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Improvement of Fertility in Postpartum Anoestrus Buffaloes by using Different Hormonal Protocols during Non Breeding Season

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Abstract

The study was conducted on 40 postpartum anooestrus buffaloes randomly divided into four equal groups during non-breeding season. The buffaloes were selected based on ovarian inactivity, good body condition score and overall good health. Group I was administered Ovsynch protocol + Progesterone impregnated intravaginal device (PRID). Group II was administered PRID which was removed on 7th day and GnRH 10 µg i/m was given on day of AI. Group III was administered Ovsynch protocol and Group IV was kept as untreated control. 100, 80, 80 and 00 % animals responded in groups I, II, III and IV respectively. Fix timed AI was performed in all responded buffaloes. Calcium, phosphorous, cholesterol and protein level increased ($p<0.05$) in respect of pregnant animal than the non-pregnant animals, the rise was more in Group I than the other Groups.The conception rate was found to be 70.00, 50.00, 62.50 and 00.00 % in Group I, II, III and IVrespectively. The overall conception rate was observed to be significantly higher in Group I, i.e., Ovsynch + PRID followed by Group III, i.e. Ovsynch protocol alone in postpartum anooestrus buffaloes during non-breeding season. It can be concluded that ovsynch with progesterone based protocol is very effective for oestrus induction and improved conception rate in postpartum anooestrus buffaloes during non breeding season.

Key words: Buffaloes, Anooestrus, Hormonal protocol, Fertility improvement.

Introduction

Anooestrus with inactive ovaries is one of the most commonly occurring reproductive disorders in buffaloes particularly during summer stress (Phogat *et al.,* 2016). Ovarian inactivity is more frequent (30%) in buffaloes on low level of feeding than in those given high level of feeding and also in summer (41-46%) than in other seasons (7-33%). Progesterone based treatment regimens (PRID, CIDR, Crestar, Progesterone injections) either alone or in combination with gonadotrophins are proved to be very effective in inducing ovarian activity in summer anooestrus buffaloes (Presicce *et al.* 2005). The mechanism derived out of the treatments seemed to be the induction of follicle turnover by increased serum progesterone that sensitizes the hypothalamus and pituitary to the gonadal feedback. The aim of this study was to evaluate the improvement of fertility in postpartum

anooestrus buffaloes by using different hormonal protocols during non breeding season.

Materials and Methods

Anooestrus buffaloes (n=40) were selected on the basis of ovarian inactivity, body condition score and health status during the non breeding season. Inactive ovaries without any palpable ovarian structures were confirmed by per rectal examinations thrice on alternate day along with real time B mode ultrasonography. All the selected buffaloes were administered anthelmentic treatment followed by mineral mixture @ 50 g/day/animal.The buffaloes were randomly divided into four equal groups. Group I was treated with standard Ovsynch protocol (GPG) + Progesterone impregnated intravaginal device (PRID) for 7 days. Group II was treated with PRID for 7 days and GnRH 10 µg i/m on day 10 (FTAI). Group III was treated with Ovsynch protocol alone and Group VI was kept as untreated control. Ooestrus detection was carried out by using oestrual discharge examination and by regular per rectal examination. The animals in oestrus were bred by at fix timed AI.

Blood samples were collected from all experimental buffaloes before and after treatment for estimation of serum biochemical constituents (total protein, cholesterol, calcium and phosphorous) using autoanalyzer (Model ABX Micros ESV60, HORIBA Medical, Japan). Pregnancy diagnosis was confirmed by rectal palpation. The data were analyzed statistically (Panse and Sukhatme, 1954).

Results and Discussion

Oestrus induction and conception rate

The ooestrus induction response in postpartum anooestrus buffaloes during non-breeding season was observed to be 100, 80 and 80 in Group I, II and III%, respectively. The results of Ooestrus induction and conception rate is presented in Table 1. The animals exhibited oestrus within 24 to 60 hrs, which concurred with Harendra Kumar and Mandape (2004). The mean oestrus induction rates using CIDR+ Ovsynch FTAI protocols were 95.74±2.87% (Vikash *et al.*, 2016) to100.00% (Baruselli *et al.,*2007) in anooestrus buffaloes during breeding season by combining CIDR with Ovsynch protocol. The main action of GnRH used at the start of progesterone treatment is to synchronize emergence of a new cohort of follicles (Rhodes *et al.,* 2003). The second injection of

Table 1: Efficacy of various hormonal protocols on oestrus induction and conception rate in postpartum anoestrous buffaloes during non breeding season

Sr. No.	Parameter	Observations			
		Group I	Group II	Group III	Group IV
1	No. of animals under trial	10	10	10	10
2	No. of animals responded	10 (100%)	8 (80%)	8 (80%)	0
3	Onset of oestrus after treatment (hrs)	24	58.2	19.2	0
4	Duration of oestrus (hrs)	19.60±0.54	15.20±2.55	14.25±2.39	0
5	Conceptions				
	1^{st}oestrus	30%	12.50%	25%	0
	2^{nd}oestrus	29%	28.57%	16.66%	0
	3^{rd}oestrus	40%	33.33%	40%	0
6	Overall Conception rate	7 (70%)	4 (50%)	5 (62.50%)	0
7	Services per conception	2.8	4.5	3.8	0
8	Establishment of cyclicity (%)	93.33%	92.00%	100%	0

Group I= Ovsynch + PRID; Group II= PRID +GnRH; Group III= Ovsynch alone; Group IV = Untreated control

GnRH has the additional effect of inducing ovulation and the formation of corpus luteum in a majority of animals, resulting in elevated concentrations of progesterone. However, the induced ovulation in non-cyclic animals stimulated luteal tissue development and function resulting in the occurrence of cyclic activity (Bao *et al.,* 2003).

Vikash *et al.* (2016) observed oestrus induction rate of 98.20±1.80% using CIDR-GnRH protocol and 100.00 % with Ovsynch alone. Ingawale *et al.* (2007) and Kumar *et al.* (2012) also found Ovsynch alone to be capable of inducing cyclicity in an oestrus buffaloes. The PRID and ovsynch oestrus synchronization protocols by substitution of the second GnRH with hCG were successfully used for therapy of Bulgarian Murrah buffaloes with inactive ovaries during the low breeding season (Yotov *et al*., 2012). Thorat *et al.* (2012) showed induction of ooestrus and conception rate to be 87.50 and 85.71 % respectively with Ovsynch protocol in Marathwadi buffaloes.

In the present study, the conception rates in postpartum anooestrus buffaloes during non breeding season were found to be 70.00, 50.00 and 62.50 % in Group I, II and III respectively. The conception rates using CIDR+Ovsynch, CIDR-GnRH and Ovsynch alone with FTAI are reported to be 74.43±9.16, 81.26±8.46 and 68.02±8.59 %, respectively in buffaloes (Vikash *et al*., 2016). The differences in conception rates in the present study as compared to the others could be due to the season of experimentation; high breeding season favors the higher oestrus induction and conception rates in buffaloes.The use of progesterone-based protocols during the non breeding season allows the insemination and induction of pregnancy in animals that would otherwise be non-productive (De Rensis and Lo´pez-Gatius, 2007).

Serum mineral and biochemical profile

In the present study, there were no significant (P<0.01) differences between three treatment groups for serum calcium and phosphorous content. Group I had little higher average calcium than Group II and III, whereas Group II had little more phosphorous than Group I and III in pregnant and non-pregnant buffaloes. The results of level of serum mineral and biochemicals are presented in Table 2. Similar findings were reported by Mungad *et al.* (2016), Nakrani *et al.* (2014) and Buchecha *et al.* (2016) in buffaloes under hormonal protocols. The overall averages of calcium, phosphorous, total protein and total cholesterol increased in respect of pregnant animals than the non-pregnant animals (P<0.05), and that the Group I had greater differences (P<0.01) than the other Group. Savalia *et al.* (2014) recorded that CIDR was better than Ovsynch protocol in inducing fertile oestrus in an oestrus buffaloes and all four treatment protocols significantly influenced plasma P_4 profile, but not the protein or cholesterol, whereas De Rensis and Lo´pez-Gatius (2007) stated that buffaloes

Table 2:Effect of hormonal protocols on serum mineral and biochemical profile in postpartum anoestrous buffaloes during non breeding season

Parameters	Group I		Group II		Group III		Group IV	
	Before	After	Before	After	Before	After	Before	After
Calcium	8.48 ± 0.26	9.05 ± 0.34*	8.29 ± 0.24	8.84 ± 0.30**	8.23 ± 0.28	9.19 ± 0.42*	8.48 ± 0.36	8.48 ± 0.36
Cholesterol	100.40 ± 6.58	108.58 ± 6.58*	96.49 ± 4.79	98.71 ± 6.63	95.03 ± 4.79	106.30 ± 7.25**	104.31 ± 7.56	98.53 ± 4.66
Phosphorous	5.64 ± 0.16	6.25 ± 0.12**	5.57 ± 0.16	6.00 ± 0.18**	5.55 ± 0.16	5.64 ± 0.15	5.06 ± 0.14	5.30 ±0.05
Protein	6.21 ± 0.27	6.89 ± 0.29**	6.46 ± 0.25	6.83 ± 0.19	6.68 ± 0.06	6.27 ± 0.10**	6.17 ± 0.29	6.36 ± 0.22

Note:-*indicate significance at 5% (p<0.05) and **indicate significance at 1% (p<0.01)

respond well to the exogenous administration of hormones, and AI is possible at a pre-determined time after synchronizing ovulation. Most combined hormone protocols give satisfactory pregnancy rates, comparable to those achieved in animals inseminated at natural oestrus. Progesterone-based protocol was also reported superior to ovsynch for synchronization of ovulation and subsequent conception rate in buffalo exhibiting suboestrus during the low breeding period (Ghuman *et al.,* 2014).

The overall conception rate was observed to be significantly higher in postpartum anoestrous buffaloes with Ovsynch + PRID followed by ovsynch protocol during non breeding season. It can be concluded that a combination of protocols, i.e. Ovsynch + PRID is effective and promising remedy for the postpartum anooestrus buffaloes during non breeding season.

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