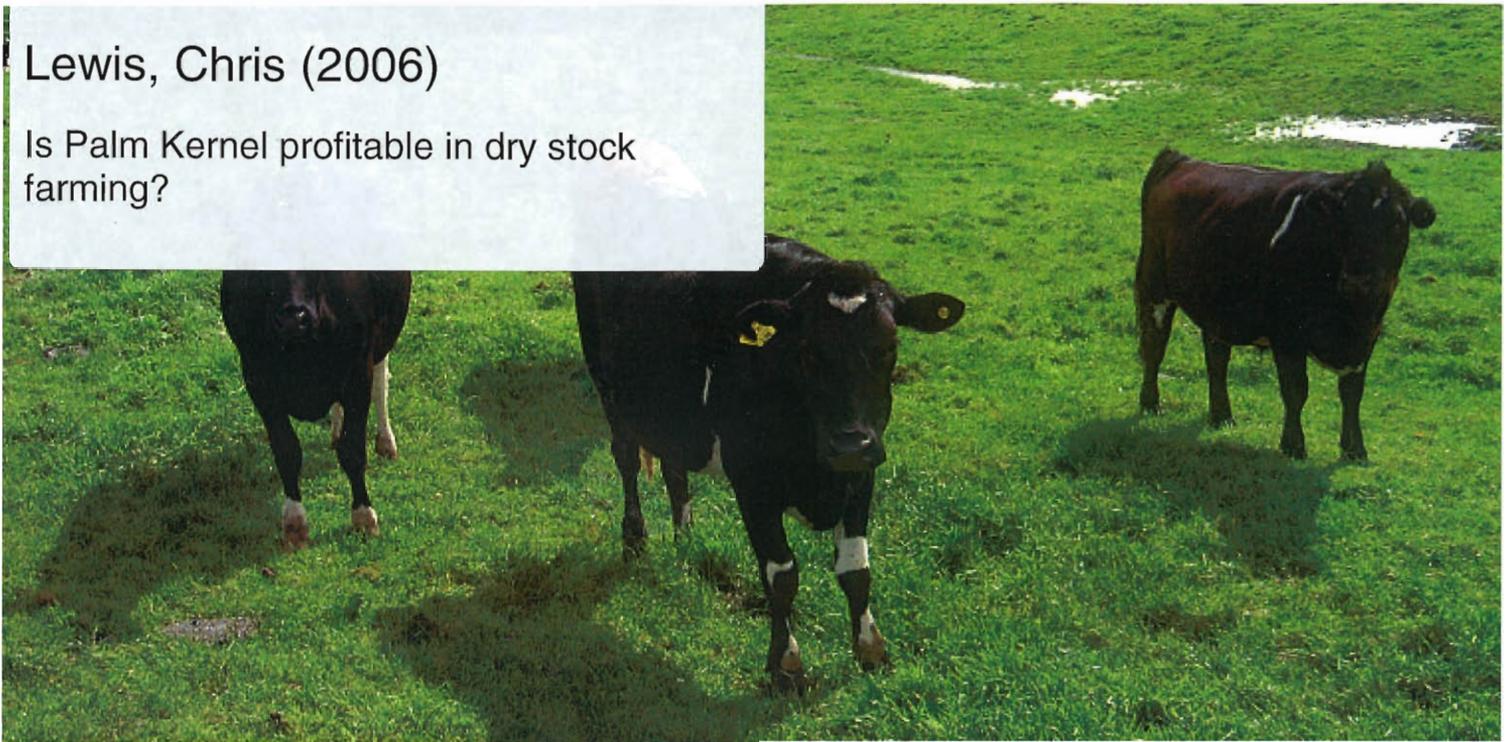


Lewis, Chris (2006)

Is Palm Kernel profitable in dry stock farming?



Is Palm Kernel Profitable in Dry Stock Farming?

**A research project by
Chris Lewis**

November 2006

Table of Contents

Introduction.....	3
Nutritive value of PKE.....	4
Suitability of PKE.....	5
Nutritional Features and Benefits.....	7
The PKE Research Project	8
Project Results	
Average Stock Weights – Control Mob.....	9
Average Stock Weights – PKE Mob.....	10
Comparison – Cost/Benefit PKE usage.....	12
Conclusions.....	13
Bibliography.....	15

INTRODUCTION

Palm oil milling is a major industry in Malaysia. The total area under oil palm covers more than 2 million hectares. The industry, besides producing palm oil, also produces by-products usable as animal feed. These are palm kernel cake, palm oil sludge and palm pressed fibre. The most useful is palm kernel extract, which is the solid residue, left behind after the extraction of oil from the kernels of the palm fruits. It is now well entrenched as a major feed ingredient in beef and dairy feed in the country.

The PKE is obtained out from two stages of oil extraction from the palm fruit. The first stage is the primary extraction of palm oil from the pericarp portion of the fruit, which also produces the kernel and by-products POS and PPF. The extraction of oil from crushed kernel then results in the production of PKE as by-product. Two methods are used for the extraction of oil from the crushed kernels. These are the conventional mechanical screw press method that results in the expeller pressed palm kernel cake and the solvent (usually hexane) extraction method that results in the solvent extracted type. The estimated annual total production of PKC is at 1.4 million tons. This paper outlines the use of palm kernel extract for the fattening of cattle and as a supplement for milk production in dairy cattle.

Nutritive value of PKE

Although PKE supplies both protein and energy, it is looked upon more as a source of protein. PKE by itself is a medium grade protein feed and with its high fibre content it is often considered as suitable for feeding of ruminants. PKE was ranked a little higher than copra meal but lower than fish meal.

Nutrient Composition of solvent extracted and expeller pressed PKE.

	Solvent extracted			Expeller pressed		
	1	2	3	1	2	3
Dry matter (%)	89.0	91.0	91.0	92.7	93.0	89.1
Crude protein (%)	15.3	15.2	15.0	14.6	14.8	16.0
Crude fibre (%)	14.3	16.0	15.6	12.1	15.7	16.8
Acid detergent fibre (%)	46.1	46.0	40.0	41.8	44.0	39.6
Neutral detergent fibre (%)	66.7	-	-	66.4	-	-
Ether extract (%)	2.9	1.8	0.9	9.1	9.8	10.6
Ash (%)	4.1	3.8	3.5	4.3	4.2	4.1
Nitrogen free extract (%)	63.4	63.2	65.0	59.9	55.5	52.5
Total digestible nutrient, TDN (calculated, %)	75.0	70.0	75.0	72.0	67.0	70.0
Metabolisable energy (cattle, MJ/kg)	13.1	12.2	13.1	12.5	11.7	12.2
Calcium (%)	0.20	0.25	-	0.21	0.20	-
Phosphorus (%)	0.54	0.52	-	0.52	0.32	-
Magnesium (%)	-	0.16	-	-	-	-
Copper (ppm)	34.0	28.5	-	18.0	-	-
Ferrous (mg/kg)	-	4.05	-	-	-	-
Manganese (mg/kg)	-	225.0	-	-	-	-
Zinc (mg/kg)	-	77.0	-	-	-	-

Source: Department of Veterinary Services, Malaysia

Suitability of PKE for fattening and in supplementary feeding

Suitability of PKE as feed for cattle has been widely recognised. Invariably, it has become the basic feed in most rations for fattening cattle in feedlots. It is also the primary constituent supplementary feed for dairy cattle, mixed together with other ingredients such as ground maize and soybean meal. A number of key Palm Kernel Trials have been undertaken around the world. Two notable trials include those in Australia and India, where trials were conducted on feed lots. The results are shown below.

PKE is often used in combination with other oil palm by-products for cattle fattening in feedlots. PKE had been mixed with PPF for feeding growing dairy bull calves, where the PPF primarily served as a fibre source. The performances of Droughtmaster animals were compared with Brahman bull calves fed a ration of PKE with palm oil mill effluent. The animals fed with PKC/POME ration achieved 0.81 kg daily gain as compared to only 0.25 kg obtained by those grazing pasture.

Results of weight gain performance of various breeds of cattle fed PKE in different trials in table below. Average daily live weight gains ranged from a low 0.39 kg achieved by the indigenous Kedah-Kelantan cattle fed a PKE diet to 0.793 kg obtained by a zebu cross.

Weight gains of cattle fed 100% PKE1 and PKE mixed diets

Feed diets	Breed of cattle	Daily weight gain (kg)
100% solvent extracted PKE	Zebu cross	0.793
100% solvent extracted PKE	Sahiwal Friesian crossbred	0.760
100% solvent extracted PKE	Local Kedah-Kelantan	0.560
100% expeller pressed PKE	Beef crosses	0.629
100% expeller pressed PKE	Local Kedah-Kelantan	0.338

This trial illustrated PKE was a safe and efficient at putting weight on animals.

However the trial, omitted the area of profits, I will endeavour to cover both these areas.

There has been a lot of media coverage about how safe PKE is. This has been fuelled by the competitors to PKE mainly the maize companies and growers and I've have witness this my self at a federated farmers meeting. So the next page is article from MAF stated otherwise.

Claims that palm kernel extract imports are a risk for the importation of exotic diseases such as foot and mouth disease and avian influenza are completely unfounded, Biosecurity New Zealand says.

They have to declare that the extract has been made in a facility dedicated to plant based meals and oils, that no other animal rations are made there, and that it has not been exposed to any source of animal contamination before processing.

It also has to be heat processed to a core temperature of at least 85°C for at least five minutes. It must also have been kept secure from possible sources of contamination before and during export. These include unprocessed plant material, vermin, birds, ruminant animals, faecal material and other animal products. It is also inspected on arrival."

Nutritional features and benefits

PKE is an energy feed, but also provides reasonable levels of protein. Most of the energy comes from digestible fibre, and from the oil and protein. As a by-product quality can be variable; however it is reasonable to use an average ME content of 11 MJME/kg/DM

Palm kernel also contains high amounts of fermentable fibre that increases acetic acid production and therefore also improves weight gain.

It is also an excellent source of other minerals such as copper and zinc.

How to feed it?

Because PKE has a low starch and sugar content, cows cannot overeat it and acidosis is not a problem. Also as it is not highly palatable it takes time for cows to acquire the taste and they tend not to overeat.

This makes free-access feeding with trailers in the paddock an efficient method of supplementing on relatively low input farms. Generally within a week cows will be eating 1-2kg/day.



The PKE Research Project

This project began on the 14 February 2006 by dividing two mobs of steers into Friesians and Herefords. I decided to use Friesians because they have greater weight gain potential and because they are usually harder to sell on the store market, whereas the Hereford cross always get a higher premium. The idea of this project was to try and add weight to a mob of steers and draft the tops off for the works and sell the rest for the store cattle. We usually have a problem of not being able to carry everything for the winter. So we need to sell something and get top dollar for them. We also find carrying too many big cattle is hard on the farm and we were certainly right this winter with it being so wet. So a good decision there in hindsight. We also find that there is a better margin per hectare wise on younger cattle as we can carry more.

Once we had a mob of Friesians, we'd drafted a smaller mob and they became our control mob. It was very random as they were the first to walk through an open gate in the yards. We weighed them all and wrote down their weights next door to the tag number. We tried to weigh them every 14-17 days to get an accurate picture with what was happening.

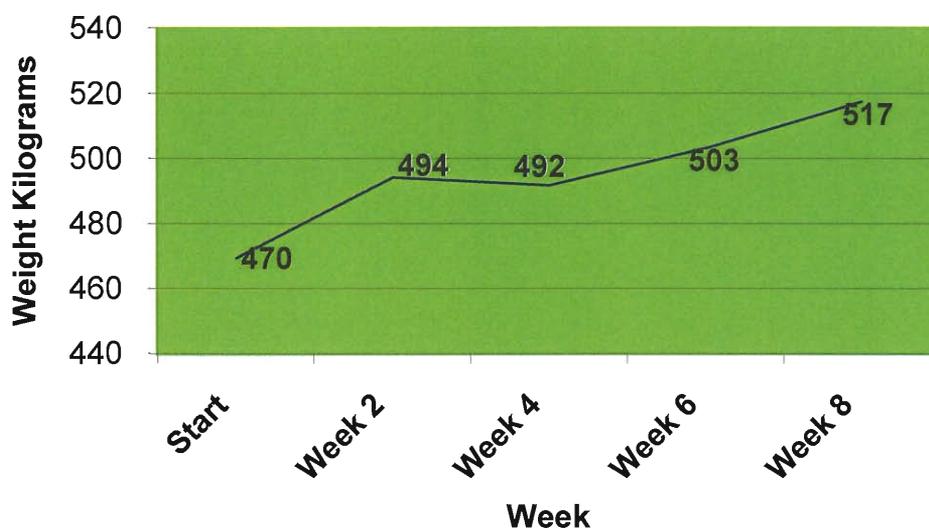
We started feeding PKE straight off and the first week we feed them 2kg per animal. Then the following week we increased it to 3 kg per animal. We shovelled the PKE on by hand onto a trailer, which we left in the paddock. We calibrated the shovel loads and trailer by scales to start with to make sure we were giving the correct amount.

Within a few days the animals got very used to it and started climbing all over the trailer. They also got very bolshy to deal with and they would chase you into and out of the paddock. They were very easy to shift, as they would follow the trailer with the PKE on it.

The steers were rising 2 year olds and were out of our own dairy herds and hand reared ourselves.

Project Results

Project PKE Average Stock Weight - Control Mob



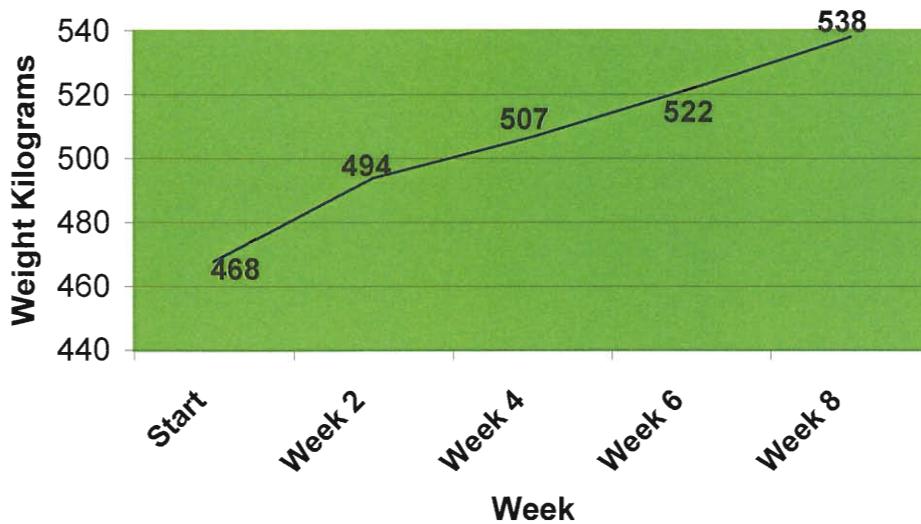
	week 2	week 4	week 6	week 8
Daily weight gain	1.47	-0.21	0.8	0.73
Weight gain in \$ at \$1.70 store price X time period	\$23.52	-\$5.00	\$20.40	\$23.60

This mob was made up of 18-month-old Friesian steers born and bred from our dairy stock.

They were solely fed grass but were drenched with dectomax on day 1. As you can see on the graph between week 2 and 6 they suffered weight loss. During this period we had 6 inches of rain and we went from summer grass to autumn grass. The cattle were made to graze down to 1500 – 1700 DM/HA.

They were going into covers of 2600 –2800kg/DM/HA.

Project PKE Average Stock Weight - PKE Mob

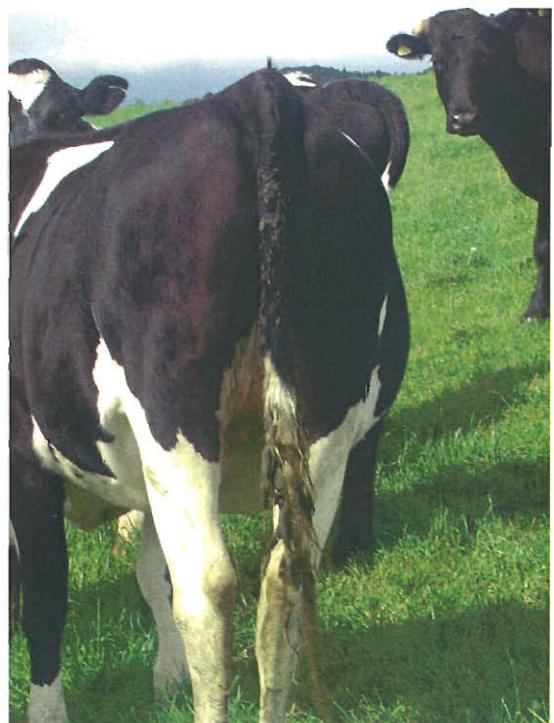


Daily weight gain	week 2	week 4	week 6	week 8
	1.85	1.07	1.07	0.89
Weight gain in \$ at \$1.70 store price X time period	\$50.40	\$25.48	\$25.48	\$28.50
amount of PKE consumed in time period X \$ costed	\$9.60	\$8.40	\$8.40	\$11.40

This mob was made up of 18-month-old Friesian steers born and bred from our dairy stock. On day 1 they were given a dectomax drench.

They were fed grass and 3 kg of PKE per day fed in the paddock on a trailer.

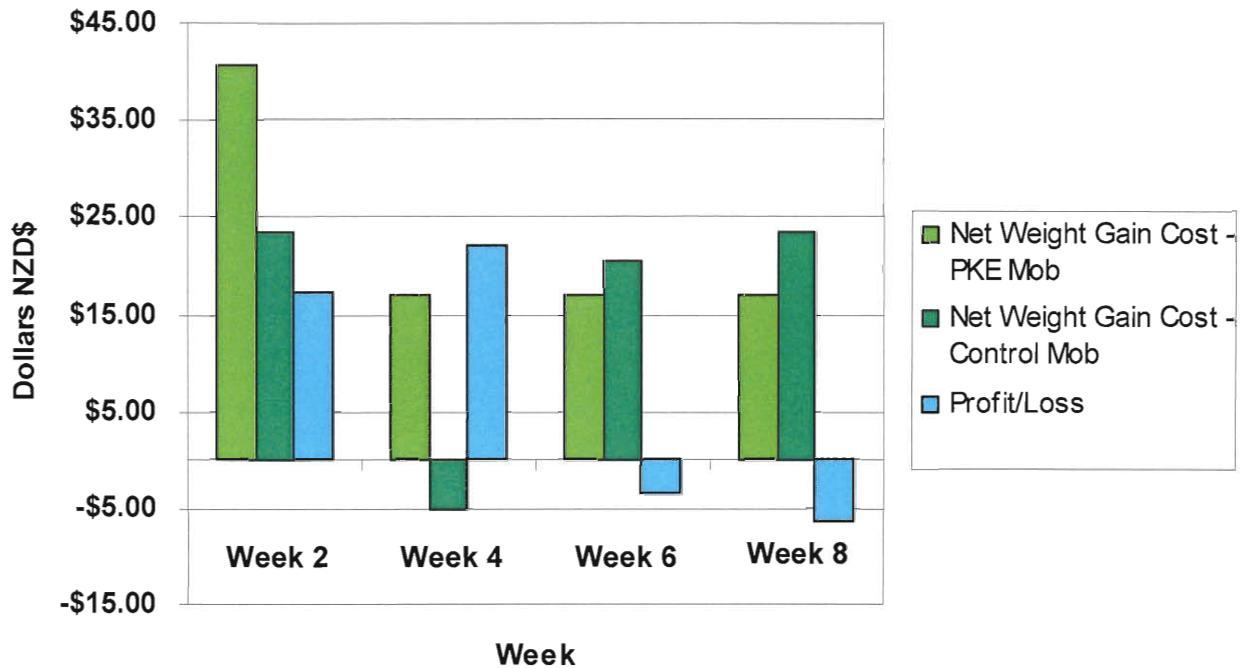
As you can see on graph between week 2 and 6 they suffered weight loss. During this period we had 6 inches of rain and we went from summer grass to autumn grass. The cattle were made to graze down to 1500 – 1700 DM/HA. They were going into covers of 2600 – 2800kg/DM/HA.



As you can see on graph between week 2 and 6 they suffered a drop in daily weight gain. During this period we had 6 inches of rain and we went from summer grass to autumn grass. They did not drop as much as the control mob.



Cost/Benefit per animal



	week 2	week 4	week 6	week 8	
Profit/loss	\$17.28	\$22.08	-\$3.32	-\$6.50	\$29.54

As you can see from this graph the PKE mob put on a lot more weight and at a modest profit overall of \$29.54 per animal. With 66 animals in the mob this created a total net return of \$1949.64. Earlier on at the start of the trial when we still had summer grass it was more profitable then, than when the autumn grass grew. There were a few risks involved in this trial with buying and storage of PKE. Also the risk of the trial not making a profit.

Conclusion

While we made a profit of \$30 per animal and close to \$2000 overall, the real cost savings cannot be accurately measured but I will summarise those below.

The PKE mob was drafted and sold 3-5 weeks earlier. This will be a considerable saving in total Dry matter, which we were able to allocate to other mobs to better feed them.

So that alone is a saving when you include not having to use so much urea to boost grass growth to carry the stock to get them up to the required weights especially in late autumn when grass growth slows down.

It also helps the nutrient budget not having to apply the urea but the PKE can get put down as a nutrient, which helps with less fertiliser being applied. Also I thought the PKE also helped convert the grass to weight a lot better as well.

Also if grass growth slowed down we would have to get rid of more cattle a lot sooner, which would affect the bottom line.

The cattle on PKE had rounder bottoms compared to the control mob of similar weight, and while we don't have hard evidence of the animals going to the works, our usual cattle yield around 52-53% for a Friesian animal (hook weight) off the scales at home.

These animals yielded a lot higher at 54-55% at the AFFCO freezing works.

So a 2% gain here on a 270kg hook weight animal would mean an extra 5.5 kg at \$3.10 kg in April 2006 = \$17.05 and add this on to the \$30 per animal we have made out of live weight gain means a net profit of \$47.00 or total for mob = \$3125.

Also were able to carry a higher stocking rate as a result of feeding PKE.

The downside to all of this was we had to pay for PKE, store under polythene, which is risk with rain, and rodents like to get in. Also we had to load it on a trailer, which only cost \$200 to buy plus

modification of \$100. The time to load it and take it out only added an extra 20 minutes but it is a cost when you employ staff. Also in the wet they left mud around the trailer looking like UFO rings. In conclusion we would do this again if store price, works price were higher and PKE price was down.



Bibliography

Source: Department of Veterinary Services, Malaysia
Biosecurity New Zealand's