

VARIATION OF HAEMATOLOGICAL PARAMETERS IN OESTRUS SYNCHRONIZATION USING FLUOROGESTONE ACETATE (FGA) INTRAVAGINAL SPONGE IN SOKOTO RED GOAT

F.U.SAMUEL¹, N.P CHIEZEY¹, J.O.O. BALE¹, T.K BELLO¹, R.HASSAN¹, F.S MAIKAJI¹ M. IBRAHIM¹, S.O EREKE¹, AND H.J MAGAJI¹

¹National Animal Production Research Institute-Shika,

*Corresponding author: felixsam75@yahoo.com, 08062804899

ABSTRACT

Variation in the haematological parameters in Sokoto red does synchronized with fluorogestone acetate (FGA) was investigated. Ten apparently healthy Sokoto does were randomly selected. 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 14 days, 2 ml of blood was also collected on the day 8 after the implant, after the removal of the sponge on day 15 during the oestrous 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 1½ inches. 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 can be concluded that no significant increase in haematological parameters and total serum protein were induced by using intravaginal fluorogestone acetate sponge in red Sokoto does.

Keywords: Fluorogestone Acetate, Pack cell volume, Haemoglobin concentration.

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 progestagen analogue is usually used to synchronize oestrus in goats during the breeding and non-breeding season (Ak *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. Hence, following withdrawal of progesterone, oestrus and ovulation occur at a predictable period of time (Bretzlaff, 1997; Leboucq *et al.*, 1998). Researchers have reported the onset of oestrus to occur within 6-120 h following progestagen withdrawal (Freitas *et al.*, 1996a; Romano, 1998; Greyling & Van der Nest, 2000). Worldwide, the most common route of application of progestagens in goats is intravaginal

(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; Ak *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 using progestagen intravaginal sponge in red Sokoto goats.

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 were used in this study. Ten Sokoto red 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 does were housed in pen and allowed to graze on natural pasture and balanced concentrate was provided. Water was available *ad libitum*. 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* 14 days and was 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 sample sample was collected before the Sponge implant day 0, after the sponge implant on 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 of each animal 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.

Table 1: Haematological parameters and total serum protein (Mean $\pm$ SEM) of Sokoto red does synchronized using intravaginal sponge fluorogestone Acetate (FGA) at 0, 8, 15, 17, 18, and 21 days.

Parameters	Period (Days)					
	0	8	15	17	18	21
PCV (%)	27.6 $\pm$ 1.6	28.7 $\pm$ 1.2	29.2 $\pm$ 1.4	29.7 $\pm$ 1.3	30.2 $\pm$ 1.02	36.6 $\pm$ 3.9
HB (g/dl)	9.4 $\pm$ 0.53	10.2 $\pm$ 0.44	10.1 $\pm$ 0.6	10.5 $\pm$ 0.39	30.1 $\pm$ 0.58	12.2 $\pm$ 1.24
RBC ($10^6/\mu\text{L}$)	9.1 $\pm$ 0.36	11.54 $\pm$ 0.94	11.01 $\pm$ 0.96	10.33 $\pm$ 1.05	12.9 $\pm$ 0.94	12.54 $\pm$ 0.64
MCV (fl)	59.9 $\pm$ 0.27	59.8 $\pm$ 0.21	59.9 $\pm$ 0.12	60.1 $\pm$ 0.05	60.1 $\pm$ 0.06	60 $\pm$ 0.15
MCH (pg)	20.5 $\pm$ 0.40	21.3 $\pm$ 0.40	20.5 $\pm$ 0.37	21.2 $\pm$ 0.43	34.1 $\pm$ 3.6	19.8 $\pm$ 0.23
MCHC (g/dl)	34.3 $\pm$ 0.61	35.5 $\pm$ 0.67	34.2 $\pm$ 0.59	35.5 $\pm$ 0.62	56.7 $\pm$ 5.92	33.6 $\pm$ 0.37

Statistical analysis

The data were statistically analysed 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 fluorogestagen 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.

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, are 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

WBC ($10^6/\mu\text{L}$)	3.8 $\pm$ 0.68	7.2 $\pm$ 0.98	9.8 $\pm$ 1.2	11.8 $\pm$ 0.71	21.7 $\pm$ 2.9	4.8 $\pm$ 2.8
NEUT ($10^6/\mu\text{L}$)	24 $\pm$ 2.8	22.5 $\pm$ 4.9	38.2 $\pm$ 2.1	50.6 $\pm$ 3.8	75.8 $\pm$ 7.0	17.3 $\pm$ 6.6
LYMPH ($10^6/\mu\text{L}$)	70.5 $\pm$ 5.8	70.6 $\pm$ 5.06	65.3 $\pm$ 2.3	54 $\pm$ 8.3	12.7 $\pm$ 5.0	83.5 $\pm$ 16
MONO ($10^6/\mu\text{L}$)	1.6 $\pm$ 0.8	5.1 $\pm$ 0.62	5.1 $\pm$ 0.42	10.7 $\pm$ 0.48	4.1 $\pm$ 0.32	7.3 $\pm$ 1.1
EOSIN ($10^6/\mu\text{L}$)	1.1 $\pm$ 0.32	2.8 $\pm$ 0.21	2.7 $\pm$ 0.26	4 $\pm$ 0.39	3.2 $\pm$ 0.15	5.8 $\pm$ 1.3
BAND ($10^6/\mu\text{L}$)	1.2 $\pm$ 0.13	1.7 $\pm$ 0.18	2 $\pm$ 0.15	2.4 $\pm$ 0.26	3.4 $\pm$ 0.20	3.8 $\pm$ 0.04
TP (g/dl)	6 $\pm$ 0.16	6.1 $\pm$ 0.08	6.1 $\pm$ 0.14	6.3 $\pm$ 0.08	6.6 $\pm$ 0.16	7.2 $\pm$ 0.22

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

erythrocyte and leucocyte values observed between 16 and 20 weeks of gestation are consistent with the previous report of Sandabe and Yahi (2000), Soliman and Zaki, 1963; Hussain and Daniel, 1991. 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). 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 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). Haematological parameters of red Sokoto does synchronized with fluorogestone Acetate intravaginal sponge do not show any significant variation.

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