EFFECT OF GONADOTROPHIN (PERGONAL(R)) ON LIVER AND KIDNEY
FUNCTIONS, BODY CONFORMATION AND SERUM PROTEIN VALUES OF
YANKASA RAMS TREATED FOR SPERM PRODUCTION

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Uche Ndubuisi EGU1, Ifenyinwa Felicia OKONKWO2, Pascal Emeka ETUSIM3

1Department of Animal Science and Fisheries, Abia State University PMB 7010, Umuahia, NIGERIA
2Department of Microbiology, Nnamdi, Azikiwe University, Awka, Anambra State, NIGERIA
3Department of Animal and Environmental Biology, Abia State, University, Uturu, Abia State, NIGERIA

*Corresponding author: jc.okonkwo@unizik.edu.ng or ucheegu1@gmail.com

Abstract. Three groups of 6 healthy mature yankasa rams aged 2.0–2.60 years weighing between 30.50 kg and 30.60 kg were assigned to either 49.50 I.U (T2), 99.00 I.U (T3) or 148.50 I.U (T4) Pergonal injection (Ferring labs, USA) each divided into 3 doses and given for three consecutive days. Another group of 6 rams was given normal saline (1 mL) during the same period to serve as control (T1). All treatments were given to study the effect of the drug on body conformation, liver function and serum protein values. All the treatments were given by intramuscular injection. The results showed that there were no significant differences (P>0.05) among the treatment groups in body weight gain. However, there were significant differences (P<0.05) among the treatment groups in scrotal circumference, height at the withers, heart girt and hip width values. The results also showed that there were significant differences (P<0.05) among the treatment groups in serum total protein, albumin and globulin values. The result further showed that there were significant differences (P<0.05) among the treatment groups in Alkaline phosphatase, Alanine transaminase, Aspartate transaminase activities, sodium, chloride, potassium, bicarbonate and creatinine values. The results of this study showed that Gonadotrophin (Pergonal®) administration to Yankasa rams for spermatogenesis did not result in any hepatoxic or nephrotoxic effects.

Keyword: Yankasa rams, Pergonal®, Liver and kidney function, Serum protein, Body conformation.

Introduction

Yankasa is the predominant breed of sheep indigenous to the Guinea and Sudan Savannah belt of West Africa. According to Iheukwumere and collab., the use of Yankasa rams to upgrade the smaller village sheep in the habitat has extended this breed to southern Nigeria [IHEUKWUMERE et al., 2008].

The Nigerian Yankasa rams are typically tall, exceeding a height of 50–70 cm at the withers and weigh 30–50kg with an outstanding sexual agility; hence they have been widely used for artificial insemination programs [OSINOWO, 1990].

Linear body measurement of meat animals gives an indication of their live weight gain, skeletal size, reproductive performance and carcass characteristics. The live body weight and linear body measurements of meat animals have been found useful in quantifying body size and shape [IBE and EZEKWE, 1994].

The size and shape measurements are necessary in animal breeding programmes for estimating certain genetic parameters. Linear body measurements have been used in health and feed managements and it provides basis for production performance monitoring and marketing of animal products [EBESBULEM, 2012]. Besides an evaluation of the relationship existing among the various live body measurements could be used as the basis of a genetic improvement in the animal. In our local markets where scales are lacking, animals are appraised visually and their economic values determined.

Such visual assessment is subjective and might not reveal the true economic value of such animal.
An objective assessment which involves the analysis of relationships existing among the various live body traits would be more appropriate.

Though studies have been documented on the relationship among live body traits in animals [TIAIMIYO, et al., 2000; CHINEKE, 2000, 2002, and 2005, ABDULLAH et al., 2003; ATANSUYI et al., 2011; HENRY et al., 2011; EBEGBULEM et al., 2011, and ORHERUATA & OLUTOGUN 1994], there is no information on the effect of Gonadotrophin on such parameters in Yankasa rams. Serum biochemical analysis is used to determine the level of heart attack, liver and kidney function as well as to evaluate protein quality and amino acid requirements in animals [ETIM and OGUKE, 2011].

Human menopausal gonadotrophin (Pergonal®), a fertility drug also known as Humagon or Mentrophin and with similar constituents as Plusset® is a gonadotrophin preparation lyophilized in vials containing a mixture of gonadotrophins consisting of follicle stimulating hormone (FSH) and Luteinizing hormone (LH) in a ratio 1:1 [DIXON and HOPKINS, 1996, BUTNARIU and GIUCHICI, 2011].

FSH and LH present in Pergonal® play vital role in the initiation of spermatogenesis. The hormone preparation is cheap, readily available and does not require cold chain storage [HEUKWUMERE, 2005, BUTNARIU and BOSTAN, 2011].

It has not been determined if the administration of the hormone preparation for spermatogenesis and semen production would induce any side effects on the kidney and liver functions, body conformation and serum proteins values of the rams.

This study was therefore carried out to determine the effect of Pergonal® administration on kidney and liver functions, body conformation and serum protein values of mature Yankasa rams.

Material and methods

Management of Animals. Twenty-four healthy sexually mature Nigerian Yankasa rams aged 2–2.6 years were used for this study. The animals were purchased from the local markets and housed in clean pens constructed in such a way that the rams could come outside during the day for access to sunlight and forage. The animals were dewormed and routine inspection for cleanliness was carried out.

Freshly cut forage consisting of Panicum maximum, Aspilia africana, Pennisetum purpureum (Elephant grass) was fed as basal diet and a concentrate ration of Grower Mash was used as supplement.

The animals were fed twice daily, in the morning and evening, salt lick was provided as mineral supplement. Water was given ad libitum to the animals.

Experimental Design and Drug Administration. The twenty-four rams were divided into 4 treatment groups consisting of 6 rams per group.

These groups were assigned to 4 level of Pergonal® as treatments.

The levels of Pergonal® were 0, 49.50 I.U, 99.00 I.U and 148.50 I.U Pergonal® represented as T1, T2, T3 and T4 respectively. T1 which contained no served as the control. The rams were treated by intramuscular injection.

The injections were given as follows:

– Pergonal was supplied in 13 vials, each vial containing FSH 75 I.U and LH 75 I.U. The content of the first vial was dissolved in 1mL of physiological saline solution immediately prior to use, resulting in a solution of PFSH 75 I.U plus PLH 75 I.U per mL.

– Group T1: Each ram received 1.00 mL of physiological saline for 3 days. Group T2: Each ram received 8.25 I.U of PFSH and 8.25 I.U of PLH (0.11 mL) on the first day; 2nd day the group received 8.25 I.U of PFSH and 8.25 I.U of PLH (0.11 mL). While on the 3rd day, the group received 8.25 I.U of PFSH and 8.25 I.U of PLH (0.11 mL) giving a total of 49.50 I.U of PFSH and PLH (0.33 mL) Pergonal injection within three days.

– Group T3: Each ram received 16.50 I.U of PFSH and 16.50 I.U of PLH (0.22 mL) on the first day. 2nd day, the group received 16.50 I.U of PFSH and 16.50 I.U of PLH (0.22 mL). While on the 3rd,
the group received 16.50 I.U of PFSH and 16.50 I.U of PLH (0.22 mL) giving a total of 99.00 I.U of PFSH and PLH (0.66 mL) Pergonal injection within 3 days

- Group T4: Each ram received 24.75 I.U of PFSH and 24.75 I.U of PLH (0.33 mL) on the first day. 2nd day, the group received 24.75 I.U of PFSH and 24.75 I.U of PLH (0.33 mL). While on the 3rd day the group received 24.75 I.U of PFSH and 24.75 I.U of PLH (0.33 mL) giving a total of 148.50 I.U of PFSH and PLH (0.99 mL) Pergonal injection within 3 days.

All treatments were administered intramuscularly on the hind leg (thigh) of each ram using a one mL syringe with 0.01 mL graduation.

Blood Collection and Serum Biochemical Evaluation. The twenty-four Yankasa rams were bled one week after Pergonal® injection between 9 am and 10:30 am from a punctured jugular vein using needle and syringe and aspirated about 5 mL of blood from each ram. Each blood sample was poured in plane bottle without anti-coagulant and allowed to coagulate.

The bottles of coagulated blood were subjected to standard method of serum separation and the harvested sera were used for biochemical evaluation. Creatinine concentration was determined following method described by Baker and Silverton [BAKER and SILVERTON, 1986].

The standard flame photometry using Gallenkamp analysis was used to determine serum sodium (Na⁺) ion and potassium (K⁺) ion.

While bicarbonate and chloride ions were assayed according to the method of Baker and Silverton [BAKER and SILVERTON, 1986]. Aspartate transaminase, Alanine transaminase and Alkaline phosphatase activities were determined using spectrophotometric method as described by Rej and Hoder [REJ and HODER, 1983].

Serum total protein was determined by Goldbery refractometer method as described by Randox [RANDOX, 2006].

Body weight and body size measurements. The body weights of the animals were measured in kg using a hanging scale. Scrotal circumference (SC) was measured in (cm) using a measuring tape at the broadest part of the scrotum.

Also withers height, heart girt and hip width were measured in (cm) using a measuring tape.

Data analysis. Data collected on body size, liver enzyme activity, kidney function and serum proteins of Yankasa rams were subjected to one–way analysis of variance (ANOVA) using the technique of Steel and Torrie [STEEL and TORRIE, 1980]. Significant treatment means were separated using Duncan’s New Multiple Range Test as described by Obi [OBI, 1996].

Results and discussion

The results of gonadotrophin (Pergonal®) administration on kidney and liver functions of Yankasa rams are shown in Table 1.

There were significant differences (P<0.05) among the treatment groups in sodium, potassium, chloride, bicarbonate, creatinine, Alkaline phosphatase Aspartate transaminase and Alanine transaminase values.

Rams on T2 recorded the highest sodium value of 44.33 (mmol/L) and this differed significantly (P<0.05) from rams on T3 and T4 which were similar (P>0.05) to each other in sodium value.

There was no significant difference (P>0.05) between rams on T2 and T1 (40.60 mmol/L) in sodium value.

The lowest value of 36.00 (mmol/L) in sodium content was observed in rams on T4. The sodium values obtained in this study were lower than the normal range of 139–152 (mmol/L) reported in sheep by Kaneko and collab. [KANEKO et al., 1997].

This may be as a result of decreased sodium reabsorption in the kidney caused by insufficient release of the hormone aldosterone responsible for sodium reabsorption in the kidney. Rams on T2 recorded the highest potassium value of 4.50 (mmol/L) and this differed significantly (P<0.05) from rams on T1. There were no significant differences (P>0.05) among rams on T2, T3 and T4 in potassium values. The lowest value of 3.85 (mmol/L) in potassium content was lower than the normal range of 3.90–4.65 (mmol/L) reported in sheep by Kaneko and collab. [KANEKO et al., 1997].
observed in rams on T1. The potassium values obtained in this study were within the normal range of 3.9–5.4 (mmol/L) reported in sheep by Kaneko and collab. [KANEKO et al., 1997]. Potassium is excreted in the kidney and elevation of plasma potassium is indicative of under excretion suggesting kidney impairment.

Liver and Kidney Functions of Yankasa Rams Treated with Gonadotrophin (Pergonal®) Treatment (Pergonal®)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T1 0.00 I.U</th>
<th>T2 49.50 I.U</th>
<th>T3 99.00 I.U</th>
<th>T4 148.50 I.U</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium (mmol/L)</td>
<td>40.60a</td>
<td>44.33a</td>
<td>38.00a</td>
<td>36.00a</td>
<td>1.80</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>3.85b</td>
<td>4.50a</td>
<td>4.40a</td>
<td>4.48ab</td>
<td>0.15</td>
</tr>
<tr>
<td>Chloride (mmol/L)</td>
<td>96.26c</td>
<td>96.60b</td>
<td>98.50a</td>
<td>98.50a</td>
<td>0.60</td>
</tr>
<tr>
<td>Bicarbonate (mmol/L)</td>
<td>20.00b</td>
<td>23.00a</td>
<td>23.30a</td>
<td>23.24ab</td>
<td>0.77</td>
</tr>
<tr>
<td>Creatinine (mmol/L)</td>
<td>53.00c</td>
<td>45.00bc</td>
<td>51.00ab</td>
<td>44.00c</td>
<td>2.21</td>
</tr>
<tr>
<td>Alkaline Phosphatase (iu/L)</td>
<td>43.15c</td>
<td>43.00a</td>
<td>43.00a</td>
<td>32.00ab</td>
<td>2.76</td>
</tr>
<tr>
<td>Aspartate Transaminase (iu/L)</td>
<td>68.25c</td>
<td>78.00a</td>
<td>77.00a</td>
<td>78.35a</td>
<td>1.39</td>
</tr>
<tr>
<td>Alanine transaminase (iu/L)</td>
<td>65.00c</td>
<td>73.00a</td>
<td>67.00bc</td>
<td>71.00a</td>
<td>1.83</td>
</tr>
</tbody>
</table>

abc Means in the same row with different superscript are significantly (P<0.05) different. SEM = Standard error of mean.

Rams on T3 and T4 recorded the highest serum chloride value of 98.50 (mmol/L) and this differed significantly (P<0.05) from rams on T1 and T2 which were similar (P>0.05) to each other in chloride value.

The lowest value of 96.26 (mmol/L) in serum chloride was observed in rams on T1. The serum chloride values obtained in this study were within the normal range of 95–103 (mmol/L) reported by Kaneko and collab. [KANEKO et al., 1997] in sheep.

Rams on T3 recorded the highest serum bicarbonate value of 23.30 (mmol/L) and this differed significantly (P<0.05) from rams on T1.

There were no significant differences (P>0.05) among rams on T3, T2 and T4 in serum bicarbonate values. The bicarbonate values obtained in this study were within the normal range of 20–25 (mmol/L) reported in sheep by Kaneko and collab. [KANEKO et al., 1997].

Bicarbonate is used in the buffering system in the blood, extracellular fluid and kidney [BRACKETT, 2005]. Rams on T1 recorded the highest serum creatinine value of 53.00 (mmol/L) and this differed significantly (P<0.05) from rams on T2 and T4 which were (P>0.05) to each other in creatinine value.

There was no significant difference (P>0.05) between rams on T1 and T3. Rams on T3 were also similar (P>0.05) to rams on T2 in creatinine value.

The lowest value of 44.00 (mmol/L) in serum creatinine was observed in rams on T4. The creatinine values obtained in this study were lower than the normal range 106–168 (mmol/L) reported in sheep by Kaneko and collab. [KANEKO et al., 1997]. Creatinine measurement is used exclusively in the assessment of kidney function.

The rate of production of creatinine is constant and elevation of plasma creatinine is indicative of under excretion, suggesting kidney impairment.

Depressed levels of plasma creatinine are clinically significant. Rams on T1 recorded the highest Alkaline phosphatase value of 43.15 (IU/L) and this differed significantly (P<0.05) from rams on T4.

There were no significant differences (P>0.05) among rams on T1, T2 and T3 in Alkaline phosphatase values. The lowest value in serum A alkaline phosphatase was observed in rams on T4 (32.00 IU/L).

The highest Alkaline phosphatase value obtained in this study was lower than the normal range of 68–387 (IU/L) reported by Radostits and collab. [RADOSTITS et al., 1997] for sheep and lower than the value 49.67 (IU/L) reported by Oguike and Ude [OGUIKE and UDE, 2008] in WAD ewes.

Alkaline phosphatase assay is useful in the diagnosis of obstructive liver diseases [MURRAY et al., 2003]. Rams on T4 recorded the highest value in Aspartate
transaminase (78.35 IU/L) and this differed significantly (P<0.05) from rams on T₁.

There were no significant differences (P>0.05) among rams on T₁, T₂ and T₃ in Aspartate transaminase value. The lowest value in Aspartate transaminase was observed in rams on T₁ (68.25 IU/L).

Aspartate transaminase values obtained in this study were within the normal range of 60–280 (IU/L) reported in sheep by Kaneko and collab. [KENRO et al., 1997].

In this regard, Pergonal can be considered safe for the rams. Rams on T₂ recorded the highest Alanine transaminase value of 73.00 (IU/L) and this differed significantly (P>0.05) from rams on T₁ and T₃ which similar (P>0.05) to each other in Alanine transaminase value.

There was no significant difference (P>0.05) between rams on T₂ and T₄ in Alanine transaminase value.

The lowest value in Alanine transaminase was observed in rams on T₁ (65.00IU/L). Alanine transaminase values obtained in this study were higher than the average of 30±4.0 (IU/L) reported in sheep by Kaneko and collab. [KENRO et al., 1997].

Increase in Alanine transaminase values would signify necrosis or myocardial infarction [SOKUMBO and EGBUNIKE, 2000].

This disparity in the value of Alanine transaminase may be attributed to breed, nutritional and physiological status of these rams. Alanine transaminase assay is important in the diagnosis of liver damage caused by drug toxicity or harmful chemicals [NELSON and COX, 2005].

The results of gonadotrophin (Pergonal®) administration on body conformation of Yankasa rams are shown in Table 2. There were significant differences (P<0.05) among the treatment groups in scrotal circumference, heart girth, height at the withers, body length, hip width, and body weight gain.

However, there were no significant differences (P>0.05) among the treatment groups in initial body weight and final body weight.

Rams on T₁ and T₄ recorded the highest numerical value of 28.45 kg in initial body weight. The lowest numerical value of 28.43 kg was observed in rams on T₃.

The initial body weight values obtained in this study were lower than the normal range of 30–50 kg reported by Iheukwumere and collab. [IHEKWUMERE et al., 2008] in Yankasa rams; this disparity in body weight may not be unconnected to the differences in environment and nutritional status of these Yankasa rams.

**Table 2.**

<table>
<thead>
<tr>
<th>Treatment (Pergonal®)</th>
<th>Parameters</th>
<th>T₁ 0.00 I.U</th>
<th>T₂ 49.50 I.U</th>
<th>T₃ 99.00 I.U</th>
<th>T₄ 148.50 I.U</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial body weight (kg)</td>
<td>28.45</td>
<td>28.44</td>
<td>28.43</td>
<td>28.45</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Final body weight (kg)</td>
<td>30.60</td>
<td>30.55</td>
<td>30.55</td>
<td>30.60</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Weight gain (kg)</td>
<td>2.15a</td>
<td>2.11b</td>
<td>2.12a</td>
<td>2.15a</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Scrotal circumference (cm)</td>
<td>27.50a</td>
<td>26.50b</td>
<td>27.50a</td>
<td>26.50b</td>
<td>0.29</td>
<td></td>
</tr>
<tr>
<td>Heart girth (cm)</td>
<td>24.00a</td>
<td>22.50b</td>
<td>23.00c</td>
<td>23.00c</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>Height at withers (cm)</td>
<td>63.50b</td>
<td>65.00bc</td>
<td>70.00a</td>
<td>69.00bc</td>
<td>1.56</td>
<td></td>
</tr>
<tr>
<td>Body length (cm)</td>
<td>54.00a</td>
<td>53.00b</td>
<td>56.00a</td>
<td>56.00a</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Hip width (cm)</td>
<td>81.50abc</td>
<td>85.50a</td>
<td>86.00a</td>
<td>77.50b</td>
<td>1.98</td>
<td></td>
</tr>
</tbody>
</table>

Means in the same row with different superscript are significantly (P<0.05) different.

SEM = Standard error of mean

Rams on T₁ and T₄ recorded the highest numerical value of 30.60 kg in final body weight. The lowest final body weight of 30.55 kg was observed in rams on T₂ and T₃.

The final body weights obtained in this study were within the normal range of 30–50 kg reported by Iheukwumere and collab. [IHEKWUMERE et al., 2008] in Yankasa rams.
Rams on T₁ and T₄ recorded the highest value of 2.15 kg in weight gain and this differed significantly (P<0.05) from rams on T₂ which had 2.11 kg.

There were no significant differences (P>0.05) among rams on T₁, T₃ and T₄ in weight gain.

Rams on T₁ and T₃ recorded the highest scrotal circumference value of 27.50 cm and this differed significantly (P<0.05) from rams on T₂ and T₄ which were similar (P>0.05) to each other in scrotal circumference values.

The lowest value of 26.50 cm in scrotal circumference was observed in rams on T₂ and T₄.

The scrotal circumference values obtained in this study were higher than the mean value of 22.40±0.54 cm reported by Iheukwumere and collab. [IHEUKWUMERE et al., 2008] in Yankasa rams.

This disparity may not be unconnected to the differences in environment and nutritional status of the Yankasa rams. Rams on T₁ recorded the highest value in heart girth (24.00 cm) and this differed significantly (P<0.05) from rams on T₂, T₃ and T₄. Rams on T₃ and T₄ were similar (P>0.05) to each other, but were significantly different (P<0.05) from rams on T₂ in heart girth value.

The lowest value in heart girth was observed in rams on T₂ (22.50 cm).

Rams on T₃ recorded the highest value in height at the withers (70.00 cm) and this differed significantly (P<0.05) from rams on T₁ and T₂ which were similar (P>0.05) to each other in height at the withers.

Rams on T₂ was similar (P>0.05) to rams on T₄ in height at the withers.

There was no significant difference (P>0.05) between rams on T₃ and T₄ in height at the withers.

The lowest value of 63.50 cm in height at the withers was observed in rams on T₁.

The values of height at the withers obtained in this study were within the normal range of 50–70 cm reported by Iheukwumere and collab. [IHEUKWUMERE et al., 2001] in Yankasa rams.

Rams on T₃ and T₄ recorded the highest value in body length (56.00 cm) and this differed significantly (P<0.05) from rams on T₂.

However, there were no significant differences (P>0.05) among rams on T₃, T₄, and T₁ in body length.

The lowest value in body length was observed in rams on T₂ (53.00 cm).

Rams on T₃ recorded the highest value in hip width (86.00 cm) and this differed significantly (P<0.05) from rams on T₄ (77.50 cm) which were similar (P>0.05) to rams on T₁ (81.50 cm) in hip width.

There were no significant differences (P>0.05) among rams on T₃, T₂ and T₁ in hip width values.

The lowest value in hip width was observed in rams on T₄. The results of gonadotrophin (Pergonal® administration on serum protein values of Yankasa rams are shown in Table 3.

### Table 3.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T₁ 0.00 I.U</th>
<th>T₂ 49.50 I.U</th>
<th>T₃ 99.00 I.U</th>
<th>T₄ 148.50 I.U</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum total Protein (g/L)</td>
<td>77.30</td>
<td>77.30</td>
<td>74.20</td>
<td>66.00</td>
<td>1.17</td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>43.60</td>
<td>36.00</td>
<td>42.00</td>
<td>40.00</td>
<td>1.64</td>
</tr>
<tr>
<td>Globulin (g/L)</td>
<td>36.20</td>
<td>36.40</td>
<td>18.50</td>
<td>10.30</td>
<td>6.54</td>
</tr>
<tr>
<td>Albumin/Globulin Ratio</td>
<td>0.63</td>
<td>0.75</td>
<td>0.73</td>
<td>0.74</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Means in the same row with different superscript are significantly (P<0.05) different. SEM=Standard error of mean.

There were significant differences (P<0.05) among the treatment groups in serum total protein, albumin, and globulin values, and albumin/globulin ratio.
Rams on T₁ and T₂ recorded the highest value of 77.30 g/L in serum total protein and these differed significantly (P<0.05) from rams on T₄. There were no significant differences (P>0.05) among rams on T₁, T₂ and T₃ in serum total protein values. The lowest value in serum total protein was observed in rams on T₄ (66.00 g/L).

Serum total protein values obtained in this study were within the normal range of 60.0–79.0 (g/L) reported in sheep by Kaneko and collab. [KANeko et al., 2008]. Serum total protein is the protein retained in an animal’s body [EScNu et al., 2001]. Blood protein content has been shown to depend on the quantity and quality of dietary protein [EScNu et al., 2001].

Rams on T₁ recorded the highest serum albumin value of 43.60 (g/L) and this differed significantly (P<0.05) from rams on T₂.

There were no significant differences (P>0.05) among rams on T₁, and rams on T₃ and T₄ in serum albumin values. The lowest value in albumin was observed in rams on T₂ (36.00 g/L).

Serum albumin values obtained in this study were higher than the normal range of 24.0–30.0 (g/L) reported by Kaneko and collab. [KANeko et al., 2008] in sheep.

Low albumin suggests poor clothing ability of blood and hence poor prevention of haemorrhage [ROBERT et al., 2008].

Rams on T₂ recorded the highest value of 36.40 (g/l) in serum globulin and this differed significantly (P<0.05) from rams on T₄. There were no significant differences (P>0.05) among rams on T₂, T₁ and T₃ in serum globulin values.

Rams on T₃ and T₄ were similar (P>0.05) to each other in serum globulin value. The lowest value of (10.30 g/L) in globulin was observed in rams on T₄.

Serum globulin values obtained in the groups that received higher doses of the test drug were lower than the normal range of 35.0–57.0 (g/L) reported for sheep by Kaneko and collab. [KANeko et al., 1997; CRISTINA et al., 2014].

Serum globulin level in this study reduced with increased levels of the test drug.

This is an indication that administration of this drug could result in mortality in the animals if used in high levels, Iheuwkumere and collab. [IHEUKwumere et al., 2009] inferred that a decrease in serum globulin is an indication of reduced disease fighting ability of the body system and could lead to mortality.

Rams on T₂ recorded the highest value of 0.75 in albumin–globulin ratio and this differed significantly (P<0.05) from rams on T₁ which had 0.63.

There were no significant differences (P>0.05) among rams on T₂, T₃ and T₄ in albumin–globulin ratio. The lowest value of 0.63 in albumin–globulin ratio was observed in rams on T₁.

The values for albumin–globulin ratio obtained in this study were slightly lower than the literature values (1.14–1.60) for different classes of livestock [Chineke et al., 2002; Graw Hill, 2000; Cheesbrough, 2004; SingGH, 2004].

This may be attributed to environment and nutritional status of the animals. Serum albumin and globulin vary both among breeds and within breeds depending on location [ORJI et al., 1987].

Conclusions

The results of this study showed that the administration of gonadotrophin (Pergonal®) to Yankasa rams had no hepatotoxic or nephrotoxic effects and was not detrimental to the body conformation and serum protein values, except globulin level which reduced progressively with increased doses of the test drug indicating that administration of this Pergonal® could result in mortality in the animals if used in high levels.

References


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