PARTIAL MILK YIELD, MILK CHOLESTEROL AND BODY WEIGHT OF LACTATING WEST AFRICAN DWARF DOES

S. T. IDOWU[1], O. O. ADEWUMI[1], O. A. FASAE[1], T. J. WILLIAMS[2] AND A. BOYLE-RENNER[1]

[1]*Department of Animal Production and Health, Federal University of Agriculture P.M.B. 2240, Abeokuta, Nigeria*

[2]*Department of Animal Physiology, Federal University of Agriculture P.M.B. 2240, Abeokuta, Nigeria*

**Correspondence: Samson_mike2000@yahoo.com*

ABSTRACT

In the present study, the effects of weeks of lactation on partial milk yield, milk cholesterol and body weight of lactating West African Dwarf does were investigated. Twelve WAD does with mean initial weight of 24.5 ± 1.58 kg were housed individually in pens. Partial milk yield was measured weekly and milk samples were analyzed for cholesterol content. Data obtained were subjected to analysis of variance using general linear model procedures. Stage of lactation significantly affected milk yield, milk cholesterol content and body weight measurement. Highest milk cholesterol level and peak milk yield were observed at the 3rd and 4th week of lactation respectively and both decreased as lactation advanced.

Keywords: WAD goats, Partial Milk yield, Milk Cholesterol.

INTRODUCTION

Goats in Nigeria are kept mainly for meat productions, the milk is not substantially consumed (Midau *et al.*, 2010, Adewumi *et al.*, 2015). However, there is a growing awareness of the importance of goats as source of milk for man (Malau-Aduli *et al.*, 2001, Adewumi *et al.*, 2015). Goat milk is of interest due to variation in yield and composition from breed to breed. One of the controversial components of goat milk is the cholesterol content. The concentration of total cholesterol in goat milk presented in literature occurs in a wide range e.g. 2 - 24.8 mg/100ml (Amer *et al.*, 1999) but its relationship with milk yield and body weight is scanty in literature. Cholesterol concentration depends on year or season, feeding system, stage of lactation and breed (Park, 1990, 1991). Therefore, the aim of this research work is to investigate the effects of weeks of lactation on partial milk yield, milk cholesterol and body weight of lactating West African Dwarf does.

MATERIALS AND METHODS

Experimental site

This experiment was carried out at the Small Ruminant Unit of the Directorate of University farms, Federal University of Agriculture Abeokuta. The site is located on the rain forest vegetation zone of south-western Nigeria on latitude 7^0 13' 49.46" N and longitude 3^0 26' 11.98" E and an altitude of 76m above sea level. The climate is humid with a mean annual rainfall of 1037mm and mean temperature and humidity of 34.7^0 C and 83 %, respectively (Google earth, 2013).

Experimental animals and their management

A total of twelve (12) lactating West African Dwarf (WAD) does with mean initial weight of 24.5 ± 1.58 kg and 2 years of age were used for the experiment. The WAD does were sourced from teaching farm of FUNAAB. They were housed intensively in a well-ventilated pen, in an open-sided pen with corrugated aluminium roofing sheet and a wooden slatted floor.

Experimental diet

The animals were fed at 5 % of their body weight. Concentrate diets were offered once daily at 09:00 hours. *Panicum maximum* was used as basal diet and clean water was offered *ad libitum* to all the animals.

Milk sample collection and analysis

Milk samples were taken at weekly intervals for 70 days from day 7 postpartum; this was done to allow the kids have access to all their dams' colostrum. Prior to milking, dams were separated

from their kids in the evening (19:00 hrs) till (07:00 hrs) the next morning. The two halves of the udder were hand-milked once weekly within (08:00 – 10:00 hrs). The quantity of milk collected from each doe was measured using a measuring cylinder and recorded before sub-samples of 20 ml were collected, bulked and refrigerated until needed for milk cholesterol analysis.

Chemical analysis

Milk cholesterol was determined using A.O.A.C. (2010) procedures.

Statistical analysis

The data obtained from the study were subjected to One way analysis of variance (ANOVA) using SPSS (1999) software procedures in a completely randomized design. Significant differences were separated using Tukey's studentized test.

RESULTS AND DISCUSSION

Effect of weeks of lactation on partial milk yield, milk cholesterol and weight of lactating West African Dwarf does

Table 1 shows the effect of weeks of lactation on partial milk yield, milk cholesterol and weight of lactating West African Dwarf does. Weeks of lactation had a significant effect on partial milk yield, weight and milk cholesterol content of lactating WAD does. Peak milk yield (360.25 ml) was recorded at the 4th week of lactation and it reduced as the weeks of lactation advanced. The increase in partial milk yield during early lactation and decrease towards the end of lactation in this study is in agreement with the reports of Akpa *et al.* (2001) and Adewumi *et al.* (2002) who reported an increase in early lactation within 2 to 5 weeks post-partum and thereafter a decline towards the end of lactation in Red Sokoto goats, Yankasa x WAD ewes respectively. The increase in milk yield in early lactation in this study can be related to increased secretory activity per cell while decrease towards the end of lactation can be related to the decreased number of secretory cells (Capuco *et al.*, 2001).

Milk cholesterol was within the range of 2 - 24.8 mg/100g reported by (Amer *et al.*, 1999). The lowest (8.43 mg/100g) value for milk cholesterol was recorded at the 7th week of lactation while the highest (42.36 mg/100g) was at the 3rd week of lactation. Milk cholesterol in this study reduced as the weeks of lactation advanced this is in accordance with the reports of Kamal and Salama (2009) and Strzalkowska *et al.* (2010) who reported decreased cholesterol content of camel and cow milk respectively as the weeks of lactation advanced.

Body weight was highest (25.41 kg) during the 1st week of lactation followed by a drop in body weight. The reduction in body weight after the 1st week of lactation could be attributed to the negative energy balance during this period as a result of the physiological status of the animals (De Vries and Veerkamp, 2000). Casamassima *et al.* (2007) however recorded an increase in body weight in goats as lactation progressed.

CONCLUSION

The study concluded that weeks of lactation significantly affected milk yield, milk cholesterol content and body weight.

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Table 1: Effect of weeks of lactation on milk yield, milk cholesterol and weight of lactating West African Dwarf does

Weeks of lactation	Milk yield (ml)	Milk cholesterol (mg/100g)	Weight (kg)
1	257.50^{bcd}	21.06^{b}	25.41^{a}
2	307.66^{abc}	$17.36b^{c}$	24.00^{b}
3	334.83^{ab}	42.36^{a}	23.54^{b}
4	360.25^{a}	22.26^{b}	23.54^{b}
5	272.16^{abcd}	12.96^{cd}	23.45^{b}
6	283.25^{abcd}	11.13^{d}	23.58^{b}
7	259.75^{abcd}	9.73^{d}	23.45^{b}
8	213.41^{cd}	9.60^{d}	23.50^{b}
9	198.08^{d}	9.36^{d}	22.87^{c}
10	182.50^{d}	8.43^{d}	22.58^{c}
SEM	31.70	1.91	0.18
P value	0.00	0.05	0.00

^{a,b,c,d} Means in the same row with different superscripts are significantly different ($P<0.05$)

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