

PERFORMANCE OF BROILER CHICKS FED GRADED LEVELS OF MAGGOT MEAL

G.O ADEYEMO, A.B OMOJOLA AND A. FOLORUNSO

Department Of Animal Science
University Of Ibadan
Ibadan/Nigeria

ABSTRACT

Eighty day-old chicks were used for a six week feeding trial. The birds were randomly allotted to five different dietary treatments that were replicated thrice. Maggot meal replaced a 4% fish meal diet in the following order: 0.25, 50, 75 and 100% maggot meal inclusions replacing fish meal.

Changes in body weight were not significant in the five different diets fed. Feed conversion ratio was significantly better ($p < 0.05$) than the diet with 100% replacement of fish meal. Dry matter digestibility showed that the diet containing 25% inclusion level of appraise the nutritional status of the birds include hemoglobin (Hb %), red blood cells (RBC), white blood cells (WBC), lymphocytes, heterophils, monocytes and eosinophils. All blood parameters showed no significant difference between the diets. The cost per kg of diets was significantly lower ($P < 0.05$) as the level of maggot meal inclusion increased.

Key words: Broiler chicks; Performance; Maggot meal.

Short title: Value of maggot meal in broiler rations.

INTRODUCTION

There have been various attempts to work out the least cost ration for broiler production without compromising the feed quality (Tewe, 1986). It is established that feed cost is the single most important factor determining the profitability of a poultry enterprise (Udonwa, 1995) and that it represents about 70% of the total cost of production (Ologhobo, 1990).

Inadequate feed ingredients that are produced and which are also competed for by man have worsened the situation requiring the search for alternative feed resources not consumed directly by man. Fish meal (FM), a major animal protein source in poultry production, is imported into the country at great cost. In 1995, the cost was over N125,000 per tonne. An untapped alternative animal protein source uncompleted for by man that can utilized in poultry production is the maggot, the larvae of housefly, which can be available for maggot meal (MM) production and substituted for the expensive fish meal in the diet of the chicken. The amino acid profile of maggots as reported by Teotia and Miller (1973) compares favourably well with that of fish meal.

MATERIALS AND METHODS

Site of experiment

The study was conducted for a period of six weeks at the Teaching and Research farm of the University of Ibadan.

Management of chicks

Eighty day-old Anak 2000 chicks were randomly allotted to five different diets, each replicated thrice. The birds were raised on deep litter for six weeks with feed and water supplied *ad libitum* daily.

Processing of maggot meal

Maggots were harvested from exposed poultry droppings of a period of 3-7 days. The poultry waste containing the maggots was put in a large container with warm water poured on it and stirred to enable the droppings sink and the maggots float on the surface ready for harvest. The sieved maggots were sundried or oven-dried depending on the water condition at the time of harvest. The dried maggots were then milled and incorporated in the right proportions into the diets.

Feed composition

The feed was compounded to meet the protein and energy requirements of the starting phase of the birds as recommended by NRC (1984). MM replaced FM in the diet in the following order 0, 25, 50, 75 and 100 % in the five experimental diets (Table 1).

Data collection

Leftover feeds were collected and weighed daily and subtracted from the amount fed to determine daily feed intake. The chicks were weighed every week. Weekly records of average feed consumption and weight of birds were obtained per bird for each replicate.

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At the sixth week, metabolic studies were carried out on two randomly selected chicks from each treatment for a period of five days.

Chemical and statistical analysis

Proximate analyses of the feeds and droppings were carried out in accordance with the method described by AOAC (1998). Data were subjected to analysis of variance (Steel and Torrie, 1960) and significant means were separated by Duncan's multiple range test (Duncan, 1995).

Table 1. Composition (%) of experimental diets Fed to Broilers

Ingredients	Replacement levels of fish meal (%)				
	0%	25%	50%	75%	100%
Maize	56.0	56.0	56.0	56.0	56.0
Groundnut Cake	20.0	20.0	20.0	20.0	20.0
Soybean meal	10.0	10.0	10.0	10.0	10.0
Fish meal	4.0	3.0	2.0	1.0	0.0
Maggot meal	0.0	1.4	2.8	4.2	5.5
Wheat bran	5.0	4.6	4.2	3.9	3.5
Bone meal	3.0	3.0	3.0	3.0	3.0
Oyster shell	1.5	1.5	1.5	1.5	1.5
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis					
Dry Matter	92.48	92.79	92.27	92.78	92.54
Crude Protein	22.25	22.51	22.77	23.03	23.30
Ether extract	4.15	4.39	4.62	4.85	5.09
Crude fibre	3.24	3.24	3.21	3.18	3.16
Ash	3.60	3.51	3.62	3.86	3.78
*Nitrogen free extract	66.76	66.35	65.78	65.08	64.67
*Gross energy (kcal/g)	2.93	2.93	2.94	2.94	2.94

Table 2. Performance characteristics of broiler chickens fed on diets for 6 weeks

Characteristics	Replacement levels of fish meal (%)				
	0	25	50	75	100
Initial liveweight(g/bird)	44.65	44.76	44.67	43.82	45.20
Final liveweight (g/bird)	1688.32	1593.11	1627.93	1520.1	1661.84
Feed consumption(g/bird/d)	67.79	63.86	68.12	65.44	62.54
Weight gain/bird/day (g)	39.14	36.87	37.70	35.15	38.50
Feed: Gain ratio	2.63	2.75	2.95	3.07	2.56
Mortality	0.00	0.00	0.00	0.00	0.00

abc: Means with different superscripts within a row are significantly different (P<0.05)

RESULTS

The performance characteristics of the birds are shown in Table 2. the weight gains for the five different treatments were not significantly different. Feed consumption, though slightly varied without

a particularly trend, did not differ significantly for the five treatments. Likewise the final live weights of the birds in the different treatment did not show a particular pattern based on the diet composition. But the feed: gain ratio was significantly better ($P < 0.05$) for the treatment that contained no FM but 100% MM replacement for FM.

Nutrient digestibility (Table 3) and hematological indices (Table 4) did not show any significant difference among the treatment groups fed different replacement levels of MM for FM.

Table 3. Nutrient digestibility and retention of six weeks old broilers fed maggot meal (FM).

	Replacement levels of fish meal (%)				
Parameters(%)	0	25	50	75	100
Crude Protein Retention	78.73	73.98	75.42	70.62	76.93
Lipid retention	90.45	89.43	88.13	85.75	86.25
Dry matter digestibility	80.53	80.61	78.46	71.09	73.90

Table 4. Haematological indices of broiler chickens fed maggot meal (MM) as replacement for fish meal (FM)

	Replacement levels of fish meals				
Parameters	0	25	50	75	100
PCV(%)	30.00	30.51	28.54	28.02	31.03
Hb (g/100ml)	9.95	10.00	9.65	9.45	10.50
RBC' (x 10 ⁶ /mm ³)	3.70	4.02	2.95	4.16	3.17
WBC (x 10 ³ /mm ³)	25.08	20.33	20.25	21.45	20.45
Lymphocyte (%)	64.51	64.04	57.53	60.54	65.53
Monocyte (%)	6.01	5.51	6.50	5.51	5.52
Eosinophil (%)	1.01	1.00	1.51	0.51	2.00

Value of maggot meal in broiler rations

DISCUSSION

The results from this experiment have clearly indicated that maggot meal can effectively replace fish meal in the ration of broiler starters. The live weight at the end of the six weeks experiment appeared better in favour of the 100% FM and 0% MM diet. This agrees with the findings of Teotia and Miller (1974) and Akpodiete (1992) that though MM ranks next to FM in biological value it could be used to replace fish meal in broiler diets at graded levels since it is cheaper and needs not be imported as FM and can be readily produced. However, these results contrast those of Akpodiete (1992) in that the weight gain/bird/day for all the treatments for the six weeks were not significantly different but agree with the findings of Ologhobo (1990) and Onifade (1993).

The feed gain ratio of this experiment showed a significant difference ($P < 0.05$) in favour of 100% MM diet. This result also contrast earlier findings by Akpodiete (1992) and Atteh and Ologbenla (1993) who reported a significantly poorer feed gain ratio as the level of MM replacement for FM increased and suggested a 57% replacement of MM and FM only. In Table 4 the similarities observed in the haematological parameters and 0% mortality in Table 2 are indications of the good nutritional status of the birds fed both fish and maggot meal diets. This is in line with the work of Babatunde, Faajimi and Oyejide (1992). Feed intake of the birds fed the different diets showed no significant difference in feed intake when MM replaced FM in poultry diets. Based on the results obtained from this study, maggot meal could serve as a good replacement for fish meal in broiler starter diet not only because of the reduced cost which it ensures and lack of health hazard to humans but also because man and his livestock.

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