

Study of scavengeable duck feeds of the south delta of Bangladesh

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The chemical analysis of some scavengeable duck feed resources was performed from two coastal districts (Noakhali and Lakshmipur) of Bangladesh. The study was undertaken with an objective to prepare a database of such feeds of the south delta of the country including their chemical composition. Oyster, crab, snail, fish head, duckweed, shawla, and azolla are available feed resources usually scavenged by the duck. Representative samples of feed ingredients were collected, recorded, sun-dried, ground and stored in airtight polythene bags and subsequently analyzed by following standard methods. Proximate components, calcium (Ca) and total phosphorus (TP) were determined from such analysis. Amino acid profile of some selected ingredients was also determined. Dry matter content of duckweed (92.22%), crude protein of snail meat (42.83%), Ca of crab meat (19.50%) and Ca and TP (5.37% and 2.59% respectively) of fish head were found to be the highest among the feed ingredients identified for chemical analysis. scavengeable feeds. Azolla, an aquatic weed were found to be available abundantly for scavenging. It contained had 18.4% CP and 0.62 and 0.78%, Ca and TP respectively of. Duckweeds collected from the region were found to contain 2.12% lysine. It was concluded that some of the duck feeds of the south delta areas are nutritionally potential and may be explored further for feeding indigenous ducks reared under semi-intensive or intensive system duck production system. However, they should be properly collected, processed and stored for feed formulations keeping deterioration in quality to a minimum extent.

Keywords: chemical composition; duck feed resources; proximate components; indigenous ducks

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I. Introduction

Family poultry production in Bangladesh mainly depends on scavengable feed resource base (SFRB). In delta areas, ducks are reared under scavenging system utilizing SFRB with some supplementary feeding of scavengable and non-scavengable feed ingredients available in the region. This may be because of the availability of natural feed resources, known as SFRB, in large areas of low-lying water reservoirs, marshy land and water logged areas. Natural feed resources like aquatic weeds, various types of insects, tadpoles, earthworms, oysters, snails and small crabs, frogs, a variety of small fishes, green forages and different fallen grains are the major scavengable feeds for ducks in the region. Information with regard to their chemical composition with a view to assessing nutritional values is scanty. The study chemical analysis reported here was an attempt to collect and process a number of scavengable feed ingredients for their ultimate chemical analyses in the laboratory. The objective of this experiment was to prepare a database of feed ingredients showing their chemical composition in order to assess their potentiality for feeding ducks.

II. Materials and Methods

Samples of feed ingredients were collected from study areas, recorded, sun-dried and ground where required. They were stored in airtight polythene bags until chemical analyses were carried out to determine nutrient profile. The chemical analyses of different feed ingredients were carried out by following standard methods (AOAC, 2004). Proximate components, Ca and total P of those ingredients were determined in the Animal Nutrition Laboratory, Department of Livestock Services (DLS) and in the Department of Poultry Science, Bangladesh Agricultural University. Calcium (Ca) and total P were determined by atomic absorption and spectrophotometer, (FAO, 1989). Amino acids were determined by amino acid analyzer in the Institute of Food Science and Technology of Bangladesh Council of Scientific and Industrial Research (B.C.S.I.R) Laboratory in Dhaka. The analysis was repeated when data for any ingredient were found to be confusing.

III. Results and Discussion

Chemical compositions of scavengable feed ingredients are shown in Table 1. Scavengable feed ingredients found in the study areas were oyster meat, crab meat, snail meat, fish head, duckweed, *shawla* and azolla. The dry matter contents among the scavengable feed ingredients ranged between 89.08 and 92.22%. The highest DM was found in duckweed (92.22%) and the lowest in snail meat (89.08%). The DM contents of these feed ingredients were more or less similar. DM content of oyster meat and snail meat meal was similar to the findings of Ali and Leeson (1994) and Biswas *et al.*, (2005). DM content of duckweed in the present study was close to the reports of previous workers (Biswas, 2003; Dhar, 2009 and Akhter *et al.*, 2011) and that of DM content of azolla was more or less similar to the values of some earlier workers. The highest CP was found in fish head (60.78%) and the lowest in azolla (18.40%). The CP content of oyster meat, crab meat, snail meat, duckweed, and *shawla* were 39.68, 33.31, 42.83, 24.57 and 21.86% respectively. The crude protein (CP) content of oyster meat was lower than the value as reported by Rahman (2010). The CP content of crab meat was almost similar to the findings of Moreng and Avens (1985) and Rahman (2010) but higher than the value of Biswas (2003). Crude protein content of snail meat was close to the value as reported by Biswas (2003). CP content of duckweed was close to the findings of Murarilal and Pathak (1988) and Rahman (2010) but higher than the values reported by other authors (Hossain, 1998 and Biswas, 2003) and also lower than the value as stated by Akhter *et al.* (2011). The CP content of azolla was more or less similar to the values of Ali and Leeson (1994) and Hossain (1998) reported earlier. The crude fibre (CF) contents of feed ingredients varied from 0.76 to 11.99%. The CF contents of duckweed, *shawla* and azolla were almost similar (Table 1). The CF content of crab meat was more or less similar to the findings of Moreng and Avens (1985), Biswas (2003) and Rahman (2010).

Table 1. Chemical compositions of scavengable feed ingredients

Ingredients	DM (g/100g)	Chemical composition (g/100g DM)						
		CP	CF	EE	Ash	NFE	Ca	TP
Oyster meat	89.11	39.68	0.76	3.75	22.50	33.31	0.65	0.40
Crab meat	90.79	33.31	11.99	3.90	39.41	11.39	19.50	0.65
Snail meat	89.08	42.83	1.07	3.66	24.04	28.40	1.15	0.55
Fish head	90.36	60.78	2.25	5.87	29.74	1.36	5.37	2.59
Duck weed	92.22	24.57	10.47	1.25	20.66	43.05	0.91	0.76
<i>Shawla</i>	90.39	21.86	10.60	0.41	15.24	51.89	0.47	0.24
Azolla	91.15	18.40	11.89	3.10	15.12	51.49	0.62	0.78

DM = dry matter; CP = crude protein; CF = crude fibre; EE = ether extract; NFE = nitrogen free extract; Ca = calcium and TP = total phosphorus.

Table 2. Amino acid profile of some selected duck feed ingredients

Name of samples	Amino acid (%)									
	Threonine	Isoleucine	Leucine	Lysine	Methionine	Alanine	Valine	Tyrosine	Histidine	Arginine
Duckweed	-	0.66	0.17	2.12	0.32	0.35	0.24	0.29	0.24	0.42
Azolla	2.35	0.80	1.51	1.24	0.22	1.42	1.10	0.65	0.24	1.66
Oyster	3.62	1.61	0.30	2.47	-	-	0.17	-	-	-
Crab	0.70	0.80	1.30	1.40	0.05	-	0.80	-	0.30	-

The ether extract (EE) contents of oyster meat, crab meat, snail meat, fish head, duckweed, *shawla* and azolla were 3.75, 3.90, 3.66, 5.87, 1.25, 0.41 and 3.10%, respectively. The ash content of analyzed feed ingredients ranged between 15.12 and 39.41%. The highest ash content was found in crab meat (39.41%) and the lowest in azolla (15.12%). Ash content of duckweed was close to the report of Murarilal and Pathak (1988). The nitrogen free extract (NFE) contents of oyster meat, crab meat, snail meat, fish head, duckweed, *shawla* and azolla were 33.31, 11.39, 28.40, 1.36, 43.05, 51.89 and 51.49%, respectively (Table 1). The Ca content of feed ingredients ranged between 0.47 and 19.50%. The highest Ca content was found in crab meat (19.50%) and the lowest in *shawla* (0.47%). The Ca content of crab meat was in agreement with the finding of Biswas (2003) and Ca content of azolla was almost similar to the values of Ali and Leeson (1994) and Hossain (1998). The highest total phosphorus (TP) content was found in fish head (2.59%) and the lowest in *shawla* (0.24%) (Table 1). Total phosphorus content of duckweed was close to the findings of Hossain (1998) but lower than the report of Akhter *et al.* (2011). Total phosphorus concentration of azolla was close to the findings of Rahman (2010).

The amino acid profile of some feed ingredients is shown in Table 2. The lysine content of duckweed, azolla, oyster and crab meat were 2.12, 1.24, 2.47 and 1.40%, respectively indicating that these are dependable sources of such critical amino acids for scavengable ducks.

IV. Conclusion

Among the feed ingredients considered for analysis, it was found that duckweed, azolla, snail meat, crab meat, oyster meat are good sources of protein and amino acid. These ingredients may be considered in the

formulation of diets for feeding ducks keeping deterioration in quality to a minimum by means of proper collection, storage and processing.

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