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# Carcass and meat characteristics of Soviet Chinchilla rabbits as influenced by age

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ABSTRACT

Carcass and meat characteristics of Soviet Chinchilla rabbits at an average age of 12(G1), 16 (G2), 20 (G3) and 24(G4) weeks was evaluated in the slaughter study. The pre-slaughter weight (kg) was 1.71 in G1 whereas it was higher in G2, G3 and G4. The dressing yield% ranged from 52.8 to 57.1 and was higher in G3 and G4 than G1 and G2. The standard cuts, viz. hind quarter, loin and forequarter expressed as percentage of carcass weight ranged from 38.6 to 41.0, 19.3 to 20.6 and 39.7 to 41.0%, respectively, and were similar in the 4 groups. The abdominal fat content was similar in G1 and G2 and higher in G3 and more so in G4. Percentage of meat in forequarter, loin and hind quarter, meat to bone ratio and total meat yield of the carcass were more in high (G3 and G4) than low (G1 and G2) age group animals. The shear force value increased with increase in slaughter age of the rabbits. It is concluded from the study that dressing yield was more in 20 weeks old rabbits than other age groups. Further, lean content of the carcass increased while its bone content decreased with the advancement of age.

**Key words**: Age, Carcass, Meat quality, Rabbit

Commercial broiler rabbit production is a profitable enterprise in many countries throughout the world. However, rabbit meat consumption is substantially lower in India due to consumer's preference for sheep and goat meat, marginal economic feasibility of rabbit meat production, minimal attention by the scientific community, pet appearance of rabbits and above all limited supply of rabbit meat. Further, information on carcass composition and quality of rabbit meat is limited in contrast to that available for other meat animals. Reported information indicates differences in carcass characteristics among rabbit breeds and crossbreds (Gupta *et al*. 2002) and age of slaughter (Bernardini *et al*. 1994) and sexes (Sen and Bhagwan 1999, Poornima *et al.* 2003). Line origin has also influence on some sensory traits determining rabbit meat tenderness (Arino *et al.* 2007). However, such information is lacking for finisher rabbits raised under hot semiarid environment requiring organized slaughter studies to optimize the age at slaughter. The study was therefore conducted to determine the effect of age on carcass and meat quality traits of Soviet Chinchilla rabbits.

## MATERIALS AND METHODS

The kits weaned at 4 weeks of age were maintained in individual cages and fed *ad lib*. on concentrate pellet and greens harvested (after 24 h wilting) till slaughter. A total of 48 Soviet Chinchilla rabbits were used in this slaughter investigation. The weaner kits were slaughtered at the age of 12 (G1), 16 (G2), 20 (G3) and 24 (G4) weeks. The rabbits were slaughtered without fasting by cervical dislocation. Traits evaluated on animals and carcasses were pre slaughter characteristics, carcass weight, abdominal fat, giblets (heart, kidneys and liver), forequarter, loin and hindquarter (Lukefahr *et al.* 1983). Separation of the forequarter from the loin and separation of the loin from the hindquarter were achieved by making transverse cuts at the last rib and at the posterior lumbar-anterior pelvic region respectively. Dressing percentage was calculated as hot carcass weight plus abdominal fat weight plus giblet weight, divided by pre slaughter weight.

Body and carcass loin width were measured as the lateral distance from the right to the left transverse processes of the lumbar vertebrae over the top of the mid loin. Lean yield traits include percentages of bone and meat of the forequarter, loin and hindquarter cuts, overall meat to bone ratio, total meat and bone percentage of the carcass were assessed. For separation of meat and bone, the carcasses were stored overnight at 5° to 6°C and the retail cuts were de-boned manually. The manually separated bone was boiled with 2% KOH and the residue meat was scrapped off in the cuts and weighed. Body and carcass lengths were measured from the first thoracic vertebra to the tuber ischiadicum (pin bones).

*Longissimus dorsi was* collected and analysed for meat

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quality evaluation. Cooking loss was determined by measuring the difference in the weight loss after cooking of meat for 1 h in water bath at 80°C and the values were expressed in percentage (Babiker *et al.* 1990). Muscle tenderness was assessed by Warner-Bratzler shear press method and the amount of force required to cut through the muscle sample was recorded and expressed as kg/cm$^2$.

The data on all the carcass and meat quality traits were subjected to analysis of variance (Snedecor and Cochran 1968) and significant differences were compared by Duncan's multiple range test (Duncan 1955).

## RESULTS AND DISCUSSION

Weaning weight (g) was significantly higher (P<0.01) in G1 than in G2, G3 and G4 whereas the finishing weights (kg) were significantly higher (P<0.01) in G3 and G4 than G1 and G2. The higher finishing weight of G3 and G4 was reflection of their age. The average daily gain (g) was however higher (P<0.01) in G1 and progressively decreased with advancement of age in G2, G3 and G4. Similar trend was also observed in feed conversion efficiency (%), which was 41.5 in G1 and decreased to 21.2, 18.3, and 13.0 respectively in G2, G3 and G4 with increasing slaughter age. Similar types of findings were also observed by Larzul *et al.* (2005).

Age at slaughter significantly (P<0.05) influenced pre slaughter and carcass weights (Table 1). The pre slaughter and carcass weight was lower (P<0.05) at 12 weeks of age compared to other age groups. However, the pre slaughter weight was similar in G2, G3 and G4. Abdominal fat% significantly (P<0.05) increased with the advancement of age. In general, a heavier carcass (G4) had higher (P<0.05) deposition of abdominal fat. The results are in agreement with the findings of Lukefahr *et al.* (1983). The average dressing percentage ranged from 52.85 to 57.10% of live weight. Dressing percentage was significantly influenced by slaughter age whereas the rabbits slaughtered at 20 weeks had higher (P<0.05) dressing percentage than those slaughtered at 12, 16 and 24 weeks of age. Dressing percentage values observed in this study are higher than earlier reports (Rao *et al.* 1978; Nofal *et al.* 1995). The higher dressing percentage with advancement of age may be due to lower (P<0.05) alimentary canal percentage with increasing age. Slaughter age influenced absolute weights of each physical cuts, however, on their expression as the per cent of carcass, the cuts were found similar in these age groups ranging from 38.6–40.9, 19.3–20.6 and 39.7–41.0%, respectively for hind quarter, loin and forequarter. The results reported here are in agreement with the work of Rao *et al.* (1978) who reported that dressed carcass weight had non-significant effect on the proportion of retail cuts. The proportions of carcass in hindquarter, loin and forequarter cuts, as observed in our study are in close agreement with the observation in New Zealand White and Flemish Giant rabbits by Lukefahr *et al.* (1983).

Body and carcass length and loin width are also presented in Table 1. The higher age group had significantly (P<0.05) wider loin as measured on the live rabbit. Carcass length

Table 1. Carcass traits of soviet chinchilla rabbits slaughtered at variable age

| Traits | Age in weeks | | | |
|---|---|---|---|---|
| | G1<br>12 | G2<br>16 | G3<br>20 | G4<br>24 |
| Pre slaughter wt. (kg) | 1.71$^{b}$±0.11 | 2.26$^{a}$±0.14 | 2.42$^{a}$±0.12 | 2.39$^{a}$±0.18 |
| Carcass wt. (kg) | 0.82$^{b}$±0.08 | 1.11$^{a}$±0.11 | 1.27$^{a}$±0.12 | 1.17$^{a}$±0.17 |
| Abdominal fat% | 1.21$^{c}$±0.09 | 0.90$^{c}$±0.26 | 2.45$^{b}$±0.34 | 3.92$^{a}$±0.37 |
| Giblet (%) | 8.17±0.24 | 6.36±0.33 | 6.75±0.48 | 7.88±0.54 |
| Alimentary canal (%) | 20.46$^{a}$±0.62 | 18.47$^{b}$± 0.56 | 16.68$^{b}$±0.73 | 17.29$^{b}$±0.75 |
| Dressing (%) | 52.85$^{b}$±0.36 | 52.99$^{b}$±0.37 | 57.10$^{a}$±0.66 | 54.25$^{b}$±0.82 |
| Hindquarter (%) | 40.99±0.49 | 39.25±0.50 | 39.74±0.41 | 38.64±0.58 |
| Loin (%) | 19.34±0.59 | 19.77±0.69 | 19.34±0.66 | 20.64±0.65 |
| Forequarter (%) | 39.66±0.56 | 40.97±0.60 | 40.82±0.59 | 40.58±0.73 |
| Skin (%) | 8.26$^{b}$±0.31 | 9.61$^{b}$±0.33 | 9.99$^{b}$±0.32 | 11.27$^{a}$±0.64 |
| Blood (%) | 3.80±0.40 | 3.18±0.29 | 3.12±0.35 | 3.78±0.39 |
| Head (%) | 8.77±0.34 | 8.65±0.20 | 8.83±0.23 | 8.53±0.15 |
| Lungs (%) | 1.02±0.21 | 0.62±0.19 | 1.07±0.15 | 1.05±0.12 |
| Tail and feet (%) | 2.92±0.21 | 2.55±0.26 | 2.59±0.29 | 2.87±0.19 |
| Body length (cm) | 21.75±0.46 | 23.37±0.34 | 22.75±0.40 | 23.75±0.49 |
| Loin width (cm) | 4.75$^{bc}$±0.27 | 5.87$^{b}$±0.39 | 6.25$^{ab}$±0.46 | 7.25$^{a}$±0.27 |
| Carcass length (cm) | 19.37$^{b}$±0.34 | 23.12$^{a}$±0.25 | 21.75$^{a}$±0.35 | 23.47$^{a}$±0.46 |
| Carcass loin width (cm) | 4.62±0.25 | 5.12±0.25 | 5.65±0.28 | 5.47±0.34 |

Means bearing different superscripts differ significantly (P<0.05).

Table 2. Lean yield traits and meat quality of soviet chinchilla rabbits slaughtered at variable age

| Traits | Age in weeks | | | |
|---|---|---|---|---|
| | G1 12 | G2 16 | G3 20 | G4 24 |
| *Total separable* | | | | |
| Lean% | 77.01$^{c}$±1.08 | 83.0$^{b}$±0.68 | 86.84$^{a}$±1.33 | 87.65$^{a}$±0.32 |
| Bone% | 16.03$^{a}$±0.98 | 12.61$^{b}$±0.77 | 13.07 $^{b}$ ±0.96 | 11.55 $^{b}$ ±0.34 |
| Lean: bone | 4.80 | 6.58 | 5.40 | 7.59 |
| *Hind quarter* | | | | |
| Lean% | 77.03$^{c}$±1.45 | 87.17$^{ab}$±0.48 | 89.05$^{a}$±1.60 | 85.58 $^{b}$ ±0.57 |
| Bone% | 15.92$^{a}$±1.35 | 10.33 $^{b}$ ±1.41 | 10.09 $^{b}$ ±0.48 | 12.52 $^{b}$ ±1.11 |
| *Loin* | | | | |
| Lean% | 85.00±1.08 | 82.31±1.28 | 85.59±0.53 | 82.83±1.73 |
| Bone% | 7.50±0.76 | 10.77±0.73 | 10.40±0.99 | 10.37±1.66 |
| *Fore quarter* | | | | |
| Lean% | 73.33$^{c}$±1.10 | 79.28 $^{b}$ ±0.71 | 85.50$^{a}$±0.95 | 79.21 $^{b}$ ±0.17 |
| Bone% | 20.00$^{a}$±0.58 | 15.83 $^{b}$±0.77 | 11.80$^{c}$±0.58 | 18.81$^{a}$±0.20 |

Means bearing different superscripts differ significantly (P<0.05).

increased significantly (P<0.05) up to 16 weeks and remained constant thereafter while the loin width gradually increased with the age. Results indicated that after reaching the particular body conformation, the animal attained a more compact body frame (wider loin and shorter carcass). It is difficult to compare these results objectively with other reports because of breed differences (Lukefahr *et al.* 1982).

Lean yield and meat quality characteristics are presented in Table 2. The lean content significantly (P<0.05) increased with age in G2 and G3 whereas the bone content was higher in G1 than other groups. Meat bone ratio ranged from 4.80 to 7.59 and it was lower (P<0.05) in G1 than other groups. These values are comparatively higher than those reported by Rao *et al.* (1978) whereas, the increasing meat or bone with age compared favorably with their results. The maximum lean content was noticed in the fore quarter and hindquarter cuts than in the loin. Per cent bone was lowest in the loin cut and highest in the forequarter. The results are in agreement with the findings of Lukefahr *et al.* (1983).

Cooking loss percentage decreased from 25.09 (G1) to 25.06 (G2), 24.56 (G3) and 24.49 (G4) with increasing age however, the differences were statistically non- significant. Shear force value of meat increased in higher age group rabbits and found to be 3.59 kg/cm$^2$ in 20 weeks group and 3.72 kg/cm$^2$ in 24 weeks group as compared to 12 weeks age (3.29 kg/cm$^2$). This could possibly be due to collagen content, its solubility and differences in fatness. Valin *et al.* (1984) also reported increased cross linking in muscles with advancement of age.

It is concluded from the study that average daily gain significantly reduced with the advancement of age and dressing yield was more in 20 weeks old rabbits than other age groups. Further, lean content of the carcass increased while its bone content decreased with the advancement of age. However, no significant differences were observed in meat quality parameters at variable age.

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