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SERUM LIPIDS AND LIPOPROTEINS DYNAMICS AND THEIR CORRELATIONS WITH TESTOSTERONE IN CASTRATED AND INTACT RED SOKOTO GOATS

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ABSTRACT

This study investigated the changes in serum total cholesterol, triglyceride, high density lipoprotein (HDL), and low density lipoprotein (LDL)-cholesterol and their correlation with testosterone following surgical castration. Ten Red Sokoto bucks between the ages of 3-5 months, weighing 8.55±1.01 kg were used for the study. They were randomly assigned to two groups (designated A and B) of five bucks each. Bucks in group A were surgically castrated while those in group B were not castrated (intact) and served as the control. At 2, 3 and 4 weeks post-castration, the castrated bucks had a significantly ($p < 0.05$) higher serum total cholesterol values. Serum triglyceride was significantly ($p < 0.05$) higher only at week 2 in castrated bucks (25.00 ± 6.92 mg/dl) when compared to that of intact bucks (15.00 ± 5.49 mg/dl). Serum HDL-cholesterol was consistently higher in the castrated group throughout the study period, and its values were significantly ($p < 0.05$) different from that of the control at weeks 2 and 4. In the castrated group, serum LDL-cholesterol was significantly increased at week 2 (27.04 ± 7.54 mg/dl) from a week one value of 13.06 ± 3.76 mg/dl and thereafter declined at week 3 (20.61 ± 11.00 mg/dl) through week 4 (10.37 ± 3.15 mg/dl). However, there was no significant ($p > 0.05$) difference in the low density lipoprotein concentrations between the two groups during the study period. Testosterone was significantly lower in the castrated group throughout the study period. It was concluded that within the first 28 days post surgical castration in Red Sokoto bucks, significant changes occur in serum lipids and lipoproteins concentrations which has significant correlation with serum testosterone particularly for total cholesterol, triglyceride and low density lipoproteins.

***Keywords*:** Serum Lipids, Lipoproteins, Correlation, Testosterone, Goat.

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INTRODUCTION

Changes in lipids and lipoprotein concentrations in the goat plasma are associated with a number of factors which include types of feed and feeding reg

The castrated bucks maintained consistently higher levels of serum LDL-cholesterol throughout the study and this was significant at weeks 2 and week 4. This observation suggests that surgical castration of Red Sokoto bucks may enhance reverse transport of cholesterol from adipocytes to the liver, which will probably lead to the production of a carcass with low cholesterol content. High density lipoproteins are involved in reverse cholesterol transport; the return of cholesterol from the peripheral tissues to the liver for catabolism and excretion [8]. The body cholesterol pool increases with decreasing plasma HDL-cholesterol concentration, but is unrelated to the plasma concentration of total cholesterol and other lipoproteins [11]. The results suggested that castration did not affect the serum LDL-cholesterol concentration since the levels were similar between castrated and control bucks throughout the study. Low density lipoproteins are involved in the transport of dietary and endogenous cholesterol from the liver to peripheral tissues, especially adipose tissues and the adrenal glands [8]. Surgical castration may have induced an increase in reverse cholesterol transport, which could be accompanied by a decrease, or an insignificant change in serum LDL-cholesterol level as observed in this study.

The progressive decrease in serum levels of testosterone in the castrated bucks suggests that the bilateral surgical castration of the goats caused a significant reduction in total testosterone output due to the absence of testicles. Testosterone in male goats is produced mainly by testicular Leydig cells and the adrenal cortex to a lesser extent [12].

Gonadal fat which is a fraction of the total body fat is necessary for spermatogenesis and, to a lesser extent, steroid biosynthesis. In addition, testosterone biosynthesis requires very little amount of these lipids, and significant reduction in the output of this hormone caused by the removal of testicles may have a significant effect on the relationship between serum level of this hormone and some lipids and lipoproteins.

CONCLUSION

In conclusion, therefore, the results of this study suggest that within one month of surgical castration of Red Sokoto bucks, lipid metabolism may be altered as a result of changes in serum lipid profile and lipoprotein concentrations with particular reference to total cholesterol, triglycerides and low density lipoprotein. These changes appear to result from changes in serum testosterone levels following surgical castration. and correlation between testosterone and serum cholesterol, triglyceride, high density lipoprotein and low density lipoprotein concentration of the castrates.

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