Effective Use of Palm Products/ By-Products as Fat Energy in Broiler Feeding

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INTRODUCTION

Malaysia is the world's leader and most efficient producer of palm oil and palm oil products. Palm oil and its products are classified as high energy feed which are technically and economically feasible to be used as partial replacement for corn in broiler feed. Every unit of palm oil and its components used in the ration can replace two units of corn. Thus, 10% of palm oil products added to the feed, will provide energy equivalent to 20% of the corn in its formulation.

Crude palm oil (CPO) is the most popular fat used in broiler and layer feed in Malaysia. In the least cost ration formulation the amount of CPO used is subjected to cost price and physical characteristic as soft fat. Normally, 2%-5% is used.

There are other products from the palm oil refinery suitable as feed for livestock such as palm fatty acid distillate, palm kernel fatty acid distillate or improved products made from them. Others like palm stearin and calcium soap made either from palm oil or fatty acids are also available as high energy feed supplements. Some of these products are cheaper than CPO, while others more expensive.

The objective of this study was to evaluate the feeding performance of improved by-products from palm oil refinery (RPPS) with existing feed materials in the diets of growing and finishing broiler chicken.

MATERIAL AND METHOD

Feeding Experiment

Day old chicks were fed eight rations, with five replications of 20 birds per replicate. CPO was used as positive control against RPPS. The eight rations were: T1 4.5% CPO, T2 4.5% RPPS, T3, T4 and T5 with 4.5% fat, respectively of blends CPO:RPPS of 25:75, 50:50 and 75:25. In the three other rations, RPPS was used at 5.5%, 6.5% and 7.5% for T6, T7, and T8, respectively. The feed and water were fed alibitum during light day. The crude protein content of the starter ration was 22% and ME 3000 Kcal kg^{-1},19% CP and ME 3100 Kcal for the finisher ration.

The feeds and water were placed in the feed and water troughs daily at 8 hr. Daily feed consumption was recorded on group basis, with any spillage of feed collected and subtracted from the amount fed. Group weight of the birds was recorded at days 1, 7, 14, 21, 28, 35 and 42.

Statistical Analysis

All the data collected were subjected to statistical analysis with ANOVA and any difference between the treatment means analysed by LSD using the SPSS™ programme package.

RESULT AND DISCUSSION

Growth Performance

The feeds were formulated to provide 3000 Kcal kg^{-1} and 3100 Kcal ME, and 22% and 18% crude protein for the starters and finishers, respectively. The formulations and nutrient compositions of the basal diets are tabulated in *Table 1*.

The day old chicks were of similar body weights of approximately 43.8 g as shown in *Table 2*. Fifteen birds, or 38% mortality, occurred during in the first three weeks. The highest mortality occurred in the fifth week when 11 birds died. The mortality was quite evenly distributed between the treatments

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TABLE 1. BASAL RATION COMPOSITION FOR BROILER, STARTER AND FINISHER

Ingredient (%)	Broiler starter	Broiler finisher
Maize US	58.17	63.22
Wheat pollard	0.00	5.00
Thai fish meal (55%)	6.00	3.50
Standard soya meal (44%)	31.10	22.30
Crude palm oil	2.00	3.00
DL-Methionine	0.17	0.20
MDCP 21/16	0.40	0.80
Salt	0.26	0.28
Limestone	1.40	1.20
PTY PMX	0.50	0.50
Analysis of Nutrients (%)		
Volume	100.00	100.00
Dry matter	89.317	89.244
Fibre	3.496	3.387
Essential fatty acid	1.814	1.947
Xanto	8.726	9.483
Oil	4.657	5.799
Crude protein (%)	22.025	17.999
Lysine	1.172	0.897
Methionine	0.552	0.514
Methionine + cystine	0.946	0.840
Threo	0.788	0.639
Tryp	0.259	0.211
Calcium (Ca)	1.081	0.893
Available phosphorus	0.406	0.413
Salt	0.401	0.377
Sodium (Na)	0.171	0.161
Available lysine	1.120	0.856
Metabolisable energy: Kcal	2 998.923	3 105.845

TABLE 2. GROWTH PERFORMANCE AND FEED INTAKE OF BROILER STARTERS AND FINISHERS FED DIETS USING CRUDE PALM OIL AND REFINED PALM PRODUCTS AS SUPPLEMENT

Parameter	T1	T2	T3	T4	T5	T6	T7	T8
Weight (g) at day 0	43.76	43.70	44.18	43.93	43.7	43.75	44.0	43.38
Total weight (g) gain at week 3**	495.6	494.1	490.1	496.0	460.5	520.2	533.2	526.0
Weight (g) at week 3	*539.3*[1]	*537.8*[1]	*534.3*[1]	*539.9*	*504.2*[1]	*563.9*[2]	*577.2*[2]	*569.*[2]
Total weight gain (g) at week 6**	1 548.5	1 566.4	1 679.6	1 641.2	1 617.9	1 693.2	1 684.9	1 618.5
Weight (g) at week 6	*1 592.3*	*1 610.1*	*1 723.8*	*1 685.2*	*1 661.6*	*1 737.0*	*1 728.9*	*1 661.8*
Feed intake (g)*	3 108.7	3 179.7	3 249.5	3 181.3	3 252.2	3 209.0	3 291.4	3 229.2
FCR*	2.00	2.03	1.94	1.94	2.01	1.90	1.96	2.00
Total mortality	0	3	8	5	9	3	6	5

Notes: *P <.05, **P <.01; FCR - feed commercial rate. [1,2] P < D.S - value in the same row with different superscript are different.

but there was no mortality in T1. The total feed consumption of birds from T1 was 3108.7 g, the lowest among all the treatments. Thus, the total weight gain in T1 was also the lowest (P<.01). The feed conversion of T1 was also the poorest at 2.0. The highest feed consumption was from T7, followed by T5, T3, T8, T6, T4 and T2. The feed consumption between treatments was different at p<0.05, (p<.05). T6, which used 5.5% RPPS, produced the best FCR of 1.90. The individual bird total weight gain was also the highest at 1693.2 g.

The T6 feed intake was fifth highest at 3209.0 g, and mortality the third lowest at three birds throughout the trial. One bird died each in the second, fourth and sixth weeks.

The FCR of T8 was no difference (P>0.5) than that of T1; however its body weight gain was better than that of T1, at 1618.5 g vs. 1548.5 g. This indicated that RPPS was palatable and readily consumed by the birds and more effective than CPO in broiler feed. Therefore, RPPS was better and more effective than the CPO as fat energy supplement for growing broiler chicken. At slightly higher levels in the feed, RPPS provided good binding without producing any oily feed. The slaughtered birds fed RPPS had very little and very firm white fat in their carcasses. The taste and the smell of the meat were excellent, normal and very acceptable.

CONCLUSION

- RPPS supported better growth of broiler chicken and the FCR produced was better than that by CPO.
- It is technically and economically feasible to replace CPO with an equal or higher level of RPPS.
- There was no deleterious effect of using RPPS in the starter and grower broiler feeds.
- The taste of meat from the birds fed RPPS was good and normal.

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