

## Performance of Kedah-Kelantan Cattle Fed Palm Kernel Cake

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### ABSTRAK

Satu eksperimen yang melibatkan rekabentuk penuh rawak, telah dijalankan untuk membandingkan kesan PKC-S-B dan PKC-S-F ke atas prestasi lembu jantan berjenis Kedah-Kelantan. Tiada perbezaan yang bererti berlaku di antara kumpulan PKC-S-B dengan PKC-S-F. Lembu jantan berjenis Kedah-Kelantan apabila diberikan purata PKC-S sebanyak 3.824 kg sehari, bagi suatu tempoh selama 175 hari, boleh mencapai purata kenaikan berat badan harian sebanyak 0.583 kg. Kecekapan makanan yang didapati ialah 6.559. Pendapatan ke atas kos makanan/seekor/sehari yang didapati ialah MR 1.096.

### ABSTRACT

An experiment involving a completely randomized design was conducted to compare the effect of PKC-S-B and PKC-S-F on the performance of Kedah-Kelantan bulls. No significant difference exists between the PKC-S-B and PKC-S-F treatment groups. Kedah-Kelantan bulls when fed an average daily feed of 3.824 kg PKC-S for a period of 175 days could achieve an average daily gain of 0.583 kg. The feed efficiency obtained was 6.559. The income over feed cost/head/day obtained was M\$1.096.

### INTRODUCTION

Kedah-Kelantan (KK) cattle is a major source of domestic beef production in Malaysia (Samuel and Mak, 1984). Their mean birth weight was 12.7 and 12.2 kg and their mean body weight at 24 months of age was 165.6 and 97.5 kg for the males and females respectively (Camoens, 1981), when these animals were kept under grazing conditions. Such values give rise to an average daily gain of 0.21 and 0.12 kg for the males and females respectively. However, Clayton (1983) was able to obtain an average daily gain of 0.36 kg from male KK cattle, aged 2.25 to 2.5 years and kept under pasture. This difference in performance may well be attributed to the difference in grazing management practised. In view of the slow growth rate

achieved by cattle fed solely on grass in Malaysian conditions, several studies were undertaken to determine the growth response of cattle fed by-products and residue from the oil palm which is abundantly grown in Malaysia. Studies on the use of solvent extracted palm kernel cake (PKC-S), expeller pressed palm kernel cake (PKC-E), palm press fibre (PPF) and other oil palm by-products and residues (BPR) for farm animals have been previously documented (Hutagalung, 1981; Hutagalung and Jalaludin, 1981; Hutagalung *et al.*, 1983). Impressive daily weight gains of 0.838 and 0.752 kg were achieved by steers (Droughtmaster cattle) when fed PKC-S and a ratio of 70 : 30 PKC-S/PKC-E respectively (Hutagalung and Mahyuddin, 1985). Similarly Ganabathi (1983) found the average daily gain to be 0.720 kg in daily cross-bred bull calves

when fed PKC-S. Mak *et al.*, (1985) reported an average daily gain of 0.712 and 0.586 kg for Hereford crossbred and KK cattle respectively when fed a ratio consisting of 60% commercial cattle concentrate and 40% PKC-E. In view of this an attempt was made in this study to feed KK cattle with PKC-S. The objectives of this study were to evaluate the effect of feeding PKC-S incorporated with mineral mix to KK cattle and provide some economic performance data derived from such use.

## MATERIALS AND METHODS

A total of eight KK cattle was selected randomly and assigned equally to two treatment groups. The first group named PKC-S-B was given PKC-S in which a mineral mix, "Biostok" was added while the second group named PKC-S-F was fed PKC-S in which a different kind of mineral mix "Flavoblock" was incorporated. The initial body weights for PKC-S-B and PKC-S-F were 126.25 and 132.25 kg respectively. The animals were assigned randomly in a cattle shed which has eight individual partitions with each partition having a floor space of 2.42 square metre. Thus the design of the experiment is a completely randomized one.

The feed formulation of PKC-S-B and PKC-S-F is indicated in Table 1. Feed and water were available at all times to the animals. A Student's t test as described by Steel and Torrie (1980) was used to test for significance in the different variables studied in this experiment. Before the experiment started, an adaptation period of 26 days was allowed. During this period, an initial amount of 2 kg of PKC-S-B or PKC-S-F was given to the animals. The feed was then gradually increased until the animals became fully adapted to the feed by the 26th day of the experimental period. The chemical composition of PKC-S, Biostock and Flavoblock are indicated in Tables 2 and 3 respectively.

The duration of the experiment was 175 days. During this period, records were kept for average daily weight gains and feed intake. Each

animal was given 2 ml of vitamins A, D and E (Jectadine) intramuscularly every fortnight. Each ml contains 500,000 i.u., 75,000 i.u. and 50 i.u. of vitamins A, D and E respectively.

TABLE 1  
Feed formulation of PKC-S-B and PKC-S-F

Ingredient	PKC-S-B	PKC-S-F
Palm kernel cake (%)	95	97.5
Biostok (%)	5	—
Dicalcium phosphate	—	2.5
Flavoblock	—	*
Total	100	100

\*Given as a lick in block form; the amount consumed was later calculated at the end of the experiment but was not included under feed intake.

TABLE 2  
Chemical composition of palm kernel cake  
(solvent extracted)

Item	Palm kernel cake (solvent)
Dry matter (%)	91.0
Ash (%)	4.0
Crude fibre (%)	15.6
NDF	70.5
ADF	40.0
Crude fat (%)	1.5
Crude protein (%)	17.6
Ca (%)	0.26
P (%)	0.72
ME (MJ/kg DM) <sup>1</sup>	10.5
TDN (%) <sup>1</sup>	70.0

1: Values derived from Hutagalung and Mahyuddin (1985).

TABLE 3  
Chemical Composition of Biostok and Flavoblock

Item	Biostok <sup>1</sup>	Flavoblock <sup>2</sup>
P	10.0%	—
Ca	7.5%	—
Mg	2000 mg/kg	5000 mg/kg
Mn	80 mg/kg	200 mg/kg
Co	20 mg/kg	50 mg/kg
I	60 mg/kg	150 mg/kg
Zn	120 mg/kg	300 mg/kg
Fe	600 mg/kg	1500 mg/kg
Cu	120 mg/kg	300 mg/kg
Se	4 mg/kg	10 mg/kg
Na	14.8%	37.0%
Ash	98.5%	98.0%
Bambermycin	—	800 mg/kg

<sup>1</sup>I.C.I. (Mal) Berhad.

<sup>2</sup>Tithebarn Ltd, England.

## RESULTS AND DISCUSSION

The mean values for the different variables studied were indicated in Table 4. Animals from the PKC-S-F group daily consumed 3.959 kg and gained 0.614 kg with a feed conversion ratio of 6.404, while the cattle from the PKC-S-B group had an average daily feed intake of 3.693 kg, an average daily gain of 0.551 kg and a feed conver-

sion ratio of 6.705. Although these values appear to be better in the PKC-S-F group, as compared to the corresponding values in the PKC-S-B group, no statistical significance at the 5% level was observed. Similarly, the initial body weight, final body weight, total feed intake and total gain showed no significant difference between PKC-S-F and PKC-S-B.

As no statistical significance was observed, the data were pooled and their grand mean values calculated (Table 4). Thus, the average daily feed and average daily gain and feed/gain were found to be 3.824 kg, 0.583 kg and 6.585 kg respectively. The average daily feed and average daily gain were not comparable with those values (5.750 kg, 0.838 kg) reported by Hutagalung and Mahyuddin (1985). This could possibly be explained by the different type of cattle employed (Droughtmaster cattle). However, it is most interesting to note that the feed/gain ratio of 6.559 achieved in this experiment of 175 days is similar to the values of 6.860 reported by Hutagalung and Mahyuddin (1985) in their experiment lasting 138 days.

The body weights at different periods of the experiment are shown in Fig. 1. PKC-S-F animals consistently showed heavier body weights than the PKC-S-B animals. This could be explained by the heavier initial body weight found in PKC-S-F animals. Nevertheless, no statistical significance at the 5% level was observed for the initial body weight as well as the

TABLE 4  
Mean  $\pm$  S.E. values for different parameters during the experimental period of 175 days

Parameter	PKC-S-B	PKC-S-F	Grand Mean
Initial body wt (kg)	126.250 $\pm$ 5.41	132.250 $\pm$ 8.49	129.250 $\pm$ 4.79
Final body wt (kg)	222.750 $\pm$ 6.43	239.750 $\pm$ 15.45	231.250 $\pm$ 8.39
Total feed intake (kg)	646.225 $\pm$ 12.27	692.025 $\pm$ 38.06	669.130 $\pm$ 20.44
Total gain (kg)	96.500 $\pm$ 2.90	107.500 $\pm$ 7.37	102.000 $\pm$ 4.21
Avg. daily feed (kg)	3.693 $\pm$ 0.07	3.959 $\pm$ 0.21	3.824 $\pm$ 0.12
Avg. daily gain (kg)	0.551 $\pm$ 0.02	0.614 $\pm$ 0.04	0.583 $\pm$ 0.02
Feed/gain	6.705 $\pm$ 0.12	6.464 $\pm$ 0.11	6.585 $\pm$ 0.09

Note: No significant difference exists between PKC-S-B and PKC-S-F at the 5% level.

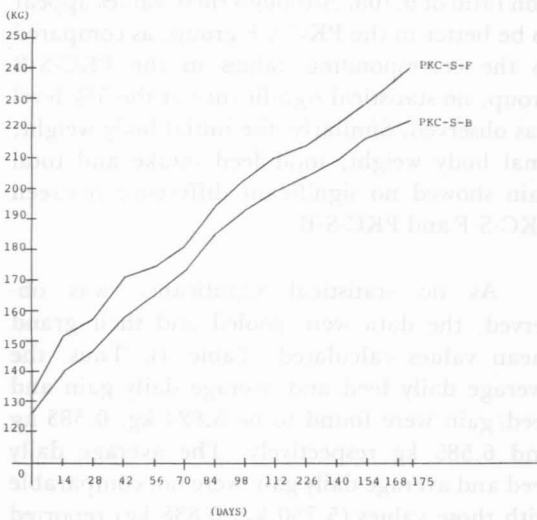


Fig. 1: Cumulative body weights of Kedah-Kelantan males.

final body weight between the PKC-S-F and PKC-S-B groups.

Before the experiment started, the eight male KK cattle, chosen at random and having an average age of 511.50 days, were found to have a mean birth weight of 14.0 kg and achieved a mean total gain of 115.25 kg thus giving an average daily gain of 0.225 kg (Table 5) which was in conformity with that reported by Camoens (1981). During this period, the animals were kept in the same location with the same management being provided. Rotational grazing on *Setaria splendida* and *Panicum maximum* was practised in this location. No concentrate was provided to these animals although mineral lick was available freely. The average daily gain achieved by these animals fed on grass only prior

to the experiment was unimpressive. However, the average daily gain during the experimental period of 175 days for the same animals given PKC-S reached 0.583 kg (Table 4). The difference of 0.358 kg in the average daily gain before and during the whole experimental period constitutes a gain of 159.11% over that achieved before the experiment.

Some economic performance data arising out of this experiment was obtained and compared with those of Braithwaite (1985) in his observations with Droughtmaster cattle (Table 6). The Droughtmaster cattle in this comparison were younger by 286 days but heavier by 46.35 kg in their initial body weights when compared to KK cattle. Owing to their heavier initial body weights, the Droughtmaster cattle were able to daily consume 2.958 kg and gain 0.546 kg more than the KK cattle although their feed efficiencies were of the same order (6.007 for Droughtmaster cattle and 6.559 for KK cattle).

The income over feed cost per head per day in KK cattle was calculated to be \$1.096 as against \$2.278 in Droughtmaster cattle. The higher income from Droughtmaster cattle could easily be explained by their superior daily gain in weight. However, Mak *et al.*, (1985) reported income over feed cost per head per animal to be \$0.514 in KK cattle. This low income could be explained by the high cost of feeds (\$0.369/kg) in their experiment. If the feed cost were to be assumed at \$0.25/kg in this experiment, then the income over feed cost per head per day would be calculated to be \$1.222 which is of the same order as that obtained in this present experiment.

TABLE 5  
Mean  $\pm$  S.E. values of different parameters before the start of experiment

Parameter	PKC-S-B	PKC-S-F	Grand mean
Birth wt. (kg)	14.25 $\pm$ 0.48	13.75 $\pm$ 0.75	14.00 $\pm$ 0.42
Total wt. gain (kg)	112.00 $\pm$ 5.61	118.50 $\pm$ 8.35	115.25 $\pm$ 4.82
Age (days)	515.00 $\pm$ 1.73	508.00 $\pm$ 1.42	511.50 $\pm$ 1.68
Avg. daily gain (kg)	0.217 $\pm$ 0.01	0.233 $\pm$ 0.02	0.225 $\pm$ 0.01

Note: No significant difference exists between PKC-S-B and PKC-S-F at the 5% level.

TABLE 6  
Economic performance data of Kedah-Kelantan and Droughtmaster fed palm kernel cake

Parameter	Kedah-Kelantan	Droughtmaster <sup>1</sup>
No. of male cattle	8	5
Age at start of expt. (days)	511.500	225.000
Initial body wt. (kg)	129.250	175.600
Duration of expt. (day)	175.000	106.000
Final body wt. (kg)	231.250	293.666
Total wt. gain (kg)	102.000	118.066
Avg. daily gain (kg)	0.583	1.129
Total feed (kg)	669.130	718.892
Avg. daily feed (kg)	3.824	6.782
Feed/gain	6.559	6.007
Cost of feed/head/day at \$0.25/kg	0.956	1.696
Value of wt. gain/head/day at \$3.52/kg	2.052	3.974
Income over feed cost/head/day (\$)	1.096	2.278
Value of wt. gain/kg of palm kernel cake (\$)	0.537	0.586

<sup>1</sup>Braithwaite (1985).

The feed cost per head per day in KK cattle, amounted to \$0.956 as opposed to \$1.696 in Droughtmaster cattle. Thus a higher feed cost of \$0.74 per head per day would have to be incurred. This would mean a further input of \$26,640.00 just for the provision of feed cost in a theoretical 200-head feedlot operation lasting 180 days before a higher income over feed cost per head per animal could be realized from Droughtmaster cattle.

In the PKC-S-F group, the mean intake of Flavoblock per animal per day for the whole experimental period was calculated to be 0.0348 kg. This amount was equivalent to 0.879% of daily feed intake although it was not incorporated into the data of daily feed intake.

Based on this study it was found that no significant difference exists between the PKC-S-B and PKC-S-F groups. PKC-S feed could be fed to KK animals which could achieve an average daily gain of 0.583 kg by consuming an average

daily feed of 3.824 kg. The feed efficiency achieved was 6.559 while the income over feed cost/head/day calculated was \$1.096.

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daily feed of 2.5% of the body weight. The feed efficiency achieved was 0.22, while the income over feed cost/head/day calculated was \$1.036.

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Based on this study it was found that no significant difference exist between the PKC-S and PKC-F groups. PKC-S feed could be fed to KK animals which could achieve an average daily gain of 0.583 kg by consuming an average