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CARCASS EVALUATION AND ACCEPTABILITY STUDIES ON RABBITS IN NORTH EASTERN HILL REGION OF INDIA

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ABSTRACT

Fifty-four rabbits, 6 each of SC x NZW, NZW x L, NZW x SC, SC x L, L x NZW, L x SC crossbred and SC, NZW and L as pure breed were evaluated for carcass traits and nutritive value of meat. Significant breed differences ($P< 0.05$) were seen in all carcass traits studied except giblet percentage and carcass loin width. NZW had the most favourable body composition amongst all the pure breeds. However, the crossbred rabbits had advantages for body measurements, meat yield traits and nutritive content of meat. Correlation studies indicate significant positive relationship ($P<0.05$) between preslaughter weight and body measurements and carcass weight and meat yield. Organoleptic acceptance studies on a 9 point Hedonic scale had high scores for rabbit meat ranging from 7.92 ± 0.38 to 7.94 ± 0.17. Comparisons between rabbit meat and chicken revealed no significant differences ($P<0.05$) in organoleptic quality and acceptance of meat. This demonstrates the potential of rabbit rearing and their crucial role as a meat producer in the North Eastern Hill Region of India.

INTRODUCTION

Animal husbandry in the North Eastern Hill Region of India (NEHR) is an important source of subsidiary income. Tribal people in this region are meat eaters, which attracts them to animal husbandry. Agricultural land constraints also make broiler rabbit rearing a viable livestock enterprise.

There has been no study on the popularity and acceptability of rabbit meat in this region. This study makes an attempt to determine the carcass characteristics and nutritive value of meat and the effect of crossbreeding for these attributes. Organoleptic evaluation and acceptance studies have also been carried out to ascertain the acceptance of rabbit meat in general and its comparison with chicken, a preferred source of meat in this region.

MATERIALS AND METHODS

Fifty-four rabbits, 6 each of Soviet Chinchilla (SC) x New Zealand white (NZW), NZW x Local (L), NZW x SC, SC x L, L x NZW, L x SC crossbred and SC, NZW and L as pure breed, of same age and sex were chosen at random out of 298 rabbits from the Animal Production farm of ICAR Research complex for NEHR, Umiam, for carcass appraisal. All rabbits were fed a commercial pelleted diet (maize-30%, wheat-15%, wheat bran-5%, deoiled groundnut cake-16%, soybean

meal-12%, rice bran-12%, molasses-7%, mineral mixture-2.5% and common salt-0.5%), weaned at 46 days of age and moved to a growing facility as a litter group. The live weights of 90-day-old rabbits were recorded and they were slaughtered according to Ziegler's (1968) method. The carcasses were divided into sections and marked as edible offals, inedible offals and main carcass (loin, chest, hindleg and foreleg) .The dressing percentage (DP), percent meat, bone, and meat: bone and chill shrinkage was calculated as per Lukefahr *et al.* (1982).

Samples for nutritive evaluation were collected from the thigh, shoulder, and muscle and loin area, and amalgamated by mincing before estimation. The nutritive quality in terms of dry matter (DM), crude protein (CP) and ether extract (EE) were determined (AOAC, 1980).

For the organoleptic test the carcasses were washed in cold water, placed in a $4^{o}C$ cooler, overnight and sealed in freezer bag at $-20^{o}C$. The carcasses were thawed overnight after 3 days and meat cooked with the addition of Indian spices to make a curry. The organoleptic test was carried out in two phases wherein in phase one (P1), the general acceptability of rabbit meat was assessed by a semi-trained panel of 30 members who were divided into regular meat eaters (T1) and occasional meat eaters (T2). In phase 2 (P2), 10 panellists rated 3 samples one of chicken and two of rabbit meat cooked identically, the identity of which was concealed from them, to assess difference in organoleptic attributes between rabbit and chicken meat. The data collected were analysed for tests of significance (Snedecor and Cochran, 1982).

RESULTS AND DISCUSSION

Important breed type differences were seen in all carcass traits except giblet % and carcass loin width (Table 1), which correspond to Lukefahr *et al.* (1982). NZW breed had the highest preslaughter weight (PSW), carcass weight, and % meat and % meat: bone among the purebred rabbits. Bujarbaruah *et al.* (1996) found that NZW had superior growth rate than SC, under subtropical conditions of rearing at 980m altitude. However, the % hot carcass weight (HCW) was low (65.40 ± 1.00), which could be due to the high skin % (11.9 ± 0.21) and % inedible offals (18.11 ± 3.02). Th DP and carcass weight in SC was the highest and this could be attributed to the high % bone (23.21 ± 1.34) in the carcass. This observation may be due to the large umber of presacral vertebrae characteristics of giant rabbit breeds (Stohl, 1978). NZW x SC crossbred had the highest PSW, carcass weight, carcass length, % meat: bone and the lowest bone %, amongst different crossbreds, which are important characteristics for any meat animal. NZW x SC had higher % HCW, %loin, %hindleg, % foreleg, and DP and % meat: bone in comparison with NZW. However it had a greater % shrinkage and lower PSW though not significantly ($P<0.05$) different. Comparisons between the means of the purebred and crossbred animal showed that the crossbred animals in general were at par in terms of all carcass traits except PSW. This is in agreement with studies carried out by Ozimba and Lukefahr (1980) which stated that crossbreeding is a useful system for the rabbits and increase herd productivity. The DP ranged from 53.2 ± 1.77 in L x NZW to 64.35 ± 2.04 in L x SC. The % chill shrinkage ranged from 0.93 ± 0.12 in NZW x L to 2.29 ± 0.09 in SC x NZW which is much lower than the range reported by Lukefahr *et al.* (1982). Percent meat: bone ranged from 2.79 ± 0.26 to 5.31 ± 0.77 which is in agreement with Rao et al (1978). The nutritive analysis also showed significant

differences (P< 0.05) between breeds in terms of DM, CP and EE. (Table 2). Among purebreds NZW had the highest DM and lowest EE whereas SC had the highest CP. Bujarbaruah *et al.* (1996) have reported similar values for NZW and SC under sub-tropical rearing conditions.

Table 2 . Nutritive value of rabbit meat

Parameter	SCxNZW	NZW x SC	NZW x L	SC x L	L x NZW	L x SC	SC	L	NZW
DM%*	27.71^{d} ±2.33	29.15^{e} ±2.15	21.79^{a} ±2.30	26.21^{c}2 ±2.20	23.38^{b} ±2.32	30.81^{f} ±1.69	27.61^{d} ±1.55	29.10^{e} ±2.10	29.13^{e} ±2.18
CP%*	72.40^{e} ±2.36	72.5^{e} ±1.69	86.37^{g} ±1.63	80.37^{f} ±2.02	86.37^{g} ±1.77	62.83^{b} ±2.88	72.22^{d} ±1.92	61.46^{a} ±1.69	66.55^{c} ±1.02
EE%*	22.72^{d} ±3.02	29.73^{h} ±3.02	16.46^{b} ±2.22	21.38^{c} ±1.98	15.35^{a} ±1.69	29.34^{h} ±2.64	28.83^{g} ±1.12	27.13^{f} ±1.99	24.67^{e} ±2.76

*Different Superscripts within a row differ significantly (P<0.05)

Correlations between body measurements and carcass characteristics are given in Table 3. Strong positive correlation between PSW and HCW with carcass weight and moderate to high correlation between body and carcass measurements with HCW and % meat were observed. The correlation between PSW and HCW (0.93) and PSW and % meat: bone (0.54) were similar to those reported by Lukefahr *et al.* (1982).

Table 3 . Correlation between body measurements and carcass traits

Traits		1	2	3	4	5	6	7	8	9	10
1	Preslaughter weight(g)										
2	Body length(cm)	0.52									
3	Body loin width(cm)	0.25	0.14								
4	Hot carcass weight(g)	0.93*	0.50	0.41							
5	Carcass length(cm)	0.66*	0.76*	0.33	0.63						
6.	Carcass loin width(cm)	0.68*	0.30	-0.03	0.67*	0.23					
7	Carcass weight(g)	0.63*	0.25	0.39	0.56	0.10	0.68*				
8	Dressing%	0.24	0.02	0.35	0.20	-0.24	0.48	0.90*			
9	%Chill shrinkage	0.08	-0.51	0.32	0.91	-0.17	0.06	0.09	0.06		
10	%bone	-0.53	0.06	-0.23	-0.58	-.02	0.54	-0.55	0.34	-0.5	
11	%meat bone	0.54	-0.04	0.11	0.57	0.19	0.48	0.29	0.07	0.56	-0.88

* Superscripts show significant results (P<0.05)

Phase 1 of the organoleptic tests showed a marginal difference in the scores on acceptability of regular meat eaters (7.94 ± 0.17) and occasional meat eaters (7.92 ± 0.42). In phase 2 there was

no significant difference ($p<0.05$) in the overall scores between rabbit (7.55 ± 0.15) and chicken (7.91 ± 0.10). Thus the study showed rabbit meat at par with chicken a finding supported by Reddy *et al.* (1978).

Table 4. Overall acceptability of rabbit meat on 9 point Hedonic scale.

Parameter	Appearance	Texture	Flavor	Odour	Aftertaste	Overall acceptability
Phase 1						
T1	8.00±0.16	7.63±0.18	7.50±0.12	7.81±0.35	7.75±0.27	7.94±017
T2	7.85±0.40	7.15±0.39	7.69±0.42	8.08±0.45	7.38±0.43	7.92±0.38
Phase 2						
Rabbit meat	7.80±0.22	7.65±0.46	7.30±0.54	8.16±0.46	7.22±0.59	7.55±0.15
Chicken	8.00±0.21	7.70±0.26	7.60±0.33	8.33±0.41	8.00±0.31	7.91±0.10

It can therefore be concluded that rabbit breeding can become a viable and sustainable enterprise in NEHR of India with good meat potential.

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Table 1 : Carcass characteristics and the nutritive value of the meat different rabbit breeds

Breed	PSW* (g)	%HCW*	C wt* (g)	C 11th* (cm)	C loin wth (cm)	% Loin	% Chest	% Hind leg	%Foreleg	% inedible offals	% Giblet	% skin	D P*	% CS*	% meat*	% bone*	% meat
SC x NZW	1600^{ab} ±5.66	77.50^{c} ±1.06	900^{d} ±2.32	29^{c} ±0.33	14.5 ±0.22	41.11^{d} ±2.36	17.78^{b} ±2.33	27.78^{bc} ±1.51	13.33^{a} ±0.66	17.63^{b} ±2.63	7.66 ±0.33	10.65^{c} ±0.33	62.18^{c} ±1.36	2.29^{f} ±0.09	72.58^{bc} ±1.32	16.16^{b} ±1.36	4.49^{f} ±0.98
NZW x SC	1800^{b} ±4.52	70.00^{ab} ±1.32	955^{e} ±3.02	33^{ce} ±0.56	14 ±0.63	37.17^{bc} ±1.63	15.71^{a} ±2.12	28.79^{c} ±2.66	18.32^{c} ±0.98	18.33^{c} ±2.54	7.93 ±0.26	11.11^{d} ±0.35	58.61^{c} ±2.02	2.05^{e} ±0.21	75.79^{d} ±2.03	14.27^{a} ±1.66	5.31^{g} ±0.77
NZW xL	1750^{ab} ±33.99	71.40^{ab} ±1111.46	950^{c} ±2.65	29^{e} ±1.56	13.5 ±0.36	33.68^{a} ±1.22	24.21^{d} ±1.73	26.32^{b} ±2.50	15.79^{b} ±1.02	20.00^{d} ±3.02	8.00 ±0.35	11.42^{d} ±0.61	60.00^{e} ±1.92	0.93^{a} ±0.12	76.00^{d} ±1.25	24.20^{f} ±1.45	3.14^{b} ±0.22
SC xL	1470^{a} ±2.84	74.82^{b} ±1.54	755^{c} ±1.95	31^{d} ±0.46	13 ±0.54	39.74^{cd} ±2.02	20.53^{c} ±1.81	26.49^{b} ±1.94	13.25^{a} ±0.56	25.85^{e} ±2.00	9.55 ±0.56	7.80^{a} ±0.43	58.50^{c} ±2.33	1.49 ±1.11	68.63^{b} ±0.99	18.70^{d} ±1.72	3.67^{d} ±0.63
L xNZW	1250^{a} ±4.27	69.20^{a} ±1.22	575^{a} ±1.03	27^{b} ±1.02	13 ±0.26	44.35^{e} ±2.13	20.87^{c} ±1.22	33.91^{d} ±2.00	20.00^{d} ±1.53	16.80^{a} ±1.95	10.40 ±0.92	11.20^{d} ±0.37	53.2^{a} ±1.77	1.12^{b} ±0.53	66.47^{a} ±1.14	17.53^{g} ±1.26	2.79^{a} ±0.26
L x SC	1600^{ab} ±3.33	74.68^{d} ±1.23	925^{dc} ±3.24	26^{b} ±0.55	15 ±0.28	37.84^{c} ±2.55	21.08^{cd} ±2.35	24.86^{a} ±1.14	16.22^{b} ±0.66	17.50^{ab} ±2.11	8.78 ±0.46	9.30^{b} ±0.55	64.35^{f} ±2.04	0.97^{a} ±0.33	77.40^{d} ±1.96	21.08^{d} ±1.58	3.67^{d} ±0.49
SC	1700^{ab} ±1.95	71.70^{ab} ±1.55	915^{dc} ±3.24	30^{cd} ±0.22	14 ±0.34	38.25^{c} ±1.95	21.32^{cd} ±2.30	24.04^{a} ±2.44	16.39^{bc} ±1.22	18.24^{bc} ±1.36	7.78 ±0.61	9.40^{b} ±0.41	59.41^{d} ±1.26	1.90^{e} ±0.44	75.00^{d} ±1.61	24.27^{f} ±1.34	3.09^{c} ±0.51
L	1250^{a} ±7.66	74.00^{b} ±1.55	640^{b} ±2.01	17^{a} ±1.14	13 ±0.79	32.82^{a} ±2.45	20.32^{c} ±1.55	29.68^{c} ±1.25	17.19^{c} ±1.49	17.20^{a} ±2.16	10.27 ±0.49	10.40^{c} ±0.39	59.20^{d} ±2.22	1.82^{d} ±0.62	69.18^{b} ±2.01	21.55^{e} ±1.28	3.21^{c} ±0.62
NZW	1850^{b} ±3.19	65.40^{a} ±1.00	965^{e} ±3.00	30^{cd} ±0.87	15 ±0.59	36.27^{b} ±1.44	20.73^{c} ±1.92	26.94^{b} ±1.78	16.06^{c} ±1.44	18.11^{b} ±3.02	8.26 ±0.66	11.89^{d} ±0.21	57.29^{b} ±1.64	1.41^{bc} ±0.18	79.75^{e} ±1.58	19.26^{c} ±1.11	4.14^{e} ±0.33

*Different Superscripts within a row differ significantly ($P<0.05$)