IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 8, Issue 7 Ver. II (July. 2015), PP 31-34
www.iosrjournals.org

Carcass Characteristics and Body Composition of Broilers Raised O N Different Levels of Sodium Chloride in Feed and Water

Ranjit Kr. Bora[1], Arundhati Bora[2], and B.C. Sarmah[3]
Directorate of Extension Education, Faculty of Vety. Science, Assam Agricultural University, Khanapara, Guwahati-781022
Department of Vety. Physiology, College of Vety. Science, Assam Agricultural University, Khanapara, Guwahati-781022
Department of Vety.Physiology, College of Vety. Science, Assam Agricultural University, Khanapara, Guwahati-781022

Abstract: *This study was carried out to find out the effect of three levels of sodium supplementation in water (0,500 and 1500 ppm) with relation to it varying content in feed (0,500 and 1500 ppm) with relation to its varying content in feed (0 and 0.5 per cent) on the performance of broiler. A total of 378 day old, commercial broiler chicks were raised on deep litter. There were three replication each having 21 chicks. They were fed for 8 week of age. At the end of the trial 10 birds (5 male and 5 females) from each group were randomly slaughtered for the carcass studies after overnight fasting. The dressing and evisceration percentages were most affected by treated feed but there was a significant (P<0.05) increase in both these percentages in the group given salt concentratin of 1500 ppm in water compared to other two groups (0 and 500 ppm). The percent moisture, protein and ether extract contents of carcass and weight of various internal organs (liver, gizzard, kidney, spleen) were found statistically similar for all treatments. The sodium and potassium contents of the carcass were not affected by sodium chloride levels in water but significantly (P<0.05) reduced by adding 0.5 percent salt in the feed.*

Keywords: *Broiler Chicken, Sodium salt, Carcass, Water.*

I. Introduction

Out of all the essential nutrients water also plays a major role for better growth and reproduction performance in birds. Sodium chloride in small amount in poultry diets is physiologically vital for growth, health production and reproduction. The requirement of sodium chloride for poultry is 0.37 percent [1] and 0.6 percent [2] respectively. Under field conditions, there are possibilities of excessive intake of sodium chloride through various feed ingredients as well as in water and hence, there is a need to study the effect of various levels of sodium chloride in water in relation to its varying content in feed on the performance of broilers. It was observed by [3] that there was no significant differences in dressing and eviscerated yield of broiler under different salt levels in water in relation to its varying content in feed. However, some revealed that the performance of birds in affected by salt concentration in water and feed. A little work on this aspect has been done in our country and therefore, need was felt to study the effect of the use of salty water in relation to its varying salt concentration in broiler feed.

II. Materials And Methods

A total of three hundred seventy eight (378) one day old unsexed commercial broiler chicks were taken for the purpose of this study. These chicks were wing banded, vaccinated against Ranikhet disease (F1 strain), weighed and randomly distributed in eighteen equal groups having 21 chicks each. Birds were reared on deep litter system with saw dust as litter material and identical managemental practices were followed in all the groups during the period of study. The chicks were provided with two levels of sodium chloride supplementation in feed (0 and 0.5 percent) and three levels in the drinking water (tap water) (0,500 and 1500 ppm) upto 8 weeks of age. There were three replicates each of which consisted of twenty one chicks (Table I)

Table I Number Of Birds Used Under Various Treatment

Replication	Feed without salt Water supplemented with salt			Feed with 0.5% salt Water supplemented with salt		
Replication	0 ppm	500 ppm	1500 ppm	0 ppm	500 ppm	1500 ppm
1		21	21	21	21	21
2		21	21	21	21	21
3		21	21	21	21	21
Total	63	63	63	63	63	63

The sodium and potassium concentration estimated (%) in the experiment ration were as follows (Table II)

Table II Sodium And Potassium Concentration (%) In The Experimental Rations

	Starter Ration		Finisher Ration	
	Without salt	With salt	Without salt	With salt
Sodium	0.35	0.55	0.28	0.53
Potassium	0.55	0.60	0.48	0.53

*Estimated

At the end of the experiment, 10 birds (5 male and 5 female) from each group were randomly slaughtered for carcass studies. Birds were kept on overnight fasting, before slaughter but they were provided *ad libitum* water. The pre slaughter live weight was recorded. Bird were killed by piercing the jugular vein and bled properly. Dressing and evisceration was done following standard processing operations and their weight recorded. The dressed and the eviscerated percentage the giblets weight, were recorded. Chemical analysis for moisture, ether extract and protein content in meat samples were carried out and recorded as described OAC (2005) [4] Sodium and potassium in meat were estimated by Flame photometer. The statistical analysis of the data were carried out as per Snedecor and Cochran (1994) [5].

III. Results And Discussion

The dressing and evisceration percentages were not affected by treated feed but were significantly ($P< 0.05$) affected by treated water. There was a significant increase in both dressing and evisceration percentages in the group given a salt concentration of 1500 ppm in water compared to other groups. (0 and 500 ppm) (Table III and Table IV) whereas, differences between 0 and 500 ppm groups were non significant (Table IV). The finding were in agreement with [6]. The effect of raising the birds on treated feed or water on the weight of various internal organs (liver, gizzard, kidney, spleen) were found non significant (Table (IV). The findings are in agreement with Ilian [7].

The percent moisture protein and ether extract content of carcass were found to be statistically similar for all treatments (Table Vand Table VI). This finding is in agreement with the findings of Kalimuthu and Kadurvel (1981) [8] who did not observe significant difference in moisture content of carcass of groups given salt in water (control, 4500 and 9000 ppm).

The sodium and potassium contents of the carcass were not affected by sodium chloride levels in water but significantly ($P<0.05$) reduced by adding 0.5 per cent sodium chloride in feed.

IV. Conclusion

Since no appreciable difference were observed in serum sodium and serum potassium levels and carcass composition (carcass moisture, protein and ether extract) were observed in the present study, it may be concluded that there is no harm of adding 0.5 percent salt in the feed when water contained salt even upto 1500 ppm for raising the broilers. However, carcass yield increased with the salty water.

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Table III Mean And Standard Errors For Carcass Yield And Organ Weights Of Broilers Given Various Levels Of Salt In Feed And Water

	Salt level in feed (%)		Salt level in water (ppm)		
	0.0	0.5	0	500	1500
Dressing (%)	83.12±0.24 (90)	83.20±0.27 (90)	82.46[a]±0.26 (60)	82.94 [a] ±0.36 (60)	84.09 [b]±0.28 (60)
Eviscerated	6692±0.28 (90)	67.12±0.41 (90)	66.23 [a] ±0.29 (60)	66.59 [a] ±0.36 (60)	68.24 [b]±0.56 (60)
Liver (%)	3393±0.61 (90)	33.29±0.57 (90)	32.83±0.64 (60)	33.93±0.76 (60)	34.07±0.76 (60)
Heart(g)	10.90±0.30 (90)	10.74±0.23 (90)	10.72±0.38 (60)	11.08±0.26 (60)	11.18±0.31 (60)
Kidney(g)	6.85±0.26 (90)	6.72±0.22 (90)	6.65±0.22 (60)	6.58±0.34 (60)	7.13±0.31 (60)
Gizzard(g)	39.71±0.73 (90)	39.15±0.55 (90)	38.20±0.75 (60)	39.77±0.79 (60)	70.33±0.83 (60)
Spleen (g)	3.47±0.12 (90)	3.55±0.16 (90)	3.37±0.15 (60)	3.57±0.20 (60)	3.60±0.18 (60)
Pre-slaughter weight (g)	1275.50±22.08 (90)	1241.33±2019 (90)	1234.67±21.84 (60)	12.57.33±25.91 (60)	1283.25±29.54 (60)

Each mean is based on 30 observation

Mean for heart weight having different superscript differ significantly (P<0.05)

Table IV Means And Standard Errors For Carcass Yield And Organ Weights Of Broilers Given Various Levels Of Salt In Feed And Water

	Feed without salt Salt level in water (ppm)			Feed with 0.5% salt Salt level in water (ppm)		
	0	500	1500	0	500	1500
Dressing (%)	82.36±0.43	83.19±0.38	83.81±0.42	82.56±0.29	82.67±0.61	84.47±0.67
Eviscerated(%)	66.20±0.40	67.02±0.34	67.45±0.66	66.31±0.16	66.16±0.63	68.94±.91
Liver (g)	32.67±0.86	35.07±1.06	34.07±1.19	33.00±0.95	32.80±1.07	34.07±0.97
Heart(g)	9.73[a]±0.60	11.90 [c]±0.37	11.07 [bc]±0.50	10.67 [ab]±0.46	10.27 [ab]±0.30	11.30 [bc]±0.38
Kidney(g)	6.67±0.32	6.93±0.60	6.97±0.40	6.63±0.32	6.23±0.32	7.30±0.47
Gizzard(g)	37.30±1.28	41.03±1.24	40.80±1.22	39.10±0.77	38.50±0.94	39.87±1.23
Spleen (g)	3.30±0.21	3.30±0.19	3.77±0.22	3.43±0.22	3.80±0.35	3.43±0.28
Pre-slaughter weight (g)	1228.67± 29.40	1299.83± 37.20	1298.00+ 46.14	1240.67± 32.77	1214.83± 34.96	1268.50± 37.52

Mean having different superscripts within a row differ significantly (P<0.05) when compared separately for two groups.

Figures within parentheses re number of observations.

Table V Means And Standard Errors For Per Cent Moisture, Protein , Ether Extract, Sodium And Potassium In Meat Of Broilers, Given Various Levels Of Salt In Feed And Water

	Feed without salt Salt level in water (ppm)			Feed with 0.5% salt Salt level in water (ppm)		
	0	500	1500	0	500	1500
Moisture	66.47± 0.89	69.43± 1.52	69.19± 1.18	67.63± 0..50	68.17± 1.63	67.20± 0.79
Protein	18.47± 0.89	20.68± 1.19	19.36± 0.22	18.75± 1.38	18.83± 1.75	20.59± 1.38
Ether extract	10.16± 0.59	10.04+ 0.74	12.12± 0.59	10.52± 0.30	12.05± 1.04	11.11± 0.68
Sodium*	0.1743± 0.0046	0.1626± 0.0069	0.1703± 0.0070	0.1550± 0.0065	0.1548± 0.0083	0.1588± 0.0069
Potassium *	0.5888± 0.0103	0.5866± 0.0128	0.5800± 0.0073	0.5516± 0.0216	0.5600± 0.0167	0.5350± 0.0274

*On dry matter basis

Each mean is based on 6 observations

Table VI Mean And Standard Errors For Per Cent Moisture, Protein, Ether Extract, Sodium And Potassium In The Meat Of Broilers, Given Various Levels Of Salt In Feed And Water

	Salt level in feed (ppm)			Salt level in water (ppm)	
	0.0	0.5	0	50	1500
Moisture	68.37± 0.74 (18)	67.67± 0.74 (18)	67.05± 0.56 (12)	68.80± 1.08 (12)	68.20± 0.74 (12)
Protein	19.50± 0.52 (18)	19.39± 0.84 (18)	18.61± 0.78 (12)	19.75± 1.05 (12)	19.97± 0.69 (12)
Ether extract	10.77± 0.42 (18)	11.23± 0.43 (18)	10.34± 0.32 (12)	11.05± 0.68 (12)	11.61± 0.46 (12)
Sodium	0.1691± 0.0036 (18)	0.1562± 0.0039 (18)	0.164± 0.0048 (12)	0.1587± 0.0053 (12)	0.1646± 0.0050 (12)
Potassium	0.5888± 0.0057 (18)	0.5488± 0.0124 (18)	0.5700± 0.0127 (12)	0.5733± 0.0108 (12)	0.5575± 0.0151 (12)

Means having different superscripts within a row differ significantly ($P<0.05$) when compared separately for two groups.
Figures within parentheses are number of observations