



Effect of timing of prophylactic treatment regimen at calving on reproductive performance in Surti buffaloes

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Received: 3 August 2011; Accepted: 3 October 2011

Key words: Buffaloes, Prophylactic treatment regimen, Reproductive performance, Surti buffaloes

During post partum period, the cattle is exposed to high risk of infection to uterus as the anatomical barriers are breached and genitalia remains open for various days (Goff and Horst 1997). Post parturient retention of placenta (ROP) and other gynaecological disorders have been associated with factors like abortion, forced labor, delayed gestation, early parturition, uterine atony, infections, and seasonal hormonal disorders (Robert 1999). Deficiencies of some vitamins and minerals also induce or predispose animals to delayed shedding of placenta (Hurley and Doane 1989, Laven and Peters 1996). The indiscriminate use of antibiotics for treatment of uterine infections may lead to emergence of resistance strains. As a result, attention is now on herbal formulations (Hemaiswarya *et al.* 2008, Patel *et al.* 2009, Walia *et al.* 2010). The oral supplementation of herbal preparations with proven ecobolic and restorative actions therefore, appears to be a safe and effective option for post-parturient health and productivity of the animals when either used therapeutically or prophylactically (Singal 1996, Khanna *et al.* 1997, Tiwari 1999, Gautam 2000, Mohan and Bhagwat 2007, Dilshad *et al.* 2008, Hanafi *et al.* 2011). We hypothesize that early prophylactic treatment regimen (PTR) supplementation (within 3 h of calving) may have more positive effect on reproductive performances. Accordingly a study on effect of timing of PTR supplementation at calving on reproductive performance in Surti buffaloes was undertaken.

Surti buffaloes (54), in their native tract of South Gujarat at Livestock Research Station, Navsari Agricultural University, Navsari, Gujarat, India, that calved normally during the year 2010 were included in the study. Time of calving was recorded and categorized in to, night (00:00 - 08:00 h), day (08:00–16:00 h) and evening (16:00–00:00 h). Animals were randomly given supplementation of PTR either

within 3 h (T₁) or after 3 h (T₂) of calving. Subsequently time taken for shedding of placenta (SOP) were recorded and categorized in to within 4 h and above 4 h groups. PTR had included a polyherbal ecobolic preparations, minerals and vitamins preparations. A polyherbal preparation was given @200 ml after calving and 100 ml/day for subsequent 4 days, along calcium drench @200 ml after calving and 100 ml/

Table 1. Compositions of commercially available polyherbal ecobolics, minerals and vitamins preparations supplemented to Surti buffaloes

Content	Compositions
<i>Polyherbal ecobolic preparations/10 ml</i>	
<i>Aristolichia</i>	125 mg
<i>Peganum harmala</i>	125 mg
<i>Saraca indiaca</i>	250 mg
<i>Rutacea</i>	125 mg
<i>Clerodendrum</i>	250 mg
<i>Stereospermum</i>	250 mg
<i>Desmodium</i>	250 mg
<i>Uraria picta</i>	250 mg
<i>Aegle marmelos</i>	250 mg
<i>Solanum indicum</i>	250 mg
<i>Gmelina arborea</i>	250 mg
<i>Tribulus terrestris</i>	250 mg
<i>Aloevera toum</i>	50 mg
<i>Mineral preparations/20 ml</i>	
Calcium	2000 mg
Phosphorus	1000 mg
Vit. D ₃	2000 I.U.
Vit B ₁₂	25 mcg
Ext. satavar	3 ml
Ext. jivanti	2 ml
Ext. valerian	2 ml
Vit. H (biotin)	12.5 mcg
Element selenium	6 mcg
Vit. E	50 mcg
Vit. A	20,000 I.U.
Vit.D ₃	10,000 I.U.

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day for subsequent 9 days and vitamins @10 ml after calving and 10 ml/day for subsequent 9 days orally to all the Surti buffaloes calved during the year 2010. The compositions of commercially available polyherbal ecobolics, minerals and vitamins preparations supplemented as PTR are given in Table 1.

The animals were maintained under standard feeding conditions (Ranjan 1998). They were fed on a basal ration comprising roughage and concentrate in the ratio of 74:26. Paddy straw, lucerne hay and hybrid napier contributed 60, 9 and 31% of total roughage of the ration, respectively. Each animal was monitored for estrus signs after calving for calculating postpartum estrus (PPE) period. Accordingly service period were calculated for each buffalo after confirmed pregnancy.

General linear model (GLM) procedure in the SPSS statistical software (version 17.0) was used to analyze the non orthogonal data. Results were considered statistically significant for $0.05 > P \geq 0.01$, whereas P values less than 0.01 were considered highly significant. The independent variables categorized in to more than 2 groups were further analyzed using Duncan's multiple range test (DMRT). To determine the effect of timing of PTR supplementation and calving time on time taken for SOP, following linear model was used:

$$S = \mu + P_i + C_j + e_{ij} \text{ (where } i = 1, 2 \text{ and } j = 1, 2, 3)$$

Where, S is time taken for SOP, μ is mean time for SOP, P_i is the effect of timing of PTR supplementation, C_j is the effect of calving time, and e_{ij} is the error component.

Similarly, to determine effect of timing of PTR supplementation, calving time and time taken in SOP on PPE and Service period, following linear model was used:

$$Y = \mu + P_i + C_j + S_k + e_{ijk} \text{ (where } i = 1, 2 \text{ } j = 1, 2, 3 \text{ and } k = 1, 2)$$

Where, Y is either PPE or service period, μ is the mean PPE or service period, P_i is the effect of timing of PTR supplementation, C_j is the effect of calving time, S_k is the time taken for SOP and e_{ijk} is the error component.

The effect of time of PTR and calving time on time taken for SOP is given in Table 2. The overall time taken for SOP in Surti buffaloes was well within the normal time for SOP (up to 8 h) in bovines. Similar time for SOP was also reported

by Kunbhar *et al.* (2011) in Kundhi buffaloes.

The time taken for SOP was lower in animals supplemented with PTR within 3 h as compared to those given after 3 h, however differences were nonsignificant ($P=0.59$). Similarly buffaloes calved in morning hours had taken less time for SOP as compared to those calved in day and evening hours, but the differences were nonsignificant ($P=0.29$). Comparatively, the overall time taken for SOP in buffaloes received PTR was in accordance with the earlier findings on herbal ecobolics, vitamins and minerals (Oliw *et al.* 1983, Tiwari 1999, Gautam 2000, Mohan and Bhagwat 2007, Ravi and Bhagwat 2007). It was opined by Oliw *et al.* (1983) that various minerals and vitamins would involve reduction in synthesis of cyclooxygenase products, impair uterine contractions, vascular tone and platelet aggregation leading to retained placenta and deficiency of vitamins may alter the competence of cellular self-defense mechanism and can increase the risk for placental retention and metritis.

The effects of time of PTR, time of calving and time taken for SOP on PPE and SP are given in Table 3. The overall PPE and SP were reported to be within the normal range for bovines (Gautam 2000, Anonymous 2010, Kunbhar *et al.* 2011). The effect of time of PTR supplementation on PPE and SP were highly significant ($P=0.00$). The buffaloes received PTR with in 3 h of calving had significantly lower PPE and SP than those received after 3 h of calving. Similar effects of PTR on reproductive performance of bovines in terms of PPE (Khanna *et al.* 1997, Tiwari 1999, Gautam 2000, Walia *et al.* 2010, Kunbhar *et al.* 2011) and SP (Khanna *et al.* 1997, Tiwari 1999) were also reported. Sheldon and Dobson (2004) opined that addition of mineral and vitamin preparations in PTR with polyherbal ecobolic may be helpful to regularize the calcium:phosphorus (1.5/1) ratio, impaired general immunity and altered cellular self-defense mechanism which can increase the risk for placental retention and metritis which indirectly affects post partum reproductive

Table 2. Least square means of time taken for shedding of placenta in Surti buffaloes in different subgroups

Parameters	N	Time taken for SOP (h)
<i>Time of PTR supplementation</i>		
Within 3 h	30	4.71±0.35
After 3 h	24	5.00±0.40
<i>Calving time</i>		
Night (00:00 - 08:00 h)	20	4.29±0.42
Day (08:00–16:00 h)	17	5.05±0.46
Evening (16:00–00:00 h)	17	5.23±0.48
Overall	54	4.85±0.26

Table 3. Least square means of post-partum estrous period and service period of Surti buffaloes in different subgroups

Parameters	N	PPE (days)	SP (days)
Overall	54	86.45±4.78	106.72±7.04
<i>Time of PTR supplementation</i>			
Within 3 h	30	65.36±6.44 ^a	73.83±9.48 ^a
After 3 h	24	107.53±7.32 ^b	139.60±10.78 ^b
<i>Calving time</i>			
Night (00:00 - 08:00 h)	20	64.57±7.84 ^a	87.25±11.55
Day (08:00–16:00 h)	17	92.91±8.47 ^b	109.87±12.48
Evening (16:00–00:00 h)	17	101.86±8.83 ^b	123.03±13.00
<i>Time taken for SOP</i>			
Within 4 h	27	86.30±6.81	111.29±10.03
After 4 h	27	86.59±6.72	102.15±9.90

Means bearing different superscripts in a column in different subgroups differed significantly ($0.05 > P < 0.01$).

performance. The present study confirms that time of supplementation of PTR plays an important role in improving reproductive performances of buffaloes. An improvement of 42.17 days (39.22%) in PPE and 65.77 days (47.11%) in SP had been obtained by supplementing PTR within 3 h of calving.

During the present study, the buffaloes calved in night hours exhibited first estrus after calving 18.6 and 26.01 days prior to the buffaloes calved in a day and evening hours, respectively. Similarly, the buffaloes which were calved in morning hours had 22.62 and 35.28 days lower service period than those calved in a day and evening hours, respectively. Analysis of data revealed that the calving time had significant effect on PPE ($P=0.007$) but not on SP ($P=0.125$). The time taken for SOP had non significant effect on PPE ($P=0.98$) and SP ($P=0.52$). Overview of the results indicated that supplementation of PTR within 3 h of calving had significant effect on reproductive performance in buffaloes. However further studies are required on different time of supplementation of PTR after calving so as to obtain maximum benefits on efficient use of such PTR.

SUMMARY

Surti buffaloes (54) were given prophylactic treatment regimen (PTR) included polyherbal ecobolic with minerals and vitamin preparations. The effects of time of calving, time of PTR supplementation after calving and time taken in shedding of placenta (SOP) on post partum reproductive performances, viz. post partum oestrous (PPE) and service period (SP) were studied. The overall mean of time taken for SOP, PPE and SP were within the physiological range. Time taken for SOP was not significantly affected either by calving time or time of PTR supplementation. The effect of time of PTR supplementation on PPE and SP were highly significant. An improvement of 42.17 days (39.22%) in PPE and 65.77 days (47.11%) in SP was obtained by supplementing PTR within 3 h of calving. Calving time had significant effect on PPE but not on SP. The time taken for SOP had nonsignificant effects on PPE and SP. Results showed that supplementation of PTR within 3 h of calving had significant effect on reproductive performance in buffaloes. This calls for further studies to be undertaken to standardize the time and duration for supplementation of PTR precisely.

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