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Effect of Bilateral and Unilateral Castration on Feed Utilization and Carcass Characteristics of Growers Rabbit (*Orytolagus cunniculus*)

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Abstract

This study was conducted on eighteen (18) New Zealand and chinchilla breeds of rabbits were used. The rabbits were allotted to 3 treatments with each treatment having six (6) animals with two (2) replicates.T1 were castrated, which both testes were removed (Bilateral); T2 were castrated, which only one testes was removed (unilateral) and T3 were not castrated (control). In nutrient digestibility, T_1 and T_2 ($p>0.05$) have a higher rate than T_3. There was no significant($p<0.05$) difference in live weight and dressing weight among the treatment groups. There is a significant ($p > 0.05$) difference in visceral organs in the treatment groups.

Introduction

In most developing countries in the tropics, there is undoubted acute shortage of animal protein consumption. The traditional livestock are unable to meet the increasing demands, this necessities the improvement for micro livestock industries and other non conventional meat source like rabbits, snails, bees, guinea pigs and grass cutters (Dairo and Adeshina, 1980). The domestic rabbit is called *Orytolagus cunniculus* (Owen, 1975) and the production of these had been attracting increase in Nigeria (Omole, 1980). The production of rabbit is suitable because the feeding does not compete with that of man as much. Rabbits grow as fast as the modern day broiler chicken and utilized feed protein more efficiently. Rabbit have relatively short gestation interval of 30 to 31 days.

Castration in rabbit involves cutting blood supply to the testis either by crushing the blood vessel, cutting or elevating temperature of the testis (Frandson and Spurgeon 1992). According to Devendra and Mcleroy (1988), castrated rabbits have no sex life and therefore have a higher feed intake level and feed conversion ratio (Lawrence and Kathèrine, 1999). F.A.O (1986).The objectives of this study are to compare the difference between bilateral and unilateral castrated rabbit; to determine the effect of feed intake, digestibility and feed utilization of castrated rabbits; to determine the growth rate of Bilateral, unilateral and the non castrated rabbits and to determine the effect of carcass characteristics and meat yield of Bilateral, unilateral and non-castrated rabbits.

Materials and Methods

The experiment was carried out at the rabbitary- section at the teaching and research farm of the School of Agriculture and Agricultural Technology, Federal University of Technology Minna. Niger state is situated on latitude 9° North, longitude 7° east, mean annual rainfall is 1200-1300mm, with a mean annual temperature of 38-42c, it has an altitude of 1475m above sea level and the vegetation is guinea savannahs. Eighteen (18) new Zealand and chinchilla breeds of growers' rabbit were used, aged from 7-8 weeks. They were all male rabbits sourced from Minna central market, Minna Niger state.

The rabbits were allotted to 3 treatments with each treatment having six (6) animals with two (2) replicates.T1 were castrated, which both testes were removed (Bilateral); T2 were castrated, with only one testes removed (unilateral) and T3 were not castrated (control). The castration was done one week after the rabbit's arrival to the farm and this mark the beginning of the experiment. Data on feed intake, feed refusal and final body weight gain were taken and the proximate composition of the growers pelleted feed (commercial feed) used during the feeding trial was determined. At the end of the experiment, seven days digestibility trial was conducted. 8 rabbits were selected one from each replicate and kept in the

metabolic cage for feacal sample collection. Sample collected was taken to the laboratory and during the digestibility trial, daily feed offered and left over was recorded, the feacal sample was analysed for proximate compositions. Data obtain from this experiment was subject to statistical analysis using one way analysis of variance (ANOVA) and Duncan multiple range test was used to separate the mean. The analysis was done using statistical package for social science. (SPSS).

Results and Discussion

Table 4.1 shows the proximate composition of the experimental diet. The proximate composition shows that the dry matter value was 93.97; Crude protein 19.56, Crude fibre 10.80 and ether extract 15.35. The ash content was 8.10 and the nitrogen free extract value was 46.09.Table 4.2 shows nutrient digestibility of castrates (bilaterally and unilaterally) and non- castrates of New Zealand and Chinchilla rabbits. In nutrient digestibility, there is no significant ($p>0.05$) difference in dry matter value among the treatment groups. In crude protein, T_1 is significantly ($p<0.05$) lower than other treatment groups. While in crude fiber, T_3 (non- castrates), differ significantly ($p>0.05$) from T_1 and T_3 Similarly, T_2 is significantly ($p<0.05$) higher than T_1. In ash nutrient digestibility, T_2 (Unilateral) differs significantly ($p>0.05$) from T_1 and T_3. In energy values, T_2 differs significantly ($p>0.05$) from T_1 and T_3 . No significant ($p>0.05$) difference was observed in ether extract and nitrogen free extract. Carcass characteristics of castrates (bilateral and unilateral) and non castrates of New Zealand and Chinchilla breeds of rabbits are presented in (Table 4.3). In slaughter weight, T3 (Non - castrates) is significantly ($p<0.05$) lower than T_1 and T_2. However, in rib weight T_1 is significantly ($p>0.05$) higher than T_3. There is no significant ($p>0.05$) difference observed in live weight, dressed weight between the treatment groups. Visceral organs of castrates (Bilateral and Unilateral) and non- castrate of New Zealand and Chinchilla breeds of rabbits is presented on (Table 4.4). T_3 is significantly longer ($p>0.05$) than T_1 and T_2 in small intestine. Similarly, T_2 is significantly higher than T_1. In Gall bladder T_1 differ significantly ($p>0.05$) from T_2 and T_3. Similarly T_2 is significantly ($p>0.05$) higher than T_3. T_1 contains significantly ($p>0.05$) higher amount of fat content compare to T_2 and T_3. Similarly, T_2 is significantly higher than T_3 in fat content. T_1 is significantly ($p>0.05$) different from T_2 and T_3 in heart weight. T_2 also differs significantly ($p>0.05$) from T3. In the head and skin weight, T_1 is observed to be significantly ($p>0.05$) bigger and heavier than T_3. T_1 is significantly ($p>0.05$) different compared to T_2 and T_3, while T_2 is significantly ($p>0.05$) higher than T_3. In long intestine, kidney, spleen and liver, there were no significant ($p>0.05$) differences among the treatment groups. Similarly, in the stomach, fore limbs, hind limbs also show no significant ($p<0.05$) difference among the treatment groups. The significant difference ($p<0.05$) observed from the result of nutrient digestibility of crude protein, crude fiber, ash and energy values shows that rabbits that are unilaterally castrated are better in nutrient digestibility than non-castrates which agrees with the report of Lawrence and Katherine, (1999) who reported that since rabbits are castrated, they therefore have a higher nutrient utilization level.

The significant difference ($p<0.05$) observed in the values of slaughtered weight and ribs weight are in line with Cicogna *et al*, (1992) which also agrees with Dawa *et al*,.(1996), and Singh *et al*,.(1996) which indicated that castrates produces significantly ($p>0.05$) more slaughter weight. However the significant difference ($p>0.05$) observed in the values of small intestine, gall bladder, heart, head and skin was in line with Riley *et al*,.(1989) as cited by Moron – Fuenmayor and Clavero (1999) who reported 65% - 75% in slaughter weight of castrated micro monogastric animal

Conclusion and Recommendation

From this study, castrates (bilateral and unilateral) perform better in terms of carcass characteristics, (slaughter weight and Ribs) crude protein and ash. Similarly from the palatability result, the taste of

boiled meat of unilateral castrates were preferred over that of Bilateral and non-castrate

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Table 4.1:- Chemical Composition of the Experimental diet

PARAMETERS	COMPOSITION
Dry matter	93.79
Crude protein	19.56
Crude fibre	10.80
Ether Extract	15.35
Ash	8.10
NFE	46.09

Table 4.2 Nutrient Digestibility of castrates (Bilateral and Unilateral) and non – castrate of New Zealand and Chinchilla rabbits fed under feedlot management.

Parameters	T_1	T_2	T_3	LS
Dry matter	95.72±0.39	92.43±6.30	99.04±0.90	NS
Crude protein	96.02±0.67^c	98.93±0.65^a	98.38±0.99^b	*
Crude fibre	97.32±0.25^c	99.00±0.60^b	99.11±0.83^a	*
Ash	97.83±0.20^c	98.89±0.68^a	99.33±0.63^b	*
Ether Extract	98.36±0.15	98.26±0.93	99.47±0.50	NS
NFE	91.97±0.75	82.86±12.75	97.83±0.20	NS
Energy	94.84±0.44^c	98.30±0.20^a	97.81±0.97^b	*

a,b,c means of superscript in the same column are significantly different ($P < 0.05$)
SEM – Standard error, Ls – Level of Significant, * significantly different ($p < 0.05$), NS – Non – significant ($P > 0.05$)
T_1 – Bilaterally castrated rabbits, T_2 – Unilaterally castrated rabbits, T_3 – Non - castrate rabbit

Table 4.3 Carcass Characteristics of Castrates (Unilateral and Bilateral) and non Castrate of New Zealand and Chinchilla breed of rabbits

Parameters	T_1	T_2	T_3	SEM	LS
Live weight	1925±25.00	1600±30.00	1530±30.00	10.96	NS
Slaughter weight	94.54±2.50^a	90.50±1.80^{ab}	78.00±3.80^c	3.39	*
Dressed weight	88.00±5.00	88.00±10.00	70.50±3.80	4.77	NS
Back	13.05±0.16	10.75±1.05	10.30±0.00	0.60	NS
Ribs	10.95±0.65^a	7.55±0.50^{ab}	6.65±0.50^c	0.31	

* a,b,c means of superscript in the same column are significantly different($p<0.05$) SEM – Standard error means LS – Level of significant, LS – Level of significance, * - Significantly different ($p<0.05$) NS - Non significant ($p>0.05$), T_1 – Bilaterally castrated rabbits, T_2 – Unilaterally castrated rabbits, T_3 – Non castrate (Control)

Table 4.4 Visceral organs of Castrate(Unilaterally and Bilaterally) and Non Castrate of New Zealand and Chinchilla breed of rabbits

Parameter	T1	T2	T3	SEM	LS
L.Intestine	1.25±0.15	1.45±0.15	1.30±0.10	0.61	NS
S.Intestine	4.16±0.10^c	4.90±0.10^b	5.60±0.25^a	1.92	*
Gall bladder	0.44±0.02^a	0.32±0.01^b	0.27±0.01^c	0.03	*
Fat	5.80±0.50^a	5.50±0.20^b	5.30±0.30^c	1.84	*
Kidney	0.47±0.0	0.56±0.05	0.48±0.75	0.03	NS
Spleen	0.52±0.00	0.19±0.03	0.16±0.00	0.18	NS
Liver	2.50±0.50	2.59±0.75	1.54±0.20	0.25	NS
Stomach	0.24±0.25	0.99±0.01	1.00±0.20	0.73	NS
Heart	0.45±0.01^a	0.29±0.02^b	0.23±0.01^c	0.42	*
Fore limbs	10.29±0.21	9.79±0.59	10.55±0.28	0.22	NS
Hind limbs	12.70±2.20	14.20±0.70	9.00±3.50	1.46	NS
Head	7.80±0.10^a	7.20±0.50^a	6.30±0.20^c	0.31	*
Skin	15.99±0.29^a	8.47±1.84^b	5.16±0.21^c	2.08	*

a,b,c means of superscript in the same column are significantly different ($P < 0.05$)
*SEM – Standard error, Ls – Level of significant * significantly different ($P < 0.05$), NS - Non- significant ($P > 0.05$)*
Key: - T_1 – Bilaterally castrated rabbits, T_2 – Unilaterally castrated rabbits, T_3 – Non castrate (Control)