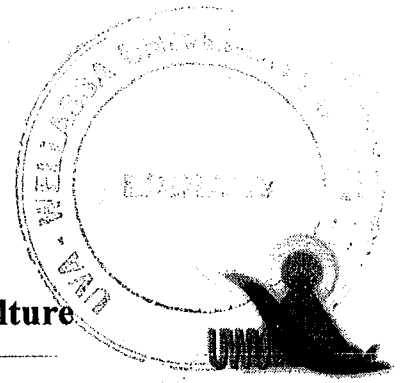


Faculty of Animal Science & Export Agriculture
Uva Wellassa University of Sri Lanka



Uva Wellassa
University

B.ASc. Degree Programme
Year IV Semester I
End Semester Examination – Dec. 2009/Jan. 2010

ANS 462-2 Scientific writing and project cycle management

Instructions

Answer **three (03) questions** including **question No.1** in booklets provided.

No. of questions : Four (04)
No. of pages : Seven (07)
Time : Two hours (2 hrs)
Total marks allocated : 100%

Index No:

1. Read the research paper given in **page 2 onwards** and complete it by writing the abstract of **not more than 250 words** in the appropriate place. (50 marks)
2. What are the **elements** of a proposal? Describe what you should include in each of the elements you have given. (25 marks)
3. What is meant by **SWOT analysis**? Describe how you would use SWOT analysis for planning a successful project giving an example. (25 marks)
4. The list of references given in **page 7 (seven)** is not in alphabetical order. Write the list of references in alphabetical order. If you find any errors in references correct them. (25 marks)

by any one of the wastes alone. Therefore, this study was designed to evaluate the use of fish waste meal in combination with shrimp waste meal as animal protein sources in poultry diets.

MATERIALS AND METHODS

The study was carried out at the University of Calabar Teaching and Research Farm, Faculty of Agriculture, University of Calabar between October and December. Calabar is the administrative and political capital of Cross River State, Nigeria and is located at latitude 04.57°N and longitude 08.20°E.

Day-old chicks of Anak breed, certified healthy by a veterinarian, numbering 204 were used for this study. They were randomly shared into six groups of five treatments and one control of 34 birds each, subdivided into two replicates of 17 birds each. All the experimental groups were balanced on initial weight basis. Allocation to treatment groups was based on the Completely Randomized Design (CRD) format (2×17×6). Treatment groups consisted of replacing fish waste meal with shrimp waste meal at 0, 25, 50, 75 and 100% levels with the conventional fish meal based diet as the control. The study period was broken into two phases viz., Starter (0-28th day) and finisher (29th-56th day) of age of the birds. Iso-caloric (2800 and kcal (ME) kg⁻¹ for the starter and finisher diets, respectively) and iso-nitrogenous (23 and 20% crude protein for the starter and finisher diets, respectively) were formulated for the birds as shown in Table 1. The birds were housed in a deep litter house with space allowance of 8.33 birds/square meter littered with wood shavings and 24 h light photo regiment. They were fed and watered *ad libitum* and put through routine medication and hygiene practices as stipulated by Seifert (1996). The fish waste and shrimp waste were sun-dried on a concrete slab for three days to a constant weight and milled to powder. The test ingredients and compound diets were analyzed for their proximate constituents using the methods of AOAC (1995). The body weights of birds were taken once a week before morning feeding and data obtained for the feed intake, weight gain and feed conversion ratio were subjected to Analysis of Variance (ANOVA) (Steel and Torrie, 1980), while Duncan Multiple Range Test (DMRT) (Duncan, 1955) was used to test the difference between and among treatment means.

RESULTS AND DISCUSSION

The results show that the crude protein content of fish meal, fish waste meal and shrimp waste meal were 63.2, 58.5 and 48.3%, respectively (Table 2). Those of fish meal and fish waste meal were similar to those reported by Fanimo *et al.* (2000) and Dale (2004), respectively. The crude protein value of shrimp waste meal was higher than that published by Oduguwa *et al.* (1998) for sun-dried shrimp waste. The two types of meals are made from different types of fish which vary in their crude protein value. The crude fiber value ranged from 0.82% in fish meal to 13.8% in shrimp waste meal. That of shrimp waste meal was higher than the values reported by Fanimo *et al.* (1996). This could be because chitin was not separated from the fiber component as in the reported literature. The ether extract were 7.38% (fish meal), 10.56% (fish waste meal) and 6.30% (shrimp waste meal). Ether extract values for fish meal and shrimp waste meal were close to those reported in the literature (Fanimo *et al.*, 1996, 2000), however, that of fish waste meal was higher than that reported by Dale (2004) and could be explained by the method of processing used to turn the fish waste to a meal as each method leaves different quantity of residual oil in the meal. The highest ash content (22.71%) was recorded for fish waste meal. This was more than values reported for fish meal (Fanimo *et al.*, 2000). This may be because fish waste has higher bone and scales contents than conventional fish meal.

The 0% replacement level weight gain was the best ($p < 0.05$) in the starter (212.2±19.73 g/bird) and finisher (520.43±28.61 g/bird) phases, though not different ($p < 0.05$) from the weight gain of the control and 25% groups. The 100% replacement level had the least ($p < 0.05$) weight gain

Table 1: Gross composition of experimental diets (g kg⁻¹)

Starter diets						
Replacement levels of shrimp waste meal (%)						
Ingredients	Control	0	25	50	75	100
Maize	509.70	496.60	496.30	484.00	477.70	479.70
Soybean meal	340.30	353.40	353.40	353.40	353.40	353.40
Fish meal	80.00	-	-	-	-	-
Fish waste meal	-	80.00	60.00	40.00	20.00	0.00
Crayfish waste meal	-	0.00	26.30	52.60	78.90	96.90
Wheat offal	30.00	30.00	30.00	30.00	30.00	30.00
Bone meal	20.00	20.00	20.00	20.00	20.00	20.00
Palm oil	10.00	10.00	10.00	10.00	10.00	10.00
Salt	5.00	5.00	5.00	5.00	5.00	5.00
Premix	5.00	5.00	5.00	5.00	5.00	5.00
Determined						
Dry matter	930.10	925.00	928.00	932.00	937.80	940.20
Crude protein	231.10	231.20	233.00	234.10	230.10	229.60
Crude fibre	20.10	28.10	36.00	40.10	48.50	49.20
Ether extract	39.80	50.60	39.90	38.20	37.30	36.00
Metabolizable energy (kcal (ME) kg ⁻¹)	2810.00	2840.00	2800.00	2790.00	2776.00	2752.00
Finisher diets						
Replacement levels of crayfish waste meal (%)						
Ingredients	Control	0	25	50	75	100
Maize	562.60	556.10	554.00	551.90	549.70	547.70
Soybean meal	307.40	313.90	313.90	313.90	313.90	313.90
Fish meal	-	-	-	-	-	40.00
Fish waste meal	-	40.00	30.00	20.00	10.00	0.00
Crayfish waste meal	-	0.00	12.10	24.20	36.40	48.40
Wheat offal	50.00	50.00	50.00	50.00	50.00	50.00
Bone meal	20.00	20.00	20.00	20.00	20.00	20.00
Palm oil	10.00	10.00	10.00	10.00	10.00	10.00
Salt	5.00	5.00	5.00	5.00	5.00	5.00
Premix	5.00	5.00	5.00	5.00	5.00	5.00
Determined						
Dry matter	928.10	920.30	923.309	928.60	931.80	939.50
Crude protein	201.30	202.20	203.00	204.80	201.20	199.60
Crude fibre	28.10	34.50	43.30	45.50	52.00	54.90
Ether extract	38.90	49.80	37.60	36.90	33.50	32.00
Metabolizable energy (kcal (ME) kg ⁻¹)	3047.00	3100.00	2980.00	2950.00	2892.00	2890.00

Table 2: Proximate composition of test ingredients (%)

Ingredients	Fish meal	Fish waste meal	Shrimp waste meal
Dry matter	93.21	90.30	90.58
Crude protein	63.20	58.50	48.30
Crude fibre	0.82	1.00	13.30
Ether extract	7.38	10.56	6.30
Ash	19.80	22.71	17.55
Energy (MJ kg ⁻¹)	12.92	13.71	10.86

of 90.55±3.91 and 304.62±19.20 g/bird for the starter and finisher phases, respectively (Table 3). This was not different (p>0.05) from that of the 75 and 50% replacement levels in both phases. The weight gain figures were generally lower than those reported in various literatures (Ojewole and Longe, 2000; Fanimo *et al.*, 1996; Oduguwa *et al.*, 1998). This could be due to the growth rate of the strain of birds as observed by Oke (1965). Also, the initial slow growth rate as the quantity of shrimp waste meal increases in the diet could be due to the inability of the birds to handle effectively the highly chitinous

Table 3: Performance characteristics of birds fed experimental diets

Parameters	Replacement levels of shrimp waste meal in diets (%)					
	Control	0	25	50	75	100
Starter phase (0-28 days)						
Weight gain (g/bird)	191.43±6.06 ^a	212.21±9.73 ^a	125.52±5.69 ^{ab}	92.68±3.55 ^b	91.55±3.68 ^b	90.55±3.91 ^b
Feed consumption (g/bird)	296.15±36.55	301.74±40.12	308.41±50.23	316.87±43.11	321.62±51.22	328.85±41.21
Feed conversion ratio	1.54±0.11 ^b	1.45±0.12 ^b	2.41±0.19 ^{ab}	3.28±0.23 ^a	3.42±0.41 ^a	3.50±0.22 ^b
Mortality (%)	2.94±0.02	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
Finisher phase (29-56 days)						
Weight gain (g/bird)	462.78±20.11 ^a	520.43±28.61 ^a	394.83±23.99 ^{ac}	355.16±22.11 ^b	341.15±20.98 ^c	304.62±19.20 ^c
Feed consumption (g/bird)	947.49±76.98	987.19±79.06	1010.68±84.60	1015.56±74.16	1041.54±70.07	1048.13±69.79
Feed conversion ratio	2.06±0.19 ^d	1.90±0.13 ^c	2.54±0.31 ^c	2.84±0.28 ^{cc}	3.02±0.33 ^b	3.42±0.25 ^a
Mortality (%)	2.94±0.01	0.00±0.00	8.82±0.01	2.94±0.03	2.94±0.02	0.00±0.00
Combined phase (0-56 days)						
Weight gain (g/bird)	327.39±18.06	366.34±27.19	260.18±17.54	223.92±16.72	216.35±16.58	197.39±15.91
Feed consumption (g/bird)	621.82±71.33	644.47±65.31	647.05±70.00	666.21±68.11	681.58±59.01	688.49±57.08
Feed conversion ratio	1.79±0.12 ^c	1.67±0.21 ^a	2.48±0.19 ^b	3.06±0.23 ^{ab}	3.22±0.29 ^a	3.46±0.31 ^a
Mortality (%)	5.88±0.02	0.00±0.00	8.82±0.01	2.94±0.02	2.94±0.02	0.00±0.00

Mean values within rows not carrying the same super scripts are significantly different (p<0.05)

diets at that tender age as explained by Fanimo *et al.* (1996). The feed intake range from 296.15±36.55 to 328.85±41.21 g/bird, 947.49±76.98 to 1048.13±69.79 g/bird and 621.82±71.33 to 688.49±57.08 g/bird for the starter, finisher and combined phases respectively.

Generally, feed intake values were non significant (p>0.05) and lower than reported values (Fanimo *et al.*, 1996, 1998). The trend reflects the slower rate of gain.

The feed conversion ratios were best (p<0.05) at the 0% replacement level for all the phases i.e., 1.45±0.12, 1.90±0.13 and 1.67±0.12 for the starter, finisher and combined phases respectively. These were not different (p>0.05) from the control in all the phases. The worst values (p<0.05) were 3.50±0.22, 3.42±0.25 and 3.46±0.31 for the starter, finisher and combined phases respectively, recorded for the 100% replacement level. These values were not different (p>0.05) from the values of the 75 and 50% levels in the combined phase only. The trend has confirmed results reported in reviewed literature (Obun and Ayanwale, 2008; Fanimo *et al.*, 1996, 1998). Feed conversion ratio was inversely related to the feed intake. Also, as the level of shrimp waste in the diet increased, feed conversion ratio increased. This could be as a reflection of increasing feed intake and decreasing weight gain.

The terminal live weight range from 1935.23±250.58 to 2163.03±155.57% while the plucked weight, plucked weight percentage, dressed weight and dressing percentage range from 1750.95±243.32 to 1996.28±148.91 g, 90.66±2.99 to 94.20±6.50%, 1327.91±191.32 to 1564±186.63 g and 68.62±4.11 to 72.77±3.22%, respectively (Table 4). These figures are higher than those obtained by Fanimo *et al.* (1996, 1998), except the percent plucked weight and dressing weight. All were not significant. The relative composition of the carcass indicates that the shanks, head, intestine, heart, neck, wings, thighs and back, though non-significant (p>0.05) range from 4.34±0.13 to 4.74±0.20%, 2.28±0.21 to 2.63±0.37%, 6.77±0.11 to 8.39±0.12%, 0.53±0.02 to 0.72±0.01%, 5.35±0.18 to 8.12±0.17%, 14.34±0.62 to 19.64±0.55%, 11.86±0.86 to 14.72±0.66% and 13.57±0.99 to 14.76±0.23%, respectively. The trend of the values is similar to those reviewed in literature (Rosenfeld *et al.*, 1997; Umoh *et al.*, 1980; Oduguwa *et al.*, 1998). The percent liver, gizzard, abdominal fat, drumsticks and breast range from 2.43±0.12 to 3.17±0.15%, 2.47±0.16 to 3.45±0.15%, 1.60±0.27 to 2.42±0.26%, 11.04±0.66 to 12.69±0.59% and 11.03±0.76 to 22.34±0.89%, respectively. These values agree with Fanimo *et al.* (1996). The 100% level had the highest (p<0.05) liver weight which was not different (p>0.05) from that of the 75 and 50% replacement levels while the control had the least (p<0.05) liver weight which was not different (p>0.05) from the 0% replacement level. The same trend was observed for the gizzard weight. This is not unconnected with the role of the liver in

Table 4: Gross carcass evaluation of birds fed experimental diets
Replacement levels of crayfish waste meal in diets (%)

Parameters	Control	0	25	50	75	100
Mean terminal live weight (%)	2162.78±212.38 ^{NS}	2163.03±155.57 ^{NS}	2050.28±179.14 ^{NS}	2020.23±193.52 ^{NS}	2017.70±218.14 ^{NS}	1935.23±250.58 ^{NS}
Plucked weight (g)	1969.48±216.70 ^{NS}	1996.28±148.91 ^{NS}	1913.10±169.14 ^{NS}	1903.08±186.93 ^{NS}	1829.18±181.03 ^{NS}	1750.95±243.32 ^{NS}
Plucked weight (%)	91.99±5.61 ^{NS}	92.29±3.63 ^{NS}	91.57±4.08 ^{NS}	94.70±6.50 ^{NS}	90.66±2.99 ^{NS}	90.48±3.52 ^{NS}
Dressed weight (g)	1564.00±186.63 ^{NS}	1528.81±153.31 ^{NS}	1484.13±150.91 ^{NS}	1490.14±148.05 ^{NS}	1411.43±184.96 ^{NS}	1327.91±191.32 ^{NS}
Dressed (%)	72.35±3.58 ^{NS}	70.68±3.01 ^{NS}	71.00±4.10 ^{NS}	72.77±3.22 ^{NS}	67.95±3.65 ^{NS}	68.82±4.11 ^{NS}
Carcass relative composition (%)						
Shanks	4.41±0.26 ^{NS}	4.74±0.20 ^{NS}	4.48±0.18 ^{NS}	4.39±0.21 ^{NS}	4.51±0.19 ^{NS}	4.34±0.13 ^{NS}
Head	2.30±0.35 ^{NS}	2.56±0.36 ^{NS}	2.41±0.29 ^{NS}	2.39±0.33 ^{NS}	2.28±0.21 ^{NS}	2.63±0.37 ^{NS}
Intestine	7.14±0.18 ^{NS}	8.39±0.12 ^{NS}	7.47±0.22 ^{NS}	7.49±0.13 ^{NS}	5.77±0.11 ^{NS}	7.14±0.23 ^{NS}
Liver	2.43±0.12 ^{NS}	2.46±0.12 ^{NS}	2.79±0.11 ^{NS}	2.85±0.13 ^{NS}	3.17±0.15 ^{NS}	3.45±0.10 ^{NS}
Heart	0.53±0.02 ^{NS}	0.54±0.09 ^{NS}	0.56±0.03 ^{NS}	0.62±0.04 ^{NS}	3.45±0.13 ^{NS}	0.72±0.01 ^{NS}
Gizzard	2.47±0.16 ^{NS}	2.32±0.16 ^{NS}	2.93±0.13 ^{NS}	3.03±0.12 ^{NS}	3.26±0.13 ^{NS}	3.45±0.15 ^{NS}
Abdominal fat	1.60±0.27 ^{NS}	2.76±0.24 ^{NS}	1.75±0.21 ^{NS}	1.94±0.23 ^{NS}	2.18±0.15 ^{NS}	2.47±0.26 ^{NS}
Neck	5.35±0.18 ^{NS}	5.95±0.19 ^{NS}	6.43±0.21 ^{NS}	6.64±0.20 ^{NS}	7.44±0.18 ^{NS}	8.12±0.17 ^{NS}
Wings	14.34±0.62 ^{NS}	19.64±0.55 ^{NS}	16.03±0.46 ^{NS}	15.91±0.47 ^{NS}	15.14±0.38 ^{NS}	17.67±0.51 ^{NS}
Drumsticks	11.04±0.66 ^{NS}	12.69±0.39 ^{NS}	11.09±0.62 ^{NS}	10.80±0.48 ^{NS}	11.21±0.71 ^{NS}	11.51±0.52 ^{NS}
Thighs	14.72±0.66 ^{NS}	12.79±0.60 ^{NS}	13.21±0.72 ^{NS}	12.24±0.50 ^{NS}	13.05±0.33 ^{NS}	11.86±0.86 ^{NS}
Breast	19.80±0.87 ^{NS}	22.34±0.80 ^{NS}	15.77±0.83 ^{NS}	14.19±0.45 ^{NS}	11.03±0.75 ^{NS}	12.26±0.91 ^{NS}
Back	14.76±0.23 ^{NS}	13.57±0.99 ^{NS}	14.15±0.87 ^{NS}	13.62±1.01 ^{NS}	13.59±0.76 ^{NS}	13.82±0.89 ^{NS}

Mean values within rows not carrying the same superscripts are significantly different ($p < 0.05$); NS = Non significant

nutrient (especially chitin) metabolism and very high muscular activity of the gizzard as a result of the digestion of highly chitinous shrimp waste. The 100% replacement level had the highest ($p < 0.05$) abdominal fat which was not different from that of 75 and 0% replacement levels whereas the least ($p < 0.05$) was recorded for the control which was not different from the 25% replacement level. The high abdominal fat value in the 0, 75 and 100% levels relative to others when crude protein inclusion in diets was not up to 10%, which makes protein still necessary for growth, cannot be readily explained. The lower the level of shrimp waste meal in the diet, the better the percentage weight of drumsticks with the least ($p < 0.05$) value recorded for the 50% level. This was not different ($p > 0.05$) from the 25, 75 and 100% and the control. The percentage breast was highest ($p < 0.05$) in the 0% level though not different ($p > 0.05$) from the control while the least ($p < 0.05$) percent drumsticks were observed in the 75% level. Oluyemi and Roberts (2000) reported that the breast and drumsticks were the most economically important portions of the carcass. In this study, their best ($p < 0.05$) values were obtained in diets not containing shrimp waste meal. This observation agrees with Parr *et al.* (1998). It, however, indicates that fish waste meal and fish meal were of a higher biological value than shrimp waste meal.

Mortality rate of 2.94% was observed for the control in the starter phase, 50%, 75% and control groups in the finisher phase and 50% as well as 75% in the combined phase while the 25% group recorded 8.82% mortality at the finisher and combined phases. The deaths had no defined pattern and could be attributed to Newcastle disease attack in the 4th week as indicated by post-mortem findings and not due to treatment administration. The mortality rates were, however, within the acceptable limits.

CONCLUSION

The aim of this study was to evaluate the usefulness of combining fish waste meal and shrimp waste meal as animal protein sources in chicken feed. Findings suggest that it is possible and feasible. If carried out, the use of these by-products and wastes of fish and shrimp processing would help to reduce the percentage of fish and shrimp wasted during processing, prevent environmental pollution, provide another alternative to fish meal and decrease the cost of chicken meat on the dining table of the consumer.

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