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STATUS OF FISH MEAL AVAILABLE FOR POULTRY RATIONS IN PAKISTAN

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ABSTRACT

A total of 184 samples of fish meal were assayed for proximate composition, pepsin digestibility, salt, acid insoluble ash and chromium. The samples were categorized into four groups A, B, C and D on the basis of their crude protein contents which ranged from 55-60, 50-55, 45-50 and 40-45% for four groups, respectively. Group A contained 12.50% samples, 46.20% samples were in group B, 29.89% in group C and 11.41% were in group D. The results showed a variation in nutrient composition among samples. An inverse relationship was observed between fat, ash, pepsin digestibility, chromium and crude protein contents of fish meal. All the samples were adulterated with slightly higher levels of sand and salt than recommended.

Key words: Fish meal, poultry rations, nutrient composition.

INTRODUCTION

Fish meal is an excellent source of protein. It is considered to be one of the best ingredients for broilers and layers rations, as it enhances the feed consumption and feed efficiency (Solangi *et al.,* 2002) and improves the egg production and feed conversion efficiency (Naulia and Singh, 1998). Moreover, it contains all the essential amino acids, especially lysine and methionine, in adequate quantities required for poultry (Sing and Panda, 1990).

The nutrient composition of fish meal can vary depending on the type and species of fish, the freshness of the fish before processing and the processing methods. According to NRC (1994), protein content of fish meal varies from 60.00 to 72.30% due to type of fish and method of preparation. In Asian countries, fish meal is prepared from mixture of trash fish and byproducts of the canning industry, resulting in a product of very variable composition (Limcangco-Lopez, 1985). In Pakistan, annually 40,000- 45,000 tons of fish meal is produced from different types of fish such as *Cirrhina mrigala, Trichogaster chuna, Johnius otolithus* and *Boricilius barila* (Nadeem, 2003). Indigenous fish meal varies in nutrient composition, with crude protein ranging from 32.00 to 58.80% (Choo and Sadiq, 1982).

The quality of fish meal is often questioned due to adulteration with cheap diluents such as sand, stone, soil, fine sawdust, horns and hooves, blood meal, animal oil, prawn, poultry byproducts and wastes of tannery (Nadeem, 2003; Hossain *et al.,* 2003). Thus, a study based on chemical analysis of fish meal samples has been carried out to present complete nutrient profile and quality of fish meal available in local market for poultry rations.

MATERIALS AND METHODS

A total of 184 samples of fish meal were assayed for moisture, crude protein (CP), ether extract (EE), crude fiber (CF) and total ash (TA) according to methods of Association of Official Analytical Chemists (AOAC, 2000). To assess the quality of these samples, digestible crude protein was determined by pepsin digestibility test (AOAC, 2000), salt was estimated by the procedure described by Sexona (1997), acid insoluble ash was determined by European Community method (Anonymous, 1971) and qualitative chromium test was carried out to see the presence of leather meal (Khajarern *et al.,* 1987). The data were categorized into four groups on the basis of percentage of crude protein contents of samples (Table 1). Pearson's correlation test was used to find out the positive or negative correlation among different parameters (Steel and Torrie, 1981).

Table 1: Percent occurrence of different groups of fish meal

Groups	Crude Protein (%)	%age occurrence
A	55 – 60	12.50
B	50 – 55	46.20
C	45 – 50	29.89
D	<40 – 45	11.41

RESULTS AND DISCUSSION

The results indicated that 46.20% samples fell in the group B, followed by C, A and D groups having 29.89, 12.50 and 11.41% of samples, respectively (Table 1). The results for the proximate composition of fish meal samples are summarized in Table 2. There was an inverse correlation between fat, ash and crude protein contents of fish meal i.e. low protein fish meal contained high level of fat and ash and vice versa. These results are in accordance with those of Choo and Sadiq (1982). Composition of fish meal can vary depending upon species of the fish and the method used to prepare the meal (Nadeem, 2003).

Pepsin digestibility of protein decreased with the increase in crude protein contents of fish meal which was lowest in group A (Table 3). Chromium test

Table 2: Proximate composition (mean ± SD) of different groups of fish meal

Groups	Moisture (%)	CP (%)	EE (%)	CF (%)	Total ash (%)
A	9.18 ± 1.27	56.93 ± 1.18	11.00 ± 1.73	1.12 ± 1.25	21.03 ± 2.85
B	8.00 ± 1.35	52.32 ± 1.32	11.77 ± 2.79	2.57 ± 1.67	21.52 ± 3.00
C	8.70 ± 2.56	47.80 ± 1.38	13.13 ± 4.37	3.61 ± 1.52	22.56 ± 3.99
D	8.58 ± 0.73	42.29 ± 2.56	15.83 ± 5.10	2.13 ± 1.93	25.71 ± 3.79

showed that 100% samples were positive in group A, while in group D all samples were chromium negative. So, a negative correlation was found between chromium contents and pepsin digestibility as well as crude protein contents. The comparison on the basis of groups, could not be made as data was scanty, however, the present results are consistent with the findings of Rehman *et al.* (1996) and Nadeem (2003), who reported the occurrence of leather meal in fish meal samples. The poor quality protein meal increased the level of crude protein in fish meal and decreased the digestibility. There was no variation in salt contents of different categories but all of them had higher than 2% salt recommended for fish meal (Malik and Chugtai, 1979). The samples had higher levels of sand/silica than recommended value of less than 2% (Malik and Chugtai, 1979). Malik and Akhtar (1972) reported that high ash was probably due to the contamination of silica or dust in the product.

In Pakistan, fish meal is being used as a major animal protein source and on the basis of the present study it is suggested that full screening of fish meal samples will help in creating a high standard of animal feeds/rations.

Table 3: Pepsin digestibility, salt, acid insoluble ash (mean ± SD) and chromium contents of fish meal

Groups	Pepsin digestibility (%)	Salt (%)	Acid insoluble ash (%)	Chromium +ive samples (%)
A	81.23 ± 7.37	3.13 ± 0.90	3.59 ± 1.80	100.00
B	82.53 ± 6.45	3.16 ± 0.90	3.26 ± 1.58	52.17
C	82.95 ± 13.42	3.18 ± 0.97	3.43 ± 1.72	50.00
D	86.31 ± 6.36	2.95 ± 1.48	5.75 ± 1.50	00.00

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REFERENCES

AOAC, 2000. Official Methods of Analysis. Association of Official Analytical Chemists. 17th Ed., Gaithersburg, Maryland, USA

Choo B. S. and M. M. Sadiq, 1982. Indigenous Feed Stuffs and Poultry Feeds, Poultry Production and Research, Sind, Karachi.

Anonymous, 1971. First commission directive 71/250/EEC of 15 June 1971, Establishing community methods of analysis for control of feeding stuffs. (E. C. O. J. No. L 155 of 12 July 1971, p:13).

Hossain, M. H., M. U. Ahmad and M. A. R. Howlider, 2003. Replacement of fish meal by broiler offal in broiler diet. Intern. J. Poultry Sci., 2(2): 159-163

Khajarern, J., D. Sinchermsiri and A. Hanbunchong, 1987. Manual of Feed Microscopy and Quality Control. Dhornhvaj Co., Ltd. Bangkok, Thailand.

Limcangco-Lopez, P. D., 1985. Legislation and quality control of feeds: The experience of Asian countries. In: Proceedings of the FAO Expert Consultation on the Substitution of Imported Concentrate Feeds in Animal Production Systems in Developing Countries, FAO Regional Office for Asia and the Pacific, Bangkok, Thailand.

Malik, M. Y. and S. M. Akhtar, 1972. Fish meal as a source of animal protein in the rations for broilers. Pakistan J. Sci. Res., 24: 239-243

Malik, M. Y. and M. I. D. Chughtai, 1979. Chemical composition and nutritive value of indigenous feedstuffs. Pakistan Assoc. Adv. Sci., Lahore, Pakistan.

Nadeem, M. A., 2003. Production and quality of fish meal in Pakistan. In: Intern. Anim. Nutr. Conf., Univ. Vet. Anim. Sci., Lahore, Pakistan.

Naulia, U. and K. S. Singh, 1998. Effect of dietary fishmeal and phosphorus levels on the performance, egg quality and mineral balances in layers. Indian J. Poult. Sci., 33(2): 153-157

NRC, 1994. Nutrient Requirement of Poultry. 9th Ed., National Academy Press, Washington, DC, USA.

Rehman A., T. M. Bajwa and J. A. Choudhry, 1996. Feed microscopy of locally available poultry feed ingredients. Annual Progress Report, Poultry Res. Inst., Rawalpindi, Pakistan.

Sexona, H. C., 1997. Poultry Feed Technology. International Book Distributing Company, New Dehli, India. pp: 65-66.

Solangi, A. A., A. Memon, T. A. Qureshi, H. H. Leghari, G. M. Baloch and M. P. Wagan, 2002. Replacement of fish meal by soybean meal in broiler ration. J. Anim. Vet. Adv., 1(1): 28-30

Singh, K. S. and B. Panda, 1990. Poultry Nutrition. Ist Ed., Kalyani Publishers, New Delhi, India,

Steel, R. G. D. and J. H. Torrie, 1981. Principles and Procedures of Statistics. 2nd Ed., McGraw Hill Book Co. Inc. New York, USA.