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Efficacy of Co-Synch Plus CIDR Oestrus Synchronization Protocol on Fertility in Anoestrus Cows and Buffaloes

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A B S T R A C T

A total of 800 anoestrus cows and 671 anoestrus buffaloes 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 cows and buffaloes were assigned to Co-Synch *plus* CIDR protocol 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 day '10' if any signs of oestrus then, a second AI was done. Pregnancy diagnosis was performed on 60th day of post-AI by per-rectal examination. The conception rates were found to be 53.50, 23.68 and 07.69 per cent for cows and 53.35, 19.34 and 10.58 per cent for buffaloes in first, second and third oestrous cycles respectively, achieving overall conception rate of 64.25 and 62.89 per cent in anoestrus cows and buffaloes, respectively. It is concluded from the present study that, Co-Synch + CIDR protocol can improves the reproductive efficiency in both anoestrus cows and buffaloes.

Introduction

When we look at dairy cows and buffaloes, the reproductive diseases are the most vulnerable problems that incidentally coincide with the reduction of milk production, prolonged uterine involution, resumption of ovarian activity, conception and greater risk to infection (Robert 2000), leading to a reduced profit in the dairy farm. The goal of dairy farms is to get one calf every year, which depends upon the normal function of the reproductive system. The functional ovaries, display estrous behavior, ability to mate, conceive, sustain the embryo through gestation, calve, resume estrous cyclicity and restore uterine function after calving are critical for a cow or buffaloe. Each of these aspects of reproductive function can be affected by management, disease and the genetic make-up of the animal. When the function of reproductive system is impaired, cows or buffaloes fail to produce a calf regularly (Arthur *et al.*, 1996, Noakes *et al.*, 2009).

Reproductive problems of dairy cows and buffaloes can be classified as before gestation (anoestrous and repeat breeding), during gestation (abortion, vagina prolapse and dystocia) and after gestation (retained fetal membrane, pyometra, metritis and uterine prolapse (Lobago *et al.,* 2006). In India, the incidence of anoestrus was reported from 2.13 to 67.11 per cent for indigenous cattle, 9.09 to 82.50 per cent for buffaloes and for cross bred cattle it is 2.55 to 40.4 per cent (Kumar *et al.,* 2014). Incidence of anoestrus is higher in adult cattle and buffaloes than the heifers (Bharkad and Markandeya, 2003).

To improve reproductive efficiency, several protocols of oestrus synchronization have been developed. Exogenous hormonal administration has been used to treat cows with problem of anoestrus and repeat-breeding (Rhodes *et al.,* 2003; Lucy *et al.,* 2004; Honparkhe *et al.,* 2008; Hailu *et al.,* 2015). One of the most classical and widely used hormone protocols for the induction of ovarian cyclicity was described by Pursley *et al.,* (1995) named as Ovsynch. Controlled Internal Drug Release (CIDR) is another most recent hormone protocol available where progesterone is released from CIDR at a controlled rate into the bloodstream of the animal through 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 that has resulted in high pregnancy rates in cattle regardless of the stage of the estrous 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 study the efficacy of Co-Synch *plus* CIDR protocol in anoestrus cows and buffaloes.

Materials and Methods

Area of study

The study was conducted under field conditions at 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 17^0 35' to 18^0 25' North latitude and 76^0 42' to 77^0.39' East longitudes at an elevation of 640 to 715 meters above the mean sea level.

Selection of anoestrus cows and buffaloes

The gyneco-clinical health check-up camps were conducted and cows and buffaloes not showing oestrus signs for more than 3 months were selected after ruling out early pregnancy, infectious infertility, anatomical defects and any other pathological conditions. All the animals were dewormed (Inj. Dectomax®@ 1mL/50kg bodyweight S/C) and supplemented with mineral mixture (Powder Lacton® 50g/day orally) for 30days. During this period, if oestrus signs were observed, then they were inseminated and excluded from the study group. The anoestrus cows (n=800) and buffaloes (n=671) which did not show any oestrus signs during this period were assigned to Co-Synch *plus* CIDR protocol.

Co-Synch *plus* CIDR protocol

Controlled Internal Drug Release (CIDR) was inserted intravaginally and kept it *in situ* for 7 days and injection of GnRH (Busereline acetate), PGF2α, (Dinoprost Tromethamine) and Fixed Time Insemination (FTAI) was carried out as shown in flow chart (Figure 1) and various veterinary products used for the present study are mentioned in Table 1.

Conception rate

All the inseminated cows and buffaloes were monitored regularly and those cows and buffaloes 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 and buffaloes by the percentage of cows/buffaloes found pregnant out of total cows/buffaloes inseminated at first, second or third oestrus. The overall conception rate was calculated by the percentage of cows and buffaloes found pregnant out of the total number of cows and buffaloes inseminated at first, second and third oestrus.

Results and Discussion

The oestrus response was 100 per cent (n=800) with conception rate of 53.50, 23.68 and 07.69 per cent in first, second and third estrous cycles with an overall conception rate of 64.25 per cent in post-partum anoestrus cows of Co-Synch *plus* CIDR oestrus synchronization protocol.

Table.1 Drugs and products used for controlled breeding programme in cows and buffaloes

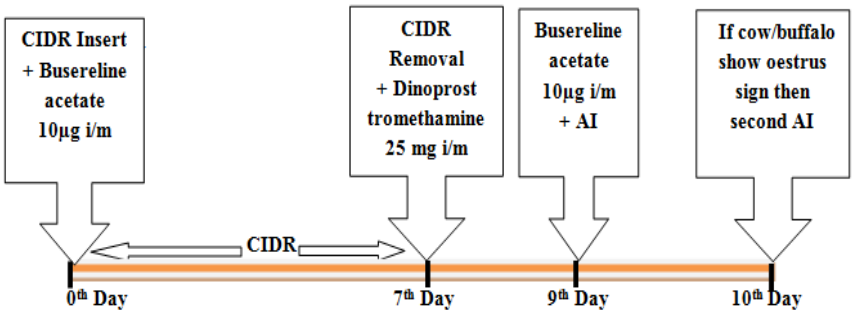
Sl. No.	Name of the product	Composition
1	Inj.: Dectomax®	Doramectin 10mg/mL
2	Powder: Lacton®	Each 100g contain: Niacin: 30mg Sulphur: 200mg Iron: 200mg Calcium Lactate: 12.5g Sodium Lactate: 12.5 g Sodium Propionate: 12.0g Base fortified with live yeast cells as QS.
3	Inj.: Gynarich®	Busereline acetate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

Table.2 Efficacy of Co-Synch *plus* CIDR oestrus synchronization on fertility in anoestrus cows and buffaloes

Number of animals	Oestrus response %	Conception rate (%)			
		First cycle	Second cycle	Third cycle	Overall
Cows (n=800)	100	(428) 53.50	(81) 23.68	(5) 07.69	(514) 64.25
Buffaloes (n=671)	100	(358) 53.35	(53) 19.34	(11) 10.58	(422) 62.89

Note: The values in the parentheses indicates no of animals

Fig.1 Co-Synch + CIDR protocol



Similar to the present study, Bhoraniya *et al.*, (2012) and Ramalakshmi (2015) used different hormonal protocols in post-partum anestrous Kankrej and crossbred cows, respectively and reported similar conception rates. In contrast, Dhami *et al.*, (2015) reported higher overall of three cycles as 80.00, 80.00 and 70.00 per cent conception rates at induced oestrus by CIDR, Ovsynch, and Norgestomet ear implant protocols in cows, whereas Naikoo *et al.*, (2016) recorded lower overall conception rate as 33.33, 50.00 and 33.33 per cent by using Ovsynch, CIDR and Ovsynch + CIDR treatment protocols with FTAI in post partum anoestrus Kankrej cows respectively and concluded that Ovsynch and CIDR protocol resulted in better oestrus expression and fertility as compared to their combination. Sah *et al.*, (2019) recorded conception rate as 00.00, 14.30 and 12.50 per cent with CoSynch + CIDR, OvSynch + CIDR and CIDR + PGF2α protocols respectively in Jersey crosses and Holstein crosses anestrous cows (Table 2).

In present study for buffaloes, the oestrus response was 100 per cent (n=671) with conception rate of 53.35, 19.34 and 10.58 per cent in first, second and third estrous cycles with an overall conception rate of 62.89 per cent in anoestrus buffaloes of Co-Synch + CIDR oestrus synchronization protocol.

The present research findings are in line with Kundulkar *et al.*, (2016) who observed first service conception rate of 50.00 and 62.50 per cent in lactating post partum anoestrus buffaloes by Ovsynch and Ovsynch +CIDR protocols, respectively. Parmer *et al.*, (2017) recorded conception rates of 33.33 and 28.57 per cent at induced oestrus and overall conception rates as 66.66 and 57.14 per cent

in true anoestrus buffaloes treated for CIDR and Ovsynch protocol, respectively. Further, their study indicated that hormonal therapies used particularly CIDR and Ovsynch protocols improved conception rates in anoestrus buffaloes under field conditions. In addition, Patel *et al.,* (2018) recorded conception rate at induced oestrus as 27.30, 27.30, 18.20 and 45.40 per cent with an overall conception rate of three cycles as 63.60, 54.50, 63.60 and 81.80 per cent which were much higher than control anoestrus buffaloes (18.20 %) by using Doublesynch, Estradoublesynch, Triu-B/PRID, PRID + PMSG and untreated control, respectively. Prasad *et al.,* (2019) also recorded conception rate as 60, 50 and 33 per cent in postpartum anoestrous graded Murrah buffaloes by using Ovsynch, double PG protocol (sub-estrus), and normal cyclic without any hormonal interventions, respectively. Similarly, Narote *et al.,* (2019) recorded first service conception rate as 44.44, 37.50, 44.44, 37.40, 40.00 and 33.33 per cent respectively. Overall conception rate recorded as 77.77, 75.00, 88.88, 87.50, 70.00 and 88.88 per cent and pregnancy rate recorded as 58.33, 50.00, 66.66, 58.33, 58.33 and 66.66 per cent in anestrous buffaloes in CIDR-7-PG, CIDR-9-PG, CIDR-7-PG-GnRH-AI, CIDR-9-PG-GnRH-AI, CIDR-7-PG-GnRH-insert, CIDR-9-PG-GnRH-insert, respectively.

In contrast, Rensis *et al.,* (2005) reported lesser conception rate of 4.70 and 30.00 per cent in Ovsynch and Ovsynch with the supplementation of progesterone from days 0 to 7 in non-cyclic Mediterranean Italian buffaloes, respectively. Azawi *et al.,* (2012) also recorded pregnancy rate of 5.00 and 31.80 per cent in postpartum anoestrus buffaloes using GnRH-PG-GnRH and GnRH-CIDR-PG-GnRH Protocols.

However, higher first service conception rate of 83.30 per cent in 54 anestrous buffaloes suffering from ovarian inactivity with the treatment regime of CIDR 7-PG-GnRH was recorded by Zaabel *et al.,* (2009). Naikoo *et al.,* (2010) also observed pregnancy rate of 50.00 in Ovsynch, 50.00 in CIDR and 83.33 per cent in Ovsynch-CIDR respectively protocols in postpartum anestrous Mehsana buffaloes during breeding season. Similarly, Nakrani *et al.,* (2014) recorded overall conception rates of 66.67, 73.33 and 60.00 per cent in anoestrus buffaloes in CIDR, Ovsynch and Crester protocols respectively. In addition, Savalia *et al.,* (2014) reported overall conception rate of three cycles as 70.00 and 60.00 per cent at induced oestrus for CIDR and Ovsynch groups respectively in true anestrous buffaloes in CIDR or Ovsynch protocols. Vikash *et al.,* (2014) also reported higher conception rate and pregnancy rate as 81.26 per cent in anoestrus buffaloes with CIDR-GnRH combination. In addition, Ghallab and Noseir (2016) recorded conception and pregnancy rates as 72.20 and 65.00 per cent in post partum anoestrus Egyptian buffaloes with CIDR-PG protocol. Similarly, Savani *et al.,* (2017) recorded conception rates of 66.66 and 50.00 per cent at induced oestrus and overall conception rates as 75.00 and 66.66 per cent in anoestrus Surti buffaloes treated with Ovsynch and Ovsynch + PRID protocol respectively.

It is concluded from the present study that Co-Synch *plus* CIDR protocol improves the reproductive efficiency of cows and buffaloes as observed with enhanced conception rates in first, second and third service along with overall conception rates of 64.25 and 62.89 per cent in anoestrus cows and buffaloes.

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