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SHORT COMMUNICATION

COMPARISON OF PALM OIL AND ANIMAL FAT IN BROILER DIET

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Target Audience: Poultry farmers, animal nutritionists and feed producers and extension workers.

ABSTRACT

Palm oil and broiler offal fat were compared for improving broiler diet by including them at 5 or 10% in the diets of 400 day-old Anate broiler chicks randomized to duplicate groups of the dietary treatments. Broiler offal fat at 5% and 10% palm oil produced significantly ($P < 0.05$) heavier 4 - week old chicks but at 8 weeks of age only broilers given 5% palm oil and 5% offal fat weighed significantly ($P < 0.05$) more than the others. Feed consumption, mortality and body composition appeared unaffected. The animal fat therefore appeared a good substitute for palm oil in spite of the better qualities of the latter. Effects of palm oil might partly be due to fat soluble vitamins rather than dietary energy alone.

Palm oil is an expensive vegetable oil in Nigeria; and it might be substituted with animal fat if the two are comparable.

Key words: Palm oil, animal fat, growth, carcass quality, broilers.

INTRODUCTION

Olomu(1) recommended a dietary crude protein of 24% and metabolizable energy of 3000kcal/kg for chicks raised under tropical conditions. This recommendation is based on the concept that the higher environmental temperatures in the tropics than in the temperate might prevent sufficient intake of the type of high energy diets used in the temperate.

However, some studies indicated that chicks and laying birds benefited from palm oil inclusion in their diets (2,3). It was therefore speculated that the beneficial effects of palm oil might partly be due to fat soluble vitamins rather than dietary energy alone (4).

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Palm oil is an expensive vegetable oil in Nigeria and it might be substituted with animal fat if the two are comparable. The objective of this study was to determine the required level of palm oil and broiler offal fat in the diet of layers.

MATERIALS AND METHODS

Palm oil was bought in the open market without subsequent storage before use. The offal fat floated on the top of the liquid when 500kg of broiler offal was boiled with water at 95-110°C for 50 minutes. Offals which consisted largely of the intestines and excluded the gall bladder, were put into a drum that was placed in wood fire. Decanted fat was further heated for 10 minutes to evaporate remnant water.

The experimental diets were composed as in Table 1. Diets 1 and 2 contained 5% palm oil (PO) and 5% broiler offal fat (BOF) while diets 3 and 4 contained 10% of PO or BOF respectively in the finisher diet. Butylated-hydroxy-toluene was included as an antioxidant.

Table 1: Experimental diet

Ingredient	Kcal./kg M.E.		
	3,200	3,000	2,800
Maize	30	37.8	42.5
Wheat offal	26	14.	1.7
Soyabean meal	13	16	19
Palm oil	7	3.5	-
Common ingred.	33.8	33.8	33.8

Common ingredients consisted in % the following: groundnut cake, 20; palm kernel meal, 10; Oyster shell, 2; bone meal, 1; salt, 0.3; premix, 0.5. The latter was at the rate recommended by the manufacturers (Pfizer).

Experimental

A total of 400 day-old Anak broiler chicks were randomized to the dietary treatments in duplicate groups of 50 birds

The birds were weighed at 4 and 8 weeks of age when cumulative feed intakes and mortality were also recorded.

The birds were slaughtered for carcass analysis at 8 weeks of age.

A complete randomized block design was used for the analysis of variance and significantly different means were identified with multiple range text (4).

RESULTS AND DISCUSSION

The performance of the birds is summarized in Table 2, showing that at 4 weeks of age, chicks on 10% and 5% dietary palm oil and broiler fat respectively, were significantly ($P < 0.05$) heavier than those on 5% and 10% palm oil and broiler fat respectively, which were not significantly ($P > 0.05$) heavier than the control. The 10% palm oil should have increased the dietary energy, fat soluble vitamins and unsaturated fatty acids to a greater extent than the dietary 5%. Probably these advantages were expressed in the improved growth rate (2).

Table 2: Growth rate, feed consumption and mortality of broilers on diets with palm oil or broiler offal fat

Trait	Palm oil		Broiler fat		Basal
	5%	10%	5%	10%	
4 weeks weight	448^{b}	463.1^{a}	462.2^{a}	442.3^{b}	400.0^{b}
Feed intake (0-4wk)	1.22	1.18	1.28	1.27	1.21
Mortality % (0-4wk) number	2	1	1	2	2
8 Week weight	1459.3^{a}	1430.8^{b}	1444.1^{a}	1369.9^{b}	1370.1^{b}
Feed intake (5-8wk)	3.08	3.05	3.10	3.12	3.2
Mortality % (4-8wk)	0	1	1	1	1

Figures on the same horizontal line differently superscripted are significantly different at 5%.

For these effects the dietary palm oil might have fallen short of the threshold. On the contrary, 10% appeared excessive for broiler fat, the heat treatment of which might have destroyed some nutrients.

However, at 8 weeks of age, dietary 5% was superior for both palm oil and broiler fat. But palm oil and broiler fat appeared excessive at 10%. The effects at 8 weeks of age is evidently cumulative and is indicative of the beneficial effect of the 5% dietary level, while the cumulative effect at 10% was excessive. These corresponded to calculated metabolizable energy values of 3059 and 3239 kcal./kg ME respectively; which are consistent with the recommendation for a moderate dietary energy for chicks (1). In fact the former might probably not have a significant effect but for providing the micro-nutrients (2).

Feed intake and feed efficiency were not significantly affected by treatment, although, better efficiency appeared to be associated with faster growth rate. There were no significant ($P > 0.05$) differences among the treatment in the component body parts of the chickens as shown in Table 3.

Table 3: **Carcass analysis of broilers on diets containing palm oil or broiler fat.**

Component	Palm oil		Broiler Fat	
	5%	10%	5%	10%
Plucked weight(%)	90.2	88.7	91.9	89.7
Eviscerated weight(%)	76.2	68.5	73.3	70.5
Yield cuts (%) of eviscerated weight drumstick	13.7	12.5	14.2	14.4
Thigh	13.0	13.7	12.5	10.7
Breast	22.3	19.2	21.5	18.5
Back	16.9	17.1	18.1	16.8
Wing	12.9	11.7	12.2	11.4
Neck	7.8	8.2	6.7	7.6
Head	2.5	2.7	2.2	2.6
Abdominal fat	0.7	1.0	0.7	0.9
Giblet	7.3	5.8	6.6	5.7
Bone to meat ratio	2.7	2.7	2.6	2.9
Edible meat	68.2	65.7	65.4	67.3

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