International Journal of Advanced Multidisciplinary Research (IJAMR)
ISSN: 2393-8870
www.ijarm.com
Impact Factor: 2.153 Volume 3 Issue 3-2016

Research Article

SOI: http://s-o-i.org/1.15/ijarm-2016-3-3-2

Comparison of meat production of three broiler strains in winter season

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Keywords

Broiler,
strain,
season,
weight, percentage
transmission.

Abstract

Day-old broiler chicks 405 (135+135+135) were collected from the purchasing two (02) breeding hatcheries in Bangladesh. The chicks were placed in an open shed house and were exposed in winter seasons. Chicks as hatched broilers belonging to 3 strains, 45 of each strain were reared in three winter seasons having 135 to each winter seasons with 3 replications 15 chicks per pen. They were fed *ad-libitum* up to 28 days to make a comparison on their production performances. The significant differences ($P<0.05$) were found in blood weight, shank weight and viscera weight of different broiler strains. The significant differences ($P<0.05$) were found in thigh weight percentage, drumstick weight, gizzard weight and gizzard weight percentage among Cobb-500, Hubbard Classic and Arbor Acres.In winter season there were significant differences ($P<0.01$) in dressing weight percentage in three different broiler strains. The breast meat, thigh meat, drumstick meat, head, liver and gizzard weight of Cobb-500 was the highest than two strains but dressing percentages of Hubbard Classic was the highest than Cobb-500 and Arbor Acres.

Introduction

Poultry meat is food source with high biological protein value, has a relatively low fat content, has high digestibility, contains iron, some of the vitamins in the B group, and has superior organoleptic quality, Rogowski (1980). With these nutritional characteristics, the chicken meat is appreciated by consumers and occupies a special place in the human diet. Broiler chickens are a result of selection programsfor rapid growth and body conformation, especially favoring breast muscles development Scheuermann *et al.,* (2003). Because breast is the most valuable portion of the chicken carcass on the market, even small differences in breast yield among broiler chickens could have significant economic impact. For this reason, in broiler chicken industry it is constantly necessary to run performance evaluation, considering yield breast, chemical composition and technological properties, usually determinations crucial for the culinary value in pectoral muscles Abeni and Bergogoglio (2001). Some research has demonstrated the presence of several influencing factors on poultry meat quality such as bird's age, sex, genetics strain, environment and nutrition, with major influences on carcass and meat characteristics. The biophysical, histological and biochemical characteristics of pectoral muscle have a decisive role on meat quality.

According to BBS (1995), the consumption of animal protein in Bangladesh is only 9.56g/day/person as against the standard requirement of 36.0g (Ahmed and lslam, 1990). This has resulted malnutrition in rural people and also urban poor rickshaw pullers and day laborers. To develop a nation that is the people to be sound, healthy and ambitious, supply of huge amount of animal protein is needed. This is because animal protein is superior to vegetable protein in some respects like higher percent of protein, higher digestibility, higher biological value (BV), less fiber content and well balanced essential amino acids (Scott, 1983).

Materials and Methods

At the end of 28 days, 2 (two) chickens were collected from each replication of each strain. Feed was withdrawn and water was supplied *ad libitum* during 12 hours of fasting prior to slaughtering to facilitate proper bleeding. After complete bleeding the slaughtered birds were weighed to detect the quantity of blood. The slaughtered broiler was immersed in pre-warmed water at 70^0C for 30 to 60 seconds in order to loosen the feathers of the carcasses.

The final preparations were performed by removal of the head, neck, viscera, shanks, kidneys and lungs of the carcasses. Heart and liver were removed from the remaining viscera by cutting them loose. The gall bladder was removed from the liver. The pericardial sac and arteries were excised from the heart. The gizzard was removed by cutting it loose in front of the proventiculus. Then it was split open with knife, emptied, washed and the lining was removed by hand. The broiler was dissected following the procedure of Jones (1984).

The inedible meat yield of broilers such as- slaughtered weight, slaughtered percentage, blood weight, blood loss percentage, feather weight, feather percentage, shank weight, shank percentage, skin weight, skin percentage, viscera weight and viscera percentage were recordedfor two chickens in each replication of each strain. The edible meat of broiler such as- breast weight, breast percentage, thigh weight, thigh percentage, drumstick weight, drumstick percentage, wing weight, wing percentage, head weight, head percentage, neck weight, neck percentage, liver weight, liver percentage, heart weight, heart percentage, gizzard weight, gizzard percentage, dressed weight and dressed percentage were also were also weighed and recorded with replication wise. All meat yield data were converted into percentages of respective live weight prior to statistical analysis. Dressing percentage of the birds was determined by dividing the carcass weight with its live weight multiplied by 100 and expressed as percentage.

Statistical procedure

The whole experimental data were analyzed statistically using analysis of variance (ANOVA) technique using SPSS Version 16.00 statistical package program in accordance with the principle of Completely Randomized Design (CRD). Significant difference among the treatments was identified using Dunkan's New Multiple Range Test (DMRT). The dressing yield parameters were converted to the percentage of their respective body weight for statistical analysis.

Results and Discussion

Inedible meat yield in winter season

The inedible meat yield characteristics of three broiler strains reared in winter season were presented in Table 1. Fig.1. The blood weight was high in Arbor Acres, low in Hubbard Classic and moderate in Cobb-500. The shank weights of three broiler strains were similar in Arbor Acres and Hubbard Classic but low in Cobb-500. In viscera weight with content, the quantities were high in Hubbard Classic, moderate in Cobb-500 and low in Arbor Acres. The slaughtering weight, slaughtering weight percentage, blood weight percentage, feather weight, feather weight percentage, shank weight percentage, skin weight, skin weight percentage and viscera weight percentage were negligible variations among the three broiler strains. The slaughtering weight, slaughtering weight percentage, blood weight percentage, feather weight, feather weight percentage, shank weight percentage, skin weight, skin weight percentage and viscera weight percentage were not significant variations ($P>0.05$) among the three broiler strains. The significant differences ($P<0.05$) were found in blood weight, shank weight and viscera weight of different broiler strains. These findings were closely related with the observations of Sarker *et al.*, (2002).

Table 1:Inedible meat yield of three broiler strains reared in winter season

parameters	Strains (Mean ± SEM)			SED	Level of Significance
	Cobb-500	Hubbard Classic	Arbor Acres		
Live weight(g/b)	1132.79±87.87	1143.98±25.96	1221.12±35.81	-	NS
Slaughtering weight(g/b)	1083.46±89.56	1101.65 ±26.48	1169.79±36.11	-	NS
Slaughtering weight %	95.57±0.47	96.29±0.17	95.78±0.27	-	NS
Blood weight(g/b)	49.33±2.03^{ab}	42.33±1.45^{b}	51.33±2.73^{a}	1.74	*
Blood weight %	4.43±0.47	3.71±0.17	4.21±0.26	-	NS
Feather weight(g/b)	38.38±0.88	38.67±2.33	40.33±1.20	-	NS
Feather weight %	3.41±0.18	3.39±0.28	3.31±0.17	-	NS
Shank weight(g/b)	39.67±0.89^{b}	47.33±2.91^{a}	47.33±1.76^{a}	1.66	*
Shank weight %	3.54±0.26	4.15±0.32	3.88±0.18	-	NS
Skin weight(g/b)	115.00±2.08	121.00±5.51	119.00±2.03	-	NS
Skin weight %	10.24±0.58	10.60±0.68	9.78±0.21	-	NS
Viscera weight(g/b)	172.00±5.19^{a}	173.00±4.36^{a}	154.33±3.38^{b}	3.57	*
Viscera weight %	15.41±1.50	15.12±0.08	13.02±0.58	-	NS

Mean ± SEM in the same raw with different superscripts differed significantly, but similar superscripts did not differ significantly. SEM=standard error mean; *= Significant ($P<0.05$); NS= Non- Significant ($P>0.05$)

Edible meat yield in winter season

The edible meat yield performances of three broiler strains were shown in Table 2. The quantity of thigh weight, thigh weight percentage, drumstick weight, gizzard weight and gizzard weight percentage was the highest in Cobb-500 and the lowest in Hubbard Classic except drumstick weight. It was the lowest in Arbor Acres. The neck weight was the highest in Arbor Acres and the lowest in Hubbard Classic. On the other hand, the dressing percentage was the highest in Hubbard Classic, the lowest in Arbor Acres. The breast weight, breast weight percentage, drumstick weight percentage, wing weight, wing weight percentage, head weight, head weight percentage, neck weight percentage, liver weight, liver weight percent, heart weight, heart weight percentage and dressing weight were more or less similar among the three broiler strains. There were no significant differences (P>0.05) for the breast weight, breast weight percentage, drumstick weight percentage, wing weight, wing weight percentage, head weight, head weight percentage, neck weight percentage, liver weight, liver weight percentage, heart weight, heart weight percentage and dressing weight. The significant differences (P<0.05) were found in thigh weight percentage, drumstick weight, gizzard weight and gizzard weight percentage among Cobb-500, Hubbard Classic and Arbor Acres. These findings were partially supported with the findings of Mohan *et al.*, (1996). There were also found significant differences (P<0.01) for thigh weight and dressing weight percentage in three broiler strains (Fig. 2). These results were related with the observations of Kassem G. EI Iraqi and Rabie H. Fayed (2012).

Table 2: Edible meat yield of three broiler strains reared in winter season

Parameters	Strains(Mean ± SEM)			SED	Level of Significance
	Cobb-500	Hubbard Classic	Arbor Acres		
Live weight (g/b)	1132.79±87.87	1143.98±25.96	1221.12±35.81	-	NS
Breast weight (g/b)	298.67±6.17	287.33±4.48	298.66±4.63	-	NS
Breast weight %	26.60±1.57	25.14 ±0.57	24.52±1.11	-	NS
Thigh weight(g/b)	153.33±6.12^{a}	122.33±2.40^{b}	132.33±4.37^{b}	3.72	**
Thigh weight %	13.62±0.68^{a}	10.71±0.46^{b}	10.87±0.68^{b}	0.50	*
Drumstick weight(g/b)	120.33±2.33^{a}	113.33±2.33^{ab}	100.67±5.55^{b}	3.04	*
Drumstick weight %	10.77±0.96	8.79±0.04	9.31±0.59	-	NS
Wing weight(g/b)	85.00±4.04	76.00 ±4.62	87.00±3.21	-	NS
Wing weight %	7.63±0.86	6.64±0.35	7.14±0.43	-	NS
Head weight(g/b)	26.33±3.18	21.67±2.33	26.00±2.65	-	NS
Head weight %	2.31±0.15	1.89±0.16	2.12±0.19	-	NS
Neck weight(g/b)	26.33±1.20^{ab}	23.67±0.88^{b}	29.33±0.88^{a}	0.82	*
Neck weight %	2.34±0.18	2.07±0.12	2.41±0.10	-	NS
Liver weight(g/b)	42.33±2.60	35.00±2.31	37.00±2.31	-	NS
Liver weight %	3.78±0.38	2.98±0.17	3.03±0.22	-	NS
Heart weight(g/b)	11.33±0.88	10.00±1.15	12.00±0.58	-	NS
Heart weight %	0.99±0.03	0.88±0.12	0.98±0.04	-	NS
Gizzard weight(g/b)	15.00±1.15^{a}	9.67±0.67^{b}	11.33±1.20^{b}	0.85	*
Gizzard weight %	1.34±0.15^{a}	0.85±0.08^{b}	0.93±0.10^{b}	0.09	*
Dressed weight(g/b)	618.82±50.77	638.81±13.14	637.99±10.29	-	NS
Dressing weight %	54.59±0.31^{a}	55.85 ±0.16^{a}	52.29±0.77^{b}	0.39	**

Mean ± SEM in the same raw with different superscripts differed significantly, but similar superscripts did not differ significantly. SEM=standard error mean; ** =Significant(P<0.01); *= Significant (P<0.05); NS=Non- Significant (P>0.05

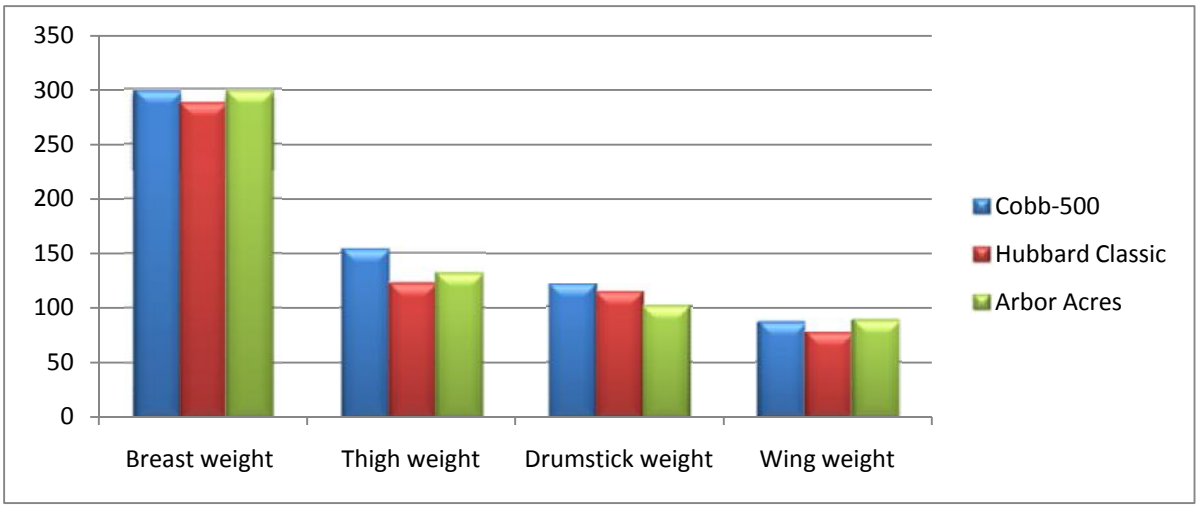

Figure: 1 The weight (g/bird) of different body parts of three broiler strains in winter season

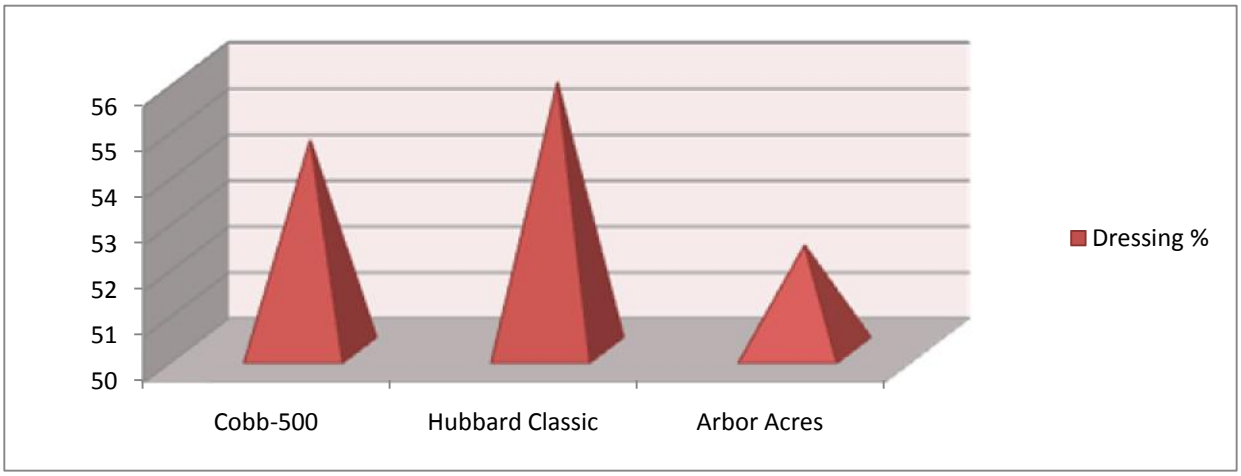

Figure: 2 The dressing percentage of three broiler strains in winter season

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How to cite this article:
Md. Rokonuzzaman**.** (2016). Comparison of meat production of three broiler strains in winter season **.** Int. J. Adv. Multidiscip. Res. 3(3): 5-8.