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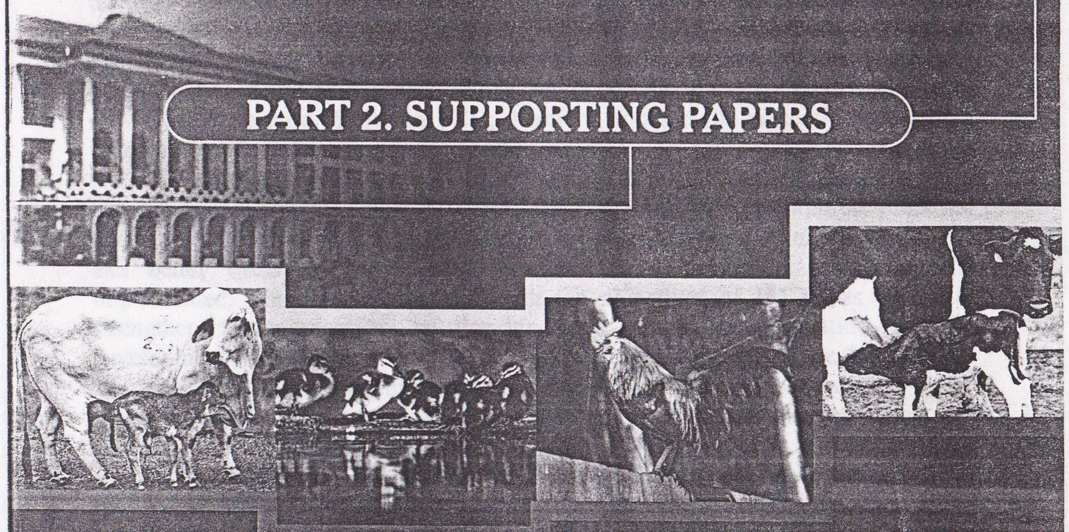
ANIMAL PRODUCTION AND TOTAL MANAGEMENT OF LOCAL RESOURCES

PART 2. SUPPORTING PAPERS



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FORWARDS

The changing in animal production towards more efficient of agricultural practices with more emphasize on the aspects of animal welfare, environmental conditions as well as resources optimization has encouraged people to direct and to set their animal production that suited with tropical region. The movement of *back to nature* with the evident of more products which are free of pesticide, antibiotics and growth hormone has proven that organic farming is getting more popular. The trend towards more environmentally and friendly farming systems has considered the availability and support of local potential resources and this becomes an important factor in designing and developing animal production in tropical countries. Economical crisis since 1997 has showed that animal production systems which are not in line with local resources would collapse if there was an economical down turn. The third ISTAP in 2002, therefore, focused the discussion on animal production and total management of local resources.

Since many experts in animal science from all part of the world especially from tropical region gathered, many problems and constrains existed could be discussed and solved. Conclusion and recommendations on the aspect of animal production and better management of local resources could finally be suggested and implemented. This is very relevant with the objectives of ISTAP as forum to strengthen communication, relationship and exchange information on the development of animal production in the tropical region. Here, we provide the resume of the ISTAP together with the list and addresses of participants. These proceedings consist of two parts that are part 1 containing the invited papers and satellite conference on Protein meal for animal feed and part 2 containing the supporting papers.

On behalf of the organizing committee and the steering committee, the editor would like to thank to all speakers for their presentation orally or in poster. The editor would also like to thank the Rector of Gadjah Mada University, Prof. Dr. Sofyan Effendi and the Dean of Faculty of Animal Science, Prof. Dr. Zaenal Bachruddin for their supports, funding and facilities given before, during and after the seminar. Thanks also go to Koperasi Majelis Taklim Widodo Makmur, PT Bogasari Sukses Makmur, The British Council for their sponsorships. To all parties who had involved and participated in the seminar, we would like to express our deep gratitude. Last but not least, we appreciate greatly to Nanung DD, CT Noviandi, Lilis, Ari, and Andri for their time and efforts in typing, correcting and preparing all the manuscripts for the publication.

Yogyakarta, January 2003
Editors

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PALM OIL SLUDGE ON FEED SUPPLEMENTATION BLOCK AND ITS EFFECT ON BALI CATTLE PERFORMANCE AND NUTRIENTS DIGESTIBILITY

Hidayat, Edi Soetrisno, Dwatmadji, and Tris Akbarillah[1]

Abstract

Twelve Bali steers, ±1 year of age with the average body weight 110 kg, were used as experimental animals. The steers were randomly assigned to four groups of treatment in Completely Randomised Design (CRD). Each group of treatment fed grass as base diet and four different feed block, namely A [ground cassava chips (GCC) 30%, rice bran (RB) 38%, fresh palm oil sludge (POS) 20%, urea (U) 10%, Salt (S) 1%, mineral-mix (MM) 1%], B [GCC 30%, RB 38%, treated EM_4 palm oil sludge (POS-EM_4) 10%, U 10%, S 1%, MM 1%], C [GCC 30%, RB 28%, POS-EM4 30%, U 10%, S 1%, MM 1%], and D [GCC 28.30%, RB 54.70%, cement 5.66%, U 9.44%, S 0.95%, MM 0.95%]. Parameters measured were DM intake, DM, OM, CP, EE, CF, NFE digestibility, and average daily gain. Different between treatments were tested using the Least Significant Difference Test. There were no significantly different (P>0.05) between four groups of treatment (A, B, C, and D) on DM intake (5820.96 g/d, 5471.49 g/d, 5233.80 g/d, 5740.79 g/d), DM digestibility (72.66%, 75.35%, 74.52%, 72.23%), OM digestibility (75.53%, 77.94%, 77.24%, 75.30%), CP digestibility (65.19%, 62.53%, 65.68%, 70.33%), CF digestibility (75.73%, 77.47%, 77.46%, 71.74%), NFE digestibility (47.91%, 53.74%, 50.29%, 50.85%), and average daily gain (0.31 kg/d, 0.18 kg/d, 0.16 kg/d, 0.19 kg/d) respectively. EE digestibility of diets containing POS (A, B, and C) was significantly higher (91.58%, 88.68%, 91.71%, respectively) than diet containing no POS (D, 86.82%).

Key words: Palm oil sludge, Nutrients digestibility, Feed block

Introduction

So far, the utilization of palm oil sludge, which is a by-product of palm oil factories, is still limited. Its existence should be interesting because it is abundantly available. Based on its nutritional content, palm oil sludge is a potentially used as feed resource.

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The utilization of palm oil sludge as feed has been studied on cattle, buffalo (Dalzell, 1978; Sudin, 1988; Agustin *et al*, 1991), sheep (Kamaruddin, 1997), and goat (Vadiveloo, 1988; 1989; Hidayat and Soetrisno, 2000). Nevertheless, it is still widely open to study the use of palm oil sludge. In fact, after palm oil sludge have been dried, its performance becomes hard. Therefore it may be used as hardening feed block of ruminant. Since bad smell is easily produced by stored palm oil sludge, EM_4 has been used to avoid this problem.

Feed block is another form of feeding in order to correct the nutrition supply, so that it is expected to improve animal production. Making feed block known now is by either pressing feed material (Fulton, 1985) or using molasses (Schroeder, 1985). Insulistyowati (1998) used 4% cement of total feed block composition as glue material on making Urea Saka Multi Nutrients Block.

The experiment was conducted to evaluate the possibilities of palm oil sludge as hardened material on feed block and to evaluate digestibility of diets containing grass supplemented different feed block.

Material and Methods

Experimental design

Twelve Bali steers, ±1 year of age with the average body weight 110 kg, were used as experimental animals. The steers were randomly assigned to four groups of treatment in Completely Randomised Design (CRD). The treatments were diet T_1 (grass + block A), diet T_2 (grass + block B), diet T_3 (grass + block C), and diet T_4 (grass + block D). The diets were offered in *ad libitum*. Each blocks were formulated to be approximately 37% of CP and 68% TDN. The feed composition of the blocks is shown in Table 1.

Table 1. The composition of feed block ingredient (%)

Feed ingredients	Blocks			
	A	B	C	D
Ground cassava	30.00	30.00	30.00	28.30
Rice bran	38.00	38.00	28.00	54.70
Fresh palm oil sludge	20.00	-	-	-
EM_4 treated palm oil sludge	-	20.00	30.00	-
Cement	-	-	-	5.66
Urea	10.00	10.00	10.00	9.44
Salt	1.00	1.00	1.00	0.95
Mineral-mix	1.00	1.00	1.00	0.95
Total	100.00	100.00	100.00	100.00

Making feed blocks

All ingredient of each feed block (Table 1) was thoroughly blended. The blended material was then formed in cubic shaped (30x15x10 cm) by pressing. The pressed material was dried and wrapped.

Feeding trial

Before the trial started, the steers had been environmentally conditioned. Each steer was placed individually, and fed the diet applied twice a day, morning feeding at 10.00 and evening feeding at 16.00. Fresh water was freely available. The steers were weighed weekly, started a day before treatment. The feeding trial was conducted as long as 12 weeks with an extra week for adaptation to evaluate animal performance. Digestion trial was done 12 days continuously in between the 12 weeks. Feed offered, feed remainder, and faeces of individual steer were weighed daily. Sub samples of feed offered, of feed remainder, of faeces were then proportionally taken and were dried. The sub samples collected were mixed as composite samples.

Variables measured were dry matter (DM) intake, digestibility coefficient of DM, of organic matter (OM), of crude protein (CP), of ether extract (EE), of crude fibre (CF), of ash, and of nitrogen free extract, and average daily gain. The SYSTAT-statistical Package Program was used as a tool to analyse the data, when there was a different between treatments, Least Significant Different (LSD) was applied.

Result and Discussion

Chemical analysis of feed used on this experiment is shown in Table 2. It shows that the nutrient content of blocks were quite different, even though the nutrient content of the blocks were expected to be similar. Variation in CP content might be caused by urea that was potentially removed. In this case, urea was potentially converted to ammonia by EM_4 activities. As a result, ammonia would be easily evaporated. It might be accelerated by moisture content and temperature (Ørskov, 1987) caused by drying process.

Table 2. Average of feed nutrient content on the experiment (dry matter basis)

Feeds	CP (%)	CF (%)	EE (%)	Ash (%)	NFE (%)	GE (kcal/kg)
Grass	11.98	32.64	2.40	10.17	42.82	4134
Block A	20.82	17.26	6.45	10.85	44.62	4473
Block B	12.35	17.94	5.93	11.64	52.13	4334
Block C	22.63	12.97	6.37	9.75	48.28	4489
Block D	20.49	15.10	2.10	17.22	45.09	3759

It can be seen that feed ingredient and proportion of block A and block B were similar. The difference was on palm oil sludge treatment. Block A used fresh palm oil sludge whereas Block B used EM4 treated palm oil sludge. The used of EM4 that was expected to prevent palm oil sludge getting bad smell, in fact it probably accelerates the N loss.

Table 3. Mean value of dry matter intake (grass, blocks, total) and total nutrient intake

Variables	Diet				SE	P
	T1	T2	T3	T4		
DM intake of grass, g/d	4177.06	4033.75	4064.22	3914.45	310.74	0.95
DM intake of block, g/d	1643.91^{a}	1437.74^{ab}	1169.59^{b}	1826.34^{ac}	107.95	0.01
Total DM intake, g/d	5820.96	5471.49	5233.80	5740.79	395.67	0.72
Total crude protein intake, g/d	847.06	667.00	752.98	849.67	51.31	0.10
Total crude fibre intake, g/d	1650.52	1581.47	1483.59	1551.36	116.75	0.79
Total EE intake, g/d	209.58^{a}	184.76^{a}	174.37^{a}	135.72^{b}	11.99	0.02
Total ash intake, g/d	605.07	584.01	527.96	718.44	41.94	0.06
Total NFE intake, g/d	2508.74	2454.25	2294.91	2485.59	174.92	0.82
Total energy intake, kcal/d	246.544	229.448	220.667	230.015	16.39	0.73

$^{a, b, c}$ Different superscript of mean value on the same row shows statistically different ($P<0.05$)
SE is standard error
P is probability

Table 4. Digestibility coefficient of DM, OM, their nutrients of four different diets, and ADG of steers

Variables	Diet				SE	P
	T1	T2	T3	T4		
DM digestibility coefficient. (%)	72.66	75.35	74.52	72.23	1.33	0.24
OM digestibility coefficient. (%)	75.53	77.94	77.24	75.30	1.33	0.35
CP digestibility coefficient. (%)	65.19	62.53	65.68	70.33	1.77	0.08
CF digestibility coefficient. (%)	75.73	77.47	77.46	71.74	1.60	0.11
EE digestibility coefficient. (%)	91.58	88.68	91.71	86.82	1.87	0.26
NFE digestibility coefficient. (%)	47.91	53.74	50.29	50.85	1.33	0.24
Ash digestibility coefficient. (%)	77.55	81.61	79.78	78.59	3.23	0.66
Energy digestibility coefficient. (%)	74.62	77.39	78.67	75.68	1.57	0.34
ADG (kg/d)	0.307	0.180	0.160	0.193	0.05	0.23

SE is standard error
P is probability

Mean value of dry matter intake and of nutrients intake, either from grass origin or from feed block origin, can be seen on Table 3. It seems that there were differences on dry matter block intake and total EE intake. Dry matter intake of block C on diet T3 statistically lower (P<0.05) than that of block A on diet T1 and of block D on diet T4.

Even though there were no differences between dry matter intake of block B on diet T2 and either dry matter of block A on diet T1 or dry matter of block D on diet T4, the dry matter of block B on diet T2 was quite low. It was probably caused by its low N content. Moreover, the low dry matter intake of block C might be caused high proportion of palm oil sludge used on it. Dalzell (1977) found that proportion of palm oil sludge on diet increased would reduce total dry matter intake.

Total intake of EE on diet T1, T2, and T3 were higher than that of EE on diet T4. It was probably as a result of palm oil sludge used (Table 1 and Table 2). The results show that there were no significantly differences on digestibility coefficient of DM, OM, CP, CF, EE, NFE, ash, and energy between treatments. In addition, average daily gain of steers was statistically similar. Nevertheless, average daily gain of group of steer fed diet T1 showed relatively higher than the others. This suggests that palm oil sludge used on the diets either fresh or fermented EM4 has no impact on steers' performance.

Conclusion

It might be concluded that palm oil sludge can be used as a part of diet as well as hardened material in making feed block. The used of EM4 reduced N content supplied by urea. Block containing 30% of EM4 fermented palm oil sludge was consumed lower than that containing 20% of EM4 fermented palm oil sludge. As palm oil sludge could potentially be used as feed block, it suggests that its nutritive content of the block should be improved.

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