

THE PERFORMANCE OF KEDAH-KELANTAN CATTLE FED WITH PELLETTED PINEAPPLE BRAN RATION

MOHD. SUKRI HJ. IDRIS*

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RINGKASAN

Dua percubaan telah dijalankan di Stesen Penyelidikan MARDI, Kluang untuk mengkaji keupayaan tumbesar dan ekonomi lembu Kedah-Kelantan bila diberi makanan campuran hampas kelapa dan hampas kelapa sawit yang mengandungi 30% atau 55% nenas until (pellet). Hasil dari percubaan ini menunjukkan campuran makanan hampas kelapa yang mengandungi 55% nenas until adalah lebih baik dari campuran makanan lain bila dibanding dari segi kenaikan berat harian dan kecekapan penukaran makanan. Meningkatkan peratus kandungan nenas until dalam campuran makanan hampas kelapa sawit dari 30% ke 55% tidak menghasilkan perbezaan yang berkesan dari segi keupayaan tumbesar lembu. Percubaan di peringkat kedua telah menunjukkan bahawa melepaskan lembu untuk meragut rumput selama tiga jam sehari sebagai makanan tambahan bagi kesemua campuran makanan yang dibanding telah memberikan hasil yang tidak menguntungkan oleh kerana ia mengurangkan kecekapan penukaran makanan dan meningkatkan kos pengeluaran.

INTRODUCTION

Studies on the utilization of pineapple by-products by monogastric animals and ruminants have been attempted in Malaysia. Results from experiments with broiler chickens indicated that feeding up to 20% of pineapple bran in the diet gave reasonably good performance (HUTAGALUNG *et al.*, 1973). Later, HUTAGALUNG *et al.*, (1975) found that a combination of pineapple bran, palm oil by-products and stearin further improved the performance of the broiler chickens.

With ruminants, CHANDAPILLAI *et al.*, (1977) reported that at the Kempas Feedlot, Johore, crossbred cattle fed with 55% fresh pineapple waste in the diet showed a daily liveweight gain of around one kilogram. Digestibility trials with cattle, sheep, goats and buffaloes showed that pineapple wastes were fully utilized by the animals as much as 70% to 75% (RAGHAVAN, 1977). The bran was considered to economically substitute grain up to 50% for fattening beef cattle and up to 20% for dairy cattle.

The objectives of the present work were to observe: (1) feedlot performance of beef cattle fed pelleted pineapple bran

incorporated into copra cake or palm kernel cake rations at 30% or 55% levels and (2) changes in growth and economic performance when these rations are supplemented with 3-hour-per-day grazing allowance. The product, pelleted pineapple bran, was purchased from Makan Ternak, FIMA Sdn. Bhd., Johore. The bran comprised the skin, the outer shell trimmings, core, apex and base portions of the pineapple fruit.

MATERIALS AND METHODS

Experiment 1. Twenty Kedah-Kelantan female calves of an average initial weight of 86 kilograms were randomly divided into four groups of five animals each and housed in separate stalls. The groups were fed *ad libitum* daily one of four different rations for a period of 202 days preceded by one month adaptation. The rations tested were copra cake and palm kernel cake incorporated with 30% and 55% pelleted pineapple bran each as presented in *Table 1*. All rations were freshly prepared. Fresh water and mineral salt lick were made available to all groups at all times. The daily feed intake was recorded for each group and the animals were weighed at monthly interval. The

*Beef Production Branch, MARDI Station, Kluang, Johore.

TABLE 1: COMPOSITION OF EXPERIMENTAL RATIONS^a

Item	Ration No.			
	I Copra cake	II	III Palm kernel cake	IV
Pelleted pineapple bran	30	55	30	55
Copra cake	25	21	—	—
Palm kernel cake	—	—	33	27
Molasses	44	23	36	17
Urea	1	1	1	1
Mineral salt lick ^b	<i>ad libitum</i>	<i>ad libitum</i>	<i>ad libitum</i>	<i>ad libitum</i>

^a Dry matter basis

^b Mineral composition : P, 22.8%; Ca, 8.5%; NaCl, 50%; Fe, 3000 ppm; Mn, 2500 ppm; I, 300 ppm; Zn, 300 ppm.

ration samples were collected at monthly interval, composited and later analysed for nutrient contents.

Experiment 2. Sixteen Red Dane x Kedah-Kelantan female calves of an average initial weight of 119 kilograms were randomly divided into four groups of four animals each and put in separate two-acre grazing paddocks. Each group was confined in a shed constructed in the middle of each paddock and was allowed to graze African Star Grass (*Cynodon plectostachyus*) outside the shed for three hours daily. While in the shed, each group was offered one of the four rations described earlier. The experiment which lasted for 206 days was preceded by one month adaptation. The procedures for preparation of feeds and recording of initial and monthly body weights and daily feed intake was similar to that of experiment 1.

The data collected in both experiments were analysed statistically by analysis of variance followed by the least significant difference for comparisons of treatment means as outlined by STEEL and TORRIE (1960).

RESULTS AND DISCUSSION

The proximate analyses data for the rations are presented in *Table 2*. Copra

cake rations were comparatively high in all constituents except crude fibre. This was expected owing to the generally higher contents of these nutrients in copra cake than in palm kernel cake. Ration I was considered the most valuable because of its high crude protein and gross energy contents.

The results of the performance trial in experiment 1 is presented in *Table 3*. Animals on ration II tended to have higher average daily gains than the other groups but the difference was not significant ($P < 0.05$). This group was also more efficient ($P < 0.05$) in converting feed to bodyweight gain than group I. Hence incorporating pineapple bran into copra cake ration was absolutely more advantageous at 55% than at 30% level but the reason for this is not clear. On the other hand, unlike with copra cake rations, there was no difference in the performance of animals fed palm kernel cake rations containing 30% or 55% pineapple bran. However, group III which was fed with palm kernel cake ration containing 30% pineapple bran showed lower ($P < 0.05$) cost per kilogram liveweight gain than those groups on copra cake rations.

When the same rations were offered to animals grazing on African Star Grass

TABLE 2: PROXIMATE ANALYSIS OF RATIONS FED IN THE PERFORMANCE TRIALS^a

Item	Ration No.			
	I Copra cake	II	III	IV Palm kernel cake
Dry matter (%)	91.46	92.78	92.23	92.26
Crude protein (%)	16.78	14.98	10.73	9.95
Crude fibre (%)	17.26	17.88	18.18	18.66
Ether extract (%)	1.04	1.18	0.82	1.08
Ash (%)	2.80	2.69	2.14	1.92
Ca ^b (%)	0.23	0.20	0.17	0.14
P ^b (%)	0.07	0.04	0.06	0.05
Gross energy (cal/g)	4215	3946	3204	3188

^a Dry matter basis

^b Excluding the amount supplied by mineral salt lick

TABLE 3: MEAN PERFORMANCE OF THE ANIMALS IN EXPERIMENT 1

Item	Group ¹				SE
	I Copra cake	II	III Palm kernel cake	IV	
Avg. initial weight (kg)	87.2	88.6	83.2	84.8	4.28
Avg. final weight (kg)	164.8	174.8	165.6	166.8	5.63
Avg. daily gain (kg)	0.39	0.43	0.41	0.41	0.02
Avg. daily feed intake (kg)	4.03 ^a	3.59 ^b	3.68 ^{ab}	3.68 ^{ab}	0.12
Avg. daily dry matter intake (kg)	3.20	2.94	2.97	3.04	0.09
Feed per kg gain (kg)	8.31 ^a	6.87 ^b	7.23 ^{ab}	7.45 ^{ab}	0.37
Cost per kg feed ² (£)	20.31	21.85	16.65	18.59	n.d.
Cost per kg liveweight gain (\$)	2.10 ^a	1.83 ^b	1.50 ^c	1.67 ^{bc}	0.09

a,b,c. Means with different superscripts in the same row are significantly different ($P < 0.05$)

¹ Five animals per treatment

² Cost of ingredients in cents per kilogram (as fed basis): pelleted pineapple bran, 20.60; copra cake, 37.60; palm kernel cake, 18.95; molasses, 11.60; Urea, 46.64.

n.d. Not determined.

(*Cynodon plectotachyus*) in experiment 2, the overall performance of the animals tended to be inferior to that in experiment 1 (Table 4). In this experiment, increasing

the level of pineapple bran in copra cake or oil palm kernel rations from 30% to 55% tended to increase the average daily gain and feed efficiency, and decrease the cost

TABLE 4: MEAN PERFORMANCE OF THE ANIMALS IN EXPERIMENT 2

Item	Group ¹				SE
	I Copra cake	II	III Palm kernel cake	IV	
Avg. initial weight (kg)	110.8	115.8	129.8	122.8	17.94
Avg. final weight (kg)	186.3	207.0	210.0	211.8	22.81
Avg. daily gain (kg)	0.37	0.44	0.39	0.43	0.04
Avg. daily feed intake (kg)	4.58 ^b	4.87 ^{ab}	5.05 ^a	4.71 ^b	0.11
Avg. daily dry matter intake (kg)	3.64 ^b	3.99 ^a	4.05 ^a	4.05 ^a	0.08
Feed per kg gain (kg)	9.84 ^a	9.07 ^b	10.39 ^a	9.05 ^b	0.23
Cost per kg feed ² (¢)	20.31	21.85	16.65	18.59	n.d.
Cost per kg liveweight gain (\$)	2.51 ^a	2.42 ^a	2.16 ^b	2.04 ^{bc}	0.06

a,b,c. Means with different superscripts in the same row are significantly different ($P < 0.05$)

¹ Four animals per treatment

² Cost of ingredients in cents per kilogram (as fed basis): pelleted pineapple bran, 20.60; copra cake, 37.60; palm kernel cake, 18.95; molasses, 11.60; urea, 46.64.

n.d. Not determined

per kilogram liveweight gain favourably. Animals fed with rations containing 55% pineapple bran were more efficient ($P < 0.05$) in converting feed to liveweight gain than animals on rations containing only 30% pineapple bran. However, it was noted that a 3-hour-per-day grazing allowance had unfavourably reduced the feed efficiency and increased the cost per kilogram liveweight gain of all groups. Furthermore, the increase in cost per kilogram liveweight gain would have been greater if the cost of the pasture were included in the total cost. On the contrary DALZELL (1977), in a study using buffaloes, found that a 3-hour-per-day grazing supplement to palm oil mill by-products-based diet decreased the cost per kilogram liveweight gain from \$2.09 to \$0.93. His experimental diet contained 35%, 20% and 5% of palm fibre, palm kernel cake and palm oil sludge on a dry matter basis, respectively. But it should be noted in his study that in preparing the costing of the diets, no cost had been given to palm fibre, sludge and grass.

The results of this study indicated that copra cake ration containing 55% pine-

apple bran was more efficient than other rations in producing better animal performances. The cost of this feed was a little higher than either of the palm kernel cake rations since the cost per kilogram of copra cake was twice that of palm kernel cake at the time this experiment was conducted. Cattle rearers in the vicinity of copra oil mills would be able to use the feed at cheaper cost since transport cost would then be negligible. However, the use of higher levels of pineapple bran and cheaper local feed ingredients should be investigated so that more economical diets for beef cattle can be formulated.

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SUMMARY

Two performance trials were conducted at MARDI Research Station, Kluang to study the growth and economic performances of beef cattle fed with copra cake or palm kernel cake rations containing pelleted pineapple bran at 30% or 55% levels. It was found that copra cake ration incorporated with 55% pineapple bran was more efficient than the other ration in producing better average daily gain and feed efficiency. Increasing the level of pineapple bran from 30% to 55% in the palm kernel cake ration had produced no significant effect on the animal performance. It was also found that supplementing these feeds with a 3-hour-per-day grazing allowance in the second trial proved not to be beneficial since it reduced feed efficiency and increased cost per kilogram liveweight gain of all groups.

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