

Original Research Article

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## Efficacy of Co-Synch *plus* CIDR and Double PG *plus* GnRH Protocols in Repeat Breeder Cows

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### ABSTRACT

#### Keywords

Co-Synch *plus* CIDR protocol, Double PG *plus* GnRH protocol, Oestrus synchronization, Repeat breeder cows, Conception rate

#### Article Info

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The present research was conducted to compare the efficacy of Co-Synch *plus* CIDR *versus* Double PG *plus* GnRH protocol in repeat breeder (RB) cows. A total of 1476 RB cows were selected after thorough gynaeco-clinical examination and were dewormed (Inj.Dectomax® @ 1ml/50kg bodyweight S/C) followed by mineral mixture (Powder Lacton® 50g/day orally) supplementation for 30 days. Then these RB cows were either assigned to Co-Synch *plus* CIDR protocol (n= 614; wherein on day '0':inj. GnRH (Busereline acetate10 µg I/M) and Controlled Internal Drug Release (CIDR) implant was inserted into the vagina and kept *in situ* for 7 days, on day '7': CIDR removed and inj. PGF2α, (Dinoprost Tromethamine 25 mg I/M) was given, day '9': inj. GnRH (Busereline acetate10 µg I/M) and insemination (AI) was done. Further, on the day '10' if any signs of oestrus then, a second AI was done) or Double PG *plus* GnRH protocol (n=862; wherein on day'0': inj. PGF2α (Dinoprost Tromethamine 25mg I/M), oestrus detection from 2<sup>nd</sup> to 5<sup>th</sup> day and insemination was done along with inj. GnRH (Busereline acetate 10 µg I/M), again PGF2α, (Dinoprost Tromethamine 25 mg I/M) was administered on 11<sup>th</sup> day to non-responders and oestrus detection from 13<sup>th</sup> to 16<sup>th</sup> day and insemination was done along with inj.GnRH (Busereline acetate 10 mg I/M). Pregnancy diagnosis was performed on 60<sup>th</sup>-day post-AI by per-rectal examination. The conception rates were found to be 50.97, 36.04 and 11.11 per cent for RB cows of Co-Synch *plus* CIDR protocol and 49.65, 29.87 and 10.75 per cent for RB cows of Double PG *plus* GnRH protocol in first, second and third oestrus cycles respectively, achieving overall conception rate of 63.68 and 56.15 per cent in RB cows of Co-Synch *plus* CIDR protocol and Double PG *plus* GnRH protocol, respectively. It is concluded from the present study that, Co-Synch *plus* CIDR protocol is better than the Double PG *plus* GnRH protocol for the treatment of repeat breeder cows.

### Introduction

Repeat breeding is one of the exasperating reproductive disorders of cows and buffaloes, which results in heavy economic loss to dairy farmers. The incidence of repeat breeding has

been reported to be ranging from 5 to 30 per cent (Bartlett *et al.*, 1986; Moss *et al.*, 2002 and Yusuf *et al.*, 2010). The incidence of repeat breeding was far higher in crossbred cattle (17.57 %) as compared to buffaloes (12.74 %) and indigenous cattle (8.64 %). The

incidence of repeat breeding in India has been reported from 19.19 (Karwani and Sharma, 2003) to 45.15 per cent (Kumar *et al.*, 2010) in cattle.

Generally, oestrus synchronization is achieved by two approaches. The first approach is by controlling the luteal phase of the cycle either through the administration of prostaglandins (Brito *et al.*, 2002) or by using progesterone analogues (Rensis *et al.*, 2005). However, the prostaglandins have limitation like it would work only if a corpus luteum is present (Chohan, 1998; Brito *et al.*, 2002).

Controlled Internal Drug Release (CIDR) is another most recent hormone device available where progesterone is released from CIDR at a controlled rate into the bloodstream of the animal through the vagina and suppresses oestrus and ovulation throughout its duration *in situ* (Lucy *et al.*, 2001). The CIDR device was developed by Macmillan *et al.*, 1991 and it is well adopted in synchronizing oestrus consistently, which has resulted in high pregnancy rates in cattle regardless of the stage of the oestrus cycle. This CIDR can be used in combination with other hormones to synchronize oestrus in cows and buffaloes (Lamb, 2010). Therefore, the present research work was undertaken to compare the efficacy of Co-Synch *plus* CIDR protocol versus Double PG *plus* GnRH protocol in repeat breeder cows.

## Materials and Methods

The research was conducted under field conditions in the selected villages of Bidar district in collaboration with the Department of Animal Husbandary & Veterinary Services, Bidar and Department of Gynaecology and Obstetrics, Veterinary College, Bidar, Karnataka state, India from August 2016 to December 2018. Geographically, Bidar district is located in

North Interior Karnataka at 17° 35' to 18° 25' North latitude and 76° 42' to 77° 39' East longitudes at an elevation of 640 to 715 meters above the mean sea level.

## Selection of repeat breeder cows

The gynaeco-clinical health check-up camps were conducted and repeat breeder cows were selected from five talukas of Bidar district after ruling out infectious infertility, anatomical defects and any other pathological conditions. A total of 1476 repeat breeder cows were selected and were dewormed (Inj.Dectomax® @ 1ml/50kg bodyweight S/C) and supplemented with mineral mixture powder (Lacton® 50g/day orally) for 30days. Then, repeat breeders were assigned randomly either Co-Synch *plus* CIDR protocol or Double PG *plus* GnRH protocol under controlled breeding. The various veterinary products used for the present study are listed in Table-1.

## Co-Synch *plus* CIDR protocol

Controlled Internal Drug Release (CIDR) was inserted intravaginally and kept *in situ* for 7 days and injection of GnRH (Busereline acetate 10µg I/M), PGF2α (Dinoprost Tromethamine 25 mg I/M) and Fixed Time Insemination (FTAI) was carried out as shown in the flow chart (Figure 1).

## Double PG *plus* GnRH protocol

Administration of the first PGF2α (Dinoprost Tromethamine 25mg I/M), oestrus detection, insemination and injection GnRH (Busereline acetate 10 µg I/M), second PGF2α, (Dinoprost Tromethamine 25 mg I/M) given on 11<sup>th</sup> day to non-responders and insemination and injection GnRH (Busereline acetate 10 mg I/M) was carried out as depicted in the flow chart (Figure 2).

### Conception rate and fertility

All the inseminated cows were monitored regularly and those cows which did not return to oestrus between 18-24 days post-AI were subjected to pregnancy diagnosis by rectal palpation after 60 days of insemination. First, second and third service conception rates were calculated separately for cows by the percentage of cows found pregnant out of total cows inseminated at first, second or third oestrus. Overall conception rate was calculated by the percentage of cows found pregnant out of the total number of cows inseminated at first, second and third oestrus. Conception rate was calculated in percentage and Chi-square analysis was done for conception rate between first, second and third oestrus cycle's inseminations in Co-

Synch *plus* CIDR and Double PG *plus* GnRH protocol for fertility.

### Results and Discussion

The repeat breeder cows of Co-Synch *plus* CIDR oestrus synchronization protocol showed 100 % (n=614) oestrus response and conception rate was 50.97, 36.04 and 11.11 per cent in first, second and third oestrous cycles with an overall conception rate of 63.68 per cent. Similarly, repeat breeder cows of Double PG *plus* GnRH oestrus synchronization protocol also showed 100 per cent (n=862) oestrus response. However, conception rate was lower at 49.65, 29.87 and 10.75 per cent in first, second and third oestrous cycles, respectively with an overall conception rate of 56.15 per cent. (Table 2).

**Table.1** Drugs and products used for controlled breeding programme in bovines

| Sl. No. | Name of the product                        | Composition  |
|---------|--|--|
| 1       | Inj.: Dectomax <sup>®</sup>                | Doramectin 10mg/mL   |
| 2       | Powder: Lacton <sup>®</sup>                | Each 100g contain:<br>Niacin: 30mg<br>Sulphur: 200mg<br>Iron: 200mg<br>Calcium Lactate: 12.5g<br>Sodium Lactate: 12.5 g<br>Sodium Propionate: 12.0g<br>Base fortified with live yeast cells as QS. |
| 3       | Inj.: Gynarich <sup>®</sup>                | Busereline acetate (GnRH analogue)<br>4µg/mL   |
| 4       | Inj.: Lutalyse <sup>®</sup>                | Dinoprost Tromethamine<br>5mg/mL   |
| 5       | EAZI-BREED CIDR <sup>®</sup> Cattle Insert | Progesterone, 1.38 gram per each EAZI-BREED CIDR Cattle Insert.  |

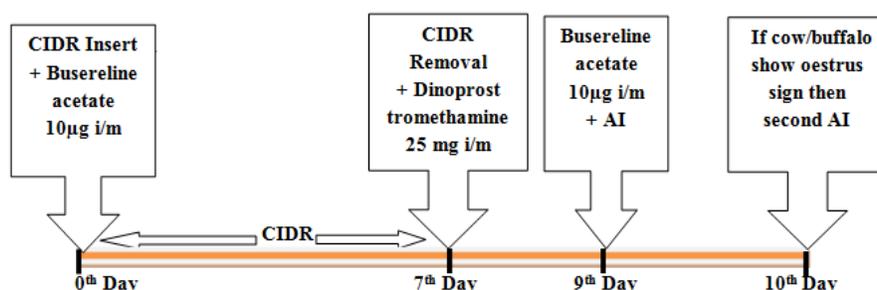
**Table.2** Efficacy of Co-Synch *plus* CIDR protocol and Double PG *plus* GnRH protocol oestrus synchronization on fertility in repeat breeder cows

| Protocol                            | Oestrus response % | Conception rate ( %) |               |               |                         | Overall        |
|-------------------------------------|--------------------|----------------------|---------------|---------------|-------------------------|----------------|
|                                     |                    | First cycle          | Second cycle  | Third cycle   | Chi-square value and df |                |
| Co -Synch <i>plus</i> CIDR (n= 614) | 100                | (313)<br>50.97       | (71)<br>36.04 | (7)<br>11.11  | 13.9**, 2               | (391)<br>63.68 |
| Double PG <i>plus</i> GnRH (n=862)  | 100                | (428)<br>49.65       | (46)<br>29.87 | (10)<br>10.75 |                         | (484)<br>56.15 |

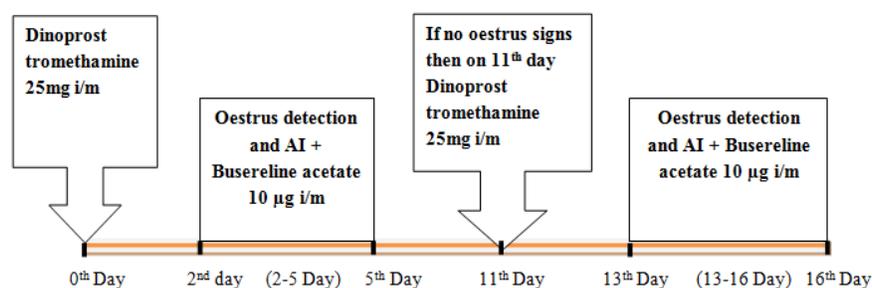
Note: The values in the parentheses indicates number of cows

\*\* Highly significant at p< 0.01

**Fig.1** Co-Synch + CIDR protocol



**Fig.2** Double PG + GnRH protocol



The conception rate for Co-Synch *plus* CIDR treated repeat breeder cows in first, second and third estrous cycle’s compared to Double PG *plus* GnRH treated repeat breeder cows was highly significant (p<0.01) and further, the overall conception rate for Co-Synch + CIDR was higher (63.68 %) compared to Double PG + GnRH treated repeat breeder cows (56.15 %).

Comparable to the present study, Jayaganthan *et al.*, (2016) in repeat-breeding crossbred Jersey cows used Ovsynch alone or Ovsynch *plus* CIDR and compared with control and reported pregnancy rate of 54.54, 72.72 per cent and 27.27 per cent, respectively. Sarath *et al.*, (2019) also reported conception rate of 69.32 per cent in Jersey crossbred repeat breeder cows with progesterone impregnated

intra-vaginal device (TRIU-B, Virbac, India)-cloprostenol sodium- protocol. In addition, Rajkumar *et al.*, (2018) recorded first service conception rate in CIDR+PGF2 $\alpha$  treatment group as 58.33 per cent whereas, 33.33 per cent in control group in repeat breeding crossbred Jersey cows. In contrast, Kim *et al.*, (2007) recorded lower pregnancy rate of 18.5 and 32.1 per cent in repeat breeder cows using CIDR-oestradiol benzoate + progesterone-PG- oestradiol benzoate and CIDR-GnRH-PG-GnRH protocols, respectively. El-Tarabany and Al-Marakby (2018) also recorded poor pregnancy per AI at 28 days post insemination as 28.75 per cent in multiparous repeat breeder Holstein cows using CIDR synch protocol.

Present study findings for Double PG *plus* GnRH protocol are line with Parmar *et al.*, (2015) who recorded pregnancy rate in repeat breeding cows (n=10) at first service and overall pregnancy rate as 40 and 60 per cent, respectively for mid-cycle PGF2 $\alpha$  protocol, further Ghuman *et al.*, (2012) recorded the first service conception rate of 66.7 per cent for repeat-breeder crossbred dairy cows with a prostaglandin F2 $\alpha$ -gonadotrophin releasing hormone (PGF2 $\alpha$ -GnRH) fixed-time artificial insemination (AI) protocol at the late luteal phase.

The prolonged exogenous progesterone priming from CIDR device might have caused negative feedback effect on hypothalamic-hypophyseal-gonadal axis and increased receptors for gonadotrophin on the ovaries followed by rebound on its sudden withdrawal causing stimulated FSH secretion, folliculogenesis and ovulation which has resulted in the higher conception rate with CIDR protocol (Naikoo *et al.*, 2016). Further, it can be concluded from the study that Co-Synch *plus* CIDR protocol is better than Double PG *plus* GnRH protocol for the treatment of repeat breeder cows.

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