

Mass oestrus synchronization programme

in dairy animals: A field experience

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Oestrus synchronization is a reproductive management technique through which most of the female animals in a herd can be brought to oestrus at a predetermined time. It allows dairy producers to plan breeding of their animals during the most favourable season of the year; enhance pregnancy rates, reduce time and labour spent on heat detection, produce of calf for the future herd replacement, and hence contribute to the dairy economy.

Key words: Artificial insemination, Dairy, GnRH, Oestrus synchronization, PGF₂α

IT is established that accurate and timely detection of oestrus in dairy animals can pay big dividends in the success of Artificial Insemination (AI) programmes. It is the job of herdsman to recognize and interpret a cow's heat signals. For dairy producers, a good heat detection program is critical in making superior genetics through AI. The modern reproductive management tools like oestrus synchronization through AI programme can be of major economic benefit.

Oestrus synchronization is a reproductive management technique through which most of the female animals in a herd can be brought to oestrus at a predetermined time. It allows a group of cows in a herd to receive a programmed series of preparatory injections or treatments which culminates either in a short period of insemination associated with detected oestrus (AI at detected oestrus: AIDE), or insemination at a predetermined time without regard to oestrus (Timed AI).

Timed artificial insemination (TAI) has become an integral part of reproductive management in many dairy herds. TAI protocol that synchronizes ovarian follicle growth, corpus luteum (CL) regression and ovulation, results in improved

reproductive performance because all animals are inseminated whether they show oestrus or not. In general, these programs are designed to assist in obtaining pregnancies in groups of cows, primarily by restricting the intervals during which oestrus detection needs to be done, or by eliminating the need for oestrus detection. With the advent of real-time ultrasonography, it has become possible to visualize the various reproductive events over a prolonged period of time and without any interruption of normal physiological events, which will provide a basis for synchronizing oestrus and ovulation with more precision. Thus, efficient oestrus synchronization protocols should have the ability to induce atresia of all large follicles present on the ovaries whatever their developmental stage is, resulting in recruitment of a new follicular wave, synchronous development of a new dominant follicle, and ovulation at a predictable time.

Advantages of oestrus synchronization

- Allows cattle breeders and dairy producers the opportunity to control when groups of cows or heifers come into heat and ovulate, know calving due dates, and can incorporate them in their

breeding plans.

- Facilitates timed AI for more efficient pregnancy rates and faster genetic improvement.
- Time as well as labour spent on heat detection can be considerably reduced or perhaps eliminated.
- Production of calf crop for the future replacement herd in the farm is another important advantage.

The basis of oestrus synchronization is to control the oestrus cycle length either by manipulating the follicular development or the CL function or by both. These strategies may device a treatment that will synchronize oestrus more precisely to allow a single, timed insemination without the need for detection of behavioural oestrus.

Following basic approaches can be used for oestrus synchronization

Prostaglandin (PGF₂α) treatment: From about day 5 of the oestrus cycle regression of the CL starts. Thereafter, progesterone level declines rapidly to basal concentrations within 24 h resulting in induction of oestrus and ovulation. The PGF₂α injection may be given either once or twice (11-14 days apart) depending on the type of

protocol followed.

Progesterone or synthetic progestins (CIDR®, PRID® or CRESTAR®) treatment: Maintains high level of progesterone even after the luteolysis and oestrus synchrony occurs within 2 to 5 days following progestin removal. These regimens sometimes additionally include the administration of estradiol at the time of progestagen application, and/or PGF₂α the day before progestagen removal.

Gonadotropin-releasing hormone (GnRH) or an analogue: Causes ovulation of a large follicle or induce luteinization and/or atresia of predominant follicles. This help in synchronizing oestrous cycle in anoestrus female.

Oestrus synchronization protocols

Ovsynch: Ovsynch synchronization protocol has been developed, tested and used extensively in lactating dairy cattle. In this protocol, the initial GnRH injection is given on day 0 followed by an injection of PGF₂α on day 7 and a second GnRH injection 48 h after the PGF₂α treatment (Fig.1). Fixed-time AI is done 8 to 18 h after second GnRH injection.

Co-Synch: Co-Synch is an alternative to ovsynch which eliminates animal handling one more time by breeding cows (fixed time AI) “coinciding” with the second GnRH injection.

Select-Synch: It is similar to ovsynch and Co-Synch except that second GnRH injection is not administered to all the cows. Select-Synch is a breeding option for those herds with good heat detection programs and that prefer to breed cows based to standing oestrus. Cows are either bred to detected oestrus for 3 to 5 days after PGF₂α or bred to oestrus for 72 h after PGF₂α. The non-responders are time bred at 72 h with a concurrent injection of GnRH (Fig.1).

Presynch-Ovsynch: Pre-synchronization with PGF₂α is commonly used in dairy herds to ensure that cows are at the most appropriate stage of the oestrous cycle at the time of the first GnRH treatment. Pre-synchronization with 2 doses of

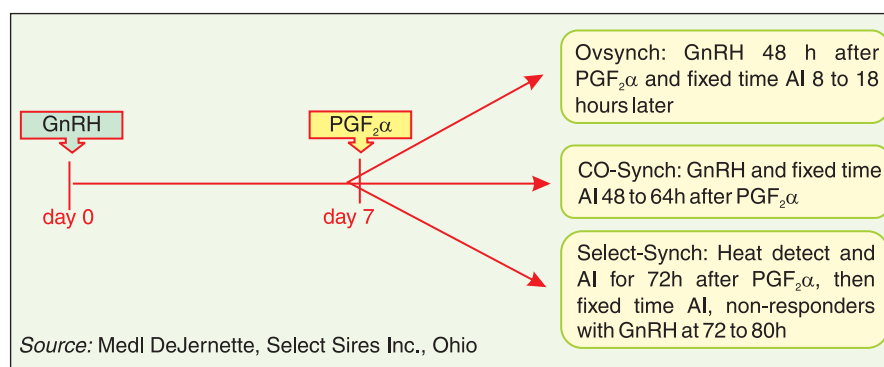


Fig. 1. Most popular and commonly followed oestrus synchronization protocols: GnRH treatment administered 7 days after the second

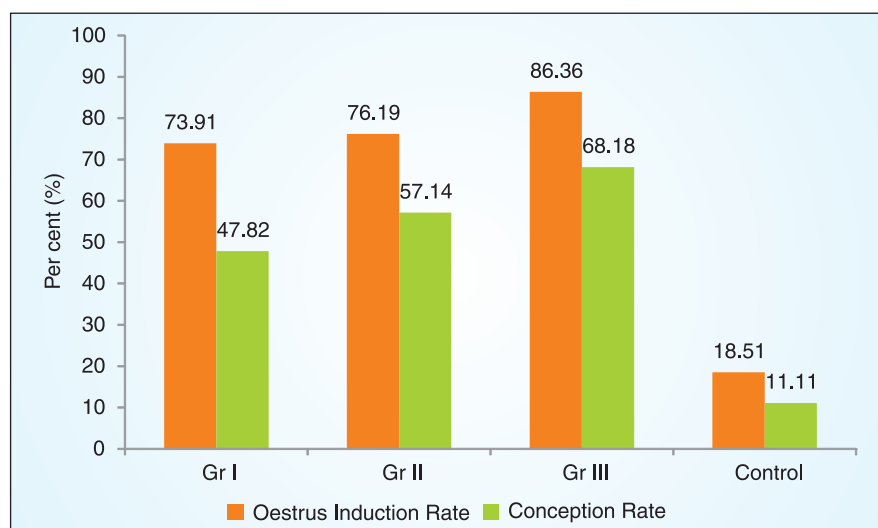


Fig. 2 Response to different oestrus synchronization protocols

PGF₂α, 14 days apart, and administration of the first GnRH 12 days after the second PGF₂α increase the probability that an LH-responsive follicle will be present at the time of the first GnRH.

Double-Ovsynch: Involves two ovsynch protocols following one after the other, with the third.

Mass oestrus synchronization under field conditions

Under the reproductive management module of the Farmer-FIRST Programme (FFP), ICAR-CIRC, Meerut demonstrated the mass oestrus synchronization and oestrus induction in anoestrus dairy animals under field conditions using different hormonal protocols. For the study, 93 anoestrus females were randomly selected from the rural areas around Meerut district through the organization of animal infertility cum health camps and divided into four groups. Animals of Gr-I (n=23) received double PGF₂α protocol 11

days apart, Gr-II (n=21) animals were subjected to ovsynch protocol and Gr-III (n=22) animals were treated with modified ovsynch protocol. Remaining, Gr-IV (n=27) animals were kept as control and received no hormonal treatment. Observations were recorded in terms of oestrus induction response and conception rate under each treatment as well as control groups. The animals were inseminated with good quality semen and pregnancy was confirmed at day 60 post-insemination. The study was able to successfully demonstrate the technique with appreciable response in all the treatment groups as compared to untreated control (Fig. 2). The highest response was noticed in Gr-III animals subjected to modified ovsynch protocol. Therefore, it can be inferred from the study that mass oestrus synchronization of infertile dairy animals under field conditions can be a good resort for the improvement of

their reproductive efficiency.

Conclusion

Synchronization of oestrus in dairy animals can be somewhat cumbersome to implement but it is an effective means to augment the reproductive efficiency of a herd and induce oestrus in acyclic or infertile animals. Appropriate nutritional management is another prerequisite for the success of any oestrus synchronization or hormonal treatment protocol. Several oestrus synchronization protocols are

available with variable degree of success and accuracy, choosing which system is best for any herd depends on numerous factors like oestrus-detection efficiency, conception rates, cyclic animals in a herd, availability and cost of hormones, where to implement (organized farm or under field conditions) and the competency of management team to implement the programme.

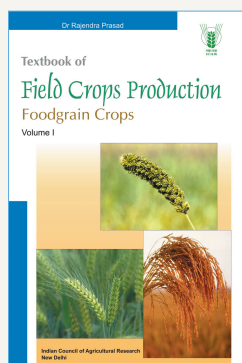
Sometimes, lack of commitment to comply with protocol specifications will usually result in increased cost with little or no

improvement in reproductive performance. Therefore, it is advisable to consult qualified veterinarian and gynaecologist to determine which protocol is most likely to optimize reproductive performance and profitability of a dairy herd.

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(Volume I)



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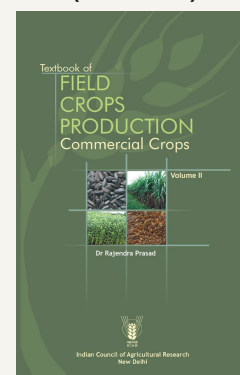
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