



# OVULATION SYNCHRONISATION FOR IMPROVING FERTILITY IN POSTPARTUM DAIRY COWS\*

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## Abstract

The aim of the study was to evaluate the different ovulation synchronisation protocols for improving fertility in postpartum dairy cows. The work was conducted in 28 lactating crossbred cows at University Livestock Farm, Mannuthy starting on day 40 postpartum (day 0) in three experimental and one control group comprising seven cows each. The cows in Group I (Ovsynch group) were administered GnRH on day 0 followed by PGF<sub>2α</sub> on day 7 and a second dose of GnRH on day 9. Cows in Group II (Doublesynch group) were administered PGF<sub>2α</sub> on day 0, GnRH on day 2, a second PGF<sub>2α</sub> on day 9 and a second GnRH on day 11. Cows in Group III (CIDR group) were inserted with CIDR followed by administration of GnRH on day 0. The CIDR insert was removed and PGF<sub>2α</sub> administered on day 7 and a second dose of GnRH on day 9. Timed artificial insemination (TAI) was performed 18 h after the second GnRH injection in all experimental groups. Cows in Group IV (Control group) that showed natural postpartum oestrus after day 0 were inseminated at detected oestrus. Pregnancy diagnosis was conducted 45 days post AI by transrectal palpation. The first service conception rate in animals of groups I to IV were 42.86, 28.57, 42.86, 28.57 per cent and the overall conception rates were 71.43, 71.43, 85.71, 57.14 per cent, respectively. The results demonstrated that the CIDR progesterone insert protocol with highest overall conception

rate was superior to Ovsynch and Doublesynch protocols. However, Ovsynch and Doublesynch protocol had better overall conception rates than control. Hence it is recommended that ovulation synchronisation protocols viz., Ovsynch, Doublesynch and CIDR can be effectively employed for improving the fertility in post partum dairy cows.

**Key words:** Ovulation synchronisation, post partum dairy cows.

Synchronisations of ovulation protocols to improve the fertility of the dairy cows involve programmed follicular development, regression of corpus luteum and sequentially timed artificial insemination. Initially, the Ovsynch protocol was developed as a breeding strategy to eliminate the need for oestrus detection. Later, the controlled internal drug release (CIDR) protocol by inclusion of an exogenous progestogen was developed. Recently, a double synchronisation (Doublesynch) protocol by administering an additional prostaglandin two days before the Ovsynch protocol was developed. All these protocols produced varied success rates. The precise control of the oestrous cycle and ovulation in cattle were achieved only when both, the life span of the corpus luteum and the follicular wave status at the end of the treatment were controlled.

This scenario clearly shows the need for an in depth study of different ovulation

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synchronisation strategies for increasing the reproductive efficiency in dairy cattle. With this objective the present research work using different ovulation synchronisation protocols viz., Ovsynch, Doublesynch, CIDR progesterone insert was conducted.

## Materials and Methods

The study was conducted in 28 lactating crossbred cows at University Livestock Farm, Mannuthy starting day 40 postpartum (day 0) in three experimental and one control group comprising seven cows each.

Experimental animals of Group I (Ovsynch group) were administered Buserelin acetate, a Gonadotrophin Releasing Hormone (GnRH) analogue, 20 µg intra muscular (i.m) on day 0 (Receptal®, Intervet, 10 ml vial) followed by Cloprostenol, a PGF<sub>2α</sub> analogue, 500 µg i.m on day 7 (Cyclix®, Intervet, 2 ml vial) and a second dose of Buserelin acetate 20 µg i.m on day 9.

Animals of Group II (Doublesynch group) were administered PGF<sub>2α</sub> analogue injection on Day 0, GnRH analogue on Day 2, a second PGF<sub>2α</sub> analogue on Day 9 and a second GnRH analogue on Day 11 at the same dose schedule and route mentioned in group I.

Animals of Group III (CIDR group) were inserted with CIDR intra vaginal device (1.38 g progesterone in elastic rubber molded over a nylon spine, EAZI BREED®, Pfizer India Ltd) followed by administration of GnRH analogue on Day 0. CIDR insert was removed and PGF<sub>2α</sub> analogue administered on Day 7 and a second dose of GnRH analogue on Day 9 at the same dose schedule and route mentioned in group I.

TAI was performed 18 h after the second GnRH injection in all three experimental groups. Animals of Group IV (Control group) that showed natural oestrus after 40 days postpartum were inseminated at detected oestrus.

Pregnancy was confirmed in all the groups 45 days post AI by rectal examination. Conception rate with respect of first service and overall conception rate were determined. The overall conception rate was calculated as percentage of animals pregnant in three consecutive AI out of the number of animals treated in each group.

## Results and Discussion

The first service conception rate

observed in animals of experimental groups I to III were 42.86, 28.57 and 42.86, respectively and the corresponding values in control group IV was 28.57 per cent. The overall conception rate observed in this study in animals of experimental groups I to III were 71.43, 71.43 and 85.71, respectively and the corresponding values in control group IV was 57.14 per cent. (Table). Statistical analysis revealed that no significant difference in the first service and overall conception rates among groups.

The first service conception rate was similar in Groups I and III and higher when compared with Group IV whereas the first service conception rate was similar in Group II and Group IV. The overall conception rate was higher in group I, II and III and highest being in group III when compared with Group IV.

The first service conception rate of 42.86 per cent obtained in the Ovsynch group in present study concurred with the findings Vijayarajan *et al.* (2009) who reported conception rate of 50 per cent in postpartum dairy cows. However, relatively higher conception rates of 55 to 90 per cent were reported in cows by Ansari *et al.* (2008) and Sathiamoorthy and Kathirchelvan (2010). On the contrary, lower conception rates of 30 to 40 per cent in cows were reported by Dagli *et al.* (2008) and Ghallab *et al.* (2009). The possible reason for the variation could be the reproductive status or stage of oestrous cycle at the beginning of the protocol in addition to the variations due to nutrition, management, lactation, drug, season, age, breed and species.

The first service conception rates of 28.57 per cent obtained in Doublesynch group concurred with the findings of Cinar *et al.* (2012). However, higher conception rate of 71 per cent was reported by Ozturk *et al.* (2010).

The conception rate of 42.86 per cent obtained in the CIDR group in present study concurred with the findings of Sathiamoorthy and Kathirchelvan (2010) and Cevik *et al.* (2010) who reported 42.74 and 53.3 per cent conception rate, respectively. Contrary to this, higher conception rates of 69 to 80 per cent were observed in dairy cows by Tauck *et al.* (2007) and Aali *et al.* (2008). However, Chenault *et al.* (2003) reported a relatively lower conception rate of 32.7 per cent was recorded in dairy cows.

The highest overall conception rate obtained in CIDR group concurred with the

**Table.** First service conception rates (%) and Overall conception rates (%) in postpartum crossbred dairy cows treated with different ovulation synchronisation protocols

Response to treatment	Group - I (n = 7)	Group - II (n = 7)	Group - III (n = 7)	Group - IV (n = 7)
First service conception rate	42.86	28.57	42.86	28.57
Overall conception rate	71.43	71.43	85.71	57.14

findings of Ammu *et al.* (2012) who reported 83.33 per cent overall conception rates. El-Zarkouny *et al.* (2004); Stevenson *et al.* (2006) and Bollwein and Lüttgenau (2013) reported improved conception rates when CIDR was included in the Ovsynch protocol. On the contrary, Lima *et al.* (2009) reported no difference in conception rates when CIDR was included in the Ovsynch protocol. However, Galvao *et al.* (2004) reported reduced conception rate when CIDR was included in Ovsynch protocol.

The overall conception rate of 71.43 per cent obtained in Ovsynch group concurred with the findings of Ammu *et al.* (2012) who reported 66.66 per cent overall conception rate. On the contrary, lower overall conception rate of 35 to 50 per cent were reported in Ovsynch group by Aali *et al.* (2008) and higher overall conception rate of 90 percent was recorded by Muneer *et al.* (2009) in dairy cows. The overall conception rate of 71.43 per cent obtained in Doublesynch group concurred with the findings Ozturk *et al.* (2010) who reported 72.8 per cent overall conception rate.

Thus, the results demonstrated that the CIDR progesterone insert protocol with highest overall conception rate was superior to Ovsynch and Doublesynch protocols which indicated that inclusion of progesterone during the period between GnRH and PGF<sub>2α</sub> prevented premature ovulation after spontaneous luteolysis during the treatment period in cows whose dominant follicles failed to respond to GnRH. However, Ovsynch and Doublesynch protocol had better overall conception rates than control.

Hence it is recommended that ovulation synchronisation protocols *viz.*, Ovsynch, Doublesynch CIDR can be effectively employed for improving the fertility in post partum dairy cows.

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