ISSN 0189-0514
J. Anim. Prod. Res. (2017) 29(1):83-87

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CHANGES IN HAEMATOLOGICAL PARAMETERS FOLLOWING OESTRUS SYNCHRONIZATION USING FLUOROGESTONE ACETATE (FGA) INTRAVAGINAL SPONGE IN RED SOKOTO DOES

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ABSTRACT

Changes in the haematological parameters in Red Sokoto does synchronized with fluorogestone acetate (FGA) was investigated. Ten apparently healthy Sokoto does were randomly selected. Two (2) ml of blood was collected from each of the selected does on day 0 after which intravaginal fluorogestone acetate (FGA) sponge was inserted and left *in situ* for 14days, Two (2) ml of blood was also collected on the day 8 of the sponge implant, after the removal of the sponge on day 15 during the oestruos period between day 16 and 19 and after oestrus period on day 21 by jugular venipuncture using disposable syringes and sterile needles 18 gauge x 1½inches. The blood was used for the determination of haematological parameters and serum total protein. There was a gradual but no significant increase in Packed Cell Volume except on day 17, with mean value of 29.7±1.3 compare to the initial mean value at day 0 of 27.6±1.6, Haemoglobin concentration and red cell counts increases gradually but not significantly from 9.4±0.53 to 12.2±1.24 and 9.1±0.36 to 12.54±0.64 respectively. No significant increase in the mean values of MCV, Mean corpuscular haemoglobin, Mean corpuscular haemoglobin concentration, White blood cell, neutrophil, lymphocytes, monocytes, eosinophils, band cells and total protein were observed except in the values of mean corpuscular volume, white blood cell and Neutrophil on days 21, 18 and 17 respectively with significant increase ($P<0.05$). It was concluded that no significant increase in haemotological parameters and total serum protein were induce by using intravaginal fluorogestone acetate sponge before oestrus in red Sokoto does.

Key words: Fluorogestone acetate intravaginal sponge, haematological parameters, oestrus synchronization, Red Sokoto goats

INTRODUCTION

The majority of goat breeds shows seasonality in their reproductive activities (Chemineau *et al.*, 1992). Therefore, synchronization of oestrus is an important management tool that has been used as an aid for artificial insemination (AI) and to reduce seasonal effects in the reproduction of dairy goats (Freitas *et al.*, 1997). In order to achieve this goal, progesterone or a progestogen analogue is usually used to synchronize oestrus in goats during the breeding and non-breeding season (Ahmed *et al.*, 1998). Both progesterone and its analogues have an inhibitory effect in the release of luteinizing hormone (LH) from the anterior pituitary so that the endocrine events that influence the maturation of the ovarian pre-ovulatory follicles and their later ovulation are suppressed. Thus, following withdrawal of progesterone, oestrus and ovulation occur at a predictable period of time (Bretzlaff, 1997; Leboeuf *et al.*, 1998). It has been reported the onset

of oestrus occur within 6-120 h following progestagen withdrawal (Freitas *et al.,* 1996a; Romano, 1998; Greyling and Van der Nest, 2000). The most common route of administration of progestagens in goats is intravaginally (Bretzlaff, 1997). Two of the types of intravaginal sponges (pessaries) commonly used for synchronization and/or induction of oestrus in does are Medroxyprogesterone acetate® (MAP) and fluorogestone acetate® (FGA) (Baril *et al.,* 1993; Romano, 1996; Ahmed *et al.,* 1998; Romano, 1998; Motlomelo *et al.,* 2002.

Examining blood for their constituents is used to monitor and evaluate health, reproductive and nutritional status of animals (Gupta *et al.,* 2007). The significance and the great variation in the haematological and biochemical indices observed between breeds of goats has been documented (Azab and Abdel-Maksoud, 1999; Tambuwal *et al*., 2002).Nutrition, age, sex, genetics (breed and crossbreeding), reproductive status (pregnancy and oestrus), housing, starvation, environmental factors, stress and transportation were known to affect haematological and biochemical parameters (Balikci *et al*., 2007). Therefore, this study was designed to evaluate the variation of haematological parameters in oestrus synchronization following progestogen intravaginal sponge in red Sokoto does.

MATERIALS AND METHODS

The study was carried out at the National Animal Production Research Institute (NAPRI), Shika-Zaria. A total of 10 Red Sokoto does 3 years of age and weighing between 18 to 25 kg with good body conditions (BCS: 3.00 to 5.00) were used in this study. The experimental does were divided into two groups of 5 does per group randomly. Oestrus was synchronized with 30 mg FGA (n = 5, Intervet, Netherlands) and 45 mg FGA (n = 5, Intervet, Netherlands) intravaginal sponges. The sponges were left *in situ*for14 days and were withdrawn on the day 14. Oestrus was detected with the aid of teaser bucks every six hours from 12 to 60 h following progestagen withdrawal. Blood samples were collected before the Sponge implanted (day 0 of the experiment), then day 8, after the removal of the sponge on day 15 during the oestrus period and after oestrus-period on day 21. Blood (2 ml) was collected each of these days by jugular venipuncture from all the does using disposable syringes and sterile needles 18 Gauge x 1½inches, prior to feeding in the morning. The blood samples were placed in vacutainers, containing ethylene diamine tetra-acetic acid (EDTA)for haematological and serum protein analysis. Red blood cells (RBC) and white blood cells (WBC) were counted with haemocytometer. The packed cell volume (PCV) was determined using microhaematocrit method, while the haemoglobin concentration was determined by the cyanmethaemoglobin method. From the above data, the mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were calculated (Schalm *et al.,* 1986). Blood smears were stained with Giemsa stain for differential WBC counts and total proteins was measured using refractometer method

Statistical analysis

The data were statistically analyzed using Paired Samples T-Test with SPSS Statistical Package (Statistical Package for Social Science) version 20.2.and values with $P<0.05$ were considered statistically significant.

RESULTS

Table 1, shows the mean values of PCV, HB, RBC, WBC, neutrophils, monocytes, lymphocytes, eosinophils, band cells, MCV, MCH, MCHC and total serum protein in red Sokoto does treated with intravaginal florogestagen acetate impregnated sponge at 0, 8, 17, 18 and 21 days .There were no statistically significant (P>0.05) variation in the mean values of the haematological parameters between pre-treatment values and values throughout the experimental period that lasted for 21 days except for the PCV at day 8 and 18 which show a significant rise P>0.05 rise, RBC count also increases significantly at day 18 and 21,MCV, WBC, Neutrophil and Band cells increases significantly (P>0.05) at days 18,17, and 17 respectively.

Table 1: Haematological parameters and total serum protein (Mean ± SEM) of Red Sokoto does synchronized using intravaginal sponge fluorogestone acetate (FGA).

Period Parameter	Day 0 (n=10)	Day 8 (n=10)	Day 15 (n=10)	Day 17 (n=10)	Day 18 (n=10)	Day21 (n=10)
PCV (%)	27.6±1.6	28.7±1.2	29.2±1.4	29.7±1.3	30.2±1.02	36.6±3.9
HB (g/dl)	9.4±.53	10.2±.44	10.1±0.6	10.5±.39	30.1±.58	12.2±1.24
RBC(10^6/μL)	9.1±0.36	11.54±0.94	11.01±0.96	10.33±1.05	12.9±0.94	12.54±0.64
MCV (fl)	59.9±.27	59.8±.21	59.9±.12	60.1±.05	60.1±.06	60^a±015
MCH (pg)	20.5±.40	21.3±.40	20.5±.37	21.2±.43	34.1±3.6	19.8±.23
MCHC (g/dl)	34.3±.61	35.5±0.67	34.2±.59	35.5±.62	56.7±5.92	33.6±.37
WBC (10^6/μL)	3.8±.68	7.2±.98*	9.8±1.2*	11.8±.71*	21.7± 2.9*	4.8±2.8
NEUT (10^6/μL)	24±2.8*	22.5±4.9	38.2±2.1*	50.6±3.8*	75.8±.70*	17.3±6.6
LYMPH(10^6/μL)	70.5±5.8	70.6±5.06	65.3±2.3	54±.83	12.7±.50	83.5±.16
MONO (10^6/μL)	1.6±.8*	5.1±.62*	5.1±.42*	10.7±.48*	4.1±.32*	7.3±.11*
EOSIN (10^6/μL)	1.1±.32*	2.8±.21*	2.7±.26*	4±.39*	3.2±.15*	5.8±.13*
BAND (10^6/μL)	1.2±.13*	1.7±.18*	2 ±.15*	2.4±.26*	3.4±.20*	3.8±.04*
TP (g/dl)	6±.16*	6.1±.08	6.1±.14	6.3±.08	6.6±.16*	7.2±.22*

Data * are statistically significant

NB. PCV= Pack Cell Volume, Hb=Haemoglobin concentration, MCHC=Mean Corpuscular Haemoglobin Concentration, MCV=mean corpuscular volume, MCH= mean corpuscular haemoglobin, WBC=White Blood Cell, NEUT=Neutrophil, MONO=Monocytes, LYMPH=Lymphocyte, EOSIN=Eosinophils, BAND= Band cells and TP=Total Protein

DISCUSSION AND CONCLUSION

Haematological parameters vary with normal physiological and pathological status (Bobade *et al.,* 1985). Various researchers have reported changes in haematological parameters during the different phases of the oestrous cycle (Harewood *et al.,* 2000; Alavi-Shoushtari *et al.,* 2006; Chaudhari and Mshelia, 2006). The mean haemoglobin concentration, haematocrit and erythrocyte of the Sokoto red does, in the present study, were comparable to the mean values reported in other goat breeds (Oduye, 1976; Payne *et al.,* 1982; Pospisil *et al*., 1987; Mbassa and Poulsen, 1993). The significant (P<0.05) increase in the erythrocyte and leucocyte values observed between 16 and 20 days after the implant removal are consistent with the previous report of Sandabe and Yahi (2000), Soliman and Zaki, (1963); Hussain and Daniel, (1991) which could be attributed to increase vascularization and circulation as well as well as immunological response to ward off any pathogic agent capable of preventing fertilization and conception.

There was no significant increase (P>0.05) in Hb concentration, MCH, MCH and MCHC in the present study which agrees with the work of Masoni *et al.*,(1985); Mbassa and Poulsen, (1993). but not consistent with the report of in the Ijaz *et al.* (2003). There was no general significant change in haematological parameters in this present study and this corroborate the findings of Yaqub *et al.* (2011a). A significant increase (P<0.05) in Hb, MCH, MCH and MCHC were observed on day 18. This corroborate the work Ijaz *et al.* (2003) and could be attributed to oestrus and increase tissue vascularization.

The total white blood cell (neutrophil, eosinophil, monocytes and band cell) increases significantly during and after the period of synchronization except for lymphocyte this agrees with the work of Sandabe and Yahi (2000) and could be attributed to the adaptation mechanism needed to maintain immunocompetency throughout the experimental period.

Some conditions such as dehydration, external haemorrhage, inflammatory disorders, stress, pregnancy, lactation (Thomas, 2000) and stage of oestrous cycle have been reported to affect plasma protein concentration (Alavi-Shoushtari *et al.*, 2006). The total plasma proteins was observed to increase from the period of pre- treatment to the post-treatment period but the increase was not statistically significant (P>0.05) which disagrees with the findings of Alavi-Shoushtari*et al.* (2006) and Yaqub *et al.* (2011b) who reported low serum concentration of total protein during oestral phase of oestrous cycle in Red Sokoto goats but this work agrees with the work of Khan *et al.*, (2010). However a significant increase was observed on day 18 and 21 following the removal of the implant. Haematological parameters of red Sokoto does synchronized with fluorogestone acetate intravaginal sponge do not show any significant variation before oestrus but produce significant variation post oestrus.

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