



Effect of Dose level of Estrumate® (prostaglandin) on Estrus Response in two Nigerian Breeds of goat

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ABSTRACT

The present study was aimed at determining the effect of dose level of prostaglandin on estrus response in Sokoto Red Goats (SRG) and West African Dwarf (WAD) goats. Estrumate® (a prostaglandin analogue) was administered by intramuscular injection to thirty does (15 animals per breed) at three dose levels (0.25ml, 0.50ml and 0.75ml). Results showed that dose level influenced the proportion of animals that responded to Estrumate® in the two breeds. Results further showed marked difference in the estrus response between WAD and SRG at 0.25ml Estrumate® dose level (60 against 40% respectively). There was also breed difference in overall response (87 and 80% for WAD and SRG does, respectively). Time interval between Estrumate® administration and onset of heat ranged from 48-72 hours. Dose level influenced interval between Estrumate® administration and onset of heat in WAD goats. Dose levels of 0.50 and 0.75ml hastened the onset of heat (48-54hrs after injection) and shortened within breed variation compared to dose level of 0.25 ml (60-72 hrs after injection). Pearson correlation showed strong associations among levels of Estrumate® administration, time before the onset of heat and the number of does that showed estrus in both West African Dwarf and Sokoto Red goats. It was concluded from the study that 0.50ml of Estrumate® can be used to achieve a satisfactory estrus synchronization in both SRG and WAD does.

Key words: *Estrumate®, Estrus, Red Sokoto goat, West African Dwarf, Correlation.*

1.0 INTRODUCTION

Small ruminants like goats have potential for bridging the ever increasing gap between animal protein demand and actual intake in many Nigerian homes. However, complete reliance on natural reproductive process is largely responsible for the inability of commercial goat production to contribute maximally to total animal protein intake. [1] observed that kidding interval is one of the factors affecting the profitability of any goat breeding enterprise. The use of artificial

reproductive management tool to circumvent the natural breeding processes is therefore an important requirement for exploiting the huge breeding potential of Nigerian goat breeds. In Europe and America, estrus synchronization has helped to shorten kidding interval and to facilitate greater economic return [1]. According to [2], estrus synchronization is a labour saving tool for those who want to capitalize on improved breeding tools such as Artificial Insemination (AI). It is also a valuable tool for improving and

maintaining an all year round production of milk and meat [3]. It can be exploited to take the advantage of niche markets [4], to control diseases and for a simplified 'all-in all-out' kid raising programme [5]. The use of artificial reproductive management tool to circumvent the natural breeding processes in Nigerian breeds of goats has received little attention. Thus, this research was designed to determine the effect of dose level of Estrumate® (a prostaglandin analogue) on estrus response in Sokoto Red Goats (SRG) and West African Dwarf (WAD) goats.

2.0 MATERIALS AND METHODS

Thirty matured WAD and SRG female goats of 1 – 1½ years old were used for the experiment. The experiment was conducted at the College of Agriculture, Zuru, Kebbi state. Zuru is a South – East border town of Kebbi state. Zuru Local Government lies between latitudes 11°35'N and 11°55'N and longitudes 4°45' to 5° 25'E [6].

The West African Dwarf (WAD) goats used in the study originated from Ilorin suburbs in Kwara State while the Sokoto Red Goats (SRG) were bought from Zuru local government in Kebbi State. The animals were managed in conformity with guidelines on the care and use of animals for scientific research. All the animals were allowed to graze freely within an enclosed pasture land. They were also provided with supplements (Groundnut hay, wheat bran and cowpea husk), salt lick and ample water throughout the period of the experiment.

Goats in each breed group were randomly allotted to three treatment groups (5 goats per group and 15 does per breed). Estrumate® (a prostaglandin analogue) was administered intramuscularly to goats in each breed group at 0.25ml, 0.50ml and 0.75ml dose levels to induce estrus. Rectal temperature was recorded twice daily (morning and evening at 8.00am and 6.00pm, respectively) for a period of 8 weeks. Rectal temperature was measured using digital clinical thermometer. Sexual attractivity and proceptivity behavioural signs of heat were also monitored on each of the goats after the hormonal injection. The 'time- to-

onset' of heat was monitored every six hours after the injection of animals with Estrumate®. Response of the goats to Estrumate® at different dose rates (0.75, 0.5 and 0.25ml) were described using simple descriptive statistics (percentages and line graphs). The association among levels of Estrumate® administration, time to onset of heat and the number of does on estrus in both West African Dwarf and Sokoto Red goats were determined using Pearson correlation analysis [7].

3.0 RESULTS AND DISCUSSION

All the goats in the two breed groups (100%) administered with 0.5 and 0.75ml Estrumate® exhibited estrus while half (50%) of those administered 0.25ml Estrumate® showed signs of estrus (Table 3.1). Sexual attractivity and proceptivity behavioural signs exhibited by does in estrus were redening and swelling of the vulva, clear mucus discharge from the vulva, isolation from others and reduced appetite. The sexual behavioural signs observed among goats administered with Estrumate® in this study were similar to those reported by [8]. The level of proceptive behaviour clearly influences the chances of the ewe being mated [9], which in turn influences the fertility of the flock [10]. The result also agrees with the earlier submission of [11] who reported that increasing Estrumate® hormonal dose level gave higher doe response to mating and litter size in dwarf goat (*Capra hircus*). Table 3.1 shows marked difference in estrus response between WAD and SRG does at 0.25ml Estrumate® dose level (60 vs 40%, respectively) and in overall response (irrespective of Estrumate® dose level) which stood at 87 vs 80% for WAD and SRG, respectively.

Morning and evening rectal temperature readings showed slight differences between the two breeds under consideration, and between estrus and non-estrus periods in the same animals (Table 3.2). Higher morning rectal temperatures were recorded for SRG and WAD that were in estrus than for does that were not in estrus (38.2 and 38.4°C compared with 37.3 and 37.6 °C, respectively). The evening rectal temperature measurements

were higher than morning rectal temperatures in both breeds (Table 3.2). The overall average daily temperature of goats in the present study agrees with normal body temperature stated by [12]. Higher rectal temperature of does on heat is an

indication of intense physiological activities accompanied by restlessness in goat [13].

Table 3.1: Response (%) of SRG and WAD goats to three doses of Estrumate®.

Breed	Dosages (ml)		
	0.25	0.50	0.75
Sokoto Red Goat (SRG) %	40	100	100
West African Dwarf (WAD) %	60	100	100
Total %	50	100	100

Table 3.2: Mean morning and evening rectal temperatures (°C) in estrus and non-estrus does.

Breed	Non-estrus does		Estrus does	
	8.00am	6.00pm	8.00am	6.00pm
SRG	37.3±2.3	38.9±1.6	38.2±1.0	39.1±1.1
WAD	37.6±1.8	38.6±1.9	38.4±1.5	39.0±1.0

WAD and SRG represent West African Dwarf and Sokoto Red goats, respectively.

Table 3.3: Pearson correlation of levels of Estrumate® administration, time to onset of heat and the number of does on estrus in West African Dwarf and Sokoto Red goats.

	Level	Hour	Number
Level	1.00	-0.87	0.87
hour	0.98	1.00	-1.00
Number	0.87	0.76	1.00

Values in the upper diagonal are for West African Dwarf goats while values in the lower diagonal are for Sokoto Red goats.

The 6-hourly heat detection regime (Figure3.1) showed that onset of heat in the treated goats occurred within 48 and 72 hrs after Estrumate® administration. Only 23% of goats displayed heat between 48 and 54 hrs of Estrumate® administration, with WAD constituting 71% of the total. The onset of heat was generally delayed in SRG (≥ 54 hrs post- injection). Dose level influenced interval between Estrumate® administration and onset of heat in both WAD and SRG does. Higher dosages (0.50 and 0.75 ml) hastened heat exhibition (48-54hrs after injection), (Figure3.2) and shortened within breed variation. Goats administered with the lowest dosage

(0.25ml) came on heat 60-72 hrs after Estrumate® injection. The 100% response obtained at both 0.50 ml and 0.75 ml single doses of Estrumate® administration was higher than 64-84% estrus response obtained by [14] in their work on goats involving the use of PGF₂ alpha as the synchronizing agent. Heat response in the present study (100%) was also better than 70 – 75% estrus response obtained by [15] when 7.5 and 10 mg PGF₂ alpha were used as the synchronizing agents.

Pearson correlation showed strong associations among levels of Estrumate® administration, time to onset of heat and the number of does on estrus

in both West African Dwarf and Sokoto Red goats (Table 3.3). The negative correlation between the levels of Estrumate® administration and onset of heat in WAD may be explained by the fact that

administration of Estrumate® beyond 0.25 ml per doe was not associated with delayed onset of heat.

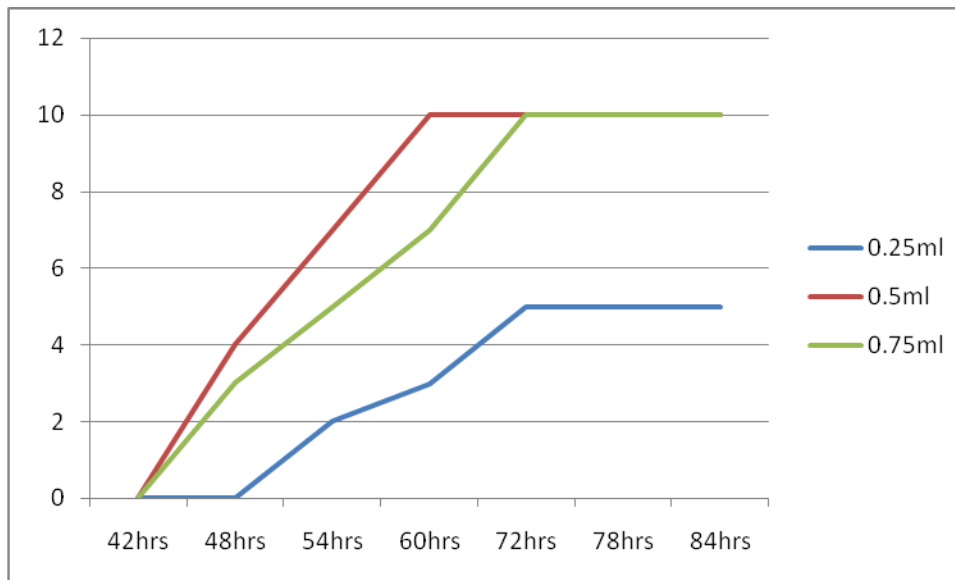


Figure 3.1: Doe response as influenced by the dose level of Estrumate® administration.

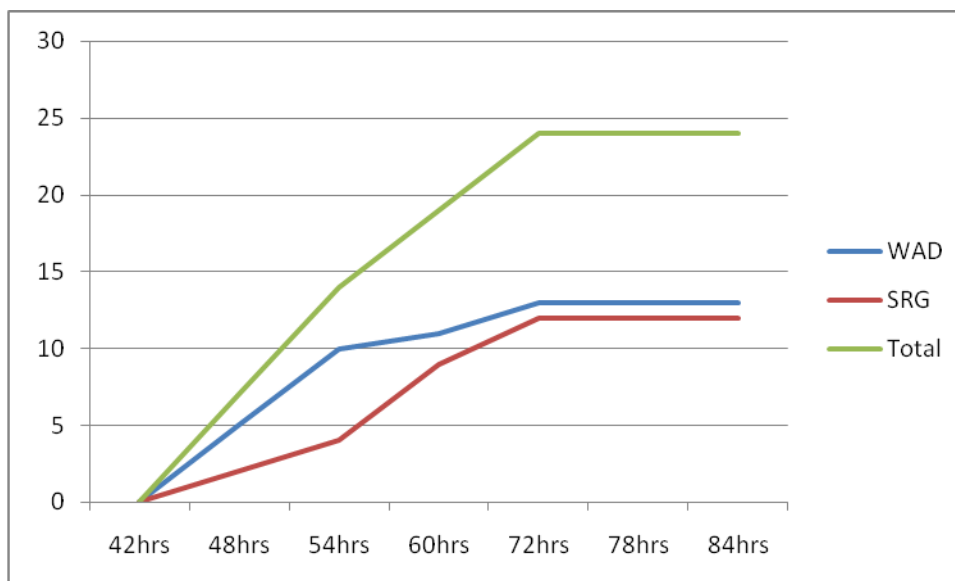


Figure 3.2: Doe response toEstrumate® administration as influenced by breed of goat

4.0 CONCLUSION

It is concluded from the present study that the administration of Estrumate® at less than 0.5ml per doe cannot satisfactorily induce estrus in both Sokoto Red Goat and West African Dwarf goat. Thus, the study recommends 0.5ml of Estrumate® per doe as effective dosage for the two breeds.

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