NUTRITIVE VALUE OF PALM KERNEL MEAL SINCE 1999 TO 2010 BASED ON SAMPLES ANALYZED BY ANIMAL FEED LABORATORY, IVM.

Sharif S, A., Norlindawati A. P., Noormah Miw A., Sabariah B., Omar R., Samijah A., Supie J. and Jamnah O.

Malaysia Veterinary Institute, KM 13 Jalan Batu Pahat, Beg Berkunci 520, 86009 Kluang, Johor
Corresponding author: shariff@dvs.gov.my

Abstract: Palm Kernel Meal is well known as raw material with a balanced nutritional value, especially as livestock feed. It also widely used by livestock producers as a supplementary feed. However, the nutritive values of this by-product vary and depend on many factors. Proximate analysis values are important for analyzing feed quality for feed formulation. The aim of this study is to evaluate the quality of PKM from twelve years' data from 1999 to 2010. Results show that the nutrient content of PKM over the past twelve years in livestock feed is not consistent.

***Keyword**: Palm kernel Meal, proximate analysis*

INTRODUCTION

High quality feed and farm management ensure good animal performance and health. According to Corson *et al.* (1999) nutrition is often limiting the productivity of ruminants selected for high genetic merit, whether it is expressed as milk production, multiple births, and growth rate or disease resistance. Malaysian farmers should be aware about the quality of the feed that they use to feed their livestock. By knowing the nutritive values of the feed, the best ration to meet the nutritional requirements of various classes of livestock can be formulated.

Malaysia is well-known as a top producer of palm oil and palm kernel meal (PKM) as an important by-product from this industry. However, the nutritive value of this by-product varies and depends on manufacturing methods. Monitoring nutritive value of PKM is essential and it can be done by proximate analysis. Since the 1999 until 2010, the Animal Feed Laboratory, Malaysia Veterinary Institute in Kluang received a total of 593 samples of PKM. Samples were received from all over Peninsular Malaysia by manufacturers, farmers and also Veterinary Service Department. The aim of this study is to evaluate the quality of PKM from twelve years of data.

MATERIALS AND METHODS

Palm Kernel Meal Samples: A total of 593 samples were submitted to Animal Feed Laboratory, IVM since year 1999 to year 2010. Received samples were recorded, analyzed and the results are collected in PROX system. PROX system can be used to produce the laboratory report, check the analytical results quickly and accurately developed by Animal Feed Laboratory, IVM using Lotus 123 program.

Proximate analyses: Crude protein content (*N x 6.25*) was determined by the Kjeldahl method. Crude fibre was measured using Fibertec methods (FOSS). Ether extract was measured using Soxtec methods (FOSS). Other parameters in proximate analysis were determined according to Association of Official Analytical Chemists, AOAC (2000). TDN was calculated using Manke equation (1979). Calcium and phosphorus values were obtained by using the atomic absorption spectrophotometer.

RESULTS AND DISCUSSION

Two methods of palm oil extraction process are being used in palm oil industries; solvent extracted and expeller pressed. The difference in the quality of expeller PKC and solvent extracted is small, although in general expeller PKC contains more oil (4% to 8%) than solvent extracted PKC (1% to 2%) (Alimon, 2004). Chin (2001) also mention that the main difference between the solvent extracted PKC and the expeller pressed type is in the ether extract or oil content. The oil content of the solvent extracted is around 0.5% to 3%, while in the expeller extracted is higher (5% to 12%). No difference can be found in the crude protein contents between the two types, which range from 14.6% to 16.0% on dry matter basis (Chin, 2001). In this paper, PKM refers to PKC and PKE.

The results (Table 1) showed that the average value of dry matter from 1999 to 2010 ranged from 87.66% to 93.13%. Dry matter value in 2002 is low compared to other studies. Average value for crude protein ranged from 12% to 16.57%. The lowest crude protein value was noted in 2004. The data also shows that the lowest crude protein value is only 5.2%. About 26% of the total samples were considered low quality PKM with crude protein value below 14.6%. Average of crude fiber ranged from 17.56% to 22.58%, which is higher than the values by Alimon (2004). Ash average value is ranged from 5.06% to 8.71%, which is still within ranged from other studies. However, from the data the highest value of ash is 23.8%, which can influence the crude protein value.

Table 1: Average value of PKM since 1999 until 2010, studies from Mustaffa *et al.* (1987), Chin (1991) and Alimon (2004)

	n	**DM**	**CP**	**EE**	**CF**	**ASH**	**Ca**	**P**	**NFE**	**TDN**
		%	%	%	%	%	%	%	%	%
1999	61	89,42	16,25	3,75	21,48	5,31	0,32	0,51	53,02	65,11
2000	72	91,64	16,57	5,67	20,04	5,06	0,37	0,46	52,69	66,16
2001	48	93,13	15,73	8,16	17,56	6,93	0,75	0,67	51,63	66,00
2002	33	87,66	15,96	4,88	18,33	7,20	0,36	0,45	53,63	65,77
2003	16	90,52	15,17	3,88	17,64	6,44	0,36	0,41	56,87	67,97
2004	34	90,65	12,00	4,22	22,58	8,12	0,55	0,43	53,07	59,06
2005	9	91,79	14,43	4,39	18,92	7,06	2,54	0,63	55,19	63,52
2006	38	91,41	12,99	4,95	21,09	8,71	0,83	0,47	52,26	61,43
2007	73	91,22	14,79	4,35	20,42	8,56	0,89	0,48	51,88	62,83
2008	62	91,51	15,00	3,89	20,60	8,13	0,76	0,48	52,38	64,20
2009	77	91,45	16,30	4,88	19,07	6,91	0,52	0,48	52,84	66,88
2010	70	91,69	16,20	5,11	19,43	6,93	0,46	0,46	52,34	66,12
Mustaffa *et al.* (1987) and Chin (1991) (PKC)		89,00-91,00	15,00-15,30	0,90-2,90	14,30-16,00	3,50-4,10	0,20-0,25	0,52-0,54	63,20-65,00	70,00-75,00
Mustaffa *et al.* (1987) and Chin (1991) (PKE)		89,10-93,00	14,60-16,00	9,10-10,60	12,10-16,80	4,10-4,30	0,20-0,21	0,32-0,52	52,50-59,90	67,00-72,00
Alimon (2004) (PKE)		88,00-94,50	14,50-19,60	5,00-8,00	13,00-20,00	3,00-12,00	0,21-0,34	0,48-0,71	46,70-58,80	

DM: Dry matter, CP: Crude Protein, EE: Ether Extract, CF: Crude Fiber, Ca: Calcium, P: Phosphorous, NFE: Nitrogen Free Extract, TDN: Total Digestible Nutrient

The inconsistency with wide range of nutritional values in PKM may be due to different extraction method, and low quality of PKM source. Adulterated PKM also can cause increasing of ash value but decreasing the crude protein value. Estimation of PKM nutrition values for feed formulation without laboratory testing is not recommended. If essential nutrient in PKM such as crude protein is low, it will affect production of the livestock. This situation definitely will affect farmer's profit and also livestock performance.

CONCLUSION

Evaluation of PKM samples for twelve years of data shows that some of the samples do not achieve the proper specification values. Nutrient quality of the PKM must be monitored regularly because of its wide use as animal feed and will impact the livestock industry if the quality of nutrients decreased or not in accordance with specifications. This situation will affect livestock farmers to obtain a balanced diet to get good livestock production. Feed Quality Monitoring Program in Feed Animal Act 2009 from Department of Veterinary Services is very important to make sure that nutrition quality of PKM is always in accordance with specification.

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REFERENCES

A.O.A.C. 2000. Official Methods of Analysis. 17th edition. Association of Official Analytical Chemists. Washington D. C.

Alimon, A. R. 2004. The Nutritive Value of Palm Kernel Cake for Animal Feed. Palm Oil Developments, 40, pp. 12-14. [Online, accessed August 16, 2011] http://www.chgs.com.my

Chin, F. Y. (1991). Oil palm - A rich source of animal feed. In: Asian Livestock, Vol. XVI, No. 10, FAO/APHCA Publication Bangkok, Thailand.

Chin, F.Y. 2001. Palm Kernel Cake (PKC) as a Supplement for Fattening and Dairy Cattle in Malaysia. 7th Meeting of the Regional Working Group on Grazing and Feed Resources. [Online, accessed December 28, 2011].

Close, W. and Menke, K. H. 1986. Animal Nutrition Manual.

Corson, D.C., Waghorn, G.C., Ulyatt M.J. and Lee J. 1999. NIRS: Forage analysis and livestock feeding. Proceedings of the New Zealand Grassland Association, 61, pp. 127–132.

Mustaffa, A. B., Chin, F. Y. and Yusoff, M. S. (1987). The use of palm kernel cake as animal feed. In: Asian Livestock, Vol. XIII No. 2 & No.3, FAO/APHCA Publication Bangkok, Thailand.