Research article

DOI: 10.48165/ijar.2024.45.02.1

The Indian Journal of Animal Reproduction

The official journal of the Indian Society
for Study of Animal Reproduction

ACS Publisher
www.acspublisher.com

Year 2024, Volume-45, Issue-2 (December)

ISSN 0970-2997 ***(Print)*** *ISSN 2583-7583* ***(Online)***

Efficacy of Ovsynch and Select-Synch Protocols to Improve Fertility in Anestrus Sahiwal Cows During Summer Season

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ABSTRACT

The present investigation was carried out to evaluate the efficacy of ovsynch and select-synch protocols for improvement of fertility in postpartum Sahiwal cows during summer season. Experimental animals (n=18) were equally divided into three groups; each group consisting of 6 animals. Animals of ovsynch group were treated with standard G-P-G protocol beginning from day 70 postpartum and FTAI was performed 14-20 hrs after second GnRH treatment. Animals of select-synch group were treated similar to ovsynch group without second GnRH injection and they were inseminated at detected estrus following AM-PM rule. Animals of this group, which did not show estrus signs up to 72 hrs after $PGF_2\alpha$ treatment, were inseminated with concurrent second injection of GnRH. No treatment was given to the animals of control group and reproductive organs of animals were examined per rectum on days 80-82 for secondary signs of estrus and A.I. was carried out in suspected estrus animals. The cyclic status of animals was assessed based on presence of CL on ovary either on day 60 or 70 postpartum. Three cyclic animals got conceived in ovsynch group; while two cyclic animals with detected estrus were conceived in select-synch group. Two cyclic and two acyclic animals in select-synch group were inseminated at pre-determined time with concurrent GnRH injection and only one cyclic animal got conceived giving overall conception rate of 50% (3 out of 6). In control group, one out of 6 animals got conceived yielding 16.66 per cent of conception rate during experimental period. It may be concluded that ovsynch and select-synch protocols are effective in cyclic than in acyclic animals.

Keywords: Anestrus, Ovsynch, Postpartum, Sahiwal, Select-synch, Summer

How to cite: Angadi, S., Awasthi, M. K., & Parveen, K. (2024). Efficacy of Ovsynch and Select-Synch protocols to improve fertility in anestrus Sahiwal cows during summer season.
The Indian Journal of Animal Reproduction, 45(2), 1–4. 10.48165/ijar.2024.45.02.1

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Received 23-05-2024; Accepted 09-07-2024

INTRODUCTION

Reduced production of follicular estrogens and ovulation of lower quality oocytes have been reported during heat stress (De Rensis and Scaramuzzi, 2003) resulting in formation of a sub-functional CL, which produces a lower amount of progesterone (Wiltbank *et al*., 2011). The cyclical ovarian activity is disturbed resulting in decreased LH secretion in the peri-ovulation period with reduced production of progesterone during diestrus phase under heat stress (Souza *et al*., 2008). To minimize the negative effects of heat stress on the secretion of reproductive hormones and maturation of oocytes, the use of hormonal protocols has been proposed during summer to improve the fertility (Roth *et al*., 2001). Ovsynch is one of the most classical and widely known systems of cattle breeding (Pursley *et al*., 1995) and its protocol consists of two injections of GnRH analogue separated by a single injection of $PGF_2\alpha$ on days 0-7-9 mainly targeting the dairy cows. The ovulation is precisely synchronized in dairy cows and usually occurs approximately 26-32 hrs after the second GnRH injection. Thus, a timed insemination at 14-24 hours after second injection of GnRH resulted in a high probability of successful conception (Peters *et al.,* 1999). Select-synch is also a good breeding option for those herds with good heat detection programs and that prefer to breed the cows based on detected estrus. Cows are either bred to detected estrus for three to five days after $PGF_2\alpha$ (Option 1; Geary *et al*., 2000) or non-responders are time bred at 72 hours after $PGF_2\alpha$ treatment with a concurrent injection of GnRH (Option 2; DeJarnette *et al*., 2003). This approach allows most cows (50 to 70 percent) to be bred at standing estrus and gives all cows an opportunity to conceive with the clean-up A.I. at 72 hours. Select-synch approach saves on hormone cost because only those cows that fail to show estrus receive the second GnRH injection. Select-synch also facilitates more efficient use of expensive or genetically valuable semen by targeting its use in cows at estrus, whereas less expensive semen can be reserved for the timed-A.I. services.

Very little information is available in existing literature on efficacy of ovsynch and select-synch protocol in postpartum Sahiwal cows during summer season. In perspective, the present investigation was conducted on postpartum Sahiwal cows to assess the efficacy of ovsynch and select-synch protocol. Both breeding protocols were started on day 70 postpartum by considering the voluntary waiting period of breeding at the farm as 80 days postpartum.

MATERIALS AND METHODS

The present experiment was conducted on postpartum Sahiwal cows (n=18) with normal parturition from second to sixth lactation in Bull Mother Experimental Farm, College of Veterinary Science and Animal Husbandry, Anjora, Durg, (C.G.), over a period of four months from March to June. The selection of experimental animals was strictly based on absence of genital infection in these animals. The cyclic status of animals of each group was assessed by palpation of ovary per rectum with presence or absence of corpus luteum either on day 60 or day 70 post-partum. The animals were selected randomly and equally divided in three groups viz. ovsynch group, select-synch group and control group, each group comprised of 6 animals. The animalsof ovsynch group were treated with first dose of GnRH @ 10 µgm (Inj. Receptal Vet @ 2.5ml) I/M on day 70 post-partum followed 7 days later by Inj. $PGF_2\alpha$ @ 500 µgm (Inj. Pragma @ 2.0 ml) I/M. Two day later animals were treated with second dose of GnRH @ 10 µgm. All the treated cows were inseminated at fixed time (FTAI) of 14 to 20 hrs after second GnRH injection without estrus detection.The animals of select-synch group were treated similar to that of ovsynch group without second GnRH injection and inseminated at detected estrus following AM-PM rule. Animals which did not show estrus signs up to 72 hrs after $PGF_2\alpha$ treatment were inseminated with concurrent second GnRH injection. No treatment was given to the animals of control group and reproductive organs of animals were examined per rectum on days 80-82 for secondary signs of estrus. A.I. was carried out in such animals that were found in suspected estrus. Pregnancy diagnosis was carried out through examination per rectum any day between days 50 and 60 after artificial insemination in animals of treatment and control groups.

RESULTS AND DISCUSSION

Based on presence or absence of corpus luteum on the ovary through examination per rectum either on day 60 or day 70 postpartum, four animals were detected as cyclic and two as acyclic in both ovsynch and select-synch group; while 2 animals were cyclic and 4 animals were acyclic in control group. Three cyclic animals of ovsynch group got conceived yielding conception rate of 50% (3 out of 6), while one cyclic and 2 acyclic animals did not conceive. In select-synch group, estrus was detected in two cyclic animals after $PGF_2\alpha$ treatment and both these animals got conceived. Remaining 2 cyclic and 2 acyclic animals were inseminated at pre-determined time at 72 hrs after $PGF_2\alpha$ treatment with concurrent GnRH injection. Out of these 4 animals only one cyclic animal got conceived giving overall conception rate of 50% (3 out of 6) in select-synch group. In control group one cyclic animal got conceived yielding 16.66 per cent of conception rate (1/6) during experimental period.

In the present study, estrus response in select-synch group approximates with observation of Noui *et al.* (2020) who reported estrus response as 40% in dairy cows treated with select-synch protocol. Similarly, present findings on conception rate approximate well with the observation reported by Rabiee *et al*. (2010) and Noui *et al.* (*loc cit*) who reported non-significant difference in conception rates between ovsynch and select-synch treated animals. Geary and Whittier (1999) reported that the ovsynch, co-synch, and select-synch protocols all resulted in similar (P>0.01) pregnancy rates. The conception rates have been reported ranging from 45 to 60% after ovsynch treatment in dairy cows (Ambrose *et al*., 2000; Cordoba and Fricke, 2001 and Taşal*et al*., 2005), which approximate with findings of present study.

The ovsynch protocol is based on principal that the first GnRH injection luteinizes or ovulates the ovarian follicle, which leads to development of the corpus luteum (Nowicki *et al*., 2017). The efficiency of ovulation induction by the first GnRH injection varies from 66% to 85% (Ullah *et al*., 1996; Perry *et al*., 2005). First GnRH injection also initiates the recruitment and selection of a new dominant follicle 7-8 days later. The injection of PG on day 7 initiates the regression of spontaneous CL or a potential CL induced by first GnRH or both and allows the continuing development of dominant follicle of new follicular wave. A strategic second injection of GnRH is administered 48 hrs after the injection of PG, which induces a surge of LH causing ovulation of newly formed dominant follicle within 30 hrs of injection (Pursley *et al*., 1994). The cows are artificially inseminated at pre-determined time of 14-24 hrs after second GnRH injection. This system of breeding is termed as fixed time artificial insemination (FTAI).

Three animals of each treatment group did not conceive in the present study. It may be due to the number of follicular waves that an individual animal expresses during an estrous cycle (Willard *et al*., 2003). The preponderance of cycle type (two-wave versus three-wave) within a herd may determine effectiveness of protocol treatment. The developmental stage of ovarian follicle determines the response to first GnRH treatment.

Interestingly, 3 cyclic animals of each treatment group got conceived demonstrating that ovsynch and select-synch protocol is effective in cyclic animals. Present finding approximates with the observation of Laven (2019) who documented that ovsynch protocol is most efficient in cyclic cows, less efficient in anestrus cows and least efficient in heifers. Therefore, based on finding of present study it may be suggested that ovsynch and select-synch protocols may be effectively used in postpartum cyclic animals for their first breeding after voluntary waiting period during summer season. Furthermore, select synch protocol may be recommended for synchronization of estrus in farms where breeding is preferred at detected estrus for efficient use of frozen semen and where estrus detection is not a problem thereby reducing the cost of hormone.

CONCLUSIONS

The findings of present study led to the conclusion that ovsynch and select-synch protocol is effective in cyclic animals and may be effectively used for better fertility management after normal parturition in Sahiwal cows during summer season.

ACKNOWLEDGEMENT

Authors are grateful to the Dean of the Veterinary College, Anjora and authorities of Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Durg, Chhattisgarh, India for providing facilities to conduct this experiment.

CONFLICT OF INTEREST

None.

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