

Palm Kernel Cake (PKC): A Potential High Energy Feed for Farm Animals

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Abstract

Production of PKC in Malaysia is in abundance throughout the year and has increased more than 43% since 1999 (1.62 million metric tonnes) to 2011 (2.39 million metric tonnes) respectively. Palm kernel cake (PKC) is a protein source leftover from pressed nuts of the palm fruit. PKC is rich in both protein (16-18%) and energy (9-14 MJ/Kg) and is regarded as a potential protein source of farm animals feed. This paper discussed on the rate of energy conversion, cost effectiveness and availability of PKC as a supplementary food ingredient for ruminants, non-ruminants and fishes. Price comparison between soybean cake and PKC showed that soybean cake cost 550.0 US\$/MT while PKC is 150 US\$/MT. This difference indicated that PKC is a reasonably good economic feed for better growth and fattening rate to farm animals (cattle, sheep, goat, pig, chicken and ducks) and farm fishes (cat fish and other). Countries in Asia, Asia-Pacific, South America and Africa are presently using PKC as an alternative feed for various farm animals. PKC is rich in protein, due to bio-conversion effects which doubled the nutritive value and protein concentration of PKC to 32% protein. Besides that, PKC is highly palatable for ruminants, non-ruminants and fishes because of its distinctive carbohydrate source namely 56.4% mannose, 11.66% glucose, 3.77% xylose and 1.4% galactose. PKC has high fibre content (16%), high phosphorus to calcium ratio and other essential elements like magnesium, iron and zinc recommended in animal optimal growth. A value-added quality of PKC is that it is free from Aflatoxins and other toxins of E.Coli, S.aureus and Salmonellaspp., that could be harmful for animal growth and productivity. Its sufficient concentration of vitamin E, acts as natural anti-oxidants which helps in synthesizing female reproductive hormones. As a supplement of high energy feed, PKC can be used under various concentrations for different farm animals such as, for beef cattle up to 90%, dairy cattle 50%, swine 25-30%, poultry 20-25%, sheep and goat 30-40% and fish 20-30% of total ration. Therefore, this paper will provide

an outlook of PKC as a potential feed source that may meet the requirements as an alternative feed ingredient for farm animals and fishes.

Key words: energy conversion and cost effective, farm animals, palm kernel cake (PKC), protein concentration

Introduction

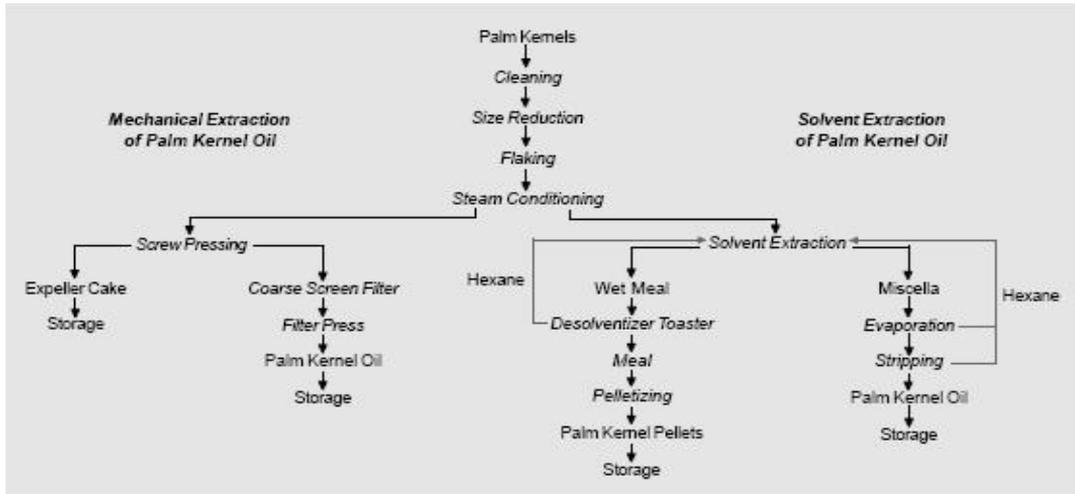
The oil palm industry in Malaysia has expanded rapidly from 60,000 ha in 1964 and reached 5 million hectares in 2011 and increased 3% from 4.85 million hectares recorded in previous year (MPOB, 2011). Therefore the palm kernel cake also increased 6.5% from 2.22 million tons in 2006 to 2.39 million tons in 2011 (MPOB 2011). Most of Palm kernel cake was exported to European Union Countries and China, which represents 93% of the total production of palm kernel cake in Malaysia. Most of the EU countries consumed the palm kernel cake as potential livestock feed for dairy cattle industry. The exports of palm kernel cake were increased 910,000 metric tons to 2.39 million metric tons in 2011 to the European Union Countries and China (MPOB 2010).

Literature Study

The palm kernel cake is the biomass residue which obtained from the crushing of palm kernels to extract the kernel oil. The palm kernel was crushing with 2 methods depending on the size of the plant throughput which is shown in the figure 1 (Yusoff, 2000). The mechanical method was using the traditional method which needs higher power consumption and has high maintenance cost due to wear and tear of the screw expeller. Normally the palm kernel with low capacity is suitable with this method. The other method for crushing the palm kernel is the solvent extraction method. This method was used only with high capacity of palm kernel. The oil residue in the palm kernel cake is about 1% compared to the mechanical method where the oil residue left in the screw expeller more than 6%.

The nutrition value in (Palm Kernel Cake) PKC contains 16-18% of crude protein, 13-16% crude fiber, 4-6% fat and the metabolisable energy estimated at 10.3MJ/kg. The available nutrient content of Palm Kernel Cake is a suitable and valuable source of feed for ruminants (Yeong *et al.*, 1981). The growth performance of various breeds of cattle with 100% of palm kernel cake and the combination with other ration ingredients contribute the average daily gain weight ranges 0.5-1.2 kg/head/day and the Droughtmaster cattle contribute average daily gain weight (ADGW) at the rate 0.75kg/head/day at small holder feedlot model (Jelan *et al.*, 1991).

Figure 1



Sources: Yusof , M.S.A (2000)

Discussion

The palm kernel cake can be considered as reliable supply compared to the other by product. The other advantageous of palm kernel cake are lower cost compared to Soya bean Meal. Price comparison between soybean cake and PKC showed that soybean cake cost 550.0 US\$/MT while PKC is 150 US\$/MT (Ayob *et al.*, 2011). This difference indicated that PKC is a reasonably good economic feed for better growth and fattening rate to farm animals (cattle, sheep, goat, pig, chicken and ducks) and fishes (cat fish and other). The PKC is free from aflatoxins and safe for animal . In additions the PKC are also free from pesticide, chemicals, heavy metals and dioxins (Codjo, 1995). The PKC is difficult to become moldy due to high dry matter content encourages the growth microorganisms. PKC also very palatable and contain high vitamin E which acts as natural anti-oxidants helps in the synthesis of female reproductive hormones. The value added characteristic quality is the PKC are free from Aflatoxins, and other toxins of *E.Coli*, *S.aureus* and *Salmonellaspp.*, that could be harmful for animal grow and productivity.

Conclusion

PKC is a high energy and protein containing alternative feed source for all kinds of ruminant, non-ruminant (monogastric) animals and fishes. It is easily affordable to the small and large scale farmers all over the world and constantly available in the market.

Table 1. PKC in Animal and Aquaculture Feed

	Beef Cattle and Buffaloes	Dairy Cattle	Sheep and Goats	Poultry
Inclusion levels in Feed	80% in feed	30-50% in feed	30%	Up to 20%
Advantage	May give Live Weight Gain of 0.6-0.8 kg/day and 1-1.2 kg day for local (Kedah-Kelantan) and Mafriwal respectively	A cow may yield 10-12 liters milk/day. With good formulation can even give higher yields	Good and cheap source of energy for sheep and goats	FCR of 1:0.48 was reported for broilers fed palm kernel expeller (PKE) at 35 days of age (Onifade and Babatunde, 1998)
Disadvantage	-	-	Long-term feeding of PKC at high inclusion level (>80%) can cause Cu toxicity in sheep	Inclusion of PKC at levels >20% was reported to reduce egg production and egg quality (Yeong <i>et al.</i> , 1981)

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