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Effect of breed, weaning age and feeding regime on chemical composition of rabbit meat

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Abstract
The study was carried out on New Zealand White (NZW) and Soviet Chinchilla (SC) rabbits. Thirty male kits from each breed were identified and randomly assigned to three groups G1, G2 and G3 which were weaned at 4, 5 and 6 weeks of age respectively. Each group was divided into 2 units comprising of 5 kits. The animals were kept in individual galvanized wire mesh cages measuring 0.60m x 0.60m x 0.30m. The samples were mixed thoroughly and stored at chiller for a short period before analysis. The proximate composition *viz.*, moisture, fat, protein and ash were estimated as per A.O.A.C. (1990) and the data were statistically analyzed using 'ANOVA' of MS excel programme. Breed and feeding regime also had no influence on moisture per cent of rabbit meat. Palanska *et al*. (1981) studied moisture percentages in rabbits of 4, 6, 8, 10, 12, 14 and 16 weeks age and mentioned that the total moisture content decreased significantly with increasing age, from 76.3 to 73.77 per cent. In respect to ash content, rabbit of Soviet Chinchilla (SC) breed weaned at 5th and 6th week had higher ash content than those weaned at 4th week. The proximate composition *viz.*, moisture, fat, protein and ash were estimated as per A.O.A.C. (1990) and the data were statistically analyzed using 'ANOVA' of MS excel programme.

Keywords: Rabbit meat, fat, protein, weaning age

1. Introduction
Rabbit (*Oryctolagus cuniculus*) is a versatile animal and one of its utilities is production of meat. It can efficiently utilize fibrous plant materials and agricultural by-products for their nutrition. Rabbit farming has also been encouraged by the FAO (1987) [4] solely for meat production in the developing countries for its small body size, shorter generation interval, high prolificacy and early marketability. The production of 1 kg of rabbit meat requires only 25 per cent of the food energy needed to produce the same amount of lamb or beef and 70 per cent of the food required for the equivalent quantity of pork (Lebas and Metheron, 1982) [5]. The per capita consumption of animal protein is 8.3g against the requirement of 15g per head per day according to the Indian Council of Medical Research (Chatterjee 1995). As reported by Das (1998) [3] India's rabbit meat production was only 75 thousand ton with a consumption rate of 9 g/head/year only. Rabbit production for meat is expanding, because of its meat being wholesome, tasty and protective food having high protein (Bora, 1995) [2]. Rabbit meat has extremely low cholesterol (136 mg %) and sodium (393 ppm), thus plays a vital role in the prevention of vascular diseases (Rao *et al*., 1978) [7]. The present study was undertaken to evaluate the proximate composition of meat of two rabbit breeds weaned at various ages which were fed with different feeding regimes.

2. Materials and methods
The study was carried out on New Zealand White (NZW) and Soviet Chinchilla (SC) rabbits. Thirty male kits from each breed were identified and randomly assigned to three groups G1, G2 and G3 which were weaned at 4, 5 and 6 weeks of age respectively. Each group was divided into 2 units comprising of 5 kits. One unit was fed with concentrate (C) where the daily fed allowance was divided into 2 splits and supplied in the morning and left afternoon. The other unit was provided with (C+G) i.e. 50 per cent concentrate in the morning and the remaining 50 per cent substituted with Congo signal grass (*Brachiaria brizantha*) fed ad libitum in the evening. The proximate composition of the experimental concentrate pellet was estimated at 10.22 per cent moisture, 15.68 per cent crude protein, 7.12 per cent ether extract and 11.37 per cent crude fibre and the corresponding values of Congo signal fodder were 76.2,

8.08, 1.93 and 28.04 per cent, respectively. All the kits were provided with wholesome drinking water round the clock.

The animals were kept in individual galvanized wire mesh cages measuring 0.60m x 0.60m x 0.30m. The cages were placed in a semi open shed with C.I. sheet roof and concrete floor. The shed had sufficient cross ventilation and provision for optimum light and proper drainage system. The rabbits were slaughtered at 12 weeks of age.The feed was withdrawn 12 hours before slaughter. After slaughter, Longissimus dorsi muscle was collected from each unit, trimmed and cut into small pieces. The samples were mixed thoroughly and stored at chiller for a short period before analysis. The proximate composition *viz.*, moisture, fat, protein and ash were estimated as per A.O.A.C. (1990) and the data were statistically analyzed using 'ANOVA' of MS excel programme.

3. Results and discussion

Results of the present study (Table 1) revealed that there was no significant difference in respect of moisture per cent among the groups. Breed and feeding regime also had no influence on moisture per cent of rabbit meat. Palanska *et al*. (1981) [6] studied moisture percentages in rabbits of 4, 6, 8, 10, 12, 14 and 16 weeks age and mentioned that the total moisture content decreased significantly with increasing age, from 76.3 to 73.77 per cent. In respect to ash content, rabbit of Soviet Chinchilla (SC) breed weaned at 5th and 6th week had higher ash content than those weaned at 4th week. Arrington and Kelley (1976) [1] reported the ash percentage of rabbit meat to be 4.8, which is much higher than the value observed in the present study. This difference might be due to the difference in aim of the experiment.

Table 1: Average values of proximate composition (in Per cent) of meat of New Zealand White (NZW) and Soviet chinchilla (SC) rabbits under different weaning ages and feeding treatments

Breed	Weaning age	Moisture			Protein			Fat			Ash		
		C	C+G	Average	C	C+G	Average	C	C+G	Average	C	C+G	Average
NZW	4 weeks (Group I)	76.20 ±0.52	78.09 ±0.55	77.14 ±0.50	19.06 ±0.19	18.17[a] ±0.33	18.62 ±0.23	5.80 ±0.09	5.01[a] ±0.33	5.40 ±0.21	1.12 ±0.01	1.13 ±0.02	1.23 ±0.01
	5 weeks (Group II)	76.60 ±0.21	76.99 ±0.69	76.80 ±0.34	18.08 ±0.85	17.96[ab] ±0.69	18.02 ±0.52	5.80 ±0.17	4.69[ab] ±0.26	5.25 ±0.24	1.13 ±0.04	1.18 ±0.04	1.15 ±0.03
	6 weeks (Group III)	75.76 ±0.47	77.20 ±0.70	76.48 ±0.46	18.76 ±0.70	20.63[c] ±0.54	19.70 ±0.52	5.86 ±0.24	6.35[c] ±0.18	6.10 ±0.16	1.20 ±0.03	1.16 ±0.06	1.18 ±0.03
Average		76.19 ±0.24	77.42 ±0.37	76.81 ±0.25	18.63 ±0.36	18.92 ±0.43	18.63 ±0.25	5.82 ±0.10	5.35 ±0.24	5.58 ±0.13	1.15 ±0.02	1.16 ±0.02	**1.15 ±0.01**
SC	4 weeks (Group I)	76.82 ±0.36	77.50 ±0.35	77.16 ±0.26	18.81 ±0.27	18.13 ±0.40	18.47 ±0.25	4.57 ±0.19	5.57 ±0.31	5.07 ±0.24	1.15 ±0.02	1.05[a] ±0.02	1.10 ±0.02
	5 weeks (Group II)	77.28 ±0.36	76.73 ±0.45	77.01 ±0.29	18.61 ±1.11	17.96 ±0.33	18.29 ±0.56	5.03 ±0.30	4.98 ±0.12	5.00 ±0.15	1.21 ±0.04	1.18[b] ±0.03	1.19 ±0.03
	6 weeks (Group III)	77.41 ±0.50	74.89 ±0.57	76.15 ±0.55	19.17 ±0.57	19.02 ±0.38	19.12 ±0.32	4.81 ±0.32	5.19 ±0.39	5.00 ±0.25	1.19 ±0.05	1.18[bc] ±0.03	1.18 ±0.03
Average		77.17 ±0.23	76.37 ±0.38	76.77 ±0.23	18.86 ±0.40	18.39 ±0.24	18.63 ±0.23	4.80 ±0.15	5.25 ±0.17	5.03 ±0.12	1.18 ±0.02	1.13 ±0.02	1.16 ±0.02

Figures given in bold are the overall averages. C indicates concentrate (pellets) feed and C+G concentrate feed plus green fodder.
Similar superscripts in a column do not differ significantly. (Superscripts used only in cases where there is a significant difference)

The results obtained in the present study are not comparable with the above workers due to the fact that the study was conducted on weaning and feeding regimes in two different breeds. However, the meat of G III showed a significantly (P<0.05) higher protein per cent than those of GI and GII, whereas there was no significant difference between group I and II. Thus the study indicated that the weaning age has an impact on the protein content of meat. Similarly, the fat content of meat also influenced by the weaning age, however, breed and feeding regime had no effect. The rabbits that weaned at 6th week of age had higher fat per cent compared to those weaned at 4th and 5th week. Rao *et al*. (1978) [7] concluded that protein content (18.6 to 19.4%) was not influenced by slaughter age; whereas, fat (7.9 to 10.9%) and moisture (68.5 to 72.0%) contents of the rabbit meat were affected (P<.05) by the slaughter ages. The moisture content tended to go down while the fat content went up as the slaughter age increased. Their experiment showed a contrasting result with the present study that weaning age had no effect on any of the chemical components. Results of this study indicate that rabbit can be weaned at 4 weeks of age without affecting the meat quality. In chemical composition, rabbit meat is comparable to chicken and is higher in protein content than the other meats (USDA, 1973). In addition rabbit showed a lower fat content than most of the other meats (USDA, 1973).

4. Summary

From the above findings it may be concluded that the moisture, protein, fat and ash percentages of rabbit meat may be affected due to variation in weaning age, feeding treatment and breed. Late weaning could increase the protein and fat per cent of rabbit meat. Significant change in ash content was also noticed in the meat of SC breed. From the above it can be precisely concluded that early weaning in rabbits had no significant influence on the moisture, protein, fat and ash per cent in the meat of NZW and SC breed.

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