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PROCEEDING
INTERNATIONAL SEMINAR
IMPROVING TROPICAL ANIMAL PRODUCTION FOR FOOD SECURITY

3-5 November 2015
Eddy Agus Mokodompit Auditorium

Organized by
Faculty of Animal Science Universitas Halu Oleo
Kendari - Southeast Sulawesi
Indonesia

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Kendari, 2015

Proceeding
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Proceeding International Seminar "Improving Tropical Animal Production for Food Security"

Zainal Jaelan, Patricio S., J. Murali Dharan, W. Dollemore, Nasrullah, B. Purwantara, C. Sumantri dan Herry Sonjaya
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Remark From The Chairman of International Seminar Committee

Assalamualaikum Warahmatullahi Wabarakatuh

Distinguished Ladies and Gentleman,

As the host of the International Seminar, we are very grateful and would like to thanks to keynote speaker, all invited speakers and presenter who have prepared the papers and participating to the seminar. We strongly believe that their significant contribution will be useful to all of societies to enhance the development of tropical animal production in the future.

The theme of this seminar is "Improving Tropical Animal Production for Food Security". We believe that food issue has become important and strategic sector and it should be the main strength of the Indonesian economic empowerment. Food security in the animal production field is the concept of fulfilment food from animal which is produced using sustainable and eco-friendly farm system appropriate with local wisdom. Therefore, it was necessary to formulate various policies, programs and strategies to accelerate the improvement of the production and the productivity of the tropical animal based on the latest research.

In this seminar we have keynote speaker, Prof. Dr. Ir. Ali Agus, DAA, DEA, he is an expert in Nutrition and Feed Technology. His current position is Dean of Faculty of Animal Science of Gadjah Mada University, Indonesia. He will talk about the role of agricultural by products in beef cattle production.

Besides that, we have seven invited speakers from different countries;

Prof. L. C. Cruz, he was Head of Philippine Carabao Research Canter.

Prof. Dr. Dahlan Ismail, he is an expert in the field of integrated livestock system, Universiti Putra Malaysia.

Dr. Kieren McCosker, he is an expert in free range-based management of cattle production. He works at Department of Primary Industry and Fisheries, Northern Territory, Australia.

Prof. Monchai Duangjinda, he is an expert in animal breeding–native chicken production. His current position is Dean of Faculty of Agriculture, Khon Kaen University. He also works as Director of Research and Development Network Center for Animal Breeding (native chicken), Thailand.

Prof. A. K. Thiruvenkadan, he is an expert in animal genetics and breeding conservation. His current position is Head of Tamil Nadu Veterinary and Animal Sciences University, India.

Prof. Bui Van Doan, he is an expert in Animal Production, Faculty of Animal Science and Aquaculture, Vietnam National University of Agriculture Vietnam.

And the last, Ir. Eko Widodo, M.Agr.Sc. M.Sc. PhD, he is an expert in poultry nutrition, Faculty of Animal Science, Brawijaya University, Indonesia.

We also have participants who will deliver their researches through poster presentation. We wish all the participants could fulfill their expectation as well as enjoying the interaction among all scientists in this seminar.

High appreciation to Rector of Universitas Halu Oleo and Dean of Faculty of Animal Science Universitas Halu Oleo, who have concerned and supporting this seminar. We thanks to the sponsorship; Government of Southeast Sulawesi, Major of Kendari, Major of Baubau, Regent of West Muna, BRI, Kendari Pos, ISPI and HILPI South East Sulawesi who have contributed for the successfull of this seminar. We also would like to thanks to committee who have helped in the preparation of this seminar.

Finally thanks to you all, for the successful of this seminar. I wish all of you would be very pleasant and most enjoyable stay in Kendari.

Wassalamualaikum Warahmatullahi Wabarakatuh

Dr. Ir. La Ode Nafiu, M.Si.

Chairman of International Seminar Committee

Preface

The Proceeding of International seminar "Improving Tropical Animal Production for Food Security". The seminar was held on 3-5 November 2015 at Eddy Agus Mokodompit Auditorium, Universitas Halu Oleo, Kendari, Southeast Sulawesi, Indonesia, and organized by Faculty of Animal Science, Universitas Halu Oleo, Kendari. As much as 49 papers were contained in this proceeding. The papers consist of 8 papers from key note and invited speakers, 24 papers for oral presentation and 17 papers for poster presentation. Papers were divided into 6 categories, they are Genetic and Breeding, Physiology and Reproduction, Nutrition and Feed Technology, Forage and Pasture Management, Processing and Animal Product, and Livestock Management and Marketing.

The committee would like to say thank you very much to all of the reviewers, editorial staff, and all of the members of the committee who have given their support for the successfull of this international seminar and for the preparation of the proceeding. Finally, we would like to say thak you vey much for all the authors for their significant contribution to the seminar. We strongly believe that their significant contribution will be useful to all of societies to enhance the development of tropical animal production in the future.

Editorial Team

Differences in The Quality Of Feed on Blood Glucose Levels, Production and Quality Of Milk in Dairy Cattle

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ABSTRACT

This study aims to determine the effect of different feed quality on blood glucose levels, production and quality of milk in dairy cattle. The material used in this study are 9 Friesian Holstein dairy cows with a weight range of 350-400 kg , lactation levels I-III , divided into 3 treatment groups feed are: T0 = 70% forage of corn + concentrate 30% (14% CP); T1 = Forage of Corn 60% + 40% concentrate (17% CP); T2 = Forage of Corn 50% + 50% concentrate (20% CP). This research method used a Randomized Block Design. Data were analyzed by analysis of variance. The average consumption of dry matter T0, T1 and T2 respectively 11,95, 11,08 and 10,29 kg. The average blood glucose concentration at T0, T1 and T2 respectively 53,00, 49,33 and 57,67 mg/dl. The average production of milk at T0, T1 and T2 respectively was 13,60, 16,67 and 17,37 kg. The average fat levels and fat content of milk on the T0, T1 and T2 respectively 4,8; 4,67; 3,68% and 0,65, 0,63 and 0,64 kg. Average protein levels and protein content of milk on the T0, T1 and T2 respectively was 3,56; 3,48; 3,45% and 0,48; 0,57 and 0,59kg. Average lactose levels and lactose content of milk on T0, T1 and T2 respectively was 4,85; 4,69; 4,58% and 0,60, 0,84 and 0,78kg.
The conclusion from this study is the feeding with different quality (crude protein content of 14%, 17% and 20%) did not significantly affect blood glucose levels, milk production and milk quality in dairy cows

Key Words: Feed, Blood Glucose, Production Milk, Quality of Milk

INTRODUCTION

In some areas in Indonesia mostly dairy cow population has shown a fairly high production performance. Measurement of productivity of dairy cows in milk production aspect is based on the ability of a cow to produce milk and quality of milk produced. The needs of both concentrate feed and forage in dairy cows is very important to prepare for milk production during lactation in connection with increased production and quality of milk. This relates to the energy derived from the feed material. The nutritional requirements of dairy cows in the early period of lactation is very high especially energy needs, where the cows in this period is usually in deficit of energy due to the intake of feed that the maximum is not reached, so as to anticipate the cow will mobilize energy reserves of the body resulting in weight loss.

The nutritional requirements are high in the early period of lactation difficult to meet through the addition of concentrate consumption, because the theory in practice does not support the physiological processes of livestock feed, especially the metabolic processes in the rumen that is normal. The addition of concentrate will cause low rumen pH and crude fiber digestibility decreased so that low forage consumption and resulted in the rumen acidosis. Real effect of the administration of the concentrate in large numbers is a decrease in milk fat content, which in turn has an impact on the quality of milk produced. Potential lactation addition affected by the secretors cells are also influenced by the substrate feed milk as a raw material derived from feed consumed both forage and concentrates. Adequacy standards microbes need to be able to perform its function one of them is generating Volatile Fatty Acids (VFA) where the VFA is one of the raw materials for the synthesis of milk.

Focused on these things, then it would need to be done manipulation of feed to increase production while maintaining the quality of milk produced by feeding with different quality in dairy cattle and see its effect on blood glucose levels, production and quality of milk. The hypothesis in this study is: differences in the quality of feed given to the dairy cows will have an effect on levels blood glucose, the production and quality of milk produced.

MATERIALS AND METHODS

Research Material

Animal

Nine Friesian Holstein dairy cows were used as research materials with average body weight of 350-400 kg at the level I-III lactation. The cows are placed in individual cages measuring 1.5 x 2 meters which are equipped with a food and drink. Nine dairy cows were divided into 3 treatment groups feed.

Feed

Feed used in this study were forage and concentrates. Given forage crop corn is chopped. Comparison Forage : Concentrate (BK) = 70:30; 60:40; and 50:50. Concentrate consisting of a mixture of pollard Wheat, soybean meal. The composition of the concentrate in the study was shown in Table1.

Table 1. Composition of research feed materials

Treatment	Forage	Concentrate	Pollard Bran	Corn Meal	Soybean Cake	Coconut Skin	Soybean	Total
				%				
T0	70	30	32,4	12,6	20	23	12	100
T1	60	40	15	10	30	30	15	100
T2	50	50	7	5	35	35	18	100

Table 2. Composition of research feed nutrition

Treatment	Dry Matter	Crude protein	TDN	Ca	P
			Kg		
T0	11,95	1,38 (14%)	8,02 (67%)	0,099	0,033
T1	11,08	1,49 (17%)	7,41 (66%)	0,087	0,033
T2	10,29	1,74 (20%)	7,19 (69%)	0,088	0,040

Research Methods

The study was conducted using a randomized block design with 3 treatments and 3 replications. Treatment of feed as follows:

1. T0: Forage of Corn (70%): Concentrated (30%) with CP content of 14%
2. T1: Forage of Corn (60%): Concentrated (40%) with CP content of 17%
3. T2: Forage of Corn (50%): Concentrated (50%) with CP content of 20%

The samples of cow were selected using purposive sampling. It means that samples selected with certain criteria, namely: (1) Cows are at lactation level I-III, (2) the average weight ranges from 350-400kg.

Implementation of Research

This research was conducted in two stages:

1. Adaptation period during 2 weeks,
   During adaptation period, gradually feed accustom cows consume feed according to treatment and each cow got appropriate amount of calculation.
2. Treatment during 8 weeks
   a) To measure daily feed intake in cows treated T0, T1 and T2. Consumption of the feed is measured by weighing the amount of feed given reduced residual feed.
   b) To measure production of milk daily, weekly until the end of the study
   c) To analyzed milk samples for fat, protein and lactose for every 2 week
   d) Take blood samples 1 times that in the last week of treatment is 3 hours after feeding, blood samples were used for analysis of blood glucose levels

Parameter Observed:

The parameters observed during the study were:

1. Feed Intake
2. Milk Production
3. Quality of milk includes milk fat content, protein content of and lactose content
4. Blood Glucose Levels

Data Analysis

Data obtained include feed intake, blood glucose levels, milk production and milk quality (fat content, protein content, lactose content) were analyzed by analysis of variance, and if there are differences among the treatments will be continued with Duncan test.

RESULTS AND DISCUSSION

Dry Matter, TDN, and Crude Protein Consumption

The average consumption of dry matter (DM), TDN and crude protein (CP) of cows in each treatment shown in Table 3.

Table 3. Average consumption of DM, TDN and Crude Protein (kg) In each treatment

	Treatment		
	T0	T1	T2
Dry Matter	11,95[a]	11,08[a]	10,29[a]
Total Digestible Nutrient	7,19[a]	8,02[a]	7,41[a]
Crude Protein	1,38[a]	1,49[a]	1,74[b]

[a,b] Different superscript on the same line indicate significant differences (P <0.05)

Table 3 shows that the average consumption of BK of each treatment was T0 = 11,95 kg, T1 = 11,08 kg, and T2 = 10,29 kg. Average consumption of TDN of each treatment was T0 = 7,19 kg, T1 = 8,02 kg, and T2 = 7,41 kg. The average consumption of CP was T0 = 1,38 kg, T1 = 1,49 kg and T2 = 1,74 kg. Statistical analysis showed that the average consumption of DM and TDN in all three treatments had no significant difference (P> 0.05). Feeding with different protein levels has not been able to give effect to the DM and TDN consumption. Sanh et al, (2000) suggests that the higher the level of crude protein (CP), the feed palatability and digestibility of feed increases. Statistical analysis showed that the consumption of CP in the three treatments showed significant differences (P <0.05). Feeding with different protein levels was influential on the amount consumed PK. The highest crude protein consumption (CP) was found in T2 because the protein content of feed on the treatment was highest in the T2 (20%) while the T1 and T0 respectively 17% and 14%.

Blood Glucose Concentration

The average blood glucose concentration of each treatment are shown in Table 4.

Table 4. Average Blood Glucose concentrations for each treatment (mg/dl)

Group	Treatment		
	T0	T1	T2
1	46,00	58,00	58,00
2	55,00	40,00	51,00
3	58,00	50,00	64,00
Average	53,00a	49,33a	57,67a

[a,b] Different superscript on the same line indicate significant differences (P <0.05)

In Table 4 shows that the blood glucose concentration in each treatment T0 = 53.00 mg / dl; T1 = 49.33 mg / dl; T2 = 57.67 mg / dl. This is in accordance with the opinion of Wulandari (2005) that normal blood glucose concentrations ranging from 40-70 mg / dl. Statistical analysis showed that the average blood glucose concentration among the three treatments (T0, T1 and T2) shows no differences (P> 0.05). Giving a different protein feed in the third treatment glucogenic expected availability of substrate in the form of propionic acid may increase significantly. Increased protein levels in T0, T1 and T2 has not shown any significant differences in blood glucose concentrations produced. This is due to the protein level of feed consumed TDN has not been able to increase the consumption resulting concentration of propionic acid as a precursor of glucose are no different. At T2 treatment of blood glucose concentrations tend to be higher than the T1 and T0 this is because the proportion of forage: concentrate on T2 higher at 50:50 than T1 = 60: 40 and T0 = 70: 30. That is the T2 treatment given amount of concentrate more so that the glucose levels are also relatively high.

Milk Production

The average milk productions of dairy cows in each treatment are shown in Table 5.

Table 5. Average milk production (kg) in each treatment

Group	Treatment		
	T0	T1	T2
1	14,41	14,32	11,94
2	14,42	18,37	20,15
3	11,98	17,33	20,00
Average	13,60a	16,67a	17,37a

[a,b] Different superscript on the same line indicate significant differences (P <0.05)

In Table 5 shows that the average production of milk in each treatment T0 = 13.60 kg; T1 = 16.67 kg; T2 = 17.37 kg. Statistical analysis showed that the average milk production in the three treatments (T0, T1 and T2) showed no differences (P> 0.05). Differences in protein feed cannot increase blood glucose levels, blood glucose which is a precursor of milk lactose. In Table 5 showed, at treatment T2 glucose levels tend to be higher than T0 and T1 and T2 milk production at relatively higher than T1 and T0.

In Table 5 shows increasingly high proportion of the concentrate : forage (T2 = 50:50), milk production is likely to increase even though the three different treatments are not real. Chaturvedi et al (1973) stated that improving the quality of the feed easily digestible can increase propionic acid

in the rumen and propionic acid is a precursor of glucose, so the increase in propionic acid will be followed by increased blood glucose.

Levels of Fat Milk and Milk Fat Content

The average fat content of milk and milk fat content in each treatment are shown in Table 6.

Table 6. Average milk fat (%) and the fat content of milk (kg) at each treatment

Group	Treatment		
	T0	T1	T2
Milk Fat (%)			
1	4,96	5,60	3,36
2	4,96	3,80	3,84
3	4,80	4,62	3,85
Average	4,80	4,67a	3,68a
Milk Fat Content (Kg)			
1	0,71	0,40	0,42
2	0,68	0,69	0,77
3	0,57	0,80	0,77
Average	0,65a	0,63a	0,64a

[a,b] Different superscript on the same line indicate significant differences (P <0.05)

In Table 6 shows that the average milk fat in each treatment T0 = 4.80%; T1 = 4.67%; T2 = 3.68%. Statistical analysis showed that the average milk fat on the three treatments (T0, T1 and T2) showed no differences (P> 0.05). This is due to the availability of substrates for synthesis of milk fat (blood glucose) was also not significantly different. Giving different feed protein level have not been able to increase blood glucose concentrations. Soetanto (1994) argues that every gram of fat requires milk produced 0.22 grams of glucose.

In Table 6 shows that the average fat content of milk in each treatment T0 = 0.65 kg, 0.63 kg = T1, T2 = 0.64 kg. Statistical analysis showed that the average fat content of milk on the three treatments (T0, T1 and T2) showed not significantly different (P> 0.05). In Table 7 shows that the milk fat content in T2 tends to be lower than T1 and T0, this is due to the proportion of forage in the T2 least lower than T1 and T0 is 50: 50 (T1 = 60: 40, T0 = 70: 30). The higher the proportion of forage given the higher levels of fat because the digestibility of crude fiber will produce a higher proportion of acetic acid. In the subsequent process of acetic acid is the main raw material milk fat formation.

Levels of Protein Milk and Milk Protein Content

The average levels of protein milk and milk protein content in each treatment shown in Table 7.

In Table 7 shows that the average milk protein (%) in each treatment T0 = 3.56%; T1 = 3.48%; T2 = 3.45%. Statistical analysis showed that the average milk protein on the three treatments (T0, T1 and T2) showed no differences (P> 0.05). This suggests that feeding with different protein levels have not been able to increase the protein content of milk. CP consumption at T0, T1 and T2 showed significant differences (P <0.05) respectively T0 = 1.38; T1 = T2 = 1.49 and 1.74 kg, but this difference did not affect the protein content of milk. This is in accordance with the opinion of Macrae and Reeds (1980) that the protein consumed is not fully utilized by animal.

In Table 8 shows that the average protein content of milk in each treatment T0 = 0.48 kg, 0.57 kg = T1, T2 = 0.59 kg. Statistical analysis showed that the average protein content of milk on the three treatments (T0, T1 and T2) showed no differences (P> 0.05). The protein content of milk at T2 tends to be higher than the T1 and T0. This is caused by the consumption of feed PK at T2 is higher

than T1 and T0, but the differences have not been able to feed PK consumption showed significant differences in the protein content of milk.

Table 7. Average milk protein (%) and milk protein content (kg) at each treatment

Group	Treatment		
	T0	T1	T2
Protein Milk (%)			
1	3,65	3,47	3,54
2	3,51	3,36	3,34
3	3,54	3,63	3,48
Average	3,56a	3,48a	3,45a
Milk Protein Content (kg)			
1	0,52	0,49	0,42
2	0,49	0,61	0,67
3	0,42	0,62	0,69
Average	0,48a	0,57a	0,59a

[a,b] Different superscript on the same line indicate significant differences (P <0.05).

Levels of Lactose Milk and Milk Lactose Content

The average level of lactose milk and lactose content of milk in each treatment shown in Table 8

Table 8. Average lactose content of milk(%) and lactose content of milk (kg) at each treatment

Group	Treatment		
	T0	T1	T2
Lactose Milk (%)			
1	5,02	4,36	4,91
2	4,77	4,63	4,57
3	4,78	5,07	4,27
Average	4,85	4,69	4,58
Milk Lactose Content (kg)			
1	0,72	0,80	0,58
2	0,67	0,85	0,92
3	0,42	0,87	0,85
Average	0,6	0,84	0,78

[a,b] Different superscript on the same line indicate significant differences (P <0.05)

In Table 8 shows that the average milk lactose (%) in each treatment T0 = 4.85%; T1 = 4.69%; T2 = 4.58%. Statistical analysis showed that the average milk lactose on the three treatments (T0, T1 and T2) showed no differences (P> 0.05). Feeding with different protein levels has not been able to increase the concentration of blood glucose, so it can not increase the lactose content of milk. Blood glucose is the main precursor for the formation of milk lactose.

In Table 8 shows that the average content of milk lactose in each treatment T0 = 0.60 kg, 0.84 kg = T1, T2 = 0.78 kg. Statistical analysis showed that the average lactose content of milk on the three treatments (T0, T1 and T2) showed no differences (P> 0.05). Feeding with different protein content have not been able to increase the levels of lactose of milk and milk production. The lactose content of milk in all treatments did not show any significant difference because blood glucose

concentrations in the three treatment also had no significant, which is why the content of milk

CONCLUSION

Based on the results of this study concluded that feeding with different quality (protein content of 14%, 17% and 20%) did not significantly affect blood glucose levels, production and quality of milk produced. Feed with 20% protein content tends to give a response of milk production and better quality.

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