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CARCASS QUALITIES OF BROILER UNDER INTENSIVE AND BACKYARD SYSTEM OF MANAGEMENT IN MIZORAM

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ABSTRACT

Due to consumer appeal for higher fat deposit and preference of tougher meat and yellowish colour carcass by the Mizo people, broilers are reared up to 3- 4 months of age till they weigh around 4 - 5 kg. The study was conducted to compare the performance of broiler under Intensive and Backyard System of management, for which 300 commercial broilers were reared in three replicates (100 birds in one replicate) under Intensive System in the College farm and another 300 birds were reared at farmers level under Backyard System in 10 replicates (30 birds / farmers). All the birds were reared up to 6th weeks of age and thirty birds from each rearing system were randomly selected (10 birds per replicate from Intensive System and 3 birds per replicate from Backyard System) and slaughtered to study some important carcass characters. Remaining birds under both the rearing systems were reared up to 3 months of age and another similarly selected 60 birds (30 birds per rearing group) were utilized for carcass study. The live weights of broilers at 6th week and at 13th week were significantly (P<0.05) higher in intensive system; however dressing percentage was found to be significant only at 6th week. Non-significant differences (P<0.05) were observed in carcass quality parameters like pH, Water Holding Capacity, Extract Release Volume between the carcasses of birds under two rearing system both at 6th and 13th weeks of age. However, significant difference (p > 0.05) was observed in shank, liver and giblet weight and in total meat and bone yield both at 6th weeks and at 13th weeks of age.

Key words: Broiler, meat quality, Intensive System, Backyard System.

Rearing of commercial broiler birds in the backyard is a natural occupation of many families of the Mizo people. In Mizoram, broiler birds are reared in 20-30 numbers in small raised housed constructed in the backyard with locally available materials. These birds not only satisfy their animal protein source, but also act as source of valuable income for the rural poor. Due to consumer

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preference for yellowish colour carcass of higher fat with tougher meat in the local market, broilers are usually reared up to 3 to 4 months of age, till they weigh around 4 to 5 kg. However, commercial broilers are best for marketing at 5 to 6 weeks of age, weighing between 1.5 to 2 kg body weights with soft tender meat with lesser amount of fat content. Numerous studies have so far been conducted on carcass characteristic of broilers slaughtered at this age. However, no such study is so far been conducted on the carcass characters of broilers reared up to 4-5 kg weight under the backyard system of Mizoram. Considering the importance and potential of broiler farming in the state, the present study was undertaken to compare some of the important carcass characters of broiler birds reared under intensive and backyards system of management at different age.

MATERIALS AND METHODS

Six hundred day old, good quality broiler chicks (*Vencobb*) were divided into two groups consisting of 300 numbers in each group and one group of broilers were reared in three replicates (100 birds in one replicate) under intensive system in the College farm and another 300 birds were reared at farmers level under backyard system in 10 replicates (30 birds / farmers). Commercial broiler feeds available in the local market was used for feeding and routine managemental practices were followed for the birds reared under intensive system. However no intervention was made in the broilers reared under backyard system in terms of feeding and other managemental procedure. Under backyard system, broiler birds are reared in small raised housed constructed in the backyard with locally available materials. Usually, commercial feeds available in the local market are used for feeding of birds reared under backyard system. Use of left over kitchen waste and grains for feeding of broilers reared under backyard system is quite common. All the birds were reared up to 6th weeks of age and thirty birds from each rearing system were randomly selected (10 birds per replicate from intensive system and 3 birds per replicate from backyard system) and slaughtered to study some important carcass characters. Remaining birds under both the rearing systems were reared up to 3 months of age and another similarly selected 60 birds (30 birds per rearing group) were utilized for carcass study. Carcass traits like dressing percentage, weight of blood, feather, shank, meat, bone, heart, liver, skin, gizzard, giblets, abdominal fat and meat bone ratio were recorded. Meat quality parameters like Water Holding Capacity (WHC), pH and Extract Release Volume (ERV) were estimated using different methods mentioned by [7, 10, and 19]. Statistical analysis of the data was done as per standard procedure.

RESULTS AND DISCUSSION

The carcass traits expressed as percentage of live weight and carcass quality parameters at 6th week and 13th week for intensive and backyard system has been presented in Table 1.

Carcass Traits

Live weight at both 6th and 13th week were found to be significantly ($p<0.05$) better in broilers reared under intensive system compared to broilers reared under backyard system, which might be due to good management and feeding practices adopted in the intensive system. The live weight at 6th week under intensive system was in agreement with earlier report[13] and the live weight under backyard system was comparable with the report of earlier worker [11].

Significantly higher dressing percentage ($p<0.05$) was observed in broilers reared under

intensive system both at 6th and 13th weeks of age, which might be due to higher body weights of broiler compared to backyard system. Present findings were in agreement with the reports of [6, 9 &17].

No significant differences were observed in weights of blood, feather, heart, liver gizzard, abdominal fat and skin in between the birds reared under the two systems of rearing both at 6th and at 13th weeks of age. Similar records were also reported in broilers slaughtered at 6th weeks by [12 &14], however no such reports are available for broilers slaughtered at 13th weeks of age.

Shank weights were significantly ($p<0.05$) lower in broilers under intensive system both at 6th and 13th week compared to broilers reared under backyard system, which might be due to difference in the composition of feed offered to the birds. Present findings were in accordance with the reports of [14], but higher than the report given by [12].

Meat yield and meat bone ratio were found to be significantly ($P<0.01$) higher in broilers reared under intensive system compared to backyard system both at 6th and 13th weeks of age, which might be due better feeding and housing condition provided under intensive system. The bone yield weights of broilers at 6th and 13th weeks were significantly lower ($P<0.01$) under intensive system which might be due to higher meat yield compared to broilers reared under backyard system. The meat bone ratio obtained in the present study was lower than those reported by [9], which could be due to difference in the process of deboning, however it was in agreement with the findings of [8] under backyard system.

Significantly higher ($p<0.01$) liver weight was observed in broilers slaughtered at 6th week under backyard system (2.70 ± 0.10 %) as compared to intensive system (2.31 ± 0.04 %). Enlargement of the liver (Hepatomegaly) was observed in birds reared under backyard system which could be due to improper management of the birds. The liver weight percentage observed in the present study was comparable with the report given by [14] in broilers reared under intensive system and with [18 & 6] under back yard system.

A highly significant difference ($P<0.01$) was observed in the giblet weight percentage between the two rearing system at 6th weeks of age, which could be due to higher liver weight percentage in broilers reared under backyard system as discussed earlier. The present findings were in agreement with the reports of [18] under intensive system and with [2 &3] under backyard system.

Meat Quality

No significant difference was observed in the pH value of meat of broilers between the two rearing system at both 6th and 13th weeks of age. The pH observed in the present study was in line with the findings of [1&16]. The lower pH observed in the present study could be due to pre slaughter care maintained at the time of slaughter. Earlier worker [5 &15] suggested that lower pH could be due to better welfare conditions that reduce pre slaughter stress.

There were no significant differences in the water holding capacity of meat of broilers between the two rearing system at both 6th and 13th weeks of age. The lower values obtained in the present study could be due to chilling of the meat. Earlier workers [4&20] also stated that chilling of meat cause considerable decrease in water holding capacity.

No significant difference was observed in the ERV of meat of broilers reared under the two rearing system both at 6th and at 13th weeks of age. The result observed in the present study was in agreement with the findings of [1].

Table 1. Carcass traits and meat quality characters of broiler birds reared under Intensive System and Backyard System at 6th week and 13th weeks of age

Parameters	6th week			13th week		
	Intensive	Backyard	p - value	Intensive	Backyard	p - value
Carcass Traits						
Live weight (g)	1839.83 ± 21.81	1636.8 ± 69.81	0.00**	4930.1 ± 104.08	3466.97± 204.82	0.04 **
Dressed Weight (%)	76.85 ± 1.09	73.71 ± 0.84	0.03 **	76.63 ± 0.30	73.35 ± 0.71	0.10^{NS}
Blood Yield (%)	4.37 ± 0.17	4.07 ± 0.08	0.81^{NS}	4.13 ± 0.21	3.94 ± 0.26	0.33^{NS}
Feather Yield (%)	5.50 ± 0.10	6.03 ± 0.39	0.20^{NS}	6.25 ± 0.24	5.80 ± 0.52	0.44^{NS}
Shank Weight (%)	4.13 ± 0.10	4.97 ± 0.12	0.00*	3.21 ± 0.09	4.16 ± 0.24	0.00*
Meat Yield (%)	37.50 ± 0.31	34.14 ± 0.86	0.00*	42.09 ± 0.58	37.49 ± 1.43	0.00*
Bone Yield (%)	18.52 ± 0.29	22.22 ± 0.58	0.00*	17.51 ± 0.49	19.56 ± 0.46	0.00*
Meat bone ratio	2.06 ± 0.03	1.56 ± 0.05	0.00*	2.47 ± 0.09	2.02 ± 0.07	0.00*
Heart Weight %))	0.56 ± 0.01	0.58 ± 0.02	0.20^{NS}	0.52 ± 0.03	0.54 ± 0.03	0.56^{NS}
Liver Weight (%)	2.31 ± 0.04	2.70 ± 0.10	0.00*	1.91 ± 0.07	2.03 ± 0.07	0.23^{NS}
Gizzard Weight (%)	2.04 ± 0.06	2.19 ± 0.08	0.14^{NS}	0.90 ± 0.05	1.03 ± 0.09	0.22^{NS}
Giblets weight (%)	5.47 ± 0.16	4.90 ± 0.08	0.00*	3.32 ± 0.10	3.60 ± 0.13	0.38^{NS}
Abdominal Fat weight (%)	1.67 ± 0.25	1.34 ± 0.33	0.33^{NS}	3.07 ± 0.37	2.74 ± 0.46	0.55^{NS}
Skin weigh t(%)	8.13 ± 0.19	7.85 ± 0.62	0.67^{NS}	7.63 ± 0.27	7.08 ± 0.24	0.14^{NS}
Meat quality Characters						
pH	5.61 ± 0.04	5.63 ± 0.04	0.71^{NS}	5.75 ± 0.5	5.94 ± 0.09	0.07^{NS}
ERV (ml)	19.9 ± 0.38	17.88 ± 0.51	0.75^{NS}	19.45 ± 0.26	19.17 ± 0.71	0.71^{NS}
WHC (cm²)	3.07 ± 0.26	3.12 ± 0.26	0.89^{NS}	3.13 ± 0.23	3.23 ± 0.25	0.77^{NS}

* Significant at 5 %, ** Significant at 1 %, NS- Non Significant.

CONCLUSION

Carcass traits in terms live weight at slaughter, dressing percentage, meat yield and meat bone ratio were found to be superior in broilers reared under intensive system of management at 6th and 13th weeks of age compared broilers reared under backyard system in Mizoram. However non-significant differences (P<0.05) were observed in carcass quality parameters like pH, Water Holding Capacity and Extract Release Volume between the carcasses of broiler birds reared under the two rearing system both at 6th and 13th weeks of age.

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