ADAN J. Agric. 2025, 6: 146-150

ISSN 2736-0385
DOI:10.36108/adanja/5202.60.0141

Effect of castration on the growth performance of rabbits

Okpakpor, U.E[1]., Akinbinu, A. J. [2], Bamidele, S. D[1]., Adeoye, L.S[1]., Oluwafemi, S.K.[1] and Momoh, I. M.[1]
[1]*Department of Animal Production and Health Technology, Federal College of Agriculture, Akure, Nigeria.*
[2] *Department of Animal Breeding and Genetics Federal University of Agriculture, Abeokuta*

Corresponding Author's: *estherugochi@gmail.com* ***Phone number:*** *+2348069028015*

Abstract

Castration has been reported as a management practice that could improve weight gain in farm animals but there is not enough information about its effect in rabbits. To help rabbit farmers manage their rabbits when it has more males than females, it is important to investigate the effect of castration on the performance of the animal. The study was a completely randomized design involving 20 male New Zealand white breed of rabbits weighing between 850 - 950g at 6 weeks age. The rabbits were separated into 2 groups with 10 rabbits in each group. One group was castrated (Neutered) while the other group was not castrated (Intact). The animals were fed daily using pelletized rabbit concentrate while water was provided ad libitum. The experiment lasted for eight weeks. In the 7th week of the experiment, blood samples were collected from ear vein and taken to the laboratory for analysis. Data obtained from the study were analyzed using the T- test on SPSS version 27. Result of the study revealed that, Neutered rabbits gained significantly (p≤0.05) more weight than Intact rabbits, the Intact rabbits consumed more (p≤0.05) feed than neutered rabbits. Dressing percentage was higher in Neutered rabbits. Testosterone in Neutered group was statistically (p≤0.05) higher than that of Intact rabbits. The study concludes that Neutered rabbits are superior to Intact rabbits in feed consumed, weight gained and dressing percentage. Also, castration reduced the testosterone level in neutered rabbits. It is recommended that male rabbits not used for breeding should be castrated.

Keywords: *Neutered, Intact, Castration, Rabbits, Testosterone*

Introduction

Rabbits are small mammals of the Leporidae family, they are domesticated and farmed in Nigeria for consumption, as source of healthy lean meat, source of income and used for research purpose. Rabbits are highly prolific species which accounts for the fast rate of multiplication of stock if well managed since they have very short gestation period, multiple breeding cycle a year and reproduce multiple kittens at each kindling. In a colony of rabbit, a mating ratio of one male to ten female (MSU, 2017) is sufficient to maintain productivity. Hence, farmers tend to sell off the young male and retain the females for breeding. There is a need to consider fattening male rabbits that will not be used during reproduction, this could help to improve rabbit meat production in Nigeria to meet up with the increasing demand for animal protein. Castration has been reported as a management practice that could be used in improving productivity in domesticated animals (Chen *et al.,* 2022). Telles *et al.,* (2016) and Nagamine and Sunagawa (2017) reported that castration caused an increase in

weight gained and improved meat quality of pigs and goats respectively.

Castration in rabbits also known as neutering could be a management practice to help improve handling and maintain a calm rabbit colony where lots of male rabbits are available, since castration in other larger animals has been reported to bring about reduced fighting among male animals in the flock (Jean-Loup *et al.,* 2011). To help farmers better manage their colony of rabbits particularly when they consist of more male than the females, it is important to investigate the effect of castration on the growth performances and behavior of the male rabbits. The outcome of this study will help to suggest to farmers if castration of their excess male rabbits will be important to improve handling and rabbit meat production.

Materials and Methods

This study was carried out at the Rabbit Section of the Teaching and Research Farm of Federal College of Agriculture Akure, Ondo State, Nigeria. The rabbits were housed in wooden hutches placed in a well-ventilated pen. The hutch had 10 cells and each cell was well equipped with concrete feeding and water troughs. Dimension of the hutch is 1.8m x 0.6m x 0.6m high.

The experiment was a completely randomized design involving 20 male New Zealand white breed of rabbits which weighed between 850 - 950g procured from reliable and reputable farmers in Akure at six (6) weeks of age. On arrival to the experiment site, the rabbits were quarantined in a holding pen for 5days during which they were observed for any signs of ailment, the rabbits were dewormed and anti-cocci were also administered. After the quarantine period, the rabbits were separated into two (2) groups with 10 rabbits in each group. One group of rabbit was castrated (Neutered) while the other group were not castrated (intact).

Open castration was successfully carried out on 10 rabbits by veterinary doctors from the Federal College of Agriculture, Akure Veterinary Clinic and tagged Neutered rabbits while the other group which were not castrated were tagged Intact rabbits. The identification of the rabbits was done using simple ear tags.

The experimental animals were housed 2 rabbits in each cell of the hutch. Each rabbit in each cell stood as replicate. The rabbit was offered weighed quantity of pelletized rabbit concentrate daily while water was provided *ad libitum.* The experiment lasted for eight weeks.

Initial weight of rabbits was taken after castration was carried out and changes in weight was monitored weekly. Feed consumed were determined daily as the differences between feed offered and left over. In the 7^{th} week of the experiment, blood samples were collected from the ear vein as described by Marongiu (2007). Some of the blood samples collected were stored in sterile bottles and stored at room temperature for 2hours to aid collection of serum while others were stored in sample bottles containing ethylenediaminetetraacetic acid (EDTA). Biochemical and hormonal parameters were determined as described by Ahmed *et al.* (2022). Blood parameters evaluated includes pack cell volume, red blood cell, hemoglobin, white blood cell, mean corpuscular volume, mean corpuscular hemoglobin, total protein, cortisol and testosterone.

At the end of the feeding trial which lasted for 8 weeks, 5 rabbits from each group were randomly selected for slaughter to study the changes in weight of selected organ and non- organ components. The selected rabbits were stunned using a club to render them unconscious before

slaughtering. After slaughtering, the rabbit carcass was hung upside down on a prepared rope to allow proper blood draining. Removal of the fur was achieved using sharp blade to carefully scrape it off the skin after which an incision was then made through the abdominal region in other to eviscerate the carcass. After complete removal of the abdominal content, the rabbit was weighed and taken as dressed weight. Data obtained from the study were analyzed using the T-test on SPSS version 27.

Result and Discussion

Table1 shows that there was no significant difference ($p \geq 0.05$) across the treatments for final weight, average weight gained and feed conversion ratio while total feed consumed and weight gained were significantly ($p \leq 0.05$) affected.

Neutered rabbits gained significantly ($p \leq 0.05$) more weight than the intact rabbits while the intact rabbits consumed more ($p \leq 0.05$) feed (81.82g/day) than the neutered rabbits (70.14g/day) did during the study. The result of this study is in agreement with those of Jehl *et al. (*2000) and Aheed, *et al.* (2020) who reported that castration improve weight gained in rabbits. The weight gained in favor of Neutered rabbits could be as a result of improved digestibility. Muhikambele *et al.* (1994) and Aheed, *et al.* (2020) reported that castration improved digestibility in rabbits and this could lead to better absorption and utilization of nutrients from feed consumed. Dressed weight of slaughtered rabbits from this study was significantly ($p \leq 0.05$) affected, with the neutered rabbit recording higher value than those of the intact rabbits. Castration in animals could lower anabolism in the animals and encourage fat deposition in such animals (Needham, *et al.*, 2017). The result on this study for feed conversion ratio (FCR) is similar to that of Jehl *et al.* (2000) that FCR was not significantly ($p \geq 0.05$) affected by castration.

From the result on table 2, it was observed that the castration had no significant ($p \geq 0.05$) effect on various haematological indices but the testosterone level was affected ($p \leq 0.05$). The Neutered rabbits recorded 0.24 ng/mL for testosterone which was significantly ($p \leq 0.05$) lower than 0.51 ng/mL recorded in the intact rabbits. Harada, *et al.*, (2016) reported that castration can reduce testosterone level in animals, this could lead to obesity and accumulation of fat in such animals. Testosterone is present in the testicles of male animals; partial or total disruption of the testicles will affect its production. During the experiment, it was observed that the intact rabbits were more aggressive than the neutered rabbits, this could be as a result of to the higher level of testosterone in the rabbits. Testosterone activates the subcortical areas of the brain to produce aggression (Batrinos, 2012). George and Rosvall (2022) in their study on the bidirectional relationships between testosterone and aggression reported that there is evidence that elevated testosterone level promotes aggression.

Testosterone is a hormone predominant in male animals but can also be found in the female. It is primarily produced in the testicles of males and the ovaries of females (Hua, *et al.* 2024). The Adrenal glands also produce little amounts of testosterone, and the body also converts dehydroepiandrosterone DHEA (produced in the adrenal gland, the gonads and the brain) into testosterone (Holst, *et al.* 2004). Other factors that may support testosterone production includes a healthy diet containing zinc, magnesium, and healthy fats.

Conclusion and Recommendation

It is concluded based on the result of this study that neutered rabbits are superior

to intact rabbits in feed consumed, weight gained and dressing percentage. Also, castration reduced the testosterone level in neutered rabbits. It is recommended that male rabbits not used for breeding should be castrated and fattened for meat purpose.

Acknowledgment

We appreciate the contribution of the veterinary doctors at the Federal College of Agriculture, Akure Clinic for helping out with the open castration procedure and monitoring to ensure the animals were animal health throughout the experimental.

Table 1: Growth performance response and dressed weight of neutered and intact rabbits

	Neutered rabbits	Intact rabbits	P-value
Initial weight (g)	971.25±247.58	1041.70±232.51	0.97
Final weight (g)	2183.83±174.54	2222.03±309.22	0.10
Weight gained (g)	1212.63±332.03[a]	1180.33±178.42[b]	0.02
Average Weight gained (g/day)	24.23±6.28	24.23±5.15	0.61
Average total feed consumed (g/day)	70.14±9.84[b]	81.82±1.69[a]	0.00
Feed conversion ratio	3.15±1.21	3.53±0.81	0.45
Dressed weight (%LW)	2.35±0.09[a]	1.96±0.04[b]	0.00

Mean±Sd

Table 2: Hematological and serum indices of neutered and intact rabbits

	Neutered rabbits	Intact rabbits	P-value
Packed Cell Volume (%)	42.00±3.16	43.71±2.43	0.97
Red Blood Cell (x10^{6}/L)	6.26±1.15	6.64±1.67	0.47
Mean Corpuscular Volume (fL)	69.66±16.79	68.72±14.79	0.61
Mean Corpuscular Hemoglobin (pg/cell)	23.19±5.59	22.87±4.94	0.61
Hemoglobin (Hbg/dl)	13.98±1.08	14.56±0.08	0.96
White Blood Cell (x 10^{9}/L)	7.73±1.45	8.39±2.68	0.18
Total Protein (g/dL)	12.98±0.57	15.21±1.22	0.27
Cortisol (µg/dL).	0.99±0.59	0.89±0.03	0.27
Testosterone (ng/mL)	0.24±0.01[a]	0.51±0.02[b]	0.02

Mean ± Sd

References

Aheed, S., Tsado, D. N., Tiamiyu, S. A., & Habu, T. (2024). Influence of Castration and Different Diets on Growth Performance and Nutrient Digestibility of Weaner Rabbits. *Nigerian Journal of Animal Production*, 1370–1373. https:// doi. org/10.51791/njap.vi.5746.

Ahmed, S. and Abdul-Rahman, S. (2022). Impact of castration and sex hormones on some hormonal and biochemical parameters of male rabbits. *Bulgarian Journal of Agricultural Science*, 28 (No 6): 1131–1139.

Batrinos, M. L. (2012). Testosterone and aggressive behavior in man. *International Journal of Endocrinology and Metabolism* Volume 10(3):563-568. doi: 10.5812/ ijem.3661

Chen, Y. A., Chen, J. Y., Chen, W. Q., Wang, W. Y., Wu, H. H. (2022). Effects of Castration Age on the Growth

Performance of Nubian Crossbred Male Goats. Animals (Basel). 2022 Dec 13;12(24):3516. https:// doi.org/ 10.3390/ ani12243516. https:// pubmed.ncbi.nlm.nih.gov/36552436/. Accessed 17/04/2025.

George, E. M and Rosvall, K. A. (2022). Bidirectional Relationships between Testosterone and Aggression: A Critical Analysis of Four Predictions. *Integrative and Comparative Biology*, Volume 62, Issue 3, September 2022, Pages 474–486, https://doi.org/ 10.1093 /icb/icac100

Harada N, Hanaoka R, Horiuchi H, Kitakaze T, Mitani T, Inui H, Yamaji R. (2016). Castration influences intestinal microflora and induces abdominal obesity in high-fat diet-fed mice. *Scientific Reports* 6(1):23001.

Holst, J.P., Soldin, O. P., Guo, T. and Soldin, S. J. (2004). Steroid hormones: relevance and measurement in the clinical laboratory. *Clinics in Laboratory Medicine* Volume 24(1):105-118. doi: 10.1016/j.cll. 2004.01.004. PMID: 15157559; PMCID: PMC3636985.

Sci Rep. 2016 Mar 10;6: 23001. doi: 10.1038/srep23001. PMID: 26961573; PMCID: PMC4785334. https:// pubmed.ncbi.nlm.nih.gov/26961573. Accessed 12/ 02/2025.

Hua, G., Jing-Yi, Z., Li-Jie, Z., and Yuan-Yuan, G. (2024). Synthesis and application of clinically approved small-molecule drugs targeting androgen receptor. *Bioorganic Chemistry* Volume 143 ISSN 0045-2068. (https://www. sciencedirect. com/science/article/pii/S0045206823006594). Accessed on 2nd of May, 2025.

Jean-Loup, R., Donald C. L., Jeremy N. M. (2011). Castration induced pain in pigs and other livestock. *Applied Animal Behaviour Science*, Volume 135, Issue 3, Pages 214-225, ISSN 01681591,https://www.sciencedirect.com/science/article/pii/S0168159111003224. Accessed 12/02/2025.

Jehl, N., Delmas, D. and Lebas, F. (2000). Influence of the male rabbit castration on meat quality. 1/ Performances during fattening period and carcass quality. *7th World Rabbit Congress, Valencia Spain, 2000* Volume A, 599-606.

Michigan State University (2017). Rabbit tracks: Breeding techniques and management.https://www.canr.msu.edu/resources/rabbit_tracks_breeding_techniques_and_management. Accessed 4th June, 2024.

Muhikambele, V. R. M., Mkenga, L. A., Owen, E. Kifaro, G.C and Senda, D. S. C. (1994). Effect of castration and diets on performance and feed utilization in Saanan goats. *Proceeding of the small ruminate research network on small ruminant research development in Africa*. Kampala (Uganda). Pp 221-224.

Nagamine, I. and Sunagawa, K. (2017). Effects of the castration on the growth, meat production and odours in male goats (2017). *Animal Behaviour Management* 53:137–150.

Needham, T., Lambrechts, H., & and Hoffman, L. C. (2017). Castration of male livestock and the potential of Immuno-castration to improve animal welfare and production traits: Invited Review. *South African Journal of Animal Science*, *47*(6), 731-742. https://doi.org/10.4314/sajas.v47i6.1

Telles, F.G., Luna, S. P. L., Teixeira, G. and Berto, D.A. (2016). Long-term weight gain and economic impact in pigs castrated under local anaesthesia. *Veterinary and Animal Science*, Volumes 1–2, Pages 36-39. ISSN 2451-943X. https://doi.org/10.1016/j.vas.2016.11.003.