

## **SERUM PROGESTERONE LEVELS AND CONCEPTION RATES FOLLOWING FIVE DIFFERENT ESTRUS SYNCHRONIZATION PROTOCOLS IN POSTPARTUM CROSSBRED COWS**

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**Abstract:** Serum peripheral progesterone concentrations in cows treated with different synchronization protocols were estimated. Sixty healthy postpartum crossbred cows were randomly assigned to Double PG, PGP, CIDR + PG, Ovsynch and Ovsynch + CIDR protocols, each group with 12 animals. Pregnancy was diagnosed by rectal palpation 60 days post TAI. Blood samples were taken from the beginning of treatment and at each hormonal treatment until FTAI for progesterone estimation. Pregnancy rates were 33.33, 25.00, 41.67, 50.00 and 58.33 percent for double PG, PGP, CIDR + PG, Ovsynch and Ovsynch + CIDR protocols respectively. The difference in the progesterone concentration among protocols and among different day of treatment was significant.

**Keywords:** Synchronization, post partum crossbred cows, pregnancy rates, progesterone concentration.

## **INTRODUCTION**

The reproductive performance has been declining in dairy cows with increased number of days open (Silvia, 1998) and decreased conception rates. To improve reproductive management and thus profitability in cattle industry various estrus synchronization protocols have been adapted to reduce the time and labor involved in estrus detection and by bringing a large percentage of a group of females into estrus at a predetermined time. Progesterone is important to fertility as demonstrated by a positive correlation between serum progesterone before AI and subsequent conception rate (Folman et al 1990). The objective of the present study was to compare the effect of different estrus synchronization protocols on fertility as well as in vivo progesterone production.

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## MATERIALS AND METHODS

Sixty crossbred cows were randomly assigned to one of the five synchronization protocols double PG (Group I), PGP (Group II), CIDR+PG (Group III), Ovsynch (Group IV) and Ovsynch + CIDR (Group V). The Group I animals received 25 mg of PGF<sub>2α</sub> (Dinoprost tromethamine; Lutalyse, Pfizer limited, Mumbai) and again on day 11. The Group II animals also received same treatment except a GnRH (Buserelin acetate, Receptol, Intervet international GmbH, Germany) on day 3. The Group III animals received a CIDR insert (Eazibreed CIDR, DEC international limited, Hamiltan, Newzealand, each insert contains 1.38 grams of Progesterone) on day 0 and on day 6 injection of PGF<sub>2α</sub> and on day 7 removed CIDR. Group IV animals received a GnRH injection on day 0, PGF<sub>2α</sub> injection on day 7 and a GnRH injection on day 9 and Group V animals received a similar treatment as that of previous except a CIDR between day 0 and day 7. All animals received FTAI 72 hours after the PGF<sub>2α</sub> injection.

Blood samples were collected on each treatment day up to FTAI from 8 animals in each group. The harvested serum was stored at -20<sup>0</sup> c until analysis. Plasma progesterone concentration was determined by ELISA.

## RESULTS

The overall conception rate in Double PG, PGP, CIDR + PG, Ovsynch and Ovsynch + CIDR protocols was 33.33, 25.00, 41.67, 50.00 and 58.33 percent, respectively (Table 1). The difference in the serum progesterone concentration among all the synchronization protocols was significant. (P<0.05) but the difference was not significant between double PG and Ovsynch. Where as these two protocols showed significant difference with PGP, CIDR + PG and Ovsynch + CIDR protocols (Table 2). Similarly, the serum progesterone concentration among different treatment days of synchronization protocol was significant (P<0.05) but the difference was not significant between the day of initiation of treatment and day of administration of PGF<sub>2α</sub> where as both these exhibited significant difference with the concentration of progesterone on the day of TAI.

## DISCUSSION

The improved and highest conception rate observed with Ovsynch + CIDR protocol in this study might be due to significantly higher concentration of progesterone observed on the day of PGF<sub>2α</sub> and the serum progesterone concentration remained elevated for 7 days in the present experiment might have caused synchronization between luteolysis, ovulation and TAI

(Stevenson et al., 2006). Even the higher blood progesterone concentrations during CIDR supplementation preceding insemination might have increased the conception rates without significantly affecting the progesterone concentrations for 2 weeks after insemination (Folman et al., 1990 and Kawate et al., 2004). This supplementation of progesterone with GnRH will significantly reduce the dominant follicle size at the time of PGF<sub>2α</sub> and improve fertility apparently due to the reduced incidence of persistence of follicle (Martinez et al., 2001). It has been suggested that high blood progesterone concentration prior to insemination reduced uterine concentration of PGF<sub>2α</sub> (in response to oxytocin) during the late luteal phase after insemination (Albalancy et al., 2001).

## CONCLUSION

The higher blood progesterone concentrations during CIDR supplementation preceding insemination in Ovsynch protocol might increase the conception rates in post partum crossbred cows.

**Table 1: Conception rate in postpartum crossbred cows after synchronization with different protocols**

| Particulars                        | Double PG | PGP   | CIDR + PG | Ovsynch | Ovsynch + CIDR |
|------------------------------------|-----------|-------|-----------|---------|----------------|
| <b>First Conception rate (%)</b>   | 25.00     | 8.33  | 41.67     | 33.33   | 41.67          |
| <b>Second Conception rate (%)</b>  | 08.33     | 16.67 | 0         | 16.67   | 16.67          |
| <b>Overall Conception rate (%)</b> | 33.33     | 25    | 41.67     | 50      | 58.33          |

**Table 2: Progesterone concentrations (ng/ml) on various days of synchronization treatments by different protocols in postpartum crossbred cows**

| S. No | Particulars | Day of initiation of treatment '0' day | Day of administration of PGF | Day of AI | Cows (12) x 5<br>N = 60 |
|-------|-------------|----------------------------------------|------------------------------|-----------|-------------------------|
|       |             | Mean ± S.E                             |                              |           |                         |
| 1     | Double PG   | 1.48±0.27                              | 1.49±0.18                    | 1.06±0.14 | 1.34±1.21 <sup>a</sup>  |
| 2     | PGP         | 2.02±0.24                              | 2.43±0.20                    | 0.61±0.13 | 1.69±1.21 <sup>b</sup>  |
| 3     | CIDR + PG   | 2.29±0.26                              | 1.95±0.18                    | 1.00±0.16 | 1.75±1.21 <sup>b</sup>  |

|                      |                       |                        |                        |                        |                        |
|----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| 4                    | <b>Ovsynch</b>        | 1.16±0.28              | 1.27±0.20              | 0.95±0.05              | 1.13±1.21 <sup>a</sup> |
| 5                    | <b>Ovsynch + CIDR</b> | 1.98±0.34              | 2.21±0.17              | 0.96±0.17              | 1.71±1.21 <sup>b</sup> |
| Cows (12) x 5 N = 60 |                       | 1.78±0.94 <sup>A</sup> | 1.87±0.94 <sup>A</sup> | 0.91±0.94 <sup>B</sup> | 1.52±1.21              |

Means bearing different superscripts (A, B) within a row differ significantly P < 0.05

Means bearing different superscripts (a, b) within a column differ significantly P < 0.05

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