

A Comparative study of Estradiol Level by various Estrus synchronization protocols in Kilakarsal ewes during the breeding season

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Received: 13.05.2020 | Revised: 20.06.2020 | Accepted: 26.06.2020

ABSTRACT

To produce lambs consistently throughout the year in an accelerated lambing system, the use of exogenous hormones can be utilized in order to induce a synchronized estrus and stimulate cyclicity during the anestrus period. This can be achieved by either lengthening or reducing the duration of the estrous cycle by administration of exogenous progesterone (P4) or prostaglandin (PG). Gonadotropin-releasing hormone (GnRH) and Nanao GnRH may also be incorporated into treatment protocols to assist in initiating hormonal events necessary to synchronize estrous cycles, such as estrus and ovulation, especially in anestrus ewes. The objective of this study was to determine the effects of various estrus synchronization protocols utilizing the estrus synchronization protocols for Estradiol Level during reproductive cycle in Kilakarsal ewes at Breeding season. Blood samples were collected via jugular venipuncture on the day of CIDR insertion. On the day of CIDR removal. On the day of estrus. On the day of mating and On the 70th day of pregnancy. Serum was analyzed to estradiol concentration which was estimated by direct immunoenzymatic method using ELISA kit (RIA). From the values recorded on the day of estrus though no significant difference was observed between any of the treatment groups, the control showed the lowest value of estradiol which was significantly ($P < 0.05$) different from that of the other groups.

Keywords: Gonadotropin-releasing hormone (GnRH), Nanao GnRH, Ewes

INTRODUCTION

Sheep are often referred to as “short day” breeders because they begin to cycle and become sexually responsive when the amount of darkness increases in late summer to early autumn (Robinson & Karsch, 1988).

Intravaginal CIDRs are utilized on commercial sheep operations as a controlled reproductive management tool. Limited research has been conducted utilizing the CIDR in combination with GnRH and PG in seasonally anestrus and estrus ewes.

Cite this article: Vinayaki, M.S. (2020). A Comparative study of Estradiol Level by various Estrus synchronization protocols in Kilakarsal ewes during the breeding season, *Ind. J. Pure App. Biosci.* 8(3), 459-462. doi: <http://dx.doi.org/10.18782/2582-2845.8171>

Therefore, the following research focuses on synchronizing estrus in ewes during breeding seasons by potentially reducing the days to detected estrus, while increasing overall ewe prolificacy through the utilization of various CIDR protocols that include various combinations of the administration of GnRH and PG. The objective of this study was to evaluate the effects of combinations of controlled internal drug releasing (CIDR) inserts infused with progesterone (P4) in association with prostaglandin (PG), and gonadotropin-releasing hormone (GnRH) and nano conjugated GnRH on the Estradiol Level during reproductive cycle in Kilakarsal ewes at main season.

MATERIALS AND METHODS

The study was carried out during breeding season (Jul-Aug in Kilakarsal sheep maintained under semi-intensive system of rearing at Instructional Livestock Farm Complex ,Veterinary College and Research Institute and District Livestock Farm, Abishegipatti, Tirunelveli . The experiment was carried out)in a total of 140 cyclic Kilakarsal ewes were selected at random and grouped in to seven.Each group consist of twenty Animals.The first group was kept as control while other six groups were numbered from I to VI and subjected to six different hormonal treatments for estrus synchronization. as per the regimen described below.

Groups	Treatments
Control	Without any treatment
Group - I	CIDR
Group - II	CIDR with GnRH
Group - III	CIDR with PGF ₂ α
Group -IV	CIDR, PGF ₂ α with GnRH
Group -V	CIDR with Nanoconjugated GnRH
Group -VI	CIDR, PGF ₂ α with Nanoconjugated GnRH

Blood samples were collected five times through jugular puncture, from all the treatment groups during various stages of the experiment as listed below.

First collection : On the day of CIDR insertion.
 Second collection : On the day of CIDR removal.
 Third collection : On the day of estrum.
 Fourth collection : On the day of mating.
 Fifth collection : On the 70th day of pregnancy.

From the samples serum was separated and subjected and estradiol concentration was estimated by direct immunoenzymatic method using ELISA kit obtained from Agappe Diagnostics Limited as described by Tsang et al. (1980).

RESULT AND DISCUSSION

Effect of different estrus synchronization on the serum estradiol (ng/mL) during reproductive cycle in Kilakarsal ewes

Different stages of reproductive cycle	Control	Group I	Group II	Group III	Group IV	Group V	Group VI
		CIDR	CIDR with GnRH	CIDR with PGF _{2α}	CIDR, PGF _{2α} with GnRH	CIDR with nano conjugated GnRH	CIDR, PGF _{2α} with nano conjugated GnRH
On the day of CIDR insertion ^{NS}	4.29 ^b ±0.04	4.24 ^b ±0.05	4.21 ^b ±0.05	4.27 ^b ±0.05	4.19 ^b ±0.06	4.26 ^b ±0.05	4.18 ^b ±0.06
On the day of CIDR removal ^{NS}	8.27 ^c ±0.36	8.44 ^c ±0.06	8.19 ^c ±0.08	8.22 ^c ±0.07	8.15 ^c ±0.08	8.18 ^c ±0.09	8.21 ^c ±0.09
On the day of estrum	16.60 ^{Ad} ±0.41	18.04 ^{Bd} ±0.13	17.83 ^{Bd} ±0.16	17.57 ^{Bd} ±0.16	17.65 ^{Bd} ±0.13	17.54 ^{Bd} ±0.17	17.66 ^{Bd} ±0.12
On the day of mating ^{NS}	14.21 ^e ±0.15	14.37 ^e ±0.13	14.26 ^e ±0.13	14.09 ^e ±0.18	14.34 ^e ±0.13	14.17 ^e ±0.11	14.06 ^e ±0.20
On the 70 th day of Pregnancy ^{NS}	3.36 ^a ±0.14	3.46 ^a ±0.15	3.44 ^a ±0.10	3.56 ^a ±0.12	3.42 ^a ±0.09	3.39 ^a ±0.08	3.56 ^a ±0.09

The serum estradiol level during the main season on the day of CIDR insertion, CIDR removal.

Means bearing different superscripts in a row (Upper case A,B,...) differ significantly between groups at 5 % (P<0.05)

Means bearing different superscripts in a column (small case a,b,c...) differ significantly within groups at 5 % (P<0.05) and ^{NS}-Non significant (P<0.05)

The mean serum estradiol level of the control and other groups of ewes at different phases of reproductive cycle during main are presented in Table. day of estrum, day of mating and on the 70th day of pregnancy in control and different treatment groups ranged from 4.18±0.06 to 4.29±0.04, 8.15±0.08 to 8.44±0.06, 16.60±0.41 to 18.04±0.13, 14.06±0.20 to 14.34±0.13 and 3.36±0.14 to 3.56±0.09 ng/mL, respectively. From the values recorded on the day of estrum though no significant difference was observed between any of the treatment groups, the control showed the lowest value of estradiol which was significantly (P<0.05) different from that of the other groups .

However the values increased from the day of CIDR insertion to the day of estrum and thereafter tended to decline as observed on the day of mating and 70th day of pregnancy and the variations were statistically significant. While the same trend was observed in all the treatment groups the highest values were on the day of estrum in all the groups and ranged from 16.60±0.41 to 18.04±0.13ng/mL in Kilakarsal ewes.

Romano (2004) and Terqui et al. (1973) reported that the concentrations of 17β estradiol in the plasma increases three days before estrus and attained a maximum on the day of estrus and then declined.

Thomas et al. (1988), Majid and Mazaher. (2017) reported that the estradiol level varied from 7-8 pg / mL to a peak of 10-15 pg / mL depending on the stage of estrus cycle during the follicular phase of Merino ewes.

As reported by all the above authors the serum estradiol value was found to be highest in this study on the day of estrum in control and all the treatment groups of Kilalarsal ewes.

It may be inferred that the advocacy of CIDR, PGF_{2α} with nanoconjugated GnRH protocol to induce ES had resulted in normal and safe response in the ewes and may be adopted in the field to increase sheep production.

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