EFFECT OF CONFINEMENT AND SEMI-INTENSIVE SYSTEM OF MANAGEMENT ON THE RECTAL TEMPERATURE OF SHEEP

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Abstract
Twenty (20) non-lactating Yankasa sheep were used in Ten (10) weeks experiment to determine the effect of confinement and semi-intensive management system on body temperature. The animals were divided into two treatment groups of ten animals per treatment, with five replicates and two animals per replicate using Complete Randomized Design (CRD). The experimental animals were reared under confinement and semi-intensive management systems (T_2) and fed yam peel as supplement at the rate of 1800g per animal per day. The rectal temperature was taken twice daily in the morning and evening using a clinical thermometer. The mean body temperature of sheep in T_1 and T_2 in the morning hours span between 37.17±0.35 to 38.12±0.10 and 37.58±0.30 to 39.17±0.35, respectively. Similarly, from the evening values, it spans between 38.02±0.08 to 38.11±0.12 and 38.21±0.81 to 40.23±0.08 for T_1 and T_2, respectively. The environmental temperature of the study area fairly impacted on the variations obtained in the body temperature of the animals under study. It is therefore concluded that semi-intensively managed sheep had significantly higher body temperature values than those under confinement, particularly at the evening periods of the day after grazing. As such, it is recommended that grazing hours of the semi-intensively managed sheep be reduced to at least four (4) hours in a day.

Keywords: Confinement, Semi-intensive Management, Yankasa Sheep, Body Temperature, Gazing hour

Introduction

Management of small ruminants by most local famers in Nigeria is by semi-intensive system of management (Ozung *et al.*, 2011). In semi-intensive system of management, stall feeding and grazing is usually limited depending on the availability of time, labour and feeds. The period or duration of grazing varies and it was about 4-6 hours per day usually late morning to evening. Traditionally, the nomadic herdsmen keep sheep and goats which are allowed to graze along with the cattle and eating from the same source. Sheep display unique ability to survive different management systems in Nigeria. However, (Magaji, 2004) reported that despite the tremendous commitment of the small holder f armers to the Nigeria's livestock economy and the improvement programmes, the productive capability of these animals is yet to be fully utilized. Some of these productivity capabilities incorporate the ability of small ruminants to highly adjust to a wide range of environments (Aye, 2004).

Body temperature is an essential parameter in evaluating an animal's wellbeing status (Patty and Charles, 2006). Body temperature is the most quantifiable parameter and a responsive marker of the animals reaction to physic-ecological factors, disease procedures and delicate physiological functions such as nutrition, lactation and reproduction (Michael *et al.*, 2009).

Rectal temperature has been considered as the gold standard for indicating main body temperature (Richard *et al.*, 2009). In clinical settings, rectal thermometry is the most

consistent system for getting an animal's body temperature; despite the fact that this system needs restraint and proper care.

Lack of adequate knowledge on the importance of body temperature in disease diagnosis in small ruminants and the attendant implications of trekking long distances in search of feed and water on the health indices of these animals poses alot of challenge to small ruminant production efficiency within the study area (Adama & Fasanya, 2008).

Materials and Methods

Location of Study

The experiment was carried out in the feedlot unit of Teaching and Research Farm, Animal Production Department, Federal University of Technology, Minna, Niger state. Niger state is characterised by two seasons which are the wet season (April to October) and the dry season (November to March). Minna is located in the Guinea Savanna zone of the North Central region of Nigeria. It has an altitude of 75mm above sea level with a land area of 6784 km^2 and lies between latitude $9^0$37'N and longitude $6^0$33'E. The mean annual rainfall is 1200 mm – 1300 mm and mean annual temperature of 38^0C to 42^0C (NSADP, 2009).

Experimental Animals and their Management

The experiment was conducted using twenty (20) non-lactating Yankasa sheep, weighing between 7—10kg body weight. The animals were managed under confinement and semi-intensive system of management in which semi intensively managed group were allowed to graze on natural pasture during the day (9am till 5pm) but confined in a well ventilated pen and 1800g of yam peel per animal per day was provided as supplementary feed. The pen was routinely cleaned and disinfected while the animals were given prophylactic treatment against endo and ecto parasites using Ivomec at the dose rate of 0.5ml/10kg body weight and were treated using oxytetra cycline at the dose rate of 2mg/10kg body weight.

Experimental Design

The experimental animals were allotted to two treatment groups with each treatment consisting of ten (10) animals made up of five (5) replicates per treatment with two animals per replicate using a Completely Randomized Design (CRD). Treatment one served as those under confinement within the pen without allowing them to go out for grazing outside the pen.

Data Collection

The body temperatures of the animals were using a clinical thermometer. The thermometer was inserted in the rectum as described by Kelly (1984). A firm grip was held on the thermometer and it was left there for half a minute before it was removed and read. The thermometer used after insertion in each animal was disinfected using methylated spirit before being used for another animal.

The rectal temperature of the animals was measured twice a week for a period of three months (March to April) at regular intervals to avoid undue stress of the animals. It was measured in the morning at 0800 hours before the animals were released for grazing and in the evening at 0700hours when they return back from grazing.

Feed Analysis
The proximate analysis of the supplementary diet (yam peel) was carried out in the Animal Production Departmental laboratory, Federal University of Technology, Minna according to AOAC (2000).

Data Analysis
The data generated from the experiment were polled and subjected to statistical analysis using SPSS Version 17.0 (SPSS, 2009). The means were separated using Duncan's Multiple Range Test (DMRT). Significance was set at ($P<0.05$).

Results

Table 1: Proximate composition of the dry yam peel

Nutrients	Proximate composition (% DM)
Dry matter content	76.13
Crude protein	13.65
Crude fibre	7.33
Ash	9.50
Ether extracts	1.00
Nitrogen free extracts	44.65

DM- Dry Matter Basis

Table 1 shows the result of the proximate analysis of the yam peel. The crude protein value of 13.65 % indicates a good nutritional status of the dry yam peal used as supplemental diet. The other chemical components of the yam peel are as follows: Dry matter content (76.13 %), crude fibre (7.38 %), Ash (9.50 %), ether extract (1.0 %) and Nitrogen free extract (44.65%).

Table 2: Mean rectal temperature of Sheep reared under confinement and semi-intensive system of management

		Rectal temperature (^{0}C)		
Week	**Group**	**Morning**	**Evening**	**Total Mean**
1.	T_1	38.45±0.19	39.66±0.19	39.01±0.19
	T_2	38.84±0.10	39.93±0.13	39.39±0.13
2.	T_1	38.12±0.10^b	38.02±0.08^b	38.07±0.09
	T_2	39.16±0.22	40.12±0.12^a	39.64±0.17
3.	T_1	38.22±0.11	38.11±0.12^b	38.17±0.12
	T_2	38.34±0.08	39.64±0.81^a	38.99±0.45
4.	T_1	37.74±0.16	38.21±0.81^b	37.98±0.49^b
	T_2	37.85±0.22	39.42±0.91^a	38.64±0.57^a
5.	T_1	3.53±0.11	38.32±0.13^b	38.43±0.12
	T_2	37.79±0.21	39.22±0.07^a	38.00±0.14
6.	T_1	38.16±0.21	39.59±0.06	38.89±0.12
	T_2	38.31±0.9	39.61±0.15	39.96±0.53
7.	T_1	38.35±0.10^b	39.66±0.06^b	39.01±0.08
	T_2	39.17±0.35^a	40.23±0.08^a	39.17±0.09
8.	T_1	37.17±0.35	38.33±0.18^b	38.25±0.27
	T_2	37.95±0.12	39.49±0.18^a	38.72±0.15
9.	T_1	37.58±0.35	38.16±0.25^b	38.27±0.27

	T_2	37.59±0.30	39.03±0.23[a]	38.31±0.42
10.	T_1	37.34±0..12	38.03±0.23[b]	37.69±0.14 [b]
	T_2	37.58±0.30	39.54±0.17[a]	38.56±0.17[a]

T_1 (Control) – Treatment One representing animals under intensive management system.
T_2 – Treatment two representing animals on semi-intensive management system.
a, b – means with different superscripts on the same column are significantly different ($P<0.05$).

Table 2 shows the mean body temperature of sheep under confinement (T_1) and semi-intensive (T_2) management systems, which spans between 37.17±0.35 to 38.12±0.10 and 37.58±0.30 to 39.17±0.35 in the morning for T_1 and T_2, respectively. Similarly, from the evening values, it spans between 38.02±0.08 to 38.11±0.12 and 38.21±0.81 to 40.23±0.08 in the evening between T_1 and T_2.

The result of the mean temperature values in the morning at week 2 and 7 shows T_2 to be significantly higher ($P<0.05$) than the corresponding values of T_1.

The mean temperature values of T_1 from evening records were significantly lower ($P<0.05$) than the corresponding values of T_2 as from week 2 to the end of the experiment. However, at week 1, the values obtained at morning and evening did not show any significant ($P>0.05$) difference between the two treatments.

Variations also exist in the total mean temperature values at week 2, 4 and 10 respectively. The mean total temperature T_2 were significantly higher ($P<0.05$) than the corresponding values of T_1 within these three weeks.

Table 3: Mean Environmental Temperature (^{0}C) of Federal University of Technology, Minna, Gidan Kwano Campus, Minna, Niger state between March and May, 2015

Week	1	2	3	4	5	6	7	8	9	10
Mean temperature (^{0}C)	33.75	31.25	31.50	31.75	32.25	33.00	32.25	32.00	31.50	32.50

Source: Meterological station, Geography Department, Federal University of Technology, Minna, Niger State

Table 3 shows the mean environmental temperature of the study area. From this table, it was observed that the temperature was at its peak during the first week of the experiment. However, there were fluctuations in values throughout the period with a steady lower values obtained from week 7 to 10.

Discussion

The crude protein content value of the yam peel obtained in this study was higher than the value obtained by previous author (Aduku, 1993). However, the crude fibre content and nitrogen free extract obtained from the same author were much more higher than in the current study. the relatively higher crude protein content obtained serves as a good source of nutrient to the experimental animals. According to Therdachi and Choke (2001), yam

peels are used in ruminant diets as an energy source and that 94% of yam starch can be digested in the rumen.

Temperature is said to have been used in checking the health status of farm animals especially those left to scavenge on their own. The relatively high temperature of the animals in the present study agrees with the findings of Ayo and Minka (2003), when they examined the effect of confinement on some physiological parameters in Red Sokoto goats during the early raining season. Furthermore, the relatively high temperature of the sheep obtained among semi-intensively kept animals in this study might probably be due to the stress the animals had undergone during grazing and the inadequate availability of green forages at the time of the experiment being ending of dry season to early raining season period.

The decrease in the body temperature observed in the experimental animals as the season changes from the dry season to the inception of the raining season agrees with the work of Khalid *et al*. (2012) where they observed in their relative study on seasonal variation in body temperature and blood composition of camels and sheep that increase in both species as the season changes from winter to summer designates that heat dissemination was lower than heat gain and as a result, thermal balance could not be maintained that is cooling mechanisms became insufficient since the gradient difference of temperature between the body and air could not be maintained.

In conclusion, the present study shows that the semi-intensively managed animals had significantly higher body temperature than those under confinement. There was a clear indication of significant increase in the body temperature of the semi-intensively managed animals in the evenings after grazing as compared to those under confinement. Furthermore, those under confinement and the semi-intensively managed group also showed a significantly lower body temperatures in the morning when compared to the evening time. It could also be concluded that the environmental temperature also had a significant influence on the body temperature of the experimental animals.

It is therefore, recommended that the grazing hours of small ruminants particularly sheep be reduced to about four (4) hours in a day and that there should be a corresponding increase in feed supplements especially during dry season periods of the year when adopting the semi-intensive system of management.

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