



# Effects of lactation on lipid profile of yankasa ewes

**\*Corresponding Author(s): Musa SI**

Department of Animal Science, Nasarawa State,  
University, Nigeria  
Email: dribmazara@yahoo.com

**Abstract**

The objective of the study was to evaluate the effects lactation on lipid profile of yankasa sheep. A total of 10 ewes were used for the study 5 lactating and 5 non lactating. The parameters evaluated include total cholesterol, triglycerides, high density lipoprotein cholesterol and low density lipoprotein cholesterol. The result indicate significantly lower mean values of total cholesterol and triglycerides in lactating ewes compared to non lactating ewes ( $P < 0.05$ ). The mean values of high density lipoprotein cholesterol and low density lipoprotein cholesterol were similar for both groups. Understanding the dynamics of lipid profile during lactation is important in providing guidelines to guarantee the metabolic needs of lactating animals and reduce the incidence of metabolic diseases.

Received: Jan 29, 2020

Accepted: Mar 06, 2020

Published Online: Mar 10, 2020

Journal: Journal of Veterinary Medicine and Animal Sciences

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Musa SI (2020). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

**Introduction**

The critical role of lipids in body functions is well documented, they serve as hormone precursors, energy source, and metabolic fuels and act as structural components of cellular membranes [1]. Significant alteration in serum levels of lipids could lead to systemic disorders in the affected animal. It has been observed that, the concentration of carbohydrates, triglycerides, high density lipoprotein cholesterol and very low density lipoprotein cholesterol were higher at late pregnancy compared to post-partum period [2].

The influence of pregnancy and lactation on metabolic status of farm animals is well documented [3]. Thyroid hormones are reported to influence lipid metabolism by increasing lipolysis in adipose tissues and stimulating lipogenesis. Lactation is reported to result in significant changes in biochemical variables in all animals. Cholesterol synthesis is depended on energy metabolism in the liver using glucose and amino acids as key precursors. Nutritional status and fatty acid composition are important determining factors of the level of plasma cholesterol [4].

Late pregnancy in sheep has been associated with increased

concentration of total cholesterol, triglycerides and lipoproteins [3]. This is attributed to diminished responsiveness of tissues to insulin and increase mobilization of fatty acids from adipose tissues to meet up energy demands for foetal development. The plasma lipid profile in sheep is characterized by low triglyceride and lipoprotein concentrations [5]. Lipid profile is an important indicator of metabolic activities in lactating animals [6]. Assessment of serum metabolites is therefore an essential is understanding the dynamics of metabolic disorders in farm animals.

**Materials and methods****Experiment site**

This study was conducted in the livestock farm of the Department of Animal Science of College Agriculture, Lafia, Nasarawa state. The location lies within latitude 08033' N and longitude 08033'E at an attitude of 181.53m (570ft) above sea level with an annual rainfall of 1311.75cm

**Animals and management**

A total of ten (10) ewes (2-21/2 years of age) weighing 23.5 - 27.1 kg were used for the study. The animals were allowed



access to grazing most of the day. Maize offal was provided as supplementary feed and Minerals salt lick and clean drinking water provided *ad libitum*. All animals were given prophylactic treatment against ecto and endo parasites, by using ivermectin (50 µg/kg subcutaneously). The animals were divided into two groups (5 lactating and 5 non lactating). The lactating ewes were at 30 to 40 days postpartum.

### Determination of lipid profile

Blood samples were obtained from the jugular vein for the determination of lipid profile. Triglycerides was determined using calorimetric enzymatic method with glycerophosphate oxidase, as described by. Standard commercial test kits manufactured by ERBA diagnostics, Mannheim GmbH, Germany was used. Total cholesterol was determined by calorimetric enzymatic end point using reagents manufactured by Agappe diagnostics Switzerland, GmbH. HDL Cholesterol was measured by phosphotungstic acid method using commercial test kits produced by Erba diagnostics as described by [7].

### Statistical analysis

All data obtained was analyzed using student t – test.

### Results & discussions

The results indicate significantly lower mean serum values of total cholesterol and triglycerides in lactating ewes compared to non lactating ewes ( $P < 0.05$ ). The mean values of serum high density lipoprotein cholesterol and low density lipoprotein cholesterol are similar for both groups.

**Table 1:** Effects of lactation on Serum lipid profile of Yankasa sheep (mean ± sem)

Parameters	n	Lactating ewes	Non lactating	Los
Total cholesterol	10	1.46± 0.27	1.90± 0.32	*
HDL-Cholesterol	10	0.80± 0.20	0.90± 0.16	NS
LDL – Cholesterol	10	0.40± 0.12	0.52± 0.25	NS
Triglycerides	10	0.44± 0.11	0.74± 0.15	*

Means within same row bearing different superscript are significantly different ( $P < 0.05$ ), SEM – Standard Error or mean, NS: Not Significant; \*: Significant ( $P < 0.05$ ); HDL: High Density Lipoprotein; LDL: Low Density Lipoprotein, n: number of animals; LOS: Level of Significance

Decreased serum levels of total cholesterol and triglycerides have been associated with pregnancy, postpartum period, early lactation and late lactation in ewes [3]. Lipid profile is useful in predicting peripartum diseases, while the contribution of triglycerides to milk synthesis is well established [2]. Significant proportion of blood metabolites is utilized by the mammary gland during lactation. Low plasma concentration of triglycerides and lipoprotein in sheep is associated with specie showing low participation of triglycerides in lipemia and limited hepatic synthesis of fatty acids. [5]. Similarly, lower concentration of triglycerides and low density lipoprotein cholesterol have been reported in lactating ewes [8]. Variation in blood metabolites with changing physiological status justify blood metabolic profiling in assessment of nutritional status of ewes under different physiological conditions.

It can be concluded that understanding the dynamics of lipid profile and other serum metabolites during lactation is important in providing guidelines to guarantee the metabolic needs

of lactating animals and reduce the incidence of metabolic diseases.

### References

1. Sani A, Abiodin A I, Isa DJ, Joel SN, Nicodemus MU, et al. Changes in the serum Profile of lipids and cholesterol in sheep experimental model of acute Africa Trypanosomosis. African Journal of Biotechnology. 2008; 7: 2090-2098.
2. Nazifi S, Saeb M, Ghavami S. Serum lipid profile in Iranian Fat Tailed sheep in late pregnancy, parturition and during post parturition period. Journal of Veterinary Medicine. 2002; 49: 9-12.
3. Giuseppe P, Giovanni C, Claudiu G, Fortunata G, Sebastiano C, et al. Selected biochemical serum parameters in ewes during Pregnancy, post parturition, lactation and dry period. Animal Science Papers and Reports. 2009; 27: 321-330.
4. Fair S, Doyle DN, Diskin MG, Heneessy AA, Kenny DA. The effects of dietary A-3 Polyunsaturated fatty acids supplementation of rams on semen quality and subsequent quality of liquid stored semen. Theriogenology. 2014; 81: 210-219.
5. Mazur A, Ozgo M, Rayssiguer Y. Altered plasma triglycerides-rich Lipoproteins and triglycerides secretions in feed restricted pregnant ewes. Vetrinari Medicina. 2009; 54: 412-418.
6. Karapehliyan M, Atakisi E, Atakisi O, Yucart, R, Pancrsi M. Blood biochemical parameters during the lactation and dry periods in Tuj Ewes. Small Ruminant Research. 2007; 73: 267-271.
7. Musa SI, Bitto II, Ayoade JA, Oyedipe EO. Serum immunoglobulins and lipid Profile as influenced by Vitamin E and Selenium. Journal of Animal Science and Veterinary advances. 2019; 18: 1-4.
8. Antunovic Z, Novoselec J, Sauerwen M, Speronda M, Pavic V. Blood metabolic profile and some hormone concentration in ewes during Different physiological status. Bulgarian Journal of Agricultural Science. 2011; 17: 685-695.