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Effect of different watering systems on carcass characteristics of commercial broiler chicken

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Abstract
A biological experiment was conducted to assess the effects of different watering systems on the carcass characteristics of commercial broiler chicken at 35th day of age. The study was carried out with 180 sex separated and commercial broiler chicken belonging to single hatch, randomly allotted into five treatment groups and reared with bell drinker system (T_1), nipple drinker system (T_2), floating cup drinker system (T_3), basin drinker system (T_4) and linear channel drinker system (T_5). At the end of the experimental period (35nd day of age) one male and one female from each replicate, totally six birds per treatment group were randomly slaughtered and carcass characteristics were studied. The result revealed a significantly (p<0.01) difference among treatment groups in percentage yield of eviscerated carcass, dressed carcass, giblets, liver, heart and gizzard. The result concluded that the watering systems affected the carcass characteristic in broiler chicken at 35th day of age.

Keywords: Drinker system, carcass characteristic, broiler chicken

Introduction
The contribution of broilers to meat production and availability for customers has expanded significantly over the past ten years as a result of improved genetic and management approaches. Due to its high protein level and low fat content, customers view broiler meat as a high-quality food. Since broiler chickens are little and can grow practically anyplace, they take up less area than some other animals. Drinker systems, stocking systems and water quality are the most significant parameters that might affect broiler carcass and meat quality. Broiler chickens can be sold whole or cut into various sections, such as the neck, front and back, hind back, wings, gizzard, liver, whole breast, and whole legs, depending on the need in the market. Another crucial economic component in the broiler sector is the carcass yield. According to Skrbic *et al.* (2011) [3], the final weight, body development and yield of the main carcass components affect the quality of the slaughtered carcass. Now-a-days attempts are being made to modify the drinker systems to improve the performance and health of livestock and poultry. Another factor of economic importance to the broiler industry is carcass characteristics, specifically carcass dressed yield and fat content. Hence the present study is aimed to assess the carcass characteristics of commercial broiler chicken at 35th day of age with respect to the different drinker systems.

Materials and Methods
A biological experiment was carried out with one hundred and eighty, sex separated and commercial (Strain: "Cobb 430Y") broiler chicken belonging to single hatch. The experimental chicks were sexed, wing banded, weighed and randomly allotted into five treatment groups. Each treatment was allotted with thirty six chicks and each treatment had three replicates with twelve chicks per replicate. The chicks were weighed, wing banded and randomly assigned into five treatment groups. Each group of treatment birds was provided water with one of the following watering system throughout the experimental period. Bell drinker system (T_1), nipple drinker system (T_2), floating cup drinker system (T_3), basin drinker system (T_4) and linear channel drinker system (T_5).
The chicks were reared in deep litter system in a gable roofed, open sided house. All the chicks were provided with uniform floor space, feeder and waterer space and were reared under standard management conditions throughout the experimental period of 35 days. The broiler chickens were fed *ad libitum* with pre-starter, starter and finisher diets from 1 to 07, 08 to 21 and 22 to 42 days of age, respectively. The experimental birds were vaccinated against New Castle disease and infectious bursal disease.

At the end of the experimental period (35nd day of age) one male and one female from each replicate, totally six birds per treatment group were randomly selected, then slaughtered as per the method of Arumugam and Panda (1970) [1] and the following carcass characteristics i.e. eviscerated carcass yield, dressed carcass yield, per cent yield of liver, heart, gizzard and giblet were assessed and expressed as percentage of pre-slaughter live weight.

Measurements of parameters

1. **Dressing yield:** The dressed carcass is weighed with heart, gizzard and liver.
2. **Eviscerated yield:** The dressed carcass is calculated without heart, gizzard and liver.
3. **Liver weight:** The liver weight is measured after removal of gallbladder from the liver.
4. **Heart weight:** The heart weight is taken after removal of the pericardium layer.
5. **Gizzard weight:** Inner kaolin layer is peeled off and contents inside the gizzard were removed and then weight was taken Abdominal fat: The abdominal fat pad is removed and weighed.
6. **Giblet weight:** The weight of liver, heart and gizzard was added to calculate giblet weight.

Statistical analysis

The data collected were subjected to statistical analysis in Completely Randomized Design (CRD) as per the methods suggested by Snedecor and Cochran (1989) [4] and the means of different experimental groups were tested for statistical significance by Duncan's multiple range test (Duncan, 1955) [2]. Angular transformation was applied to percentages wherever needed before carrying out statistical analysis.

Result and Discussion

The mean (±S.E.) carcass characteristics of broiler chicken (expressed as percentage of pre-slaughter weight) at 35th day of age as influenced by the different watering systems is presented in Table 1.

Table 1: Mean (±S.E.) carcass characteristics of broiler chicken (expressed as percentage of pre-slaughter live weight) at 35th day of age as influenced by different watering systems

Treatment	Eviscerated yield	Dressing yield	Liver	Heart	Gizzard	Giblets
Bell drinker (T_1)	68.06^{B}±0.81	72.06^{B}±0.82	1.73^{B}±0.03	0.51^{B}±0.01	1.75^{B}±0.06	3.40^{B}±0.03
Nipple drinker (T_2)	70.44^{B}±0.65	74.30^{A}±0.66	1.73^{B}±0.06	0.57^{AB}±0.02	2.06^{A}±0.05	4.36^{AB}±0.11
Floating cup drinker (T_3)	71.90^{A}±0.38	76.53^{A}±0.30	2.14^{A}±0.06	0.57^{AB}±0.02	1.91^{AB}±0.08	4.63^{A}±0.15
Basin drinker (T_4)	70.81^{A}±0.29	75.45^{A}±0.18	2.06^{A}±0.07	0.57^{AB}±0.02	2.00^{AB}±0.09	4.64^{A}±0.14
Linear channel drinker (T_5)	71.17^{A}±0.43	75.81^{A}±0.50	2.08^{A}±0.04	0.61^{A}±0.01	1.94^{AB}±0.07	4.64^{A}±0.10

Value given in each cell is the mean of 6 observations

$^{A, B}$ Means within a column with no common superscript differ significantly (p<0.01)

The percentage of eviscerated carcass yield, liver yield and giblet yield were significantly (p<0.01) higher in the treatment groups with floating cup drinker system (T_3), linear channel drinker system (T_5), basin drinker system (T_4) than bell drinker system (T_1) and nipple drinker system (T_2). Similarly, the percentage of dressing carcass yield was significantly (p<0.01) higher in the treatment groups T_2, T_3, T_5, T_4 and than T_1.

The percentage of gizzard yield was significantly (p<0.01) higher in nipple drinking systems (T_2) than bell drinker system (T_1), whereas other treatment groups (T_3, T_4, T_5) had intermediary results. The percentage of heart yield was significantly (p<0.01) higher in linear channel drinker system (T_5) than bell drinker system (T_1), whereas other treatment groups (T_2, T_3, T_4) had intermediary results. The result indicates that the drinker system has influence on the carcass characteristics of broiler chicken at 35th day of age with highest dressing yield in the group with floating cup drinker followed by linear channel drinker system.

Conclusion

These finding indicates that different drinker systems had an impact on the yield of eviscerated carcass yield, dressed carcass yield and giblet yield. The floating cup drinker system followed by linear channel drinker system could be recommended for broiler chicken to achieve highest carcass yield including eviscerated and dressed carcass yield.

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