COMPARATIVE EFFECT OF FEEDING BASED ON BODY WEIGHT AND UNRESTRICTED FEEDING ON THE PERFORMANCE AND HAEMATOLOGY OF WEANER PIGS.

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Abstract

The experiment was conducted to compare the effect of feeding based on body weight and ad libitum on the performance and serum biochemistry of weaner pigs. A total of 20 weaned pigs were randomly allotted into two treatments with two replicates each (5 weaned pigs per replicate) and arranged in a completely randomized design, T_1 (Ad libitum) and T_2 (10% of Body weight). The experiment lasted for 42 days. Pigs in T_1 had unrestricted access to feed (ad libitum) while 10% of body weight was offered to pigs in T_2. Body weight, rectal and environmental temperatures were measured weekly while the feed conversion ratio was calculated. Blood samples were collected from the weaned pigs at the end of the experiment to determine the serum biochemistry of the experimental animals. Significant differences ($P<0.05$) were observed in the feed intake and feed conversion ratio of weaned pigs, in which the feed intake for T_1 was 3.33 kg/pig/week and T_2 was 7.43 kg/pig/week while the feed conversion ratio for T_1 was 1.11 and T_2 was 2.78. The rectal temperature of pigs in T_1 increased from 35.6°C to 37.2°C while it decreased from 38.3°C to 36.5° C in pigs allotted to T_2. The environmental temperature also decreased from 27.3°C to 25.5°C. The temperature - humidity index was critical throughout the period of the experiment. There was no significant ($P>0.05$) effect observed in most of the serum biochemical parameters of weaner pigs fed based on body weight and ad libitum. But, significant difference ($P<0.05$) was observed in the cholesterol level with 1.36 g/l for T_1 and 1.94 g/l for T2. Based on this research work, the performance of the weaner pigs fed on ad libitum improved when compared to weaner pigs fed based on their body weight. Although, feeding based on body weight helps in reducing the heat produced from metabolic activities.

Key words: Performance, serum biochemistry, Weaned pigs.

Introduction

Pig production remains one of the veritable sources of supply of animal protein (Udofia *et al.*, 2007). The choice of feeding periods for pigs is based entirely on nutritional and economic considerations (INRA, 1984). For example, feeding restriction is commonly practiced with market pigs to improve carcass quality and feed efficiency while decreasing production costs. *Ad libitum* feeding is a system in which each animal or group of animals is allowed to eat all it wants without any restriction. This method is the most commonly used procedure in farm animal investigations and gives unbiased results for direct practical application. However, the problems associated with *ad libitum* feeding are; 1) the overfeeding of dry sows can depress the reproductive performance of sows; 2) high feed wastage; and 3) little scientific evidence for developing recommendations on feeding space for pigs fed ad libitum (Ru and Bao, 2004).The increase in the price of feedstuffs have made many pig farmers in Nigeria to embark on indiscriminate feeding of their animals with poor quality feeds. High humidity combined with high temperatures, can enhance the negative effects of the high temperatures. Since pigs must rely heavily on evaporative heat loss in order to stay cool when it is hot, humidity level is very important. The higher the humidity level in the air, the less effective is the process of evaporative cooling. Thus, when relative humidity is 50% or higher, the pig will feel the effects of heat stress at a lower temperature than when the air is drier. At temperatures above 30°C (86°F), an 18% increase in relative humidity is equivalent to 1°C (2°F) rise in air temperature.

This research was designed to compare the performance and serum biochemistry of weaner pigs fed based on their body weight and *ad libitum*.

Materials and Methods

This study was conducted at the Piggery unit of the Department of Animal Science, Teaching and Research Farm, University of Ibadan, Oyo State, Nigeria. Twenty weaner pigs were assigned to two treatments and each treatment was replicated twice with five pigs per replicate in a Completely Randomized Design (CRD). Each replicate were housed in an open sided pen measuring 3.2 x

2.75m. Each pen had inbuilt concrete water and feed troughs. A concentrate containing 18% CP and 11.82MJME/kg was formulated and mixed with brewery waste in a ratio of 40:60. The mixture was fed to the treatments as follows: T_1: *Ad libitum* feed supply, T_2: 10% of the body weight. The feeding trial lasted for 42 days. The weaner pigs were acclimatized for 7 days and the initial body weights of the weaner pigs were taken on day 1 of the trial and subsequently on weekly basis. Feed intake record was taken on daily basis. Feed conversion ratio was calculated as ratio of feed/gain. The rectal temperature of each pig in each replicate was taken per week with the use of clinical thermometer. The environmental temperature and humidity was measured using hydro-thermometer at each pen per replicate. 5ml of blood samples were collected each treatment at the end of the trial to determine the serum parameters. Data collected were processed and analyzed using the analysis of variance method as outlined by Steel and Torrie (1980). Significantly different means were separated by methods of Duncan's New Multiple Range Test, Duncan (1955).

Results and Discussion

The result from Table 1 on the performance characteristics revealed that there were no significant ($P>0.05$) effect in the final weight and weight change of all the weaner pigs fed based on body weight and *Ad libitum*. Although, there were significant ($P<0.05$) effect on the feed intake and feed conversion ratio of pigs across the treatments. The feed conversion ratio for weaner pigs fed *ad libitum* (1.11) was lower than that of weaner pigs fed based on body weight (2.78). The increased growth rate observed in pigs fed *ad-libitum* could have resulted in more deposition of protein which has a greater effect on growth rate than fat deposition. This agrees with the earlier view of Onyimonyi *et al.* (2010) that efficiency of feed conversion in pigs is inversely related to increase feed intake because higher intake allows for increased body fat deposition. There is significant ($P< 0.05$) difference in the feed intake of pigs fed based on body weight (7.43kg/pig/week) and those fed *ad libitum* (3.33kg/pig/week). The reason might be that the weaned pigs fed *ad libitum* feed slowly because the feed is always available while those fed based on their body weight feed quickly. The result from Figure 1 on Temperature Humidity Index was critical throughout the period of the experiment. It dropped from 78.82 at week one to 77.49 at week three and finally stayed at 75.91 at week 5. None of the recorded result was ≤74 which is considered the safe THI limit. The environmental

Table 1: Performance Characteristics of Pigs Fed based on body weight and *Ad libitum*

	Ad libitum	Body weight	SEM
Initial weight (kg/pig)	5.33	5.33	0.53
Final weight (kg/pig)	8.33	8.00	1.25
Weight change (kg/pig/week)	3.00	2.67	0.85
Feed intake (kg/pig/week)	3.33^b	7.43^a	0.06
FCR	1.11^b	2.78^a	0.02

^{ab}Means with different superscript in the same row differ significantly ($P<0.05$).

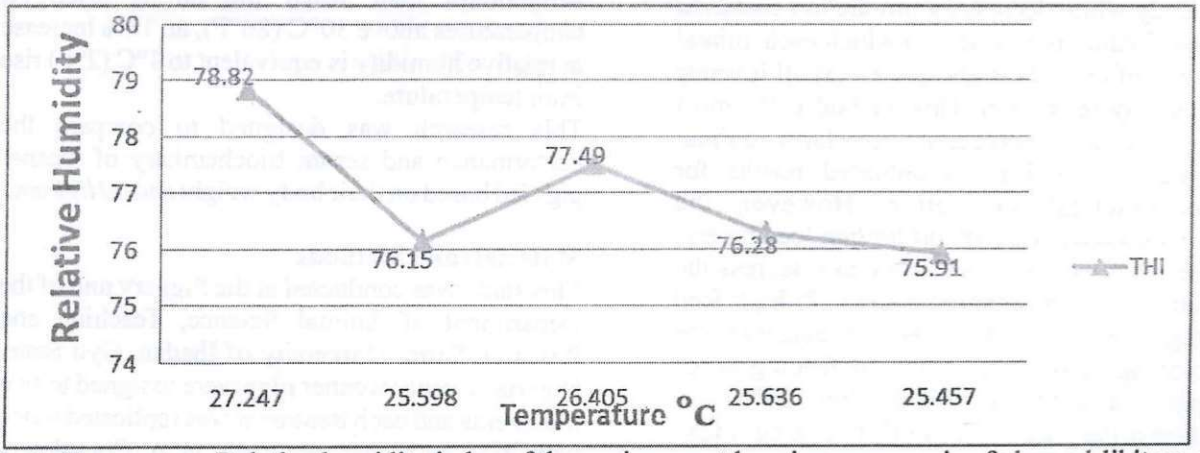


Fig 1: Temperature Relative humidity index of the environment housing weaner pigs fed on ad-libitum and those on Percentage body weight basis

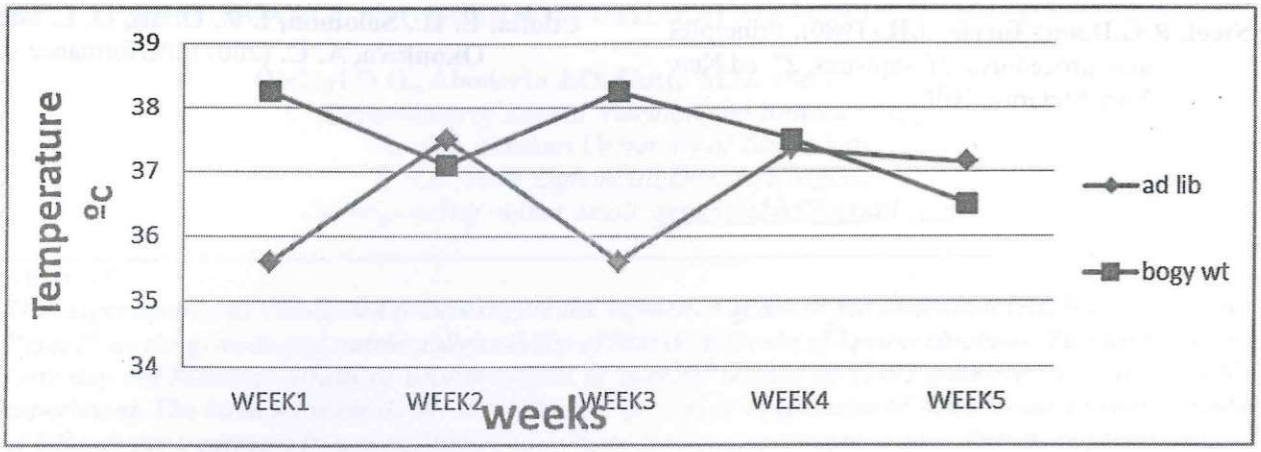


Fig 2: Rectal Temperature of weaner pigs fed on ad -libitum and those on Percentage body weight basis

Table 2: Serum Biochemistry Of Weaner Pigs Fed Based On Body Weight and Ad Libitum basis

	AD LIBITUM	BODY WEIGHT	SEM
Cholesterol (g/l)	1.36[b]	1.94[a]	0.14
Glucose (g/l)	0.53	0.56	0.06
Creatinine $x10^{-2}$ (g/l)	1.60	1.49	0.33
Albumin (g/dl)	4.31	4.57	0.31
Total protein (g/dl)	6.23	6.42	0.40
Globulin (g/dl)	1.92	1.85	0.27

[ab]Means with different superscript in the same row differ significantly ($P<0.05$).

temperature decreased from 27.3°C at week one to 25.5°C at week five. According to Mader *et al.*,(2002), he observed that in a hot climate (THI>74), steers fed a restricted diet for either 21 or 42 days had a decreased tympanic temperature when compared to steers offered *ad libitum*. This showed that feeding frequency can help in reducing heat produced from metabolic activity in pigs. Pig is a homoeothermic animal which needs to maintain constant body temperature for general body functions. The rectal temperature is a function of the metabolic feed intake which is influenced by the environmental temperature. The result in Figure 2 shows that the rectal temperature of weaner pigs fed *ad libitum* increased from 35.6°C at week one to 37.15°C at week five. While the rectal temperature of weaner pigs fed based on body weight decreased from 38.25°C at week one to 36.5°C at week five.

The result in Table 2 showed that there were no significant ($P>0.05$) differences in Glucose, Creatinine, Albumin, Globulin, and Total Protein of weaner pigs fed based on body weight and ad libitum. However, the cholesterol value of weaner pigs fed based on body weight and *Ad libitum* was significantly ($P<0.05$) affected with weaner pigs fed based on body weight having the cholesterol value of 1.94g/l and weaner pigs fed *ad libitum* having the cholesterol value of 1.36g/l. This might be because the feed intake of weaned pigs fed based on their body weight was higher than those fed *ad libitum*.

The practical implication of the present study is that weaner pigs fed *ad libitum* performed better than those fed based on their body weight. Although, feed restriction may help to reduce metabolic heat production.

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