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SHORT COMMUNICATION

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Estrus response and fertility rate in Kundhi buffaloes following estrus synchronization in breeding season

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ABSTRACT

The aim of the present study was to compare the effect of two estrus synchronization treatments *i.e.*, Ovsynch alone and Ovsynch plus Controlled Internal Drug Release (CIDR), on the occurrence of estrus and conception rate in Kundhi buffalo during breeding season in Pakistan. Forty Kundhi buffaloes were randomly selected and were divided into three groups; Group A (n=16; Ovsynch) received 2 mL GnRH intramuscularly (i/m) on day 0 and 9. On day 7, 5 mL prostaglandin F2α (PGF2α analogue) was administered through i/m route. The buffaloes of Group B (n=17; Ovsynch+CIDR) received 2 mL GnRH on day 0 along with implantation of CIDR. On day 7, the CIDR was removed, and 5 mL PGF2α analogue was injected through i/m route. A second dose of GnRH was administered through i/m route after 48 h of PGF2α inj. in both groups. Group C (n=7; control) received 2 mL normal saline through i/m route on day 0, 7 and 9. The buffaloes of all three groups were artificially inseminated twice (12 h and 24 h after the second GnRH inj.) using frozen-thawed semen. Estrus response differed significantly ($P<0.05$) among the groups. The animals of Group B (76.47%) showed superior estrus response as compared to others. Higher conception rate (52.94%) was observed in the animals of Group B; however, the difference was not significant. In conclusion, Ovsynch+CIDR causes to occur better estrus response and conception rate as compared to Ovsynch alone in Kundhi buffaloes during breeding season.

Keywords

Buffaloes, Conception rate, Estrus incidence, Estrus synchronization

ARTICLE HISTORY

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INTRODUCTION

Low reproduction potential of buffalo has been a major concern for decades (Kumar et al., 2014). This is thought to be because of late maturity, poor expression of estrus, variable estrus duration, and prolonged intercalving interval. Several attempts have been made to improve the reproductive performance of buffalo. Estrus synchronization offers the opportunity to induce estrus increasing the fertility, which reduces the intercalving period. Several methods of estrus synchronization have been developed in bovine (Yusuf et al., 2010; Ahmad et al., 2011). Most commonly used estrus/ovulation synchronization protocols include progesterone, prostaglandin F2α (or PGF2α analogs), and estrogens alone or in assorted combinations (Stevenson et al., 2012; Paul et al., 2015).

Use of GnRH in synchronization of estrus causes ovulation or luteinization of large follicles present in the ovary, and subsequently synchronizes the recruitment of new follicular wave (Mehmood et al., 2012). Administering the first GnRH in absence of a dominant follicle leads no Corpus Luteum (CL) at the day of PGF2α inj., which may cause estrus around the day of PGF2α inj. ((Islam, 2011; Ghosh et al., 2012). Therefore, administration of exogenous progesterone during the period between GnRH and PGF2α is suggested by Cerri et al. (2009). Ravikumar et al. (2011) reported that Controlled Internal Drug Release (CIDR)-based Ovsynch or fixed timed AI (FTAI) protocols using either GnRH or GnRH yielded pregnancy rates

as higher than the absence of a CIDR. Involving CIDR in the protocol prevented the onset of premature estrus (Khumran et al., 2012), and a CL with normal life-span was formed following CIDR removal. Inclusion of CIDR in a protocol to synchronize ovulation suppressed estrus during CIDR insertion, thereby allowing a 100% submission rate for TAI without affecting fertility (Rivera et al., 2005).

Very little information exists regarding the effectiveness of different estrus synchronization protocols with Kundhi buffalo. Therefore, this study was designed to investigate the estrus response and FTAI pregnancy rate of Kundhi buffaloes using different estrus synchronization protocols.

MATERIALS AND METHODS

Animals and management: A total of 40 Kundhi buffaloes of 1st to 5th parity were randomly selected for this study. The buffaloes were housed in the Kundhi Buffalo Farm Rohri and its surrounding areas. The buffaloes were managed on semi-intensive management conditions. All the animals were confirmed as non-pregnant by rectal palpation before starting the experiment. The routine feeding and drinking practices of the farm were observed during this study.

Experimental design: The animals were distributed into three groups *i.e.*, Group A (Ovsynch; n=16), Group B (Ovsynch+CIDR; n=17) and Group C (Control; n=7). On day 0, the buffaloes of Group A received i/m inj. of 2 mL GnRH analogue (25 µg lecirelin acetate; Delmarelin®, FATRO Italy). On day 7, 5 mL PGF2α analogue (5 mg/mL dino prosttromethamine; Lutalyse™, Pfizer, Belgium) were given, and a second dose of 2 mL GnRH were given on day 9. The buffaloes of Group B received i/m inj. of 2 mL GnRH and CIDR (containing 1.38 g progesterone) on day 0. On day 7, the animals were given i/m inj. of 5 mL PGF2α analogue, and the CIDR was removed on the same day. A second dose of GnRH was administered after 48 h of inj. of PGF2α in both groups. The Group C buffaloes served as untreated control and received i/m inj. of 2 mL normal saline on day 0, 7 and 9.

Heat detection and artificial insemination: The animals of all the three groups were observed closely from the day of treatment for behavioral changes to confirm the heat. Behavioral signs of heat (e.g., mounting, bellowing, vulvar swelling, tail raising, chin resting, sniffing other females, and micturition) were recorded thrice a day (6 am, 12 pm and 6 pm) for half an hour each time by visual inspection. Start and end of heat, especially stand to be mounted, were recorded for each Kundhi buffalo for the determination of heat duration. The animals were artificially inseminated twice (12 h and 24 h after the second GnRH inj.) in all groups using frozen-thawed semen obtained from Directorate of Animal Breeding, Government of Sindh.

Fertility rate: The pregnancy was confirmed per rectum after 60 days of AI.

Statistical Analysis: The data were analyzed by Anova and Chi-square tests using software Graph pad instate 3.05 versions of statistical package. Difference was considered as significant at $P<0.05$.

RESULTS AND DISCUSSION

The present study was undertaken to compare the effect of two different hormonal treatments; Ovsynch alone and Ovsynch+CIDR in Kundhi buffalo during peak breeding season in Pakistan. The results are presented in **Table 1**.

The animals of Group B (ovsynch+CIDR) showed higher estrus response (76.47%) as compared to Group A (ovsynch; 62%) and Group C (control; 14.28%) (**Table 1**). In the present study, significantly higher result with inclusion of CIDR was found, which was in support of Kumar and Mandap (2004) and Singh (2003). However, a much higher estrus response was reported by Naseer et al. (2011) in Nili Ravi buffaloes. In contrast, Larson et al. (2006) did not observe any estrus response with the progesterone (CIDR) treatment. Murugavel et al. (2009) reported a lower estrus response with CIDR treated buffaloes in tropical conditions. The differences among the above findings might be due to differences in climatic conditions and breed of the animal.

Table 1. Effect of hormonal treatments on occurrence of estrus and conception rate in different groups of Kundhi buffaloes during Peak breeding season.

Treatment	Groups	Animals in Estrus (%) *	No of animals conceived (%) **
Ovsynch	A (n=16)	10 (62.5^{b})	6 (37.5%^{b})
Ovsynch+CIDR	B (n=17)	13 (76.47^{a})	9 (52.94%^{a})
Control	C (n=7)	1 (14.28^{c})	0 (0)

Values with different superscripts within same columns significantly differ from one another. *P-value = 0.017, **P-value = 0.051.

Higher conception rate was observed in Group B (52.94%) buffaloes than Group A (37.5%). However, the difference was not significant (**Table 1**). Similar findings were reported by Wilson et al. (2010). Ravi Kumar et al. (2007) reported 18.8% conception rate in

CIDR treated animals. In contrast, Baruselli et al. (2004) and Kumar and Mandap (2004) reported 68.2 and 80% conception rate with CIDR in buffaloes, respectively. A number of factors such as nutritional status of animals, breed, parity etc., could play a major role in the observed variations.

CONCLUSION

The findings of this study indicate that Ovsynch+ CIDR protocol of estrus synchronization produces better results, and reduces the calving interval that improves the conception rate in Kundhi buffaloes in comparison with Ovsynch alone.

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REFERENCES

Ahmad S, Kumar H, Singh G, Patra MK (2011). The administration of GnRH plus PGF2 alpha synchronizes the estrus in anestrus crossbred cows exposed to bull urine. Indian Journal of Veterinary Research, 20: 42-45.

Baruselli PS, Reis EL, Marques MO, Nasser LF, Bo GA (2004). The use of hormonal treatments to improve reproductive performance of anestrous beef cattle in tropical climates. Animal Reproduction Science. 82-83: 479-486.

Cerri RLA, Rutigliano HM, Bruno RGS, Santos JEP (2009). Progesterone concentration, follicular development and induction of cyclicity in dairy cows receiving intra-vaginal progesterone inserts. Animal Reproduction Science, 110: 56-70.

Ghosh T, Paul AK, Talukder AK, Alam MGS, Bari FY (2012). Use of two estrus synchronization protocols and their success on pregnancy in zebu and crossbred heifers at char areas of Bangladesh. Journal of Embryo Transfer, 27: 223-228.

Islam R (2011). Synchronization of estrus in cattle. A review. Veterinary World, 4: 136-141.

Kumar M, Mandap MK (2004). Fertility management in rural buffaloes by hormonal therapies during the summer season. Buffalo Bulletin, 23: 30-33.

Khumran AM, Roshina Y, Ariff MO, Wahid H, Dhaliwala G, Khanh NP, Yap KC, Fahmi M, Azmil ME (2012). Comparision of estrus response and pregnancy rate of beef cows synchronized with Progesterone and prostaglandin based protocols. Journal of Animal and Veterinary Advances, 11: 3561-3567.

Kumar PR, Singh SK, Kharche SD, Govindaraju CS, Behera BK, Shukla SN, Kumar H, Agarwal SK (2014). Anestrus in cattle and buffalo. Advances in Animal and Veterinary Sciences, 2: 124-138.

Larson JE, Lamb GC, Stevenson JS, Johnson SK, Day ML, Geary TW, Kelser DJ, Dejarnette JM, Schrick FN, Dicostonzo A, Arseneau JD (2006). Synchronization of estrus in suckled beef cows for detected estrus and timed artificial insemination using gonadotropin releasing hormone, prostaglandin F2alpha, and progesterone. Journal of Animal Science, 84: 332-342.

Mehmood MU, Mehmood S, Riaz A, Ahmad N, Sattar A (2012). Superovulatory response in summer anestrus buffaloes and cattle treated with estrus synchronization protocol. Journal of Animal and Plant Sciences, 22: 888-893.

Murugavel K, Antoine D, Raju MS, Lo´pez-GatiusF (2009). The effect of addition of equine chorionic gonadotropin to a progesterone-based estrous synchronization protocol in buffaloes (*Bubalus bubalis*) under tropical conditions. Theriogenology, 71: 1120-1126.

Naseer Z, Ahmad E, Singh J, Ahmad N (2011). Fertility following CIDR based synchronization regimens in anoestrous Nili-Ravi buffaloes. Reproduction in Domestic Animals, 46: 814-7.

Paul AK, Yoisungnern T, Bunaparte N (2015). Hormonal treatment and estrus synchronization in cows. Journal of Advanced Veterinary and Animal Research, 2: 10-17.

Ravi Kumar K, Asokan SA, Veera pandian C (2007). Inclusion of CIDR in ovsynch protocol to improve fertility in postpartum anestrus buffaloes. Journal of Dairy Science, 67: 380-387.

Rivera H, Lopez H, Fricke PM (2005). Uses of intravaginal progesterone releasing insert synchronization protocol before timed AI and for synchronizing return to estrus in Holstein heifers. Journal of Dairy Science, 88: 957-968.

Ravikumar K, Asokan SA, Veerapandian C, Palanisamy A (2011). Ovarian status serum progesterone (P4) level and conception rate in OVSYNCH plus CIDR treated postpartum buffaloes. Tamilnadu Journal Veterinary & Animal Sciences, 7: 1-5.

Singh C (2003). Response of anestrus rural buffaloes (Bubalus bubalis) to intravaginal progesterone implants and PGF2alpha inj. in summer. Journal of Veterinary Science, 4: 137-141.

Stevenson JS, Pulley SL, JrMellieon HI (2012). Prostaglandin F2α and gonadotropin-releasing hormone administration improves progesterone status, luteal number, and proportion of ovular and anovular dairy cows with corpora lutea before a timed artificial insemination program. Journal of Dairy Science, 95: 1831-1844.

Wilson DJ, Mallory DA, Busch DC, Leitman NR, Haden JK, Schafer DJ, Ellersieck MR, Smith MF, Patterson DJ(2010). Comparison of short-term progestin-based protocols to synchronize estrus and ovulation in postpartum beef cows. Journal of Animal Science, 288: 2045-2054.

Yusuf M, Nakao T,Yoshida C, Long ST, Fujita S, Inayoshi Y, Furuya Y (2010). Comparison in effect of Heatsynch with heat detection aids and CIDR-Heat synch in dairy heifers. Reproduction in Domestic Animals, 45: 500-504.

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