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Effect of Transport Time on Body Performance of Broilers during Transit to Slaughter House

Mesut Karaman
Department of Animal Science, Faculty of Agriculture,
Kahramanmaras Sutcu Imam University, Kahramanmaras, Turkey

Abstract: The objective of the study was to determine body weight loss during transportation of chickens into the Slaughtering house. For this reason, after 42-days of feeding, the male and female broilers were separated into three weight groups such as <2200 g (group A, light weight), 2200-2500 g (group B, middle weight) and >2500 g (group C, heavy weight). Also, female birds were separated into three groups according to live body weights such as <2000 g (group A, light weight), 2000-2200 g (group B, middle weight) and >2200 g (group C heavy weight). Three crates (7/crate) were used for each sex and for each live weight group. Transportation periods were stated as 1-3 h. Live weights of the all chickens were recorded prior to end of the transport period. Mortality and carcass performances also were determined. Weight lost of the male chickens from group A was determined as 46.81, 64.43 and 106.15 g for 1-3 h transport periods, respectively and the differences among three periods were found to be significant. Weight lost of male chickens for group B was determined as 43.10, 94.05 and 120.42 g for 1-3 h transport periods, respectively and the differences among three periods were found to be significant. Weight lost for group C chickens were determined as 92.57, 138.87 and 140.94 g for 1-3 h periods, respectively. For the group A, weight lost of female chicks were recorded as 33.67, 50.90 and 73.33 g for 1-3 h periods, respectively. Main lost was found for 3 h period (compare with two other periods), which was significant. Body weight lost for group B chicks were determined as 37.76, 60.67 and 87.37 g for the same periods, respectively. As conclusion, transportation of the chickens is a great stress factor and has adverse effects on the live weight of the birds.

Key words: Broilers, transport time, body weight loss, mortality

INTRODUCTION

Rearing the broiler chickens at geographically separated areas from slaughter plants is an important issue from sanitary points. Large numbers of chickens, therefore, have to be transported to centralized slaughter houses at the end of the production period. Since, pre-slaughter procedures such as handling to remove from farm, loading and unloading during transportation and shackling in cages could be traumatic and stressful for chickens, the maximum care should be taken during that process. It is now well established in the published data that all kind of procedures effect the carcass performance severely (Northcutt, 1997). Billions of broiler chickens, however, have to be transported to the slaughter houses every year resulting remarkable production loss (Randall *et al*., 1994; Kettlewell and Mitchell, 1994; Mitchell and Kettlewell, 1998).

The stress factors during the transportation of broiler chickens are divided into two main groups as physical and mental (Elrom, 1999). The physical factors were titled as temperature, wind, air flow, gas content and oscillation of vehicle used in transit, whilst mental factors were reported as existence of feed and drinking water, anxiety and fear by the same researcher. All these factors increase the secretion of some hormones and enzymes resulting remarkable raise at concentration of these metabolites in blood and this process affects the meat quality adversely (Kannan *et al*., 1997). High environmental temperature is also reported as a significant stress factor resulting injury and death of broiler chickens in transit (Webster *et al*., 1993). Moreover, static, dynamic and oscillation were also reported that they had adverse effects on chickens (Webster *et al*., 1993).

The adverse effects of the trips on broiler chickens are strongly correlated with length and duration of trip and this is directly related with the distance between production house and slaughter plant. It is therefore, suggested that the distance between production house and slaughter plant should not exceed 100 km. There is also a linear correlation with body size and weight of chickens along with vibration caused by bad road

conditions particularly during transit (Yildirim and Aydin, 2002). This study aims to investigate the possible effects of different transportation period on live weight, death rate and carcass performance of broilers for male and female chickens.

MATERIALS AND METHODS

Male and female chickens, housed separately, were exposed to restrict feeding for 6 h and are both divided into three weight groups at 42-days-old. The groups according to live weight for males were as follow; group A (light weight) <2200 g, group B (middle weight) 2200-2500 g and group C (heavy weight) >2500 g. The groups according to live weight for females were as follow; group A (light weight) <2000 g, group B (middle weight) 2000-2200 g and group C (heavy weight) >2200 g.

Seven chickens were loaded into each special crate (40×60 cm). Three crates were used for each sex and for each live weight group (groups A-C). Transportation periods were stated as 1-3 h and 63 birds experimented for each transport period (total 189 birds). Live weights of the all chickens were recorded prior to transport and live weight groups were composed accordingly. End of the 1st h of the transportation 63 birds from each weight group were taken out and live weights were recorded. Remaining birds continued to transit to investigate the transportation effects for 2 and 3 h. At the end of the transportation periods, death ratio, live weights and carcass performances were determined for each sex and weight groups.

The experiment was carried out during the mid-day (between 11:30 am and 14:30 pm local time) and the temperature and humidity were recorded as 26.3°C and 31.3%, respectively at the start of experiment whilst these figures were 28.7°C and 24.0% at the end of experiment. Completely randomized design model of the experiment was used and Duncan test was applied to determine the differences among treatments.

RESULTS AND DISCUSSION

The weight lost of different groups (A-C) of male and female broiler chickens during transportation were given in Table 1 and 2 ($p<0.05$). The sex of the chickens had remarkable effects on body weight lost since weights lost of male chickens were found to be higher than females for both factors Table 1.

Weight lost of the male chickens from the group A was determined as 46.81+5.03, 64.43+4.91 and 106.15+5.78 g for 1-3 h transport periods, respectively and the differences among three periods were found to be statistically significant ($p<0.05$). Weight lost of male chickens for group B was determined as 43.10+4.67, 94.05+9.21 and 120.42+7.03 g for 1-3 h transport periods, respectively and the differences among 3 periods were found to be statistically significant ($p<0.05$). Weight lost for group C chickens were determined as 92.57+7.78, 138.87+8.49 and 140.94+9.42 g for 1-3 h periods, respectively. The differences between 2 and 3 h periods were found statistically similar ($p>0.05$), however, weight lost for 1 h period was remarkable lower than the values of other 2 periods ($p<0.05$).

Live weight lost and significance values for different transport periods of female chicks were given in Table 2. For the group A, live weights lost of the chicks were recorded as 33.67+3.41, 50.90+5.25 and 73.33+8.66 g for 1-3 h transport periods, respectively. Main lost was found for 3 h period (compare with 2 other periods), which was statistically significant ($p<0.05$). Body weight lost figures for group B chicks were determined as 37.76+4.55, 60.67+6.78 and 87.37+6.14 g for the same periods respectively and these figures were found to be statistically significant ($p<0.05$).

Body weight lost of group C chicks were 71.71+8.48 and 91.80+8.64 for 1 and 2 h transport periods, respectively and there was no remarkable differences ($p>0.05$). However, weight lost figure for 3 h period was recorded as 117.82+7.30 g, which was considerably higher than the figures of 1 and 4 h periods.

The vibration during the transport causes fear, anxiety and mental stress on chicks (Carlisle *et al*., 1998). Oscillation and vibration frequency during transport of broilers varies from 0.5-25 Hz and that amount of vibrations has considerable adverse effects on the birds (Randall *et al*., 1997). The effect of the vibrations on body weight lost increases parallel to increase of chick's body size (Yildirim and Aydin, 2002), increase of chick's body size is also shown to be effective on carcass defects (Mayes, 1980; Nicol and Scott, 1990; Gezertekin and Yalçin, 1999).

It should be considered that the determined carcass defects could also be caused during catching, loading and unloading in addition to transport. The percentage values (%) of carcass performance from transport period, sex and live weight groups are presented in Table 3. The differences between carcass performance values of male birds were statistically similar ($p>0.05$). Carcass values of female birds for different weight groups were remarkably different ($p<0.05$), whilst transport period din not affect the carcass values.

Table 1: Weight lost (g) of male broiler chickens for different weight groups and different transportation periods[1]

	Transportation period (h)		
Weight groups	1	2	3
A (light)	46.81±5.03a	64.43±4.91b	106.15±5.78c
B (middle)	43.10±4.67a	94.05±9.21b	120.42±7.03c
C (heavy)	92.57±7.78a	138.67±8.49b	140.94±9.42b

Table 2: Weight lost (g) of female broiler chickens for different weight groups and different transportation periods[1]

	Transportation period (h)		
Weight groups	1	2	3
A (light)	33.67±3.41a	50.90±5.25a	73.33±8.660b
B (middle)	37.76±4.55a	60.67±6.78b	87.37±6.140c
C (heavy)	71.71±8.48a	91.80±8.61a	117.82±7.30b

[1]a-c differences between means are important in same line shown by different letters ($p<0.05$)

Table 3: Carcass performance (%) of both male and female chickens

		Transportation period (h)		
Sex	Weight groups	1	2	3
Male	A (light)	71.0	71.7	71.2
	B (middle)	74.3	72.9	72.7
	C (heavy)	73.5	73.4	72.4
Female	A (light)	75.9b	74.6a	73.7a
	B (middle)	71.4a	74.4ab	74.9ab
	C (heavy)	75b	76.2b	75.6b

*Differences between means are important in the same row shown by different letters ($p<0.05$)

CONCLUSION

As a conclusion, transportation of the chickens is a stress factor and have adverse effects on the live weight of the birds remarkably. The effects of the transportation have a linear relationship with the body weight of the chicks and extensions of transportation period have severe adverse effects on live weight.

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