

THE INFLUENCE OF FLOOR TYPES ON HAEMATOLOGICAL INDICES OF CROSSBRED WEANED PIGS

¹Ogunbode, A.A., and ²Adepoju, M.A

¹Department of Animal Production Technology

²Department of Animal Health and Production

Faculty of Animal and Fisheries Technology

Oyo State College of Agriculture and Technology, Igboora, Nigeria

Corresponding author's email: gaogunbode@gmail.com ; +2348062455318

ABSTRACT

Blood parameters have been shown to be major indices of physiological and nutritional status of an organism and changes in the constituent compound of blood when compared to normal values could be used to interpret the metabolic state of an animal. Twelve (12) crossbred weaned pigs were used, they were allotted into two (2) floor types: concrete and straw floors, of six (6) animals per floor type and two (2) animals per replicate. The concrete were constructed using cement, gravel, sand and water while the straw floors were made of maize stalk. One kilogram straw was placed in the pen before the pigs arrived. A further 1kg was supplied every two days. Waste straw and manure were removed daily. The straw provided was not sufficient to allow a bedded layer to accumulate but a crust formed over the surface of the lying area, comprising straw, feed, skin and dung. The experimental design used was completely randomized design and the experiment lasted for fifty-six (56) days. 3ml of blood were collected from two (2) animals per treatment for the analysis of haematological profile into Ethylene Diamine Tetra Acetate bottle to determine the packed cell volume, haemoglobin, red blood cell volume, white blood cell and platelet. Results revealed that there were no significant difference ($p > 0.05$) in the value obtained for packed cell volume (28.00% and 26.00%) and haemoglobin (9.10g/dl and 8.33g/dl) respectively while red blood cell (2.60106/ul and 2.20106/ul) white blood cell (56.00103/ul and 45.00103/ul) and platelet (12.00 and 13.00) were significantly different ($p < 0.05$). It was concluded that rearing pigs on concrete floor gave the best haematological blood profile of pigs.

Keywords: Concrete, floor, haematology, pigs, straw

INTRODUCTION

Proper environmental management is important to maximize productivity of livestock. Haematological indices are of great diagnostic importance in livestock husbandry since they reflect the response of the animal to its environment and diseases. Blood acts as a pathological reflector of the status of exposed animals to toxicant and other conditions (Olafadehan *et al.*, 2010). They can also act as useful aids to prognosis and may reveal adverse conditions even when the animal did not display obvious clinical signs of ill health. The best indicator of animal well being and its potential for production is its health status. The examination of blood gives the opportunity to investigate the presence of several metabolites and other constituents in the body of animals and it plays a vital role in the physiological, nutrition and pathological status of an organism (Doyle, 2006). Additionally, haematological values reflect the response of the animal to its environment and may reveal adverse conditions, even though animals may not be displaying clinical signs of diseases (Eze, *et al.*, 2010). Diseases cause pain and distress to the animal and also significantly reduce their profitability or in severe cases, through the premature death of infected animals. Haematological profiles are important indicators of health and disease in animal and have become indispensable in the diagnosis, treatment or prognosis of many disease (Mbanasor *et al.*, 2003). This study examined the effects of floor types on haematological profile of crossbred weaned pigs.

METHODS AND MATERIALS

The experiment was carried out at the piggery unit of the Teaching and Research Farm of the Oyo State College of Agriculture and Technology, Igboora, Nigeria. The experimental areas lies in savannah forest zone on latitude 7° 43N and longitude 3° 28E in an elevation of 140m above sea level. The average minimum temperature is about 21.5°C and maximum average temperature of about

32.5°C. Twelve (12) crossbred weaned pig (Largewhite x Landrace) with an average weight of 9.0kg in their eight weeks of age were purchased from piggery unit of the college. The pigs were dewormed and fed 4% of their body weight as feed per day at the beginning of the experiment and increase as the animal age increased while water was supplied *ad libitum*. The animal was kept and monitored for one week for acclimatization before the commencement of the experiment for proper adaptability and the animals were fed twice daily morning by 7.30am and evening by 4.00p.m. The experimental diet was formulated to meet the nutrient requirements of weaned pigs (Table 1). The experiment lasted for eight weeks. The pigs were restrained and bled through the caudal vena cava as described by Carle and Dewhirst (1942) into bijou bottle containing Ethylene Diamine Tetra Acetic acid (EDTA) as anticoagulant after adequate restraint. The blood samples were analyzed for the following parameters Packed Cell Volume (PCV), Haemoglobin (Hb), Red blood cell (RBC), White blood cell and platelets. The PCV was determined using the microhaematocrit method while the Red blood cell were determined using the improved Neubauer counting chamber (Jain, 1986). Data collected were subjected to analysis of variance using SAS (2020) Software. Means were separated using Duncan's Multiple Range Test of the same statistical software.

Table 1: Gross composition of experimental diet

Ingredients	KG
Maize	25.00
Corn Bran	35.00
Palm Kernel Cake	25.00
Groundnut Cake	7.00
Bone Meal	3.00
Fish Meal	3.00
Common salt	0.50
Lysine	0.50
Methionine	0.50
Premix	0.50
TOTAL	100.00
Calculated Analysis	
Metabolize Energy (Kcal /Kg)	2850.00
Crude Protein (%)	20.00

RESULTS AND DISCUSSION

The result of haematological indices of crossbred weaned pigs on concrete and straw floors are presented in Table 1.0. There was no significant ($P < 0.05$) difference in the packed cell volume and haemoglobin concentration of pigs maintained on both concrete and straw floors while significant ($p > 0.05$) differences exist among red blood cell, white blood cell and platelet of pigs kept on concrete and straw floors. Packed cell volume is the percentage of the red blood cells in blood and involved in the transport of oxygen and absorbed nutrients. Pigs on concrete floor had the highest value (28.00%) of packed cell volume than those on straw floor (26.00%). Increased packed cell volume shows a better transportation and thus results in an increased primary and secondary polycythemia.

Table 2: Haematological parameters of weaned pigs on concrete and straw floors

Parameters	Concrete T1	Straw T2	SEM
PCV (%)	28.00	26.00	10.00
HB(g/dl)	9.10	8.33	3.80
RBC(10^6 /ul)	2.60	2.20	1.28
WBC(10^3 /ul)	56.00	45.00	11.10
Platelets	12.00	13.00	5.00

a, b, c, means on the same row with different superscripts differed significantly

PCV – Packed Cell Volume

HB – Haemoglobin

RBC – Red Blood Cell

WBC – White Blood Cell

The reduction in the value of packed cell volume of pigs kept on straw floor could be as a result of pigs using the floor type as an enrichment thereby performing the rooting tendency and divert most of nutrient absorbed to play and exercise their bodies. Pigs kept on concrete floor recorded the highest mean value (9.10%) while the lowest mean value (8.33%) was obtained in pigs maintained on straw floor. Though the mean value was not statistically different. Haemoglobin is the iron- containing oxygen – transport metalloprotein in the red blood cells of all vertebrates as well as tissues of invertebrates. Haemoglobin has the physiological function of transporting oxygen to tissues of the animal for oxidation of ingested food so as to release energy for the other body functions as well as transport carbon dioxide out of the body of animals (Soetan *et al.*, 2013). Red blood cells (erythrocytes) serve as a carrier of haemoglobin and are involved in the transport of oxygen and carbon dioxide in the body. Pigs on concrete floor had the highest value (2.60%) while those on straw floor recorded the lowest value (2.20%). The values obtained for the white blood cell was statistically ($P<0.05$) different among the means as white blood cell functions to fight infections, defend the body by phagocytosis against invasion by foreign organisms and to produce or at least transport and distribute antibodies in immune response. There were significant difference ($p>0.05$) in platelets and that the observed differences in the mean values of platelets might have been the cause of the varied degree of blood clotting of the pigs kept on straw floor during bruises and fighting. Variations in the values obtained might also be attributed to factors such as iron deficiency, vitamin B12, and folate deficiencies, chronic haemolytic anaemia and infectious and chronic diseases e.g African Trypanosomiasis (Baker *et al.*, 2000).

REFERENCES

- Baker, F.J., Silvertown, R.E and Pallister, C.J. (2000). **INTRODUCTION** to Medical Laboratory Technology, 7th Edition, Sam-Adex Printer, Felele Rab, Ibadan- Nigeria
- Carle, B.N and Dewhirst, W.H. Jr. (1942). A method for bleeding swine. J. Am. Vet. Med. Assoc. 101:495-496
- Doyle, D. (2006). William Hewson (1739-74). The father of haematology. British Journal of Haematology, 133 (4): 375 -381
- Eze, J.I., Onunkwo, J.I., Shoyinka, S.V.O., Chah, F.K., Ngene, A.A., Okolinta, N., Nwanta, J.A. and Onyenwe, I.W. (2010). Haematological profiles of pigs raised under intensive management system in South-Eastern Nigeria. Nigerian Veterinary Journal. Vol. 31 (2): 115 - 123
- Jain, C.N. (1986). Schalm's Veterinary Haematology. 4th Edition. Lea and Febiger Philadelphia
- Mbanasor, U.U., Anene, B.M., Chime, A.B., Nnaji, T.O., Eze, J.I and Ezekwe, A.G. (2003). Haematology of normal and trypanosome infected Muturu cattle in Southeastern Nigeria. Nigeria Journal of Animal Production 30 (2): 236 – 241
- Olafadehan, C.O., Obun, A.M., Yusuf, M.K., Adewumi, O.O., Olafadehan, A.O., Awofolaji, A.O and Adeniji, A.A. (2010). Effects of residual cyanide in processed cassava peel meals on Haematological and biochemical indices of growing rabbits. Proceedings of 35th Annual Conference of Nigerian Society for Animal Production P.212
- Soetan, K.O., Akinrinde, A.S and Ajibade, T.O. (2013). Preliminary studies on the haematological parameters of cockerels fed raw and processed guinea corn (*Sorghum bicolor*). Proceedings of 38th Annual Conference of Nigerian Society for Animal Production. Pp. 49 - 52