PALM KERNEL MEAL-BASED BROILER STARTER AND FINISHER FORMULATIONS (BR1501)

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The poultry industry has contributed greatly to the agricultural sector, especially towards animal protein production. It contributes to the country's economy and also to the well-being of the population. Feed cost is the most important factor for determining profitibility in the poultry industry as it accounts for 70% of the total cost of production. The relatively high cost, attributed mainly to expensive feed, and market liberalisation under WTO arrangements, as well as consumer demand for quality livestock. The demand for livestock products as a source of high quality protein and safe food is expected to rise with increases in population and per capita income.

The Malaysian poultry industry has been heavily dependent on imported feed ingredients. Prices of corn and soyabean meal are more than RM 900 t^{-1} and RM 1500 t^{-1}, respectively (Raghavan, 2008). The challenge is for the industry to continue to increase local production of livestock products at affordable cost. The utilisation of agri-by-products may offer only a partial solution as one needs to look into the various constraints associated with these by-products. There are several by-products from the palm oil industry which can be used as components in compound feeds. These include oil palm fronds (OPF), palm pressed fibre (PPF) and palm oil mill effluent (POME) (Wan Zahari and Alimon, 2004).

Figure 1. Broiler feed supplemented with palm kernel meal.

The most common component that has been used in compound feeds is palm kernel cake (PKC). PKC is a by-product from kernel oil extraction. It is obtained either after solvent extraction, when it is commonly known as palm kernel meal (PKM), or after a mechanical extraction process, when it is commonly known as palm kernel expeller (PKE). PKC alone cannot substitute a complete diet for poultry. This is because of its high fibre content, low digestibility, gritty nature, unpalatability and relatively low availability of amino acids. Feeding trials on broiler starter and finisher feeds with different levels of PKC have been done by many researchers (Yeong, 1981; Onwudike, 1986; Okeudo *et al.*, 2006). The study conducted by Yeong (1981) indicated that PKC can be included in poultry rations at a level of 20% without any adverse effect on the performance of both broiler and layer chickens. At more than 20%, it affected the growth performance of broilers. Higher levels of PKC in poultry rations may result in energy deficiency due to the high fibre content (Wan Zahari and Alimon, 2004).

Figure 2. Palm kernel meal (PKM).

METHODOLOGY

The ration was formulated to be isocaloric and isonitrogenous using FORMAT software and utilising required amount of raw materials. An experiment on the performance of male birds fed with either a control (without PKM or PKE), a palm kernel meal-based (Formula BR1501) or a PKE ration was carried out at the Energy and Protein Centre (EPC), MPOB Keratong (*Figure 3*). Four hundred and five male Cobb day-old chicks (45 birds/treatment, three replications) were used

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in this study. The birds were raised in battery cages in a fully automatic climate control house. The experiment was conducted for 35 days. A starter ration was offered from Day 1 until Day 21, and thereafter the finisher ration was offered from Day 22 to 35. Weight gain and feed consumption were recorded daily. Starter feed efficiency was calculated on Day 21 while finisher feed efficiency was calculated on Day 35. Average bird weight, feed intake and feed conversion ratio (kilograms of rations consumed per kilogram of weight gain) were measured for each of the rations.

Figure 3. Feeding trial on male Cobb birds at EPC, MPOB Keratong.

PRODUCT PROPERTIES

Data on total feed consumption (TFC), average body weight (ABW) and feed conversion ratio (FCR) of the male Cobb broilers are presented in *Table 1*. During the starter period, there were no significant differences in TFC, ABW and FCR among the three treatments. Similar trend showed during the finisher period with no significant differences observed in TFC and ABW among the three treatments. FCR from Formula BR1501 was not significantly different from that of the control ration, but different (P>0.05) from that of the PKE ration.

Figure 4. Broiler chicken at 35 days old.

ECONOMIC EVALUATION

The estimated expenditure and other economic parameters for Formula BR1501 are shown in *Table 2*. This economic evaluation is based on the assumptions that the Formula BR1501 is sold at option 1: RM 1.65 kg^{-1} and option 2: RM 1.75 kg^{-1}, the production capacity is 200 kg hr^{-1} (with production operation at 8 hr day^{-1}, 25 days per month) and there is an increase in sales from year 1 to 5.

TABLE 2. ECONOMIC ANALYSIS

Estimated expenditure at different cost	Option 1	Option 2
Cost (RM kg^{-1})	1.65	1.75
Capital expenditure (RM)	370 000	370 000
Benefit to cost ratio	1:1.05	1:1.11
Payback period (yr)	4	3
Internal rate of return (IRR) (%)	13	29
Net present value (NPV) (RM)	25 974	153 660
Return on investment (ROI) (%)	30.48	43.45

TABLE 1. TOTAL FEED CONSUMPTION, AVERAGE BODY WEIGHT AND FEED CONVERSION RATIO OF MALE COBB BROILERS FED WITH THREE RATIONS IN THE STARTER AND FINISHER PERIODS

Parameter	Treatment		
	Control	Formula BR1501	PKE
Starter period			
Weight (kg) at Day 0	0.048	0.048	0.049
TFC (kg)	$1.12^{a} \pm 0.03$	$1.15^{a} \pm 0.01$	$1.13^{a} \pm 0.04$
ABW (kg)	$0.84^{a} \pm 0.01$	$0.86^{a} \pm 0.01$	$0.80^{a} \pm 0.02$
FCR	$1.33^{b} \pm 0.05$	$1.34^{b} \pm 0.02$	$1.41^{b} \pm 0.06$
Finisher period			
TFC (kg)	$3.23^{a} \pm 0.07$	$3.12^{a} \pm 0.03$	$3.00^{a} \pm 0.06$
ABW (kg)	$1.98^{a} \pm 0.04$	$2.01^{a} \pm 0.02$	$1.57^{b} \pm 0.04$
FCR	$1.63^{cd} \pm 0.06$	$1.55^{d} \pm 0.02$	$1.91^{bc} \pm 0.01$

Note: ^{abcd} Means in the same row with different superscripts are significantly different (P<0.05).
TFC = total feed consumption; ABW = average body weight; FCR = feed conversion ratio.

TARGET MARKETS

Broiler feed industries and feedmillers will benefit from this product. The product has market potential for both domestic and international markets.

CONCLUSION

Partial replacement of soyabean meal and reduction of corn use with Formula BR1501 in broiler feeds can reduce the production cost of animal protein in Malaysia. This will increase the competitiveness of the Malaysian broiler feed industry. It will also help to reduce the loss of foreign exchange by decreasing the volume of and dependency on imported ingredients.

REFERENCES

OKEUDO, N J; ONYIKE, I L; OKOLI, C V and CHIELO, I L (2006). Production performance, meat quality and feed cost implications of utilizing high levels of palm kernel cake in broiler finisher diets. *Int. J. Poult. Sci. 5 (12)*: 1160 – 1163.

ONWUDIKE, O C (1986). Palm kernel meal as feed for poultry. 3. Replacement of groundnut cake by palm kernel meal in broiler diets. *Anim. Feed Sci. Technol., 16*: 179-186.

RAGHAVAN, V (2008). Global feed crisis – and its effect on the feed industry in Malaysia. *Programme & Abstract Book of the 3rd Int. Conf. on Anim. Nut. (ICAN)* 2008. 29-31 July 2008, Hotel Equatorial, Bangi, Selangor. 20 pp.

WAN ZAHARI, M and ALIMON, A R (2004). Use of palm kernel cake and oil palm by-products in compound feed. *Palm Oil Developments No. 40*.

YEONG, S W (1981). The nutritive value of palm oil by-products for poultry. *Proc. of the First Asian-Australasian Anim. Sci. Congress*. Kuala Lumpur, Malaysia. p. 17.

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