The Effect of Concentrate Supplementation Made From Palm Oil Sludge and Several Local Feed Resources to Production Performance of Bali Calves

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ABSTRACT

This experiment was aimed to investigate the production performance of Bali calves male supplemented by concentrate diet made from palm oil sludge (solid decanter) and several local feed resources (rice bran, cassava flour, cassava leaf flour, and blood meal). This experiment was arranged in Latin Square Design with 4 treatments and 4 replications. Four weaned Bali calves ± 9 months old were used. The treatment was the ratio of concentrate and forage ration in the diet consisted of P1=80% concentrate (C) : 20% Forage (F), P2= 60%C:40%F, P3 = 40%C: 60%F, P4= 20%C: 80%F. Data were analyzed by using analysis of variance (ANOVA) and any significant differences were further tested with Duncan Multiple Range Test. The result showed that the treatment had no a significant effect on average daily gain, crude protein consumption and feed conversion value, but significantly decreased dry matter consumption. The results indicated that concentrate diet made from palm oil sludge and local feed resources had positive effect on Bali calves performance ranged about 0.167kg/day-0.271kg/day respectively.

Key words: palm oil sludge, concentrate diet, production performance, Bali calves

INTRODUCTION

Good production performance of livestock can be reached by supplying good quality and quantity of feed. The problem is the availability of forage that is difficult to get it and the concentrates price now is getting expensive. Because of that it is urgent to create the innovation by using local feed resources which are much available, cheap, good nutritive values, safety and not compete with human needs. One of this is palm oil sludge (POS) or solid decanter.

Palm oil sludge (POS) is one of by product resulted from the first stage of palm fresh fruit processing by mechanical pressure to get palm oil. POS is produced 2% from crude palm oil produced (Devendra, 1977). Until now POS has not been used yet by the factory, but it is still a waste that can pollute the environment.

POS can function as feed ingredient mixture. In dry matter base, it contains crude protein 13% that is close to crude protein of rice bran 13.3%. Its TDN value is 74% higher than rice bran which has 70% (Agustin, 1991). The use of POS as feed significantly enhanced the weight gain of male Ongole cattle which was applied POS 1.5% dry matter from live weight *adlib* as long as three months got average daily gain 440 and 770 gram/head/day, while for control (without solid) got 200 gram/head/day (Utomo and Widjaja, 2004).

Gohl (1981) and Aritonang (1986) said that without any treatment, LMS can be applied in ruminant diet up to 50% from total concentrate. Hidayat *et al.* (2002) reported that fresh POS (without treatment) can be used for feed ingredient up to as much as 24.96% from total diet or about 49.82% from total concentrate.

The main constraint in POS utilization is that POS is too easy to become decay (rancid flavor) so it needs special handling for long lasting endurance in storage processing. The way to preserve POS is by pelleting or blocking it. Through this way, POS have long lasting preparation, have more complete nutrient value because several other ingredients can be added. POS has a character to become harden after drying so it can be used as glue in pelleting or blocking process. Several advantages from feed pellet form are it is easy to handling the feed, efficient enough because it did not need much space. The feed does not produce many wastes, dusty and very suitable with feedlot system. The pellet form made weight per volume of feed enhanced 7-8 times before ground so it can enhance the nutrient density and decreased the

activity of depraved microbial. The pellet form can be long lasting preparation (Rockey *et al*., 2008).

This research used several local feed resources such as rice bran, cassava meal, cassava leaf meal, and blood meal. Cassava meal contains high crude protein ranged between 19.5% and 22.6% of dry matter based (Kartiarso *et al.*, 1991 and Granum *et al.,* 2007). Bakrie *et al*. (1996) reported that PO cattle which was supplemented with cassava leaves meal had weight gain significantly higher than the group that supplemented by soybean cake. Blood meal derived from abattoar waste blood containing high crude protein (80%). Close *et al*. (1986) said that the bood protein has low biological value especially due to lower concentration of isoleucine and methionine amino acid. Blood meal is difficult to be degraded in rumen. However It is expected to be bypass protein source which can be used post rumen by animal

Cassava meal is one of concentrate material which has energy sources (12.9MJ/kg) and it is classified as readily available carbohydrate (Sommart, 2000), while rice bran is protein source (13-15% crude protein) and energy source (65-67%TDN). Ibrahim (1986) reported that the addition of 0.5 kg rice bran meet the basic need of cattle with 100-150 kg live weight fed urea ammoniated rice straw, increased live weight 100 gram per day.

The objective of this research was to evaluate the production performance of Bali calves supplemented with concentrate diet made from palm oil sludge and several local feed resources (rice bran, cassava meal, cassava leaf meal and blood meal).

MATERIALS AND METHODS

Feed Preparation

The diet used in this research consisted of natural field grasses (mainly *Phragmites* sp) and concentrate served with several level of feedstuff (Table 1.). The production of concentrate diet was conducted by mixing the feed sources that has little quantities, then with feed sources that has larger quantities. Lastly, all of the concentrate materials were mixed with palm oil sludge (solid decanter) homogenously, then pellet was made. The compositions of concentrate diet (Table 2) were contains crude protein ± 15% and TDN ± 60%. This value met nutrient standard requirement of cattle (Kearl, 1982). Result of Laboratorium nutrient analysis was presented is Table 3.

Table 1. The proportion of forages and concentrate pellet diets in the feeding trial

Treatments	Forage (%)	Concentrate (%)
1	20	80
2	40	60
3	60	40
4	80	20

Table 2. Composition of concentrate ingredients

Feed Sources	(%)
Solid decanter /POS	50
Rice bran	15
Cassava meal	15
Cassava leaf meal	5
Blood meal	4
Mineral mix	4
Limes	3
Salt	3
Urea	1
Total	100

Table 3. Nutrient composition of forages and concentrate pellet based palm oil sludge

Feed sources	Dry matter (%)	Crude protein (%)	Crude fiber (%)	Gross energy (%)
Natural field grass	86.42	11.68	22.18	3553
Pellet concentrate	85.82	17.07	19.76	3259

Source: Nutrition and Feed Technology Lab, Dept of Nutrition and Feed Technology, Animal Sci. Faculty. Bogor agricultural University (2009)

Blood meal was made through gradually drying method of blood taken from abattoir. The blood meal was cooked by using mild fire flame of kerosene stove. Blood were then dried under sun radiation and then it was milled. Cassava leaf meal derived from the old cassava leaf hay.

The use of feed trial was twice a day at 09.00 am and 17.00 pm. All the diet treatments were given to four wean Bali calves male with live weight of 80±10 kg and aged of ± 9months old.

Each period spent as three weeks that consisted of one week preliminary period and two weeks collection period. Variables observed were:

a. Consumption of dry matter and crude protein
b. Daily weight gain
c. Conversion of diet

Location and Time

This research was conducted at farmer farm Sidodadi Village, Muara Bangkahulu district in Bengkulu town, for 4 months from May to August 2009.

Data Analysis

Data were tabulated and analized by using analysis of variance (ANOVA) and for significance test data were further analized by using Duncan Multiple Range Test (DMRT) (Lenten and Bishop, 1986).

RESULTS AND DISCUSSION

Average Daily Gain (ADG) of Bali calves is one of indicator for the production performance value. ADG of cattle which supplemented with concentrate diet can be viewed on Table 4. The results showed that the treatment had no significant effect on average daily gain. The average daily gain value that can be reached was 0.167 kg/day up to 0.271 kg/day. The production performance of Bali calves in this research was higher than the results of Pamungkas *et al*. (2009) that the ADG was 0.102kg/day, 0.192 kg/day and 0.122 kg/day in Bali calves receiving the diet kinggrass, kinggrass + *Leucaena*, and natural field grass respectively. Other research was conducted by Pamungkas *et al.*(2009) and showed that ADG of weaned Bali cattle of nine months old got diet 100% Primafeed (Commercial complete feed in East Java made from agro industrial by product), 65% Primafeed + 35% *Leucaena*, 35% Primafeed + 65% *Leucaena* and 100% *Leucaena* respectively were -0.039, 0.161, 0.191 and 0.243 kg/day. This values are less than the results of the current work. This data showed that the application of concentrate made from palm oil sludge up to 80% level (diet 1) can produce a good growth.

The results of the current research showed that ADG can be reached in 80% forages + 20%concentrate treatment (diet 4) with average daily gain was 0.271 kg/head/day. The optimal supplementation of concentrate can be done on diet 3 (60% forages and 40% concentrate) because it had still a good acceptability with good average daily gain value (0.219 kg/day). Krisnan *et al*. (2008) reported that the optimal value using solid decanter as the single supplement could be reached by treatment of 55% forages+45% concentrate with the highest average daily gain on goat.

The avarage daily gain of the Bali calves in this experiment was in accordance to the dry matter consumption rate and protein consumption in the diet. The higher consumption of dry matter and protein in the diet gave the higher response to weight gain. The dry matter consumption in this research was 3.25-4.17 % and this value in was enough to made the weight gain of 200 gram/head/day. The consumption 2.25-3.0% from the live weight for cattle that has the live weight under 100 kg (National Research Council, 1984). This data showed that the utilization of concentrate pellet diet had good enough response to dry matter consumption. Dry matter consumption is one criteria in judging the palatability of diet that needed to ascertain the quality of diet (Parakkasi, 1999). Analysis of variance showed that the treatment had a significant effect on dry matter consumption, where the higher ratio of concentrate the consumption of dry matter decreased. The dry matter consumption of diet 3 and diet 4 was not significantly different but significantly higher than diet 1 and diet 2.

The results showed that the treatments had no significant effect on crude protein consumption. The value of crude protein consumption in this research was 0.397-0.438 kg/head/day. This value met protein requirement of calves that was 0.333-0.379 kg/head/day (NRC, 1984).

The treatment had no significant effect to the diet efficiency value. This indicated that the application of concentrate diet made from palm oil sludge and several local feed resources up to 80% is technically efficient.

Table 4. Production performance, consumption and feed conversion

Variables	Treatment				SE
	1	2	3	4	
Avarage daily gain(AVG)(kg)	0.167[a]	0.175[a]	0.219[a]	0.271[a]	0.085
Dry matter(DM) consumption (kg/day)	2.705[a]	2.985 [a]	3.36 [b]	3.470[b]	0.200
Crude Protein consumption (kg/day)	0.397[a]	0.414[a]	0. 438[a]	0.428[a]	0.100
Diet Efficiency (Kg DM/kg AVG)	16.198[a]	17.057[a]	15.365[a]	12.804[a]	1.037

Note: The different letter on the same row mean significant different (P<0.05).

CONCLUSION

The results showed that the application of concentrate diet made from palm oil sludge and several local feed resources gave positive response to Bali calves performance. The average daily gain of Bali calves in this experiment ranged between 0.167 and 0.271 kg/head/day. The optimal applicattion of concentrate diet was on treatment 3 (60% forages and 40% concentrate). It can be seen from average daily gain 0.219 kg/day.

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