Greener Journal of Agricultural Sciences
ISSN: 2276-7770
Vol. 15(1), pp. 12-16, 2025

https://gjournals.org/GJAS
DOI: https://doi.org/10.15580/gjas.2025.1.020425020

Effects of Dietary Kaolin as Feed Additive on the Performance of Weaner Rabbits

*Okachi, V.W.; Ideozu, H.M.; Isabella, O.O.

Department of Animal Science. Rivers State University. Nkpolu-Oroworukwu, Port Harcourt.

ABSTRACT

The study assessed the effects of dietary kaolin as feed additive on the growth performance and carcass characteristics of weaner rabbits. Thirty two (32) weaner New Zealand rabbits acquired from Unberik Farm, Rivers State which were allocated to four (4) treatments T1 (0g of Kaolin per kg of feed), T2 (20g of Kaolin per kg of feed), T3 (30g of Kaolin per kg of feed) and T4 (40g of Kaolin per kg of feed) replicated four (4) times with each replicate having two (2) weaner rabbits, in a Completely Randomized Design (CRD). The result of multivariate analysis showed no statistically significant impact of dietary Kaolin on growth performance and nutrient digestibility of the rabbits. There was however, significant improvement of the carcass characteristics of the rabbits fed 20g per kg of rabbit feed. Further research was recommended to assess the effect of Kaolin on growth performance using an extended period of feeding trial.

ARTICLE'S INFO

Article No.: *020425020*
***Type*:** *Research*
Full Text: *PDF, PHP, EPUB, MP3*
DOI: *10.15580/gjas.2025.1.020425020*

Accepted: *04/02/2025*
Published: *28/03/2025*

Keywords: *Dietary Kaolin, Feed Additive, Growth Performance, Weaner Rabbits, nutrient digestibility*

Corresponding Author

Okachi, V.W.

E-mail: *vwestleyc@gmail.com*

Article's QR code

INTRODUCTION

Growth performance and carcass characteristics are crucial factors in animal production, particularly in meat-producing livestock. These aspects directly impact the efficiency and profitability of animal farming operations (Yusuf *et al*., 2014; Sacarrão-Birrento *et al*., 2022). Growth performance, which includes measures like daily weight gain and feed conversion efficiency, is essential for maximizing productivity. Faster-growing animals reach market weight sooner, reducing production costs and time. Improved growth rates also typically correlate with better feed efficiency, meaning animals convert feed into body mass more effectively, lowering feed expenses for farmers (Sacarrão-Birrento *et al*., 2022). Carcass characteristics, such as carcass weight, muscle area, and fat content, are vital determinants of meat yield and quality (Yusuf *et al*., 2014; Sacarrão-Birrento *et al*., 2022). These traits influence the value of the final product and consumer satisfaction. For example, a higher muscle-to-fat ratio generally results in leaner, more desirable meat cuts (Yusuf *et al*., 2014).

Kaolin, also known as kaolinite ($Al_2Si_2O_5(OH)_4$), a soft, white clay mineral, has many uses in animal production, including as a growth promoter, supplement, and digestive aid (NutriNews, 2022). It is formed by the weathering or hydrothermal alteration of aluminosilicate minerals. Thus, rocks rich in feldspar commonly weather to kaolinite (Nelson, 2014). This study will therefore assess the growth performance and carcass characteristics of weaner rabbits fed diets supplemented with kaolin.

MATERIALS AND METHODS

Experimental Material, Animals and Management

Kaolin was purchased from Mile 3 market, Port Harcourt, Nigeria. Thirty-two (32) weaner New Zealand rabbits acquired from Unberik Farm, Rivers State which were allocated to four (4) treatments (T1, T2, T3 and T4) replicated four (4) times with each replicate having two (2) weaner rabbits, in a Completely Randomized Design (CRD). The rabbits were subjected to an acclimatization period of two (2) weeks before the commencement of the treatment which lasted for 4weeks. A formulated rabbit grower feed was administered daily and equally to the rabbits throughout the duration of the experiment but at different inclusion levels of dietary Kaolin. The inclusion levels of dietary Kaolin were based on the different treatments for both rabbit breeds as follows:

T1 = Control - 0g of Kaolin per kg of feed
T2 = 20g of Kaolin per kg of feed
T3 = 30g of Kaolin per kg of feed
T4 = 40g of Kaolin per kg of feed

Routine management practices like washing of drinkers, cleaning of the feeders, general sanitation etc. were strictly observed.

RESULTS AND DISCUSSION

Effect of dietary Kaolin on growth parameters of weaner rabbit

The effect of dietary Kaolin on growth parameters of weaner rabbit is shown in Table 1. Despite the slight numerical variations, the result showed no statistically significant variations ($p>0.05$) across all growth parameters (Final Body Weight, Weight Gain, Feed Intake, Feed Conversion Ratio) analyzed.

Table 1: Effect of dietary Kaolin on growth parameters of weaner rabbit

Parameter	T1 (0g/kg)	T2 (20g/kg)	T3 (30g/kg)	T4 (40g/kg)	SEM
Initial Body Weight (kg)	0.63	0.50	0.48	0.50	0.034
Final Body Weight (kg)	2.83	2.50	2.83	2.63	0.095
Weight Gain (kg)	2.20	2.00	2.35	2.13	0.108
Feed Intake (kg)	6.74	6.40	7.62	7.06	0.360
Feed Conversion Ratio	3.06	3.20	3.24	3.32	0.059

[abc] Means on the same row followed by different superscripts are significantly different

Effect of dietary Kaolin on carcass characteristics of weaner rabbit

The effect of dietary Kaolin on carcass characteristics of weaner rabbit is shown in Table 2. Significant variations ($p<0.05$) were observed across all carcass characteristics parameters with T1 having the highest dressed weight (2.50kg) while T3 had the lowest (2.10kg). On the other hand, T2 showed significantly ($p<0.05$) higher dressing percentage (59.00%) and higher relative weight for lung (0.37%), liver (1.78%), heart (0.17%), kidney (0.41%), large intestine (3.31%) and small intestine (1.24%) compared to the control T1 with the lowest values for the aforementioned parameters.

Table 2: Effect of dietary Kaolin on carcass characteristics of weaner rabbit

Parameter	T1 (0g/kg)	T2 (20g/kg)	T3 (30g/kg)	T4 (40g/kg)	SEM
Dressed Weight	2.50[a]	2.43[ab]	2.10[c]	2.33[b]	0.045
Dressing Percentage (%)	53.39[b]	59.00[a]	44.85[b]	54.58[ab]	1.933
Lung (%)	0.16[b]	0.37[a]	0.38[a]	0.17[b]	0.027
Liver (%)	1.24[c]	1.78[a]	1.62[b]	1.60[b]	0.054
Heart (%)	0.12[c]	0.17[a]	0.14[b]	0.13[c]	0.005
Kidney (%)	0.24[c]	0.41[a]	0.38[b]	0.26[c]	0.020
Large Intestine (%)	1.84[c]	3.31[a]	2.05[b]	2.16[b]	0.151
Small Intestine (%)	0.80[d]	1.24[a]	1.10[b]	0.99[c]	0.043

[abc] Means on the same row followed by different superscripts are significantly different

DISCUSSION

Effect of dietary Kaolin on growth parameters and carcass characteristics of weaner rabbit

The result showed no statistically significant effect of Kaolin as feed additive on growth performance and feed efficiency of rabbits which contradicts the findings of Trckova *et al*. (2004), Oko *et al.* (2011) and Abdelsalam & Fathi (2023) who reported that adding kaolin to rabbit diets improves body weight, daily weight gain, and feed conversion ratios. According to the studies, incorporating kaolin at levels around 20g/kg has beneficial effects on growth metrics and overall health by reducing gastrointestinal issues and enhancing nutrient absorption.

Despite not statistically improving the growth performance of the rabbits, Kaolin as a feed additive, supplemented at 20g per kg of rabbit feed significantly improved their carcass characteristics, which corroborates the findings of Wafer (2014) which reported that Kaolin supplementation resulted in improved carcass weight and dressing percentage.

It can therefore, be inferred from the result that the inability of the supplemented Kaolin to significantly improve the growth performance of the rabbits could be due to time factor. Compared to the experiment evaluating the effects of kaolin supplementation on the growth performance and haematological indices of weaner rabbits by Wafer (2014) which lasted for ten (10) weeks, this experiment only lasted four (4) weeks. With extended period of feeding trial, the efficacy of Kaolin in improving growth performance might be achieved. Another implication of the result is that the effect of Kaolin is easily observed in carcass characteristics before the growth performance parameters. Research indicates that dietary kaolin supplementation, particularly at levels around 20g/kg, significantly enhances carcass traits such as dressed weight and organ weights in broilers, (Owen *et al*., 2012). These improvements in carcass characteristics can be noted prior to any significant changes in growth performance metrics, suggesting that kaolin's impact on meat quality may manifest earlier than its effects on overall growth rates and feed (de Lemos *et al.*, 2015; Oko *et al.*, 2021).

However, there are limited research studies to back up this claim hence, the need for further research.

CONCLUSION

The study assessed the effect of dietary Kaolin as feed additive on the growth performance and carcass characteristics of weaner rabbits. Various growth performance and carcass characteristics parameters were analyzed using a multivariate analysis. The result established that Kaolin as a feed additive, supplemented at 20g per kg of rabbit feed significantly improved their carcass characteristics. However, no significant improvement was observed in its ability to significantly improve growth performance in rabbits.

REFERENCES

Abdelsalam, M., & Fathi, M. (2023). Improving productivity in rabbits by using some natural feed additives under hot environmental conditions – A review. Animal bioscience, 36(4), 540–554. https://doi.org/10.5713/ab.22.0354

Active Minerals International (2022). *Properties and applications of Kaolin*. https://activeminerals.com/blog/kaolin-guide/

Alhassan, M. (2022). *Rabbitry – What prospective farmers should know about rabbit business*? https://www.agriculturenigeria.com/rabbitry/

Alves, J. M., Carneiro, M., Afonso, S., Lopes, S., Garreau, H., Boucher, S., Allain, D., Queney, G., Esteves, P. J., Bolet, G., & Ferrand, N. (2015). Levels and patterns of genetic diversity and population structure in domestic Rabbits. *PloS one*, 10(12), e0144687. https://doi.org/10.1371/journal.pone.0144687

Assan, N. (2018). The essence of weaning age and its significance on performance, mortality, carcass and meat quality properties in rabbits. *Agricultural Advances*, 6. 10.14196/aa.v6i11.2478.

Bivolarski, B.L. and Vachkova, E.G. (2014), Morphological and functional events associated to weaning in rabbits. Journal of Animal Physiology

and Animal Nutrition, 98(1), 9-18. https://doi.org/10.1111/jpn.12058

Cesare, C., Alessandro, B., Arias-Alvarez, M., Pedro, L., Raffaella, C. & Pilar, R. (2010). The main factors affecting the reproductive performance of rabbit does: A review. *Animal reproduction science*, 122, 174-82. 10.1016/j.anireprosci.2010.10.003.

Carneiro, M., Afonso, S., Geraldes, A., Garreau, H., Bolet, G., Boucher, S., Tircazes, A., Queney, G., Nachman, M. W., & Ferrand, N. (2011). The genetic structure of domestic rabbits. *Molecular biology and evolution*, 28(6), 1801–1816. https://doi.org/10.1093/molbev/msr003

David, N.O., Ikem, K.E., Renner, N., Festus, E. (2019). Evaluation of organic nutrient supplements and bioaugmenting microorganisms on crude oil polluted soils. *Current Journal of Applied Science and Technology*, 38(6),1-19.

de Lemos, M.J., Calixto, L.F.L., Alves, O.S., de Souza, D.S., Moura, B.B., & Reis, T.L. (2015). Kaolin in the diet and its effects on performance, litter moisture and intestinal morphology of broiler chickens. *Ciência Rural, Santa Maria*, 45(10), 1835-1840. http://dx.doi.org/10.1590/0103-8478cr20141193

El-Ashram, S., Aboelhadid, S. M., Abdel-Kafy, E. M., Hashem, S. A., Mahrous, L. N., Farghly, E. M., & Kamel, A. A. (2020). Investigation of pre- and post-weaning mortalities in rabbits bred in egypt, with reference to parasitic and bacterial causes. *Animals: an open access journal from MDPI*, 10(3), 537. https://doi.org/10.3390/ani10030537

Encyclopedia Britannica (June 5, 2024). *Kaolin*. https://www.britannica.com/science/lithosphere

Food and Agriculture Organization (2022). *World production and trade*. https://www.fao.org/4/x5082e/X5082E03.htm#

Galeano-Díaz, J.P., Sánchez-Torres, J.E., Domínguez-Vara, I.A., Morales-Almaraz, E., Rodríguez-Carpena, J.G., Grageola-Nuñez, F. & Nieto-Martinez, G. (2023). Effects on growth performance parameters, carcass traits, meat nutrimental quality and intramuscular fatty acid profile of rabbits fed with diets with avocado waste (*Persea americana Mill*). *Agriculture*, 13, 549. https://doi.org/10.3390/agriculture13030549

Ghosh, N. & Mandal, L. (2018). Carcass and meat quality traits of rabbits (*Oryctolagus cuniculus*) under warm-humid condition of West Bengal, India. *All India People's Technology Congress*, 20, Article #146. Retrieved July 2, 2024, from http://www.lrrd.org/lrrd20/9/ghos20146.htm

IBM (2022), Independent Samples Test. https://www.ibm.com/docs/en/spss-statistics/saas?topic=features-independent-samples-test

Kassahun, D., Taye, M., Kebede, D., Tilahun, M., Tesfa, A., Bitew, A., Kebede, A., Meseret, M., Lakew, E., Bimrow, T., & Haile, A. (2022). Phenotypic and genetic parameter estimates for early growth, growth rate and growth efficiency-related traits of Fogera cattle in Ethiopia. *Veterinary medicine and science*, 8(1), 387–397. https://doi.org/10.1002/vms3.628

Kumar, S. A., Kim, H. J., Jayasena, D. D., & Jo, C. (2023). On-farm and processing factors affecting rabbit carcass and meat quality attributes. *Food science of animal resources*, 43(2), 197–219. https://doi.org/10.5851/kosfa.2023.e5

Myers, P., Espinosa, R., Parr, C.S., Jones, T., Hammond, G.S. & Dewey, T.A. (2024). *The Animal Diversity Web (online)*. Accessed at https://animaldiversity.org

Nadziakiewicz, M., Lis, M.W. & Micek, P. (2022). The effect of dietary halloysite supplementation on the performance and meat quality of pigs and some air indices in piggery. *Scientific Reports*, 12, 20533. https://doi.org/10.1038/s41598-022-24987-9

Nelson, S.A. (2014). *Weathering and clay minerals*. https://www2.tulane.edu/~sanelson/eens211/weathering&clayminerals.htm#:~:text=Kaolinite%20is%20formed%20by%20weathering,feldspar%20commonly%20weather%20to%20kaolinite.

NutriNews (2022). *Clay minerals in animal nutrition*. https://nutrinews.com/en/clay-minerals-in-animal-nutrition/

Oko, O.K., Iso, I.E., Udoh, S.P. & Mbre, J.I. (2011). Effects of dietary kaolin supplementation on the growth performance and serum chemistry of broilers. *Nigerian Journal of Animal Science*, 13.

Onifade, A.A., Abu, O.A., Obiyan, R.I. & Abanikannda, O.T.F. (2019). Rabbit production in Nigeria: some aspects of current status and promotional strategies. DOI: https://doi.org/10.4995/wrs.1999.380

Owen, O., Nodu, M.B., Dike, U. & Ideozu, H.M. (2012). The effects of dietary Kaolin (clay) as feed additive on the growth performance of broiler chickens. *Greener Journal of Agricultural Sciences*, 2(6), 233-236.

Owen et al., 2012, in the *Greener Journal of Agricultural Sciences* (Vol. 2, Issue 6, pp. 233-236)

Owuor, S. A., Mamati, E. G., & Kasili, R. W. (2019). Origin, genetic diversity, and population structure of rabbits (*Oryctolagus cuniculus*) in Kenya. *BioMed research international*, 2019, 7056940. https://doi.org/10.1155/2019/7056940

Papillon (May 31, 2022). *PAC Facts: What are feed additives?* https://www.papillon-ag.com/what-are-feed-additives/

Pérez-Etayo, L., González, D., Leiva, J., Díez-Leturia, M., Ezquerra, A., Lostao, L., & Vitas, A. I. (2021). Antibacterial Activity of Kaolin-Silver nanomaterials: Alternative approach to the use of antibiotics in animal production. *Antibiotics (Basel, Switzerland)*, 10(11), 1276. https://doi.org/10.3390/antibiotics10111276

PetsinStitches (June 13, 2018). *Rabbit breeding: A primer on rabbit reproduction*. https://petsinstitches.com/blog/rabbit-breeding/

Popović, S., Kostadinović, L., Puvača, N., Kokic, B., Cabarkapa, I. & Djuragic, O. (2017). Potential of wormwood (Artemisia absinthium) as a feed supplement in rabbit diet: Effect on controlling rabbit coccidiosis, antioxidative systems and growth performance. *Veterinarski arhiv*. 87. 769-782. 10.24099/vet.arhiv.160704a.

Sacarrão-Birrento, L., Gomes, M. J., Silva, S. R., Silva, J. A., Moreira, D., Vieira, R., Ferreira, L. M., Pereira, P., de Almeida, A. M., Almeida, J. C., & Venâncio, C. (2022). Growth performance, carcass and meat traits of *autochthonous arouquesa* weaners raised on traditional and improved feeding systems. *Animals: an open access journal from MDPI*, 12(19), 2501. https://doi.org/10.3390/ani12192501

Sledge, C.B. (2021). Parameters of longitudinal growth rate in rabbit epiphyseal growth plates. *The Journal of bone and joint surgery*, 63(4), 627–630.

Tibin, M.A.M., Bukhari, S.A.E.S., Abdalla, S.E.M., Dahia, S.B.H. & Jadalla, J.B. (2021). Weight gain, carcass characteristics and quality of rabbit meat as affected by ration type and addition of Helba (*Trigonella foenumgraecum*). *Greener Journal of Agricultural Sciences*, 11(4): 255-261.

Trckova, M., Matlova, L., Dvorska, L., & Pavlik, I. (2004). Kaolin, bentonite, and zeolites as feed supplements for animals: health advantages and risks. *Vet. Med. – Czech*, 49 (10), 389–399.

University of Idaho (March, 2017). *Carcass terminology*. www.uidaho.edu/extension/4h

Wafar, R.J. (2014). Effects of Kaolin supplementation on growth performance, carcass characteristics and hematological indices of weaner rabbits. *International Journal of Applied Sciences and Engineering Research*, 3(1). 10.6088/ijaser.030100009.

Watts, S.A. (2018). *Nutrition*. https://www.sciencedirect.com/science/article/abs/pii/B9780123

Yusuf, A. L., Goh, Y. M., Samsudin, A. A., Alimon, A. R., & Sazili, A. Q. (2014). Growth performance, carcass characteristics and meat yield of boer goats fed diets containing leaves or whole parts of *Andrographis paniculata*. *Asian-Australasian journal of animal sciences*, 27(4), 503–510. https://doi.org/10.5713/ajas.2013.13533

Cite this Article: Okachi, VW; Ideozu, HM; Isabella, OO (2025). Effects of Dietary Kaolin as Feed Additive on the Performance of Weaner Rabbits**.** *Greener Journal of Agricultural Sciences*, 15(1): 12-16, https://doi.org/10.15580/gjas.2025.1.020425020.