
COMPARISON BETWEEN THE CHOLESTEROL LEVELS OF EWES AND DOES' COLOSTRUM

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ABSTRACT: *A total of 12 lactating animals of equal number (6 Ewes) and (6 Does) were used for this study. The animals were selected from Chaha and Livestock Investigation Department (LID) of National Veterinary Research Institute (NVRI) Vom, Plateau State, Nigeria. This study was aimed at establishing comparison between the cholesterol levels of Ewes and Does' colostrum. 6mls samples of colostrum were obtained from each lactating dam (Ewes and Does) from the teat of their udder by gentle stripping to avoid injury into fresh clean sample collection bottles (Vacutainer tubes) following the standard procedure. The collected colostrum was taken to the biochemistry Laboratory of the NVRI for analysis. The parameters determined was cholesterol of the colostrum samples collected from each mammalian species, postpartum (after birth). The content of cholesterol was determined in accordance with a modified procedure described by Borkovcová. The results of the study showed that the Total cholesterol (Tc), High density lipoprotein cholesterol (HDLc) and Triglycerides/High density lipoprotein (Tg/HDL) in the colostrum of Ewes and Does' are significant. Ewes' colostrum recorded higher concentration of Tc and HDLc whereas Does's colostrum recorded higher concentration of Tg/HDL than the Ewes' colostrum. However, the results of Tg, Low density lipoprotein cholesterol (LDLc) and Very low-density lipoprotein cholesterol (VLDLc) were not significant among the colostrum of Ewes and Does studied. The results of this findings, could provide a basis for further searched to advanced more reasons attributed to the differentiation in the colostrum levels in other species.*

KEYWORDS: Colostrum, Cholesterol, Ewes, Does, Comparison, Immunoglobulin

INTRODUCTION

Colostrum is a nutrient-rich fluid produced by the mammary glands of female mammals postpartum and at the first 24-48hours after parturition, and it transform to mature milk subsequently (Georgiev, 2008). It is a complex biological fluid and its composition is similar to that of blood and varied significantly from milk. Colostrum do not have a typical composition profile across or among species. Several factors affect the production and the composition of colostrum, including the species, the breed, the health status of the mammal, feeding practices, and time collected after birth. Colostrum is not only a good source of macronutrients such as proteins, carbohydrates, fat, and micronutrients including vitamins and minerals, but also constitutes various biologically active constituents (Playford and Peptide, 2001). These include immunoglobulins (Ig), anti-microbial proteins, growth factors/ inhibitors, anti-inflammatory, antioxidant and immune-enhancing components not present in milk or present in small concentrations (Hernández-Ledesma, 2008). It plays vital role in the nutrition, protection and development of the newborn infant, and contributes to the immunological defense of the neonate by stimulating the immune system, or by offering passive protection,

especially in the gastrointestinal tract (Duggan, 2008). Many of its constituents comes directly from the blood stream, for instance, Ig, somatotropin, prolactin, insulin and glucagons, others are locally made in the udder from mammary epithelial cells and the stroma (fat, lactose, caseins, α -lactalbumin (α -La), β -lactoglobulin (β -Lg), etc. The colostrum composition varies with time postpartum, most significantly within the 24 hours after parturition.

Its natural evolution is related to the immediate demands of the newborn and, since most species of mammals (sheep, goats and cattle) develop at different rates and have varied nutritional requirements, the colostrum and follow-on milk of each species, have a different composition. Therefore, some colostrum's may be similar and some are extremely different. Details of colostrum bioactive constituents (growth and immune factors) have been investigated only in a few species such as cattle and humans, whereas the changes in proteins, fat and carbohydrate (lactose) concentrations have been determined in several species. Goat colostrum varied from those of cow or ewe colostrum, having better digestibility, alkalinity, buffering capacity, and certain therapeutic values in medicine and human nutrition (Park, 1994). Sheep milk has higher specific gravity, viscosity, refractive index, titratable acidity, and lower freezing point than average cow milk (Haenlein and Wendorff, 2006). Bovine colostrum has obtained considerable attention since it contains many beneficial substances, and several scientific and clinical studies demonstrate its health significance. This study was aimed at establishing comparison between the cholesterol levels of Ewes and Does' colostrum.

MATERIALS AND METHOD

Experimental Location

This study was conducted in National Veterinary Research Institute Vom, Plateau State, Nigeria. Plateau State is located in Nigeria. It has an area of 26,899km² with an estimated population of about three million people. The State lies between Latitude 08⁰ 24'N and Longitude 08⁰ 32' and 10⁰ 38' E. The altitude ranges from around 1200m to a peak of 1,829m above mean sea level. The state is located in the tropical zone of Nigeria with an average temperature of between 13 °C and 22 °C. Harmattan winds resulted in the coldest weather which is between December and February while the warmest temperatures usually occur during the dry season months which is between March and April. The mean annual rainfall differs from 131.75cm (52 inches) in the southern part to 146 cm (57 inches) on the Plateau (NIMET, 2017). The highest rainfall is recorded during the wet season months which is between July and August respectively.

Experimental animals

A total of 12 lactating animals of equal number (6 Ewes) and (6 Does) were used for this study. The animals were selected from Chaha and Livestock Investigation Department (LID) of National Veterinary Research Institute (NVRI) Vom, Plateau State, Nigeria.

Sample Collection

6mls samples of colostrum were obtained from each lactating dam (Ewes and Does) from the teat of their udder by gentle stripping to avoid injury into fresh clean sample collection bottles (Vacutainer tubes) following the standard procedure.

Laboratory analysis

The collected colostrum was taken to the biochemistry Laboratory of the NVRI for analysis. The parameters determined was cholesterol of the colostrum samples collected from each mammalian species, postpartum (after birth). The content of cholesterol was determined in accordance with a modified procedure described by Borkovcová *et al.* (2009).

Statistical analysis

The general linear model (GLM) of the Statistical Package for Social Sciences (SPSS version 22) was used for data analysis.

The following linear model was employed:

$$Y_{ij} = \mu + S_i + e_{ij}$$

Where;

Y_{ij} = Individual population mean

μ = General population mean

S_i = Effect of cholesterol in the colostrum of the species (ewes and does).

e_{ij} = The error term

Where;

RESULTS AND DISCUSSION

Table 1. The cholesterol levels in Ewes and Does' colostrum

Parameters measured	Ewe	Doe	LOS
	Mean \pm SE	Mean \pm SE	
Tc (mg/dl)	206.58 \pm 8.25 ^a	171.45 \pm 8.25 ^b	**
Tg (mg/dl)	208.98 \pm 38.99	291.57 \pm 38.99	ns
HDLc (mg/dl)	163.49 \pm 21.63 ^a	76.24 \pm 21.630 ^b	**
LDLc (mg/dl)	31.30 \pm 16.32	36.89 \pm 16.32	ns
VLDLc (mg/dl)	41.80 \pm 7.80	58.33 \pm 7.80	ns
Tg/HDL (mg/dl)	1.87 \pm 0.52 ^b	3.87 \pm 0.52 ^a	**

abc- means on the same row bearing different superscripts are significantly different (P<0.05).

**Significant at (P<0.05). SE- Standard error.

Tc= Total cholesterol; Tg= Triglyceride; HDLc= High density lipoprotein cholesterol; LDLc= Low density lipoprotein cholesterol; vLDLc= very Low-density lipoprotein cholesterol;

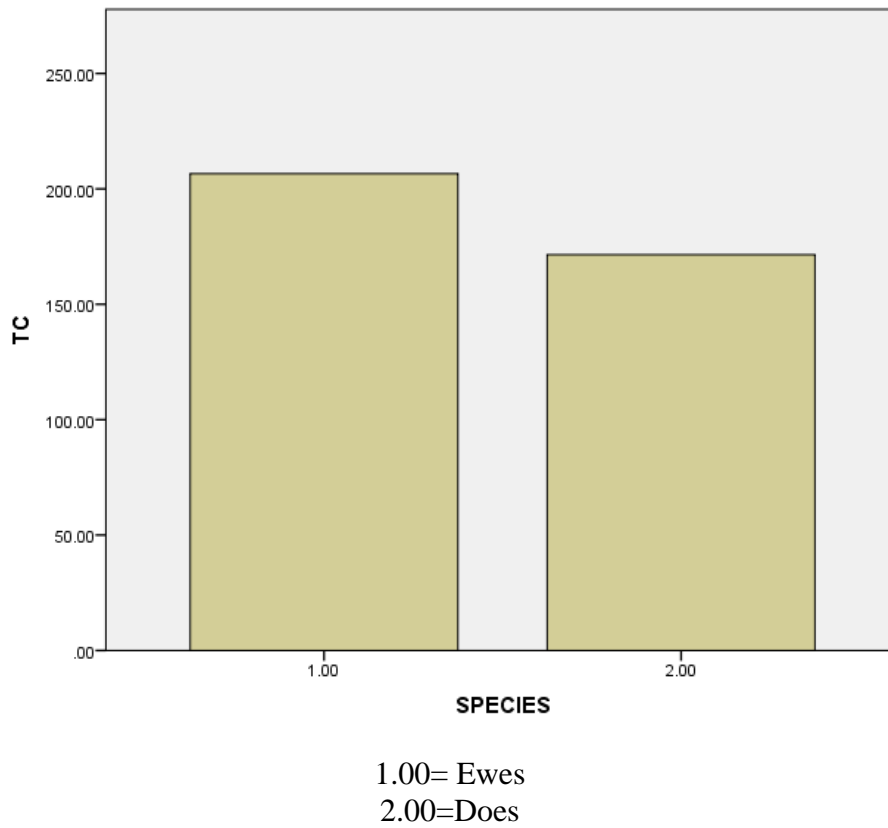


Figure 1. Total cholesterol (TC) levels in Ewes and Does' colostrum

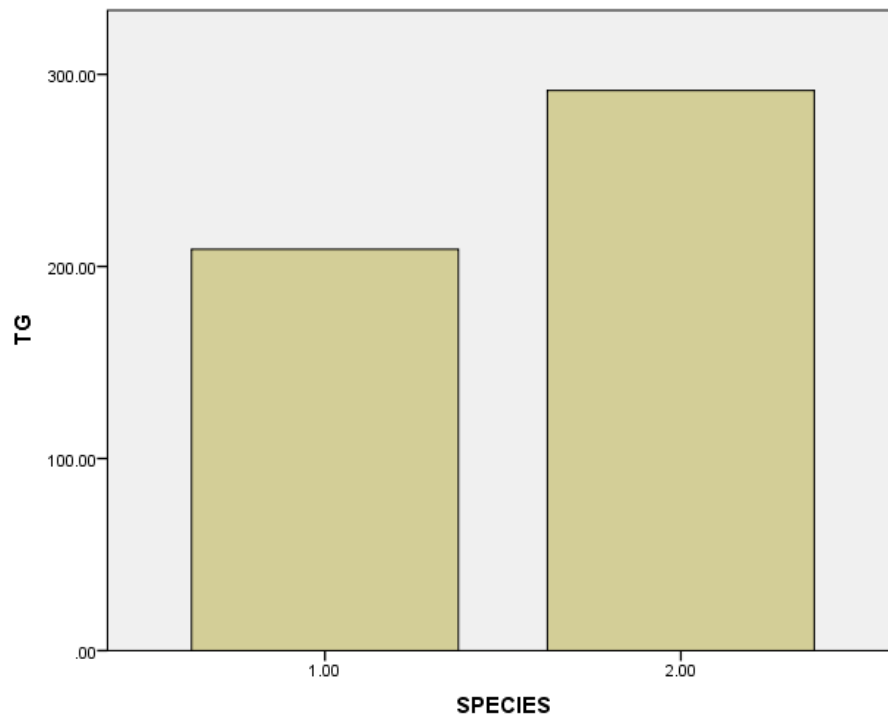


Figure 2. Triglyceride (Tg) levels in Ewes and Does' colostrum

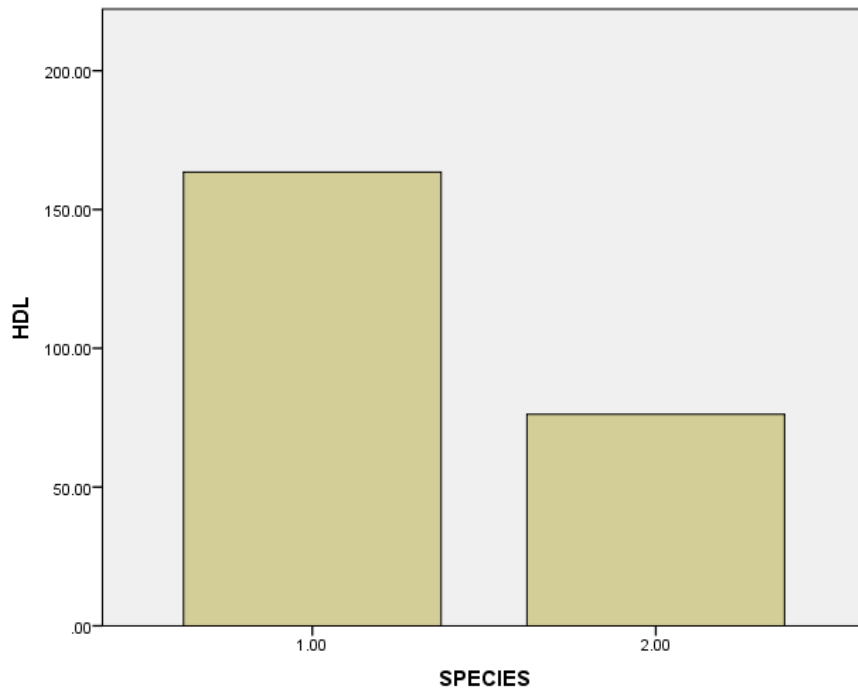


Figure 3. High density lipoprotein (LDL) levels in Ewes and Does' colostrum

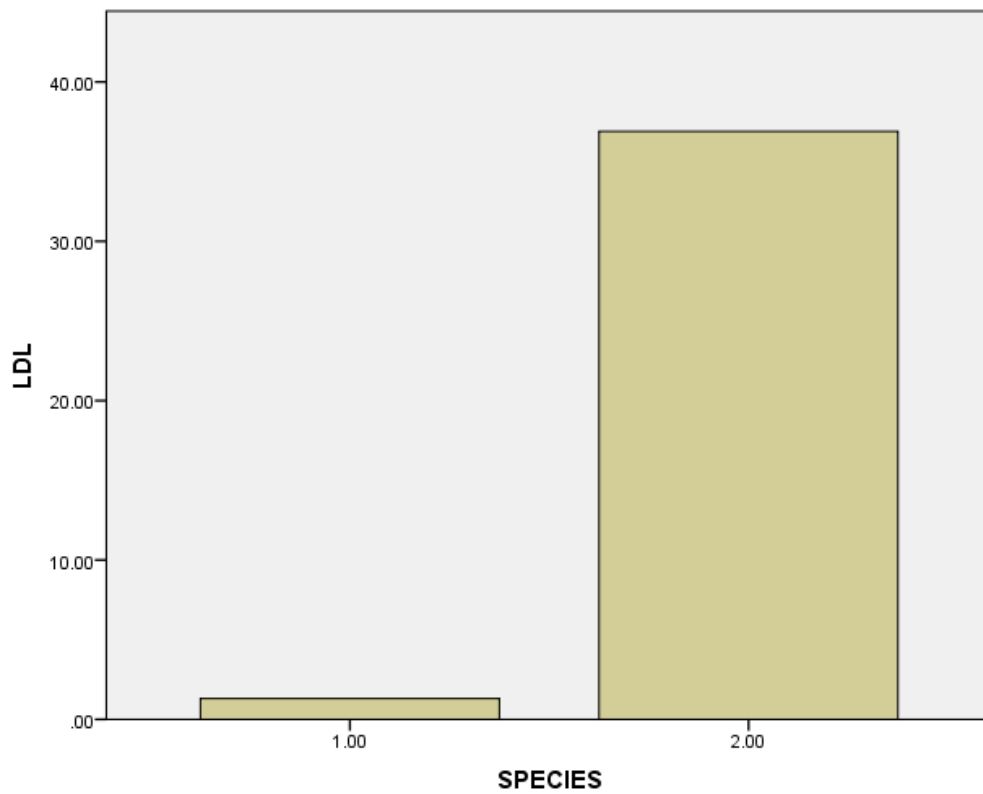


Figure 4. Low density lipoprotein (LDL) levels in Ewes and Does' colostrum

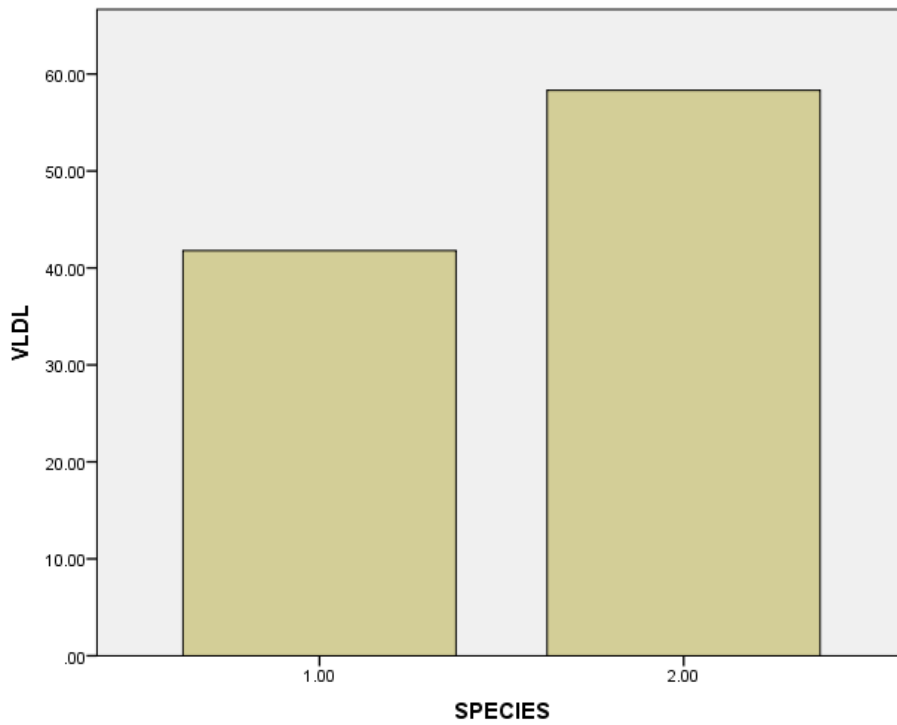


Figure 5. Very Low-density lipoprotein (vLDL) levels in Ewes and Does' colostrum

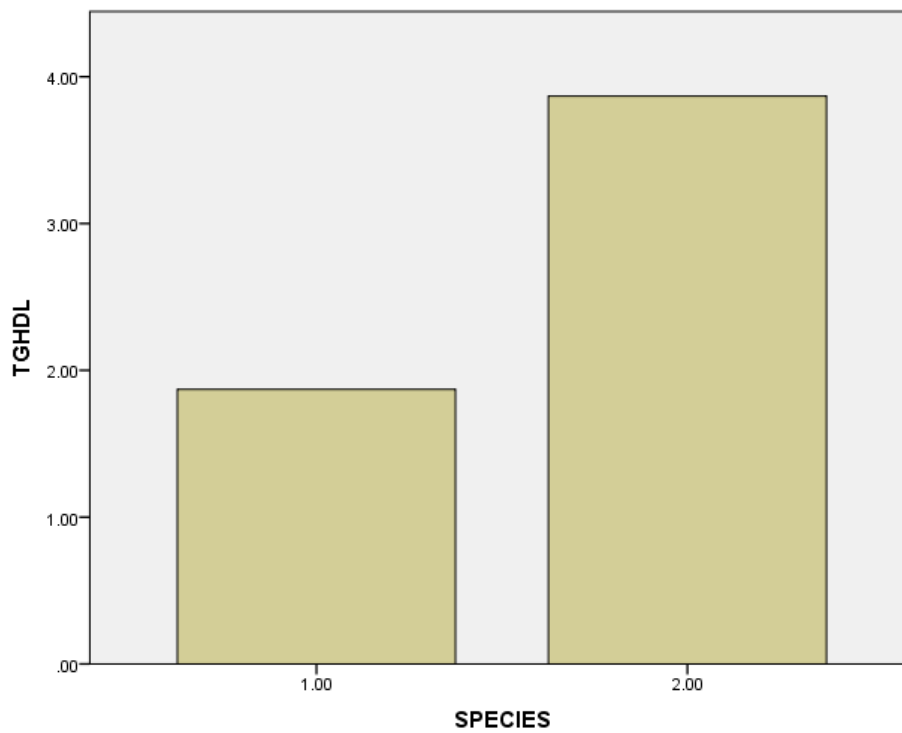


Figure 6. Triglycerides/High density lipoprotein (TG/HDL levels in Ewes and Does' colostrum

Cholesterol is an important compound in milk and acts as an important part of cell membranes, the precursor of steroid hormones, a precursor of vitamin D, and the limiting factor that the brain cells need to make connections with one another, making it necessary for learning and memory (Schreurs, 2005).

The result of the cholesterol was significantly different ($P < 0.05$) among Ewes and Does' colostrum investigated. Total cholesterol (Tc) of the Ewes colostrum was significantly ($P < 0.05$) higher than the Does' colostrum.

The results of the total triglyceride (Tg) of both the ewes and does were not significantly different ($P < 0.05$). The result of High-density lipoprotein cholesterol (HDLc) of the ewes' colostrum were significantly ($P < 0.05$) higher than those of the Does' colostrum. Nevertheless, there were no significant ($P < 0.05$) different in the LDLc of Ewes and Does' colostrum respectively. The results of very low-density lipoprotein cholesterol (vLDLc) of the Ewes and Does' colostrum were not significantly ($P < 0.05$) different.

Triglycerides/high density lipoprotein (Tg/HDL) of the colostrum were significantly higher ($P < 0.05$) Does' colostrum than those of Ewes. The results of the present study of the concentration of cholesterol in colostrum of the Ewes and Does agrees with the report of Samelson *et al.*, (2004) who asserted that the cholesterol concentrations in colostrum greatly vary depending on the species.

CONCLUSION

The results of this study showed that the Tc, HDLc and Tg/HDL in the colostrum of Ewes and Does' are significant. Ewes' colostrum recorded higher concentration of Tc and HDLc whereas Does's colostrum recorded higher concentration of Tg/HDL than the Ewes' colostrum. However, the results of Tg, LDLc and VLDLc were not significant among the colostrum of Ewes and Does studied.

RECOMMENDATION

The results of this findings, could provide a basis for further searched to advanced more reasons attributed to the differentiation in the colostrum levels of the species other species.

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