

EFFECT OF BEDDING MATERIALS ON SERUM LIPID PROFILE OF WEANED PIGS

¹Ogunbode, A.A., ²Adeniyi, O.A and ³Raji, M.O

¹Department of Animal Production Technology

^{2,3} Department of Animal Health and Production

Oyo State College of Agriculture and Technology, Igboora

Correspondence: aaogunbode@gmail.com, +2348062455318

Abstract

Housing management of animals in the form of bedding is of paramount importance for good health and better growth. Twenty-seven (27) weaned pigs were allotted to three treatments of nine (9) animals per treatment and three animals per replicate. The concrete floor was constructed using cement, gravel, sand and water while woodshaving were collected in dried form from sawmills within Igboora metropolis and harmful materials such as pebbles, iron metals, broken bottles and nails were removed and spread on cemented floor to make the woodshaving floor. The clay was gotten from termite hills within the College premises n dried form from sawmills within Igboora metropolis and harmful materials such as pebbles, iron metals, broken bottles and nails were removed and spread on cemented floor to and spread on cemented floor to make the clay floor. At the end of the experiment, blood was collected through the anterior vena cava of three animals per treatment very early in the morning before feeding for serum lipid analysis into plain bottles without anticoagulant to determine the cholesterol, triglycerides, high density lipoprotein and low density lipoprotein. Results showed that there were significant ($P < 0.05$) difference in all the parameter examined except the high density lipoprotein which is non-significant ($P > 0.05$). Highest concentration of glucose (98.67mg/dl), cholesterol (44.33mg/dl), triglyceride (23.33mg/dl), and low density lipoprotein (39.67mg/dl) were obtained in pigs reared on concrete floor while the lowest mean values (83.67mg/dl, 39.33mg/dl, 18.33mg/dl and 35.67mg/dl) were recorded in pigs reared on woodshaving floor, respectively. The pigs compared favourably among the treatment for high density lipoprotein. It can be concluded that rearing pigs on woodshaving floor gave the best lipid profile of pigs and this is an indication that the pigs are safe for human consumption and the use of woodshaving as a bedding materials prevents environmental pollution and reduce waste in the environment.

Keywords: Floors, lipid profile, pigs, serum, weaner

Description of Problem

Lipids serve as an ideal energy source for piglets due to its high energy concentration (2.25 times more than carbohydrates and proteins and have been usually added to the diet to solve the problem of insufficient energy intake during the weaning stage of piglets (1). Lipids can also provide a series of essential fatty acids such as linoleic acid and linolenic acid. Essential fatty acids can inhibit the overproduction of intestinal inflammatory mediators, especially various pro-inflammatory cytokines (2). Cholesterol is synthesized by the liver, adipose tissue and the intestine and released into the bloodstream (3). Triglycerides are chain of high energy fatty acids necessary for providing energy for cells to function(4).High density lipoprotein is good

cholesterol because of its ability to protect heart to as bad cholesterol because it leads to the plaque formation in the inner walls of the arteries that feed the heart and brain. This research was carried out to determine the effect of floor types (concrete, woodshaving and clay floor) on serum lipid profile of crossbred weaned pigs.

Materials and Methods

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, Oyo State, Nigeria. The area was situated in the Savannah forest vegetation zone of Ibarapa Central Local Government of Oyo State, Nigeria on Latitude $7^{\circ} 43'N$, Longitude $3^{\circ} 28'E$ and elevation of 140m

above sea level. The average minimum temperature is above 21.5° and maximum average temperature is about 32.5°c (5).

Twenty-seven (27) weaned crossbred (Largewhite X Landrace) pigs with an average weight of 9.0kg were purchased from the piggery unit of the Oyo State College of Agriculture and Technology, Igboora. The pigs were treated with ivomec (0.5ml per pig) subcutaneously against ecto and endoparasites and fed 4% of their body weight as feed per day and the feed intake was increased as the animals were advancing in age, water was offered *ad libitum*. The animals were kept and monitored for one week for acclimatization before the commencement of the experiment for proper adaptability. The pigs were housed in pens equipped with individuals drinking and feeding facilities. A week to the commencement of the experiment, the pen was cleared of dirt, washed with detergent, disinfectant and disinfected. Two days before the arrival of the pigs, other management practices were carried out. Concrete floor was mainly made of cement, water and sand. This floor was subjected to chemical attack by cleaners, feed acids, manure and gases and to mechanical impact from animals and high pressure cleaning. Woodshaving were gotten from sawmills within Igboora metropolis in its dried form and dirt, pebbles, debris, iron metals and broken bottles were removed and spread on cemented floor to make woodshaving floor. Clay was gotten from termite hills within the College campus and spread on cemented floor to make clay floor.

At the end of the eight weeks, three pigs per treatment were randomly chosen from each treatment and bled via the anterior vena cava, with the use of syringe and needle to obtain blood sample for the determination of glucose, cholesterol, triglyceride, high density lipoprotein and low density lipoprotein using spectrophotometric methods. The experimental diets were formulated to meet the nutrient requirement of crossbred weaned pigs and the experiment lasted for eight weeks. The data

collected were subjected to one way analysis of variance of SAS (6) and the difference between the means were separated using Duncan Multiple Range Test (7).

Results and Discussion

The results of the lipid profile of crossbred weaned pigs reared on concrete, woodshaving and clay floors are presented in Table 1. There were significant difference ($P < 0.05$) in all the parameters examined except high density lipoprotein which is non-significant ($P > 0.05$) across the treatment. Glucose ranged from (83.67mg/dl) in pigs reared on woodshaving floor to (98.67mg/dl) in pigs maintained on concrete floor. This was an indication that there was adequate glucose for life processes at cell level in weaned pigs reared on different floor types. Pigs reared on concrete floor had the highest (44.33mg/dl) cholesterol while the lowest mean value (39.33mg/dl) was obtained in pigs kept on woodshaving floor. Triglyceride was highest (23.33mg/dl) in pigs on concrete floor while the least value (18.33mg/dl) was recorded for pigs reared on woodshaving floor. There was no significant ($P > 0.05$) differences in the value obtained for high density lipoprotein across the treatments. High density lipoprotein function as transporter of cholesterol back to the liver for excretion process. It also transport cholesterol to other tissues that use them to synthesize hormones (8). The high density lipoprotein values obtained in this study (20.23-22.67 mg/dl) were higher than the value obtained (0.89-1.27mg/dl) by (9). Low density lipoprotein was highest (39.67mg/dl) in the pigs on the concrete floor while pigs on the woodshaving floor recorded the lowest value (35.67mg/dl). This value was below the range of 130 to 159mg/dl that was positively correlated with the formation of atherosclerosis in man (10). This might be an indication that pigs were safe to human consumers in terms of risk of development of atherosclerosis arising from their low density lipoprotein content.

Table 1: Effect of floor type on serum lipid profile of weaned pigs

Parameters	T1(Concrete floor)	T2 (Woodshaving floor)	T3 (Clay floor)	SEM
Glucose (mg/dl)	98.67 ^a	83.67 ^b	84.67 ^b	0.27
Cholesterol (mg/dl)	44.33 ^a	39.33 ^b	40.00 ^b	0.15
Triglyceride (mg/dl)	23.33 ^a	18.33 ^b	19.00 ^b	0.10
HDL (mg/dl)	22.67	20.33	22.00	0.12
LDL (mg/dl)	39.67 ^a	35.67 ^b	36.20 ^b	0.09

a,b means on the same row differed significantly, HDL: High Density Lipoprotein, LDL: Low Density Lipoprotein

Conclusion and Application

It can be concluded that rearing pigs on woodshaving floor gave the best lipid profile of pigs and this is an indication that the pigs are safe for human consumption and the use of woodshaving as a bedding materials prevents environmental pollution and reduce waste in the environment.

References

- Pettigrew, J.E., Moser, R.L., Miller, E.R., Ullrey, D.E and Lewis, A.J. (1991). Fat in swine nutrition. In swine Nutrition; Taylor and Francis Group: Abingdon, UK, Pg:133-145
- Calder, P.C (2008). Polyunsaturated fatty acids, inflammatory processes and inflammatory bowel diseases. *Molecular.Nutrition. Food Research.* 52: 885-897
- Young, L.D., Pond, W.G and Mersmann, H.J. (1993). Direct and correlated responses to divergent selection for serum cholesterol concentration on day 56 in swine. *Journal of. Animal Science.* 71: 1744-1750.
- He, Y., Lam, T.H., Li, L.S., He, S.F and Liang, B.Q (2004). Triglyceride and coronary heart Disease mortality in a 24-year follow-up study in Xi China. *Animal. Epidemiology*, 14 :1- 14.
- World Atlas, (2024). Available at : <https://geoeducar.wordpress.com/2024/08/07/atlas-en-pdf/>
- SAS, 2022. SAS Users Guide, Version 6.11.SAS Institute, Inc. Cary, NC
- Duncan, D.B. (1955). Multiple Range and multiple F-Test. *Biometrics*, 11: 1-11
- Fahy, E., Subramaniam, S., Murphy, R.C., Nishijima, M., Ractz, C.R., Shimizu, T., Spener, F., Van Meer, G., Wakelam, M.J and Dennis, E.A (2009). 'Update of the lipid maps Comprehensive classification system for lipids'. *Journal of lipid research.* 50 (Suppl): 9-14
- Claus, R., Gunthner, D and Letzgub, H. (2007). Effects of feeding fat-coated butyrate on mucosal Morphology and function in the small intestine of the pigs. *Journal of Animal Physiology*, 91: 312-317.
- Fine, L.B and Davidson, C (2008). Comparison of lipid and fatty acid profiles of commercially raised pigs with laboratory pigs and wild-ranging warthogs. *South African Journal of Sciences*, 104(7-8): 314-316.