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EFFECT OF TIMED ARTIFICIAL INSEMINATION USING COSYNCH METHOD ON FERTILITY IN REPEAT BREEDING CROSSBRED COWS

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Abstract: The present study was designed to assess the effect of Cosynch method of synchronization on conception rate in repeat breeding crossbred cows. A total of twenty repeat breeding crossbred cows were divided into two group containing 10 cows in each group. Cows in group I (n=10) served as control and inseminated at observed estrus. In Group II (n=10) cows, GnRH (Receptal, 10 μg) was administered i.m. on day 0, $PGF_{2\alpha}$ (Pragma, 500 μg) was administered i.m. on day 7, second GnRH was administered 48 hours after $PGF_{2\alpha}$ injection and cows were inseminated at the same time. The first service conception rate in Cosynch group was 60.00 per cent whereas it was 30.00 per cent in control group. Thus, Cosynch method of synchronization can be effectively used to improve conception rate in repeat breeding cows.

Keywords: Cosynch, Fertility, Crossbred cows, Repeat Breeding.

Introduction

Repeat breeding is one of the major causes of infertility in dairy cattle. It has been reported that 10-24 per cent of reproductive cows in dairy farms are repeat breeders (Kimura *et al*., 1987). Inadequate and inaccurate estrus detection is frequently a cause for cows becoming repeat breeder. Incorrect timing of artificial insemination causes poor conception rate in dairy cows. It has been reported that 15 to 20% of cows brought for artificial insemination to Veterinary Institutions are not in estrus i.e. at the luteal phase of the estrous cycle (Agarwal *et al*., 2005). The main reasons for these errors are poor estrus detection, lack of awareness about estrus signs or negligence of cattle owner, subestrus or silent estrus. Repeat breeding is also caused by anovulation and delayed ovulation in dairy cows.

To increase reproductive efficiency in cattle, various estrus synchronization protocols using Progesterone and $PGF_{2\alpha}$ have been tried. The effectiveness of these protocols is however, dependent upon the precision of estrus detection. Ovulation synchronisation protocol (Ovsynch Protocol) makes the use of a combination of GnRH-$PGF_{2\alpha}$-GnRH

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injections which has been reported to considerably narrow down the ovulation time to a range of 24 hours to achieve the maximum conception rate with fixed time artificial insemination and eliminates the need for estrus detection (Pursley *et al*., 1997). In ovsynch programme, two injection of GnRH, 7 days before and 2 days after $PGF_{2\alpha}$, will effectively synchronize ovulation in more than 90% of dairy cows treated. Animal should be bred 8-18 hours after the second GnRH injection. In Cosynch method, fixed time insemination is performed at the same time as the second GnRH injection i.e. 48 hours after $PGF_{2\alpha}$. Cosynch method eliminates one animal handling compared with ovsynch method (Pursley *et al*., 1998; Geary *et al*., 2001). Cosynch program can be implemented as a treatment for cows failing to be detected in estrus. Cosynch protocol allows the treatment of cows with subestrus or ovulation problems. Hence, cosynch method may improve conception rate in repeat breeding cows caused by poor estrus detection, incorrect timing of insemination, anovulation and delayed ovulation. Much work has been done using cosynch methods on fertility response in normal cyclical and postpartum anestrus cows. However, reports on application of cosynch method for fertility improvement in repeat breeding cows are meagre (Yogesh Barolia *et al.*, 2016). Hence, the present study was conducted to assess the effect of Cosynch method of synchronization on fertility in repeat breeding crossbred cows.

Material and methods

The study was conducted on 20 repeat breeding crossbred cows maintained at an organized Dairy farm, Tiruvannamalai. The body weights of the cows ranged between 300-400 kg. Cows that were free from uterine infection, gross genital tract abnormalities and having good body condition were selected for the study. The selected 20 repeat breeding cows were randomly divided into two groups containing 10 cows in each group. The selected cows were dewormed and supplemented with mineral mixture for 30 days before initiating treatment. Cows in group I (n=10) served as control and were inseminated at observed estrus. Cows in group II (n=10) were treated with Cosynch protocol. Treatment protocol was initiated regardless of the stage of the estrous cycle of the cows. In Group II cows, GnRH (Receptal, 10 µg) was administered i.m. on day 0, $PGF_{2\alpha}$ (Pragma, 500 µg) was administered i.m. on day 7, second GnRH was administered 48 hours after $PGF_{2\alpha}$ injection and cows were inseminated with frozen semen at the same time. Pregnancy diagnosis was done by rectal examination on day 60 after the fixed time artificial insemination and the first service conception rate was calculated. Animals returning to estrus were re-inseminated at the subsequent estrus and the estrous cycle length was calculated.

Results and discussion

The result revealed that the first service conception rate for cows in the control group (group I) was 30.00 per cent (3/10). Remaining seven cows returned to estrus with the mean estrous cycle length of 20.71±0.62 days in group I. The first service conception rate for cows in the Cosynch group (group II) was 60.00 per cent (6/10). Remaining four cows returned to estrus with the mean estrous cycle length of 21.00±0.64 days in group II. All the cows treated with Cosynch protocol expressed estrus in group II. The first service conception rate was 30.00 per cent higher in the Cosynch group than in control group.

Yogesh Barolia *et al.* (2016) also reported higher conception rate in repeat breeding Gir cows treated with cosynch protocol than in the control group (50.00 per cent versus 33.33 per cent). Walter Schmitz *et al*. (2017) recorded pregnancy rate of 65 per cent after fixed time artificial insemination in suckled beef cows subjected to cosynch protocol. They also observed highest pregnancy results when the cosynch protocol was administered in cows displaying increasing plasma progesterone concentrations at the beginning of synchronization treatment.

Caraba and Velicevici (2013) observed higher conception rate in dairy cows treated with cosynch protocol (57.00 per cent) as compared to ovsynch treatment group of dairy cows (25.00 per cent). Zaituni Udin *et al.* (2017) reported overall conception rate of 66.67 per cent in cosynch treated post-partum Simmental cows. Geary *et al.* (2001) observed conception rate of 54.00 per cent in beef cows treated with cosynch protocol and 63.00 per cent in beef cows that received cosynch plus calf removal. They also found that conception rates of cyclic cows were greater than those of anestrus cows.

Demiral *et al.* (2006) found higher conception rate in dairy heifers (51 per cent) as compared to multiparous cows (41 per cent). They also reported that the presence of functional corpus luteum at $PGF_{2\alpha}$ injection time could be considered as a critical stage for success. Borchardt *et al*. (2018) observed that cows inseminated with liquid semen achieved greater pregnancy per AI than cows inseminated with frozen semen using the Cosynch protocol (27.5 per cent vs. 20.0 percent). They further inferred that liquid semen might have a longer viability in the reproductive tract.

The first service conception obtained in cosynch group of the present study was comparable with Geary *et al.* (2001) and Caraba and Velicevici (2013). The conception rate obtained in the cosynch group was higher than the results of Demiral *et al.* (2006), Yogesh Barolia *et al.* (2016), Borchardt *et al*. (2018). However, the results obtained were lower than Zaituni Udin *et al.* (2017) and Walter Schmitz *et al*. (2017). The variations in the conception

rate of different workers might be due to differences in breed, climate, nutrition, management and normal cyclic or repeat breeding cows.

The precision of estrus and high fertility rates in cosynch group are due to the first GnRH treatment luteinizing or ovulating the mature follicle, and initiating recruitment and selection of a new dominant follicle. The injection of $PGF_{2\alpha}$ causes regression of the spontaneous CL or potential CL induced by GnRH, or both (Peters *et al*., 1999). The second injection of GnRH should ensure better synchronization of ovulation by stimulating the preovulatory LH surge (Coulson *et al.*, 1980).

Poor estrus detection and insemination at incorrect time is frequently a cause for cows becoming repeat breeder. Hence, the increase in conception rate of treatment group of the present study might be due to fixed time insemination using cosynch method of synchronization. Repeat breeding is also caused by anovulation, delayed ovulation and luteal insufficiency due to endocrine dysfunctions in dairy cows (Yogesh Barolia *et al.*, 2016). Higher conception rate reported in treatment group indicated that these endocrine dysfunctions might have been eliminated by cosynch method of ovulation synchronization.

Conclusion

In the present study, the first service conception rate was 30.00 per cent higher in cosynch treatment group than in control group. Thus, conception rate in repeat breeding cows can be increased by controlled breeding using cosynch method of synchronization.

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