

# Oil Palm Fronds (OPF) as Potential Affordable Source of Feeds for Ruminants Small Holder Farms

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## Abstract

*Presently, the most important constraints faced by the ruminants industry are not only the high cost of feeds but also their shortage. The shortage is especially so in the supply of palm kernel cakes (PKC) since 95% of PKC produced in Malaysia were exported to European Union (EU) countries for their dairy industries (Sabah Veterinary Services, 2009). Most of the cattle industries (about 47%) in Malaysia are run by small holders and traditional farmers. With the sufficiency level of 24.4%, it can be considered low as far as food security level is concerned. The current challenges faced by both small holders and traditional farmers are the high cost of feedstuff for the ruminants industry such as cattle and goats. The main reason for the slow growth of the ruminant industry is due to the high demand and shortage of PKC and at the same time the high cost of soya bean meal (SBM), the best alternative. Oil Palm Fronds (OPF) on the other hand are possible substitutes as affordable feeds for ruminants in cases where forages and fodder are limited. Furthermore, with the huge planted hectare of oil palm in Malaysia and Indonesia, the potential for constant supply of oil palm fronds is huge. Studies have shown the recommended levels of OPF in the total mixed rations (on dry matter basis) are 50% for beef cattle and 30% for dairy cattle and goats. Although the energy level is only 5.6M.E/MJ/kg and the crude protein (CP) is 4.7%, the OPF can be considered reliable due to their constant supply and with the dry matter production of 9.7mt/hectare/year can be considered sustainable feed for the ruminant industry. This paper reviews the potential of OPF as an alternative and affordable source of feeds for ruminants for smallholders and traditional farmers to sustain the growth of industry in Malaysia and Indonesia.*

*Keywords: cattle, feeds, Oil Palm Fronds (OPF), small holders, traditional farmers*

## Introduction

### *The issues at hand with the ruminant industry in Malaysia*

In Malaysia, natural forages are freely grown and the extensive system is widely practiced by the smallholders. The livestock graze on poor quality native pastures such as carpet grass (*Axonopus compresses*) and *Paspalum spp* which are the common vegetation grown under the waste land and under the tree crop. The slow growth of the livestock industry in Malaysia is mainly due limited forage species and the lack of technical knowhow among the small holders. In addition, the high cost of feed and shortage of palm kernel cake (PKC) supply also contributed to the constraints (Sabah Veterinary Services, 2009). The prospects of increasing farmland for grass and fodder are simply not favorable (Joseph, 1991) because the national third agricultural policy (NAP3) stated that any conversion of tropical rainforest to pasture for grazing had not enough justification in terms of environment or economic viability. The ruminants industry then was left to be carried out by the traditional farmers except for feedlot projects which were implemented in big scales by the private sector or individuals. The potential of biomass products especially from oil palm trees need to be given special attention since this is the most logical source of affordable feed.

### *Oil Palm Fronds (OPF) Availability as Source of Feeds for Ruminants*

Previously the oil palm fronds are abundant as waste materials left rotting within the stacking rows and mainly used to recycle as composting fertilizers and for soil conservation. After the introduction of cattle and goat integration programs in oil palm plantations, the potential of OPF has been observed when the cattle and goats were seen grazing on the oil palm fronds. Usually the cattle and goats would turn to oil palm fronds if the forages in the grazing area were not available. This happened when the oil palm reached the stage where the canopy became extensive thus preventing forages to grow due of poor lighting. Taking advantage of this, with the assumption of the average of economic life span of oil palm of 25 years, this would give a huge and promising supply of OPF for the ruminants industry. With the present increase in oil palm exports and rising revenue, it is very likely and most surely that there will be a tremendous increase of oil palm areas in both Malaysia and Indonesia. This in turn will provide a good opportunity to harness the biomass byproduct which includes oil palm fronds. The best thing about oil palm fronds is that they are available at all times when the pruning, harvesting and replanting are being carried out. The oil palm fronds can be taken by cattle and goats as feeds either green or conserved as silages in combination with other ingredients as total mixed ration (Abu Hassan and Ishida 1991). The oil palm fronds are similar to rice straws in that they have fibrous characteristic.

### *Availability of Oil Palm Fronds*

Oil palm fronds are available at all times when the pruning, harvesting and replanting have been carried out (Table 1).

### *Oil Palm Fronds from pruning and routine harvesting*

The total dry weight of fronds can also be obtained from routine pruning and harvesting (Table 2). OPF are available regularly in terms of dry weight and seem to be more sustainable resources of biomass compared to other oil palm biomass such as palm press fiber (PPF), palm kernel cake (PKC), oil palm trunks (OPT) and other biomass products such as soya bean meal (SBM), rapeseed and maize.

### *Comparison Cost of Other Biomass Products with Oil Palm Fronds*

The cost of oil palm fronds pellets (OPFP) is lower compared to PKC and SBM (Table 3). The feed conversion rate (FCR) for 7 kg OPFP produced an average daily gain weight (ADGW) of 0.8 kg to 1.1 kg for Kedah Kelantan Cattle which cost in the range of USD 1.33 to produce 1kg ADGW (Mardi 2008). Compared to PKC rations of 80% PKC, 17.5% grass/hay, 1.5% limestone and 1% mineral premix (M Wan Zahari and A .R Alimon 2004) the cost was USD 1.70.

Table 1. Availability of fronds during felling at replanting in million tons in 2009

Location	Oil palm (mature ha)	Fronds dry weight (mil tons)
Peninsular Malaysia	2,489,814	1.80
Sabah	1,361,598	0.99
Sarawak	839,748	0.61
Total	4,691,160	3.40

Sources: Based on 5% replanting of mature areas at 14.47t/ha of dry weight of fronds at felling taken from Chan 1999.

Table 2. Total Availability of fronds from annual pruning and harvesting in million tons in 2009

Location	Oil Palm (mature ha)	Fronds dry weight (mil tones)
Peninsular Malaysia	2,489,814	25.91
Sabah	1,361,598	14.17
Sarawak	839,748	8.74
Total	4,691,160	49.36

Sources: Based on 10.4tones dry weight/ha from pruning and harvesting taken from Chan 1999.

Table 3. Cost Comparison of OPF, PKC and SBM

Palm Kernel Cake (PKC)	Total Cost	Soya Bean Meal (SBM)	Total Cost	Fresh oil palm Fronds (OPF)	Oil Palm Frond Pellet (OPFP)
Material cost Range USD 150- 174 Based on the CPO price zone USD 903- 1000	USD 174	Material Cost	USD 472-520	Free	USD 180
Delivery cost USD 53-66	USD 66		USD 66		USD 10
Total	USD 240		USD 586	NIL	USD190

Sources: Mohammad Amizi Ayob *et al.* (2011)

*Nutritive Potential of Oil Palm Fronds as Ruminant feeds*

OPF contain less crude protein compared to the SBM and PKC (Table 4). The expeller PKC and SBM showed higher crude protein (CP) and metabolizable energy (ME). Although OPF only contain 4.7% CP and 5.7mj/kg ME, the cost of OPF is still much cheaper compared to the both PKC and SBM. Furthermore, OPF is abundant, free and available at all times. The ADGW in cattle is not much different when fed with OPF compared to PKC with exception of SBM and this was shown in a study of Brahman cattle when fed with PKC and OPF showed the ADGW of 0.75kg and 0.65kg respectively and when fed with SBM showed the ADGW of between 1.2kg to 1.3kg (Alimon and Hair Bejo 1995). Even though the ADGW was slow compared to PKC and SBM, the big difference, OPF was much cheaper.

Table 4. Comparison of Nutritive Value of By- Product (%)

By product	CP	CF	NDF	ADF	EE	ASH	TDN	DM	ME (MJ/kg)
Soya Bean Meal (SBM)	48	7.0	14.0	10.0	18.8	5.5	78	90	13.3
Oil Palm Fronds (OPF)	4.7	38.5	78.7	52.9	2.1	3.2	45	30.2	5.70
Palm Kernel Cake (PKC)	17.2	17.1	74.3	55.6	1.5	4.3	65	89	11.3

CP: Crude Protein, CF: Crude Fibre, NDF: Neutral Detergent Fibre, ADF: Acid Detergent Fiber, EE: Ether Extract, TDN: Total Digestibility Nutrient, DM: Dry Matter, ME: Metabolizable Energy.

Sources: Alimon and Hair Bejo (1995), and Baize, John C (2000).

The other potential of OPF is that it can be mixed in mixed rations thus reducing cost in the usage of PKC and SBM (Wan Zahari *et al* 2003). This will then make animal feeds affordable to traditional farmers which mostly dominated the ruminants industry in this region.

## Conclusion

OPF has a huge potential as substitute of ruminants feeds due to their availability and sustainable supply at all times compared to other by products. Continuous promotion of OPF as value added product for livestock feeds will give a higher impact potential during shortage of the livestock feed. The lower cost of livestock feed is necessities due to the Ruminants industry in Malaysia and South East Asia were dominantly accommodate by the traditional farmers and small holders. This can sustain the ruminants industry and contribute the food security in red meat production. Further research of the mixed ration with OPF needs to be carried out to observe for other potentials of this byproduct.

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