NOTA BREVE

THE FEEDING VALUE OF SUN-DRIED SHRIMP WASTE-MEAL BASED DIETS FOR STARTER AND FINISHER BROILERS

VALOR ALIMENTICIO DE HARINA DE RESIDUOS DE GAMBAS SECADOS AL SOL PARA BROILERS DE INICIACIÓN Y ACABADO

Oduguwa, O.O., A.O. Fanimo, V.O. Olayemi and N. Oteri

College of Animal Science and Livestock Production. University of Agriculture. Abeokuta. Nigeria.

ADDITIONAL KEYWORDS

Nutritive value. Fish meal. Soya bean.

PALABRAS CLAVE ADICIONALES

Valor nutritivo. Harina de pescado. Soja.

SUMMARY

The substitution of fish meal (FM) or toasted soybean (SB) by sun-dried shrimp waste-meal (SWM) in Anak 2000 broiler chicks at the starter and finisher phases was studied. It was concluded that total replacement of FM or toasted SB protein by sun-dried SWM protein in broiler diet is no good for the birds in terms of growth rate and efficiency.

RESUMEN

Se evaluó la sustitución de harina de pescado (FM) o soja tostada (SB) por harina de residuos de gambas desecados al sol (SWM) en pollos Anak 2000 en fase de iniciación y acabado. Se concluye que es inadecuado reemplazar totalmente la proteína de SB o FM con la de SWM.

INTRODUCTION

The potentials of shrimp waste-meal (SWM) as an alternative protein source in monogastric feeding is not in doubt (Talabi, 1988; Fox *et al.*, 1994). However, the extent of its usefulness and levels of utilization by monogastric livestock is yet to be resolved. While some authors reported excellent utilization even at relatively high (14.25 percent) level (Islam *et al.*, 1994 and as total replacement for soyabean meal in broiler rations (Rosenfeld *et al.*,1997). Some others dropped a note of caution in the use of SWM especially as the main animal protein source and when used at high levels (Fanimo *et al.*, 1996; Oso, 2001).

Sun-dried SWM was used to replace either FM or SB (protein for protein) in practical starter and finisher broiler diets. This was done as a follow up to some of these earlier studies and to actually establish that there is a need for appropriate processing for SWM especially where facilities are limited.

MATERIALS AND METHODS

Three experimental diets were formulated **(table I)**. The first diet was

the control diet (Dl), which contained fish meal (FM) and toasted soybean (SB) meal as the main protein sources. In the second diet (D2), shrimp waste meal (SWM) replaced FM in the control diet (protein for protein) while in the third diet (D3), SB in the control diet was replaced with SWM (protein for protein). The 204 day-old broiler chicks were randomly assigned to the three experimental diets i.e (68 birds each). The birds in each treatment were further subdivided into 4 replicates of 17 birds each. The respective groups of the birds were given feed and water *ad libitum*. The experiment lasted 56 days.

Statistical Analysis: The experimental design was randomized complete block. The data were subjected to analysis of variance and significant means were separated using Duncans multiple range test (Gomez and Gomez, 1985).

Table I. *Gross composition of experimental diets.* (Composición de las dietas experimentales).

Ingredients (gkg^{-1})	Starter			Finisher		
	D1 FM/SB	D2 SB/SWM	D3 FM/SWM	D1 FM/SB	D2 SB/SWM	D3 FM/SWM
Maize	500.0	500.0	500.0	500.0	500.0	500.0
Soya bean (Toasted)	240.0	240.0	-	240.0	240.0	-
Fish meal	70.0	-	70.0	40.0	-	40.0
Shrimp waste meal	113.2	200.9	-	64.7	200.9	-
Groundnut cake	80.0	80.0	80.0	80.0	80.0	80.0
Corn bran	10.0	0.00	32.0	10.0	0.00	77.7
Palm kernel meal	50.0	16.8	60.0	80.0	63.3	43.3
Bone meal	24.0	24.0	24.0	24.0	24.0	24.0
Oyster shell	15.0	15.0	15.0	15.0	15.0	15.0
Methionine	2.5	2.5	2.5	2.5	2.5	2.5
Lysine	2.5	2.5	2.5	2.5	2.5	2.5
Vitamin/mineral premix	3.0	3.0	3.0	3.0	3.0	3.0
Salt	3.0	3.0	3.0	3.0	3.0	3.0
Total	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
Determined analysis (gkg^{-1})						
Crude protein	220.0	218.0	220.5	205.5	203.7	207.5
Crude fibre	33.3	38.0	39.0	41.7	44.6	47.0
Ether extract	36.8	44.3	29.5	ND	ND	ND
Calculated analysis						
Metabolizable Energy ($MJkg^{-1}$)	12.87	12.96	12.17	12.79	12.83	12.13
Ca (gkg^{-1})	13.6	17.4	24.3	12.8	14.9	27.3
P (gkg^{-1})	9.4	7.1	9.7	8.6	6.9	9.0

RESULTS AND DISCUSSION

Table II presents the performance characteristics of the experimental birds at the starting, and finishing phases. Birds fed the control diet D1 had the highest ($p<0.05$) live weights and weight gains at the starting and finishing phases. They were followed by those that received diet 2 (D2 in which fish meal protein was replaced with SWM protein. The lowest weight was from the group of birds that received the diet in which the SB protein was substituted with SWM protein (diet 3). The feed consumption values at the starter and finisher phases revealed that birds fed the control diet ate more ($p<0.05$) than those on the other two dietary treatments. The differences in the values between diet 2 and diet 3 were not significant ($p<0.05$).

The use of SWM protein instead of FM protein led to a reduction in the final live weight and daily weight gains of birds in the starting and finishing phase. The availability of these amino acids in SWM is of interest. Gohl (1975) reported that about 10 percent of crude protein in whole shrimp meal originates from chitin while up to 50 percent of the nitrogen in the waste originate from chitin which he described as nearly indigestible.

When the toasted soybean protein was replaced by SWM protein at the starter and finisher phases the live weight and daily weight gains were reduced.

An important factor that is worthy of note is the method of processing used for SWM in this study (sun-

Table II. *Performance characteristics of experimental birds.* (Resultados productivos de las aves experimentales).

Starting phase (0 - 28 days)	D1 FM/SB	D2 SB/SWM	D3 FM/SWM	SEM
Initial live weight (g bird^{-1})	39.60	39.80	39.40	0.94
Final weight (g bird^{-1})	751.36^{a}	501.60^{b}	417.74^{c}	3.26
Weight gain (g bird^{-1} day^{-1})	25.42^{a}	16.49^{b}	13.51^{c}	0.542
Feed intake(g bird^{-1} day^{-1})	46.89^{a}	44.45^{b}	44.44^{b}	0.708
Feed conversion ratio	1.85^{c}	2.69^{b}	3.28^{a}	0.085
Protein efficiency ratio	2.47^{a}	1.82^{b}	1.63^{b}	0.078
Finishing phase (29-56 days)				
Final weight (g bird^{-1})	2258.66^{a}	1621.67^{b}	1192.65^{c}	17.55
Weight gain (g bird^{-1} day^{-1})	53.88^{a}	40.01^{b}	27.12^{c}	1.55
Feed intake (g bird^{-1} day^{-1})	136.68^{a}	128.75^{b}	123.65^{b}	1.50
Feed conversion ratio	2.54^{c}	3.22^{b}	4.56^{a}	0.13
Protein efficiency ratio	2.06^{a}	1.53^{b}	1.23^{b}	0.065

Means on the same row for each phase having different superscripts were significantly different ($p<0.05$).

Table III. *Proximate composition of test ingredients (gkg^{-1}).* (Composición de los ingredientes, gkg^{-1}).

	SWM	Soya bean (Toasted)	Fish meal
Crude protein	402.0	356.0	652.0
Ether extract	48.0	185.0	75.0
Crude fibre	109.0	59.0	85.0
Ash	162.0	43.0	208
Dry matter	919.0	927.0	917.0
True protein	320.6	ND	ND

drying). An interesting result was obtained when the SWM was analyzed for true protein. There was a fairly considerable depletion of the crude protein from 402.0 to 320.6gm/kg true protein **(table III)**.

The reason for this is likely to be activity of bacteria in the product (since sun-drying is a slow process). This gives place to proteolysis with attendant loss of protein quality as observed. The reasoning above needs to be taken into consideration if sun-dried SWM has to be used as it is being practiced in many developing tropical countries. This problem need not arise if the shrimp waste is processed promptly and appropriately preferably using a drier. The mean value of feed conversion ratio at the starting and finishing phases show that the control diet was best utilized while the worst feed conversion ratio were obtained from birds fed the third dietary treatment. The values of protein efficiency ratio followed the same trend as reported above.

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