Effect of Different Levels and Sources of Fish Meal on the Performance of Broiler Chicks

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Abstract— The present study was undertaken to investigate the effect of different levels and sources of fish meal. 180 day old chicks were randomly divided into 18 experimental groups of 10 chicks each. The chicks of two commercially available fish meals with three levels of Gwadar and Sindh meals were compared in this study. Results revealed significant differences between the two sources and non-significant difference among the various levels of fish meals for weight gain which showed that Gwadar fish meal was better as compared to Sindh fish meal and apparently 8% level was better than 11 and 14% levels of fish meals. Feed consumption of chicks fed on ration containing two sources of fish meal was non-significant. On the other hand there was significant differences in feed consumption of chicks fed on ration containing various levels of fish meals. Apparently better feed consumption was observed in Gwadar fish meal as compared to Sindh fish meal. Statistically non-significant difference was noticed in the feed efficiency value for both different sources and various levels of fish meals. Apparently Gwadar fish meal had better feed efficiency than Sindh fish meal while in case of levels 8% had better feed efficiency as compared to 14 and 11% respectively.

Keywords: Fish Meal, Broiler Chicks, Feed Consumption

1 INTRODUCTION

A high quality fish meal is an excellent source of protein (Hinners and Scott, 1960). Fish meal protein has a high contents of lysine, methionine and tryptophan and is a valuable supplement to cereal based diets, particularly those containing higher levels of maize. Properly rendered and hygienically prepared fish meal contain a high proportion of calcium and phosphorous and also trace minerals like magnese, iron and iodine. Moreover, fish meals are a good sources of B-complex particularly choline, cyanocobalamine and riboflavin. In commercial broiler rations unspecified fish meals are being used indiscriminately with respect to their levels in Pakistan.

Keeping in view, the present study was designed to determine the effect of different levels and sources of fish meals on the performance of broiler chicks.

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2 MATERIALS AND METHODS

2.1 The present study was conducted at Animal Nutrition Section, University of Veterinary & Animal Sciences, Lahore. Two commercially available fish meals viz., Gwadar fish meal

and Sindh fish meal were used as animal protein sources in experimental rations. Three levels of each fish meals i.e. 8, 11 and 14% were used.

The composition of starter and finisher rations was given in Table-1 and 2 respectively. Rations A, B and C contained 8, 11 and 14% level of Gwadar fish meal, while rations D, E and F contained the same level of Sindh fish meal respectively.

One hundred and eighty, day old broiler chicks were used in the experiment. The study was designed according to completely randomized design with 2x3 factorial arrangements. The chicks were randomly divided into 18 experimental groups of 10 chick each. The chicks were randomly assigned to 6 experimental rations in such a way that there were three groups of 10 birds each under each ration. The following parameters were recorded during the experiment:

1. Weekly feed consumption.
2. Weekly body weight.
3. Feed efficiency.
4. Pressing percentage.
5. Mortality.
6. Economics.

At the end of experiment three chicks from each group were picked up randomly and slaughtered for dressing percentage. The data thus collected was subjected to statistical analysis of variance technique and comparison of mean difference as described by Steel and Torrie (1981).

Table-1

COMPOSITION OF BROILER STARTER RATIONS (0 TO 4TH WEEKS)

Ingredients	A	B	C	D	E	F
Corn (Yellow)	58	58	58	58	58	58
Rice Polishing	6	6	7	6	6	7
Guar meal	6	7	6	6	7	6
Corn gluten meal (60%)	5	4	4	5	4	4
Soyabean meal	14.5	11.5	8.18	14.5	11.5	8.18
Fish meal (Gwadar)	8	11	14	-	-	-
Fish meal (Sindh)	-	-	-	8	11	14
Dicalcium Phosphate	2	2	2	2	2	2
Vitamin mineral premix	0.5	0.5	0.5	0.5	0.5	0.5
TOTAL	100	100	100	100	100	100
Crude protein(%)	22.60	22.82	23.08	22.20	22.72	22.95
Metabolizable energy (k.cal/kg)	3002	3025	3050	3002	3025	3050
Protein calorie ratio	1:130.43	1:130.43	1:130.43	1:130.43	1:130.43	1:130.43
Crude fiber(%)	3.95	3.8	3.6	3.95	3.8	3.6
Calcium(%)	1.06	1.2	1.05	1.06	1.2	1.05
Available Phosphorus(%)	0.44	0.49	0.54	0.44	0.49	0.54
Available Lysine	0.97	0.99	1.01	0.97	0.99	1.01
Methionine	0.42	0.43	0.45	0.42	0.43	0.45
Linoleic acid	1.39	1.38	1.39	1.39	1.38	1.39
Common Salt (%)	0.36	0.46	0.56	0.36	0.46	0.56

Table-2

COMPOSITION OF BROILER FINISHER RATIONS (5TH TO 6TH WEEKS)

Ingredients	A	B	C	D	E	F
Corn (Yellow)	65	65.32	65.5	65	65.32	65.5
Rice Polishing	4	4	5	4	4	5
Guar meal (Processed)	6	7	6	6	7	6
Corn gluten meal (60%)	5	4	4	4	4	4
Soyabean meal	6.44	3.18	0.00	6.44	3.18	0.66
Soya oil	0.06	0.00	0.00	0.06	0.00	0.00
Fish meal (Gwadar)	8	11	14	-	-	-
Fish meal (Sindh)	-	-	-	8	11	14
Molasses (cane)	3	3	3	3	3	3
Dicalcium Phosphate	2	2	2	2	2	2
Vitamin mineral pre-mix	0.5	0.5	0.5	0.5	0.5	0.5
TOTAL	100	100	100	100	100	100
Crude protein(%)	19.11	19.25	19.92	19.02	19.17	19.38
Metabolizable energy (k.cal/kg)	3100	3121	3145	3100	3121	3145
Protein calorie ratio	1:158	1:158	1:158	1:158	1:158	1:158
Crude fiber(%)	3.4	3.32	3.1	3.4	3.32	3.1
Calcium(%)	1.04	1.09	1.03	1.04	1.09	1.03
Available Phospho-rus(%)	0.42	0.47	0.52	0.42	0.47	0.52
Available Lysine	0.75	0.77	0.79	0.75	0.77	0.79
Methionine	0.37	0.39	0.41	0.37	0.39	0.41
Linoleic acid	1.46	1.45	1.44	1.46	1.45	1.44
Common Salt (%)	0.36	0.46	0.56	0.43	0.56	0.69

3 RESULTS AND DISCUSSION

Weight Gain (0-42 days)

The average weight gain of chicks fed on rations A, B and C (containing Gwadar fish meal) were 1879.52, 1770.65 and 1712.82 gms respectively. The maximum weight (1879.52 gms) was observed in ration A (8% level) while average weight gain on ration D, E and F (containing Sindh fish meal) were 1697.78, 1644.5 and 1677.9 gms respectively. The maximum weight gain (1697.78 gms) was observed in ration D (8% level). The analysis of variance revealed significant difference in weight gain and non significant difference among the different levels of fish meal.The results of present study were partly in line with earlier findings of Waldroup et al. (1965) and Flores et al. (1989), Heshmatollah Khosravinia et al (2014)who reported non-significant differences among the various levels of fish meals. The results indicated that chicks fed on rations containing Gwadar fish meal was better as compared to chicks fed on Sindh fish meal.

Feed Consumption

Two average feed consumption of chicks fed on rations A, B and C were 3506.1, 3540.16 and 3373.49 gms respectively. The maximum feed consumption (3560.1 gms) was observed in ration A (8% level). The average feed consumption of chick fed on ration D, E and F were 3535.50, 3374.3 and 3462.73 gms respectively. The maximum feed consumption (3535.50 gms) was observed in ration D (8% level).The analysis of variance of data revealed non significant difference in feed consumption of chick fed on different sources, while significant differences were observed among the feed consumption of chicks fed on rations contained different level of fish meal.Results were in agreement with earlier findings of Craplet et al. (1961) , A.T. Ijaiya and E.O. Eko (2009) & D.M. Babale (2012) et al who also reported non-significant differences in feed consumption. The present study results showed that the levels of fish meals of both sources had better feed utilization at 8% level.

Feed Efficiency

The average feed efficiency value of chicks fed on rations A, B and C were 1.84, 1.94 and 1.91 respectively. The better feed efficiency (1.84) was observed in ration A, while feed efficiency value of rations D, E and F were 2.02, 1.99 and 2.00 respectively. The better feed efficiency (1.99) was observed in ration E. The analysis of variance of data for feed efficiency on different sources and level of fish meal shows non significant difference.The results of study were in agreement with findings of Boogaerdt and Mass (1962) , Parigi (1966) & Ahmad Karimi(2006) who reported non significant difference in feed consumption. Apparently better feed efficiency was observed in Gwadar fish meal as compared to Sindh fish meal.

Dressing Percentage

The average dressing percentage of chicks fed on rations A, B and C (containing Gwadar fish meal) were 56.167, 54.643 and 54.640% respectively. The maximum dressing percentage (56.167) was observed in ration A (8% level). The average dressing percentage of chick fed on rations D, E and F (containing Sindh fish meal) were 57.407, 56.080 and 54.950% respectively. The maximum dressing percentage (57.407%) was observed in ration D (8% level).The analysis of variance of data revealed non-significant difference in dressing percentage between two sources as well as various levels of fish meals.The results of present study were in agreement with earlier findings of Inam-ul-Haq et al. (1988) & G.S. Ojewola et al(2006) who reported non-significant difference between the treatments.

Economics of Experimental Rations

At the end of experiment average total feed consumed per bird on ration A, B, C, D, E and F was 3560.16, 3540.16, 3373.49, 3535.56, 3374.3 and 3462.73 gms respectively and the cost of feed upto 42 days was Rs.22.44, 23.78, 21.44, 22.39, 21.17 and 22.48 respectively. At the end of experiment total live weight per bird fed on rations A, B, C, D, E and F was 1879.52,

1770.65, 1712.82, 1697.78, 1644.5 and 1677.9 gms respectively.The study indicated that ration containing Gwadar fish meal was cheaper and economical.

4 Conclusion

Effect of different levels & sources showed that Gawadar fish meal is a better source in terms of nutrition as compare to Sind fish meal even though results were non-signeficant.

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6 REFERENCES

[1] Ahmad Karimi, (2006). The Effects of Varying Fishmeal Inclusion Levels (%) on Performance of Broiler Chicks. International Journal of Poultry Science 5 (3): 255-258.

[2] A.T. Ijaiya and E.O. Eko, (2009). Effect of Replacing Dietary Fish Meal with Silkworm (Anaphe infracta) Caterpillar Meal on Growth, Digestibility and Economics of Production of Starter Broiler Chickens. Pakistan Journal of Nutrition 8 (6): 845-849.

[3] Boogaerdt, J. and H.J.L. Maas (1962). Substitution of herring meal by Peruvian fish meal in broilers rations. Tijdschr. Diiergeneesk., 87, 113-116. (Nutr. Abst Rev., 32(3): 4744, 1962).

[4] Craplet, C., W. Jousselin and J. Ladrat (1961). Comparison of nutritive value of two types of fish meal for table poultry. C.R. Acad. Agri., 47: 641-648 (Nutr. Abst Rev. 32(3): 4741, 1962).

[5] Flores, C.E. and G.E. Avila (1989). Nutritive value of anchovy (Engraulix mordax) in diets for broiler chickens. Veterinaria-Mexico, 20(2): 179-186.

[6] G.S. Ojewola and S.I. Annah, (2006), Nutritive and Economic Value of Danish Fish Meal, Crayfish Dust Meal and Shrimp Waste Meal Inclusion in Broiler Diets. International Journal of Poultry Science 5 (4): 390-394.

[7] Heshmatollah Khosravinia et al (2014). Effect of substituting fish meal with poultry by-products meal in broiler diet on nitrogen excretion and litter Characteristics. Journal of Cell and Animal Biology, Vol. 8(2), pp. 23-27.

[8] Inam-ul-Haq, M.Z. Alam, A.R. Barque, T.H. Shah and Atiq-ur-Rehman (1988). Biological evaluation of soybean oil meal as a substitute for fish meal in broiler rations. Pak. Vet. J., 8(1):1-4.

[9] Parigi, B.R. (1966). Diets without fish meal for chickens. Riv. Zootec., 39: 510-518. (Nutr. Abst. Rev. 37(3): 5545, 1967).

[10] Steel, R.G.D. and J.H. Torrie (1981). Principles and Procedure of Statistics. International Students Edition. McGraw Hill, International Book Company, Singapore.

[11] Waldroup, P.W., P. Van Walleghem, J.L. Fry, C. Chicco and R.H. Harms (1965). Fish meal studies. 1) Effects of levels and sources on broiler growth rate and feed efficiency. Poult. Sci., 44: 1012-1016.