EFFECT OF BREED ON HAEMATOLOGICAL PARAMETERS OF RABBITS

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ABSTRACT

In this study, the effect of breed on haematological parameters of rabbits was investigated. A total of 36 rabbits (12 each of New Zealand White, Chinchilla, and Dutch breeds) were used in the research in a completely randomized design (CRD). The rabbits were housed in wooden hutches inside a well-ventilated pen. They were caged based on breed and were provided with commercial feed, while clean drinking water was provided ad-libitum. Blood sample was collected and taken to the laboratory for analysis. Data collected on haematological parameters were analyzed using one-way Analysis of Variance (ANOVA) in SPSS version 21. Results revealed that breed had no significant (P>0.05) effect on haematological parameters of rabbits except in white blood cell with New Zealand White having higher value compared to Chinchilla and Dutch. This is an indication that New Zealand White rabbits have higher immunity than those of Chinchilla and Dutch.

Keywords: Chinchilla, Dutch, New Zealand White, White blood cell, Haemoglobin

INTRODUCTION

Rabbits are popular small animals that are raised for various purposes, including meat production, biomedical research and as pets (FAO, 1997). Different rabbit breeds exhibit distinct physical and physiological characteristics (Marai, 2010) which may influence their health and performance. One important aspect of assessing the overall well-being of rabbits is through the evaluation of their Haematological parameters. This can provide valuable insights into their physiological status and potential underlying health issues (Smith, 2019). There is limited research specifically focused on breed differences in Haematological parameters of rabbits, studies in other livestock species have demonstrated the influence of genetic factors on Haematological characteristics. For instance, a study by Alberts *et al.* (2005) found significant differences in red blood cell (RBC) counts, haemoglobin (Hb) concentrations and white blood cell (WBC) counts among different cattle breeds. Similarly, Ozoji and Daphney (2017) reported breed-specific variations in the three major rabbit breeds found in Nigeria which are; New Zealand, Dutch, and Chinchilla, known for their high productivity and adaptability to the Nigerian climate. Originating from California, USA, New Zealand rabbits are known for their large size and excellent meat quality. The breed has a rapid growth rate, high feed conversion efficiency, and superior maternal instincts. In Nigeria, New Zealand rabbits are primarily found in commercial rabbit farms and also kept by small-scale farmers for domestic consumption and income generation. The Dutch rabbit breed originated in the Netherlands and is characterized by its distinctive color patterns. They have a medium-sized body, weighing around 2-2.5 kg on average. Dutch rabbits are popular for their friendly nature, ease of handling, and suitability for both meat and pet purposes. Dutch rabbits can be found in various regions of Nigeria, mainly in urban and peri-urban areas where they are kept as pets or for small-scale farming. The objective of this study was to investigate the effect of breed on haematological parameters such as red blood cell count, white blood cell count, haemoglobin concentration, packed cell volume, platelet count, mean corpuscular volume and mean corpuscular haemoglobin concentration in rabbits.

MATERIALS AND METHODS

The layout of the experiment was a Completely Randomized Design (CRD). A total of 36 weaned rabbits (6 weeks old), 12 from each breed (New Zealand White, Chinchilla, and Dutch) were randomly allocated to 3 hutches with 4 rabbits per hutch which served as replicates. To ensure the purity of the breed, the rabbits were purposively purchased from the National Veterinary Research Institute (NVRI),

Vom, Plateau State of Nigeria. Wooden hutches were used to house the rabbit inside a well-ventilated building and before the arrival of the animals, the hutches were thoroughly washed, disinfect and

allowed to dry for (3) days. On arrival of the rabbits to the rabbitry, anti-stress vitalyte was administered through the drinking water. The rabbit were provided with commercial feed and clean drinking water *ad-libitum.* The Rabbits were allowed to acclimatize in the rabbitry for six weeks before blood samples were collected.

Blood collection and procedure

Blood sample was collected through the jugular vein from each of the rabbit breeds using 3ml syringe into sample bottle that contains ethylene diamond tetra acetic (EDTA) anti-coagulant.

The site for blood collection was cleaned with an alcohol pad to disinfect the area. It was then allowed to air-dry. Immediately after blood collection into EDTA bottles, they were gently inverted and rocked 8-10 times to mix the blood with the EDTA anticoagulant thoroughly. The EDTA tubes were labelled according to breed. The blood samples were stored in a cooler with ice pack and immediately transported to Bafawat Diasnostic Laboratory Lafia for haematological analysis. Data collected were analysed using One Way Analysis of variance of the SPSS statistical version 21.

RESULTS

The effect of breed on haematological parameters of rabbits is presented in (Table 1. Breed had no significant (P>0.05) effects on haematological parameters of rabbits except on White blood cells. New Zealand white exhibit higher white blood cell count compared to Chinchilla and Dutch breed of rabbits.

Table1: Effects of breeds on haematological parameters of rabbits

Parameters	T_1	T_2	T_3	P-value
Haemoglobin	10.08±0.23	10.23±0.53	10.43±0.51	0.859
Packed cell volume	31.50±0.96	31.75±1.65	33.25±1.18	0.604
Red Blood Cell	5.05±0.87	5.10±0.40	5.55±0.35	0.489
Mean Corpuscular volume	60.25±0.85	59.75±1.55	57.50±1.32	0.314
Mean Corpuscular Haemoglobin	19.25±0.25	22.50±2.18	19.25±0.48	0.179
Mean Corpuscular Haemoglobin Concentration	32.25±0.48	31.75±0.25	31.25±0.63	0.179
White Blood Cell	$10.30±1.29^a$	$5.83±0.73^b$	$5.73±0.98^b$	0.018
Platelets	98.50±5.45	119.25±56.80	88.25±42.52	0.865

T1= New Zealand white, T2= Chinchilla, T3= Dutch ^{ab}= values within the same row with different superscripts are significantly different

DISCUSSION

The study found no significant differences in haemoglobin, PCV, RBC count, MCV, MCH, and MCHC across the three rabbit breeds indicating that breed did not strongly influence these parameters. The value obtain for Haematological parameters in this findings align with those of Ewuola and Egbunike (2008) who reported that Haematological parameters in rabbits remain stable across breeds when environmental and dietary conditions are standardized. Additionally, Adeyemo *et al*. (2019) observed similar results, suggesting that Haemoglobin and red blood cell-related indices in rabbits are relatively consistent across breeds, barring external stressors.

Zealand White showed higher WBC counts than the Chinchilla and Dutch breeds. This could indicate a stronger immune response or an inherent predisposition in the New Zealand White breed toward elevated leukocyte levels. This finding is consistent with studies by Nuhu *et al*. (2010) who found breed-specific variations in WBC counts, suggesting that certain breeds may have adapted to demonstrate heightened immune responses, potentially due to genetic factors. Similar observations by Al-Dobaib (2009) also indicated that breeds with higher WBC counts may possess enhanced immunological resilience.

There is no significant differences were found in platelet counts among the breeds, suggesting that platelet production and turnover rates are similar across these rabbit breeds. These findings agree with Yusuf *et al*. (2013) who found out that platelet counts in rabbits were generally unaffected by breed, supporting the notion that platelet dynamics in rabbits are less influenced by genetic factors. This finding is corroborated by Adejinmi *et al.* (2015) who found that platelet counts remain stable across different rabbit breeds under comparable conditions.

CONCLUSION

This study found out that breed had no significant (P>0.05) effects on haematological parameters of rabbits except on white blood cells. New Zealand white exhibit higher white blood cell count compared to Chinchilla and Dutch breed of rabbits. Given the higher White blood cell count in New Zealand White rabbits, this breed may be preferable in environments or farming systems where disease exposure is a concern, as it may offer greater immunity and infection resistance.

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