

Original Research Article

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Efficacy of Intravaginal Progesterone Sponge in Estrus Induction and Fertility Rate in Indigenous Kangayam Cows under Field Conditions

K. Devipriya^{1*}, P. Selvaraj¹, S. Jayachandran¹, K. Balasundaram¹,
K. Sivakumar¹ and S. Manokaran²

¹Department of Veterinary Physiology, Veterinary College and Research Institute,
Namakkal, India

²Kangayam Cattle Research Station, Sathyamangalam, and Erode, Tamilnadu
Veterinary and Animal Sciences University (TANUVAS), India

*Corresponding author

ABSTRACT

Keywords

Kangayam, Jersey cross, Progesterone sponge and conception rate

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The effectiveness of progesterone sponges to treat the anestrus animals and to synchronisation was reported in several previous study using different breeds of cattle and buffalo. The present study was carried out to assess estrus induction potential and conception rate in indigenous Kangayam cows inserted with progesterone impregnated intravaginal sponge. About 10 cows were selected after gynaecological examination and the locally prepared intravaginal progesterone sponges were placed in vagina for 9 days and removed on 10th day. Similarly 10 Jersey cows were selected for the study as control. All the cows were noticed carefully for another 2 to 4 days. The estrus score was calculated based on expressed estrus signs. Sponge retention was 100% in both breeds. Also long duration of hours were taken to induce estrum in Kangayam (62 ± 6.95) than Jersey cows (38 ± 5.66) but available time of estrus signs very low in Kangayam (18 ± 0.26 hrs) than Jersey cows (24 ± 0.42 hrs). The conception rate in Kangayam breed was 77.78 % and 62.5% in crossbred Jersey cows. This study concluded that Kangayam cows were taken longer duration to induce estrum and good conception rate.

Introduction

Kangayam, is one of the popular draught purpose indigenous cattle breed of Tamil Nadu. The indigenous cattle breeds were naturally resistant to heat stress however, due to changing climatic condition leads to reproductive failure and irregular hormonal secretions reported in previous studies. Lack of integration or synchronization and

endocrine imbalances at any phase of the sequence may result in reproductive failure. In indian subcontinent, the incidence of true anoestrus in cattle 48% and in buffalo 74% seen in reared in rural area. The prolonged calving to conception rate in bovine due to various factors, such as breed, parity, season, presence of bull, negative energy balance and suckling. The anestrus and repeat breeding and failure in induction of regular estrus cycle

and long inter calving interval and feed cost make economic loss to the owner. Estrus detection as a major problem in dairy industry for effective breeding programme (Senthilkumar and Chandrahasan, 2015).

The effects of synchronization treatments on expression of estrus are very important in designing strategies for controlled breeding programme (Quezada-Casasola *et al.*, 2015). In cows the progesterone sponges are equally successful to that of CIDR. (Martinez *et al.*, 2011) reported 60.6 % and 62.9 % conception rate in beef heifers with use of CIDR and MAP sponge respectively. The use of progesterone impregnated vaginal sponges is more practical method of administration. The effectiveness of progesterone sponges were reported in several previous study using different breeds of cattle and buffalo. However, no reports are available for using the progesterone sponge in Kangayam breed of cattle. The present study was carried out to find out the efficacy of progesterone treated intravaginal sponge in indigenous Kangayam cows on estrus induction and conception response under field conditions.

Materials and Methods

Study Design

Ten lactating Kangayam and cross bred Jersey cows between 4-7 years of age were chosen in this study. The animals were spread over different districts Erode, Karur and Namakkal districts of Tamil Nadu state. Out of 25 animals were screened to identify the true anestrous animal for progesterone treatment.

Pre clinical examination

The animals were thoroughly examined per rectum to conform the anestrous condition by rectal examination, the cow with smooth

ovaries with no palpable structure, and not shown estrus signs for 3 to 4 months after calving were included in the study. Some animals were reported to be repeat breeder even timely insemination. All animals were on grazing and stall fed conditions. The progesterone sponges were prepared in Department of Veterinary Physiology, Namakkal.

Administration of progesterone sponge

The animals were restrained properly. Before insertion of sponge perineum was cleaned with cotton soaked with water in order to remove the dung and other dust particles from the vulval lips. Properly lubricated vaginal speculum with liquid paraffin was inserted through vulva into vagina slowly and gently without any damage to the genital tract. The sponges were inserted inside the speculum and with the help of plastic plunger the sponge was lodged inside the anterior vagina. The progesterone sponge was removed after 9 days of insertion. The onset and frequency of estrus signs were observed and recorded in the estrus symptom recording chart (Mangal, 2009).

Confirmation of pregnancy

The estrus induction time of each animal was recorded in order to calculate the mean induction time. Those animals in estrus were artificially inseminated with frozen semen. The animals were underwent rectal examination 60 days post insemination to confirm the pregnancy.

Scoring system developed by Dash, (1980) for the Zebu cattle were used for scoring of estrus signs in this study. Estrus expression ranking (maximum score being 100) was done based on cardinal sign (standing heat, mucous discharge, vulvar swelling, micturition, restlessness, bellowing sound,

mounting, redness of vaginal mucosa, sniffing, chin resting and aggression. The score obtained for each behavioural signs of individual animals were added to obtain a total score (Shahid *et al.*, 2019). All numerical data was analysed statistically.

Results and Discussion

At the time of sponge removal 100 % progesterone sponge retention (n=10) without any abnormal discharge was observed in all treated animals. This finding is correlate with several previous studies. Saini *et al.*, (2016) who reported 100% retention of sponges in anoestrus buffaloes treated with progesterone sponge to induction of estrous cycle. Similarly the locally prepared sponges produced 100% retention as reported by previous studies carried out in our university (Visha *et al.*, 2014 and Jayachandran *et al.*, 2015).

Kausar *et al.*, (2013) reported that estrus induction using Methyacetoxo progeterone (MAP) sponge for 16 days in cyclic and acyclic buffaloes induced 75% and 50% respectively. Similarly MAP for 7 days with PGF2 α exhibits 90% and 70% estrus induction in cyclic and acyclic buffalo. During the day of sponge removal MAP

sponges given 75% and 50% respectively. Our results corroborate with previous studies and it was 90% (Kangayam) and Jersey cross (80%) when used progesterone sponge without PGF2 α . Saini *et al.*, (2016) reported 100 % etrus induction in true anestrus buffaloes treated with locally prepared progesterone sponge for 8 days. They administrated 400 IU of PMSG during the day of sponge removal.

The mean hour’s duration for estrus induction was 62 \pm 6.95 in Kangayam and 38 \pm 5.66 cross bred Jersey cow. Whereas 46 - 49 h for estrus induction in indigenous cattle of Jammu and Kasmir while treated with ovisynch protocol (day 0-GnRH-1, day- 7 PG, and day-9- GnRH- 2) (Shahid *et al.*, (2019). Between Kangayam and Jersey breeds the occurrence of duration of estrus was shorter (13 \pm 0.26) than cross bred Jersey cow (16 \pm 0.42). Estrus duration recorded in present study is in corroborating with other earlier studies (Layek *et al.*, 2011). The authors reported that 14.53 \pm 0.80 h in Sahiwal cows during natural estrus induction. However, short hours of overall standing heat was observed in high producing HF heifer was 6.4 \pm 4.3 and in adult cow 6.2 \pm 3.9 (Yoshidha, C and Nakao. 2005) (Table 1 and 2).

Table.1 Mean sponge retention and estrus induction rate, duration to induction of estrus, duration of estrum and conception rate in anoestrus Kangayam and Jersey cross bred cow treated with Progesterone sponge

Breed	Sponge retention Rate (%)	Estrus induction Rate (%)	Time duration to estrus induction (Hours)	Occurrence of estrus (Hour)	Conception rate (%)
Group I (Indigenous Kangayam)	100	90	62 \pm 6.95 ^a	18 \pm 0.26	77.78 (7/9)
Group II (Cross bred Jersey)	100	80	38 \pm 5.66 ^b	24 \pm 0.42	62.5 (5/8)

The values with different superscript are significantly different between different rows

Table.2 Different estrus signs and total estrus intensity (Mean \pm SEM) core observed between anoestrus Kangayam and Jersey cross bred cow treated with intravaginal progesterone sponge

Estrus observation/signs with number	Standing Heat (25)	Mucus discharge (20)	Vulvar swelling (9)	Micturition (9)	Restlessness (9)	Bellowing (6)	Mounting (6)	Redness of Vaginal mucosa (6)	Sniffing (4)	Aggression (6)	Total intensity score (100)
Indigenous Kangayam	15.5 \pm 1.30	13.2 \pm 0.78	3.8 \pm 0.56	2 \pm 0.33	5.05 \pm 0.49	0.65 \pm 1.80	0.85 \pm 0.39	2.4 \pm 0.39	1.7 \pm 0.48	3.75 \pm 0.48	48.9 \pm 7.0
Cross bred Jersey	20.1 \pm 2.38	18.6 \pm 2.63	7.45 \pm 2.09	7.6 \pm 2.63	4.95 \pm 0.40	4.5 \pm 2.17	3.9 \pm 0.89	4.15 \pm 0.47	2.35 \pm 0.57	4.3 \pm 1.08	77.9 \pm 15.31

The present study observed conception rate was 78.78 % in Kangayam cows whereas 62.5 per cent in cross bred Jersey cows. Whereas Honparkhe *et al.*, (2008) reported 60% and 62.5 % of conception in cattle and buffalo respectively when Hydroxy progesterone caproate (750 mg) used intramuscularly at 72 hrs interval to induce estrum. In another study reported that very low level of conception rate obtained when norgestomate (Synchromate-B) ear implants used for 9 days in crossbred cows (Selvaraju, *et al.*, 2011). Another study reported that 84.61 % of conception rate was achieved by use of progesterone injection (250 mg) on day 1 and primed with GnRH on day 10th in local anestrous cows (Pawar *et al.*, 2013). Low conception rate as obtained in acyclic buffalo treated with MAP sponges intravaginally for 16 days (Kausar, *et al.*, 2013). High conception rate in the present study showed that the comparatively high efficacy of locally prepared progesterone sponge and good response from indigenous cows.

The effect of induced estrus on different estrus intensity scores in indigenous Kangayam and cross bred Jersey cows were presented in Table 2. In the present study compared with Kangayam cows, the score intensities were higher in cross bred Jersey cows while compared with lower the findings. Shahid *et al.*, (2019) reported that estrus intensity score in heifer and cow induced with Ovisynch protocol (GnRH with PG) group had 50.80 ± 2.82 and 51.94 ± 2.37 respectively whereas natural estrus induction had 59.67 ± 5.8 and 54.83 ± 4.4 respectively. They explained that the longer duration of standing heat in synchronized sahiwal heifer might be due to use of exogenous GnRH that inturn increased follicular growth and released higher concentration of estrogen hormone that induce estrus signs more prominent. Similarly in the present study higher duration of induction of estrum and

low estrus intensity score in Kangayam cows could be due to delay in release of GnRH and low concentration of estrogen hormone in plasma to express estrus behaviour. The reduction in estrus behaviour involves reduced mounting activity and shorter periods of estrus which limits the use of AI.

Results of present study revealed that use of progesterone impregnated sponges improved conception rate in indigenous Kangayam and jersey cross bred cows. Indigenous Kangayam took long duration to exhibit the estrus signs but the duration of standing heat (estrus) was shorter with good conception rate than Jersey cross bred cows.

The study concluded that use of intravaginal progesterone sponge have better efficacy to improve in synchronization of estrous cycle in cyclic and acyclic Kangayam cows to improve fertility and reduce inter calving interval.

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