elephant grass with ammoniated rice straw supplemented with

cassava leaves and Soyxyl (as a protein source by pass) with a higher percentage of ammoniated rice straw.

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