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Nutrients Availability to Scavenging Chickens in Bangladesh

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Abstract: An investigation was conducted on 540 scavenging chickens of two age groups (below 6 month and above 6 month) taking equal number from each of 6 upzilas (sub-district) under 4 districts in 3 seasons (Summer, Winter and Rainy season). The birds were collected from farmer's house between 4:0 and 5:0 pm. Collected birds were slaughtered and dissected to collect different parasites from suspected organs. Crop and gizzard contents (CGC) were collected for nutritional analyses. CGC was processed and analyzed for proximate components, calcium (Ca) and phosphorous (P). The CGC contained 2678 Kcal/kg DM TME, 11.72% CP, 0.41% Ca and 0.34% P. Seasonal variation had significant effect on TME availability but not on CP content. Seasons, areas and their interactions had significant effect on Ca availability. Availability of Ca and P to younger birds was fewer than that of to aged birds, but reverse result was found for TME. It was concluded that all scavenging birds were under deficient nutritional status.

Key words: Scavenging chicken, seasons, nutritional profile

Introduction

It is estimated that there are approximately 170 millions of poultry in Bangladesh, most of which are maintained by the female members of the family and fed on household wastes and crop residues (Rahman, 2003). Egg production of indigenous birds increased during crop harvesting period and soon declined when feed supply became scarce (Bulbul, 1983, Ahmed and Islam, 1990 and Huque *et al.*, 1990). They also reported that nutrients available to the scavenging chicken are not similar throughout the year. Chickens raised by the rich farmers with their crop by-products and kitchen wastes were apparently healthier than the contemporary flocks raised by the poorer farmers (Bulbul, 1983). The availability of different feed ingredients to the scavenging chickens also varies with the season and period of harvesting of corresponding crop or grains (Mwalusanya *et al.*, 2002). Besides, cropping pattern and availability of some feed ingredients (crop) is location specific. So the location variation is another factor affecting nutrients availability to the birds. Any type of supplementation to existing indigenous birds or high yielding crossbred chickens needs accurate inventory of present nutritional status of those chickens. Keeping these views in mind, this experiment was aimed at evaluation of nutritional status of village chicken in different seasons.

Materials and Methods

An investigation was conducted on 540 scavenging chickens of two age groups (below 6 month and above 6 month) taking equal number from each of 6 upzilas (sub-district) under 4 districts in 3 seasons (Summer-March to June; Winter-November to February and Rainy season-July to October). The selected locations were Netrokona-mohongonj (NM), Serpur- Jhenaigati (SJ), Sirajgonj-Raigonj (SR), Sirajgonj-Sadar (SS), Gaibandha-Sundargonj (GS) and Gaibandah-Palashbari (GP). The birds were purchased from farmer's house between 4:0 and 5:0 pm. Collected birds were slaughtered and crop and gizzard contents (CGC) was collected for nutritional analyses. The CGC samples were dried, grounded and analyzed separately for proximate components, calcium (Ca) and phosphorous (P) contents. The proximate components (Moisture, Crude Protein, Crude Fiber, Ether Extract, Ash and Nitrogen Free Extract) were determined by the methods of AOAC (1990). Calcium (Ca) and Phosphorus (P) content of the samples was also determined using the method of Chapman and Pratt (1961). Each Sample was replicated twice to have the proximate components. The true metabolizable energy (TME) of CGC was determined by indirect method using the formula of Wiseman, (1987). According to Wiseman, TME= 3951+54.4EE- 88.7CF-40.8 Ash; Where ; EE= % of Ether Extract, CF= % of Crude Fibre, Ash= % of Ash and TME= True Metabolizable Energy, Kcal/kg Dry matter(DM). The statistical analyses of the data on different parameters were performed by the analysis of variance corresponding to a 2 (Age group) × 3 (Season) × 6 (Areas) × 15 (Replication) factorial experiment. Four factor RCBD statistical analysis method was used from MSTAT package Program.

Results and Discussion

True Metabolizable Energy (TME) in CGC: Results recorded in Table 1 showed that TME values of CGC were not affected by age ($p>0.05$). Season had a significant effect ($p<0.05$) on TME contents being higher in Winter and Summer than in Rainy season. TME content was the highest in Sirajgonj-Raigong (SR),

Table 1: Chemical composition of crop and gizzard contents (CGC) of experimental chicken according to age, season, area and their interaction

Para-meter	Age (A)+	Season (S) $	Area (AR)# 1	2	3	4	5	6	Mean	A	S	AR	AxS	AxAR	SxAR	AxSX
TME	1	1	2341.52	3296.71	3429.27	2996.52	2829.63	3939.44	2962.18	NS	*	*	NS	NS	NS	NS
Kcal/kg		2	2363.83	2705.55	2950.16	2610.59	2781.35	3018.93	2784.40	80.976	204.69	289.486	140.25	198.35	242.93	343.55
		3	2318.52	2371.58	2551.21	3175.12	2271.49	2800.00	2581.38							
	2	1	1998.90	2540.08	3185.96	2538.23	2536.13	2568.98	2541.38							
		2	2135.60	2798.68	2898.89	3365.92	3056.11	2587.73	2806.65							
		3	2671.29	1930.71	2589.95	2309.95	2425.92	2462.56	2408.40							
	Mean		2304.94	2607.21	2934.23	2842.74	2649.60	2729.66	2678.07							
%CP	1	1	12.66	9.74	16.06	110.33	12.66	12.84	12.55	NS	NS	*	NS	NS	NS	NS
		2	11.30	9.79	11.98	11.93	10.05	11.06	11.02	0.644	0.788	2.385	1.115	1.532	2.730	3.728
		3	10.23	13.35	10.03	12.61	7.01	7.76	10.16							
	2	1	7.65	12.10	12.49	14.73	9.41	8.81	10.90							
		2	10.85	12.75	113.6	11.44	11.32	10.44	11.36							
		3	9.01	14.26	14.72	11.84	12.02	10.20	12.00							
	Mean		10.29	12.01	12.77	12.31	10.42	10.19	11.33							
%CF	1	1	6.54	7.1	6.9	4.81	5.44	3.83	5.77	*	NS	NS	NS	NS	NS	NS
		2	7.18	5.51	8.77	6	4.93	5.12	6.251	3.89	0.981	0.599	1.012	1.663	1.982	2.003
		3	6.88	8.92	9.41	5.33	7.91	4.2	7.108							
	2	1	11.71	8.43	11.57	8.13	6.88	12.31	9.838							
		2	10.63	13	9.88	7.78	12.45	8.77	10.41							
		3	14	9.72	10.05	12.12	8.99	13.36	11.37							
	Mean		9.49	8.78	9.43	7.36	7.76	7.93	8.46							
%ASH	1	1	4.52	8.44	8.80	7.47	4.83	9.57	6.77	*	NS	*	NS	NS	NS	NS
		2	6.13	6.98	5.12	8.68	6.50	9.24	7.10	2.502	1.485	4.33	2.099	2.969	3.636	5.142
		3	5.92	5.76	7.18	8.20	13.16	7.77	8.00							
	2	1	21.07	19.36	5.28	10.81	17.28	16.23	13.33							
		2	31.59	6.23	7.18	10.99	6.23	16.14	13.06							
		3	21.57	13.38	15.74	8.38	16.09	7.02	13.69							
	Mean		15.13	10.02	8.21	9.08	10.68	10.99	0.69							
%Ca	1	1	0.10	0.03	0.54	0.47	0.07	0.16	0.22	**	**	NS	**	NS	**	**
		2	0.20	0.19	0.13	0.18	0.26	0.05	0.17	0.183	0.224	0.113	0.317	0.160	0.550	0.776
		2	0.14	0.06	0.20	0.10	0.44	0.09	0.17							
	2	1	0.44	0.47	0.29	0.82	2.24	1.18	1.10							
		2	1.36	0.43	0.15	0.44	0.31	0.18	0.47							
		3	0.55	0.33	0.16	0.50	0.20	0.47	0.37							
	Mean		0.46	0.25	0.24	0.42	0.59	0.46	0.40							
%P	1	1	0.12	0.11	0.35	0.16	0.10	0.03	0.22	NS	NS	NS	NS	NS	NS	NS
		2	0.18	0.10	0.73	0.36	0.36	0.17	0.32	0.058	0.071	0.100	0.101	0.143	0.175	0.247
		3	0.2	0.27	0.35	0.34	0.24	0.14	0.26							
	2	1	0.18	0.18	0.43	0.47	0.62	0.51	0.40							
		2	0.31	0.78	0.39	0.30	0.06	0.54	0.39							
		3	0.18	0.35	0.49	0.45	0.54	0.38	0.39							
	Mean		0.19	0.30	0.46	0.36	0.324	0.360	0.33							

$ 1, Winter (Nov- Feb); 2, Summer (Mar- June); 3, Rainy (July- Oct); + 1, Birds below 6 months; 2, Birds above 6 months; @NS, P>0.05; **, P<0.05; **, P<0.01 #1. Netrokona-Mohongonj; 2, Serpur-Jhenaigati; 3, Sirajgnj-Raigonj; 4 Sirajgong sadar; 5, Gaibandha-Sundarganj; 6, Gaibandha-Palashbari. TME: True Metabolizable Energy, CP: Crude Protein, CF: Crude Fibre Ca: Calcium, P: Phosphorus

Sirajgonj-Sadar (SS) and Gaibandha-Palashbari (GP), intermediate in Serpur-Jhenaigati (SJ) and Gaibandha-Sundargonj (GS) and the lowest in Netrokona-Mohongonj (NM) ($p>0.05$). This might be due to variability in feed ingredients availability in different areas. Lack of influence of age on TME values of CGC perhaps imply that the energy source ingested by the chicken of different ages might have very little difference. The pattern of TME availability in different seasons was nearly similar with that found by Ukil (1992). He claimed the highest availability in Winter followed by Summery and Wet season. This finding was contradictory with that of Mwalusanya *et al.* (2002). The mean TME value of CGC was 2678 Kcal/kg, which was slightly lower than that found by Ukil (1992). Moreover, seasonal effect on TME value may be related to difference of available energy sources in different seasons in relation to crop cultivation and harvesting.

Crude protein (CP) in CGC: Data shown in Table 1 revealed that CP content was higher in SJ, SR and SS areas than in NM, GC and GP ($p<0.05$). Age and season had no influence on CP content ($P>0.05$), which was not in agreement with the findings of Mwalusanya *et al.* (2002). He found significantly higher CP in crop contents of younger chicks than that in adult. However, age and season did not even interact among themselves or/with area to alter the value of CP in CGC. The trend of CP availability throughout the year was contradictory to the findings of Ukil (1992). He found significantly higher ($p<0.05$) CP in Summer followed by Winter. The mean value of CP (11.33%) in CGC of present study was marked higher than the values 8.18% and 9.62% reported by Ukil (1992) and Ali (2002) respectively. The result was close to the value 10.44 found by Mwalusanya *et al.* (2002) in local scavenging chicken in Tanjania. However, the variation in CP contents in CGC among areas may be an indication of variability of protein sources. Absence of the effect of age and season on CP contents might signify that availability of protein sources have little variation in different seasons with almost no difference in protein sources selected by birds of different ages.

Ash in CGC: Ash content of CGC was higher at older ages ($p<0.05$) than that found in case of younger chickens (Table 1) being in agreement with the findings of Mawlusanya *et al.*(2002). Ash content was also higher ($p<0.05$) in NM than that in other areas. Season did not affect ash content and had no interaction with season and area to alter ash content of CGC. The mean ash content of adult chickens (13.36) was much higher than the value (9.78%) reported by Ukil (1992) and Mwalusanya *et al.* (2002). The ash availability in CGC in the present study was nearly similar throughout the year, but Ukil (1992) observed higher ash content during Summer followed by Wet and Dry season. Ali (2002) found extremely higher (36.35) ash content in CGC than that observed in present study. However, ingestion of more grit by the older birds may be related to higher ash content in CGC. Such assumption was also authenticated by visual observation of CGC after drying.

Calcium (Ca) and Phosphorous (P) in CGC: Calcium content in CGC was remarkably higher at older ages ($p<0.05$) and it was supported by Mwalusanya *et al.* (2002). Ca content in Winter was significantly higher ($p<0.05$) than that in Summer and Rainy season. Area had little effect on Ca contents of CGC. There were significant ($p<0.01$) interaction of age, season and area on Ca concentration of CGC. Ukil (1992) found higher Ca in Summer followed by Wet and Dry seasons, which was dissimilar with the findings (0.40) of present study. Ca content was extremely lower compared to that (3.38) found by Ukil (1992) in CGC of scavenging chicken. The P contents of residual feed recorded could not be explained by the difference of age, season, area and their infractions ($p>0.05$). But the mean value (0.33) found in present study (0.57) was lower than that reported by Ukil (1992). However, increased Ca content at older ages, but similar P content at different ages in CGC revealed that insoluble grit ingested at higher level by birds with increasing age are mainly Ca sources. Seasonal variability in Ca content may be related to different degree of availability of feed containing Ca.

Crude fiber (CF) in CGC: Significant variation ($p<0.05$) in CF content in CGC was found between two age groups with higher values for older birds. But Mwalusanya *et al.* (2002) found slightly higher CF in crop contents of growing chickens than in adults. Area had no significant effect on CF content ($p>0.05$). Higher CF values in CGC for older birds may be related to their higher scavenging ability of forages. However, irrespective of age and season, the CF contents of CGC were much higher than that recommended in various standards (NRC, 1994).

Conclusion: The content of major nutrient (CP, TME, Ca) in crop and gizzard residues recorded appeared to be very low to support satisfactory production potential. However, the interaction of age, season, and area should be given utmost importance to deal with nutritional status of scavenging chicken in rural areas of Bangladesh.

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