

Efficacy of exapar in induction of uterine contraction *in vitro* and expulsion of fetal membranes in buffaloes*

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ABSTRACT

Efficacy of exapar (a polyherbal product) was evaluated in inducing uterine muscle contraction *in vitro* and in prevention and treatment of retention of fetal membranes (RFM) in buffaloes. In experiment 1, pieces of estrus goat uterine tissues obtained from slaughter house were exposed to exapar liquid in isolated tissue bath with continuous aeration. A tension of 1 gm weight was put to the tissue and the response of the tissues to exapar was recorded using a student Kymograph. In experiment 2, exapar liquid was orally administered to buffaloes just after calving to observe the effect of exapar on the time of expulsion of fetal membranes and reproductive performance. In experiment 3, exapar liquid was administered orally to buffaloes for the treatment of retained fetal membranes. In experiment 1, exapar was found to induce a dose-dependent contractile response on isolated estrus goat uterus. Experiment 2 showed significantly earlier expulsion of fetal membranes (4.88 ± 0.51 Vs 7.33 ± 0.74 hr, $P < 0.05$) and earlier involution of uterus (43.29 ± 2.41 Vs 49.00 ± 2.20) but no effect on the time required for appearance of first post-partum estrus in exapar treated group than in control group. In experiment 3, no significant differences were observed in the time required for expulsion of fetal membranes and onset of first post partum estrus in exapar treated group than in control group.

Key words : Exapar, goat uterus, buffaloes, retention of fetal membranes

The retention of fetal membranes comprises a failure of dehiscence and lack of expulsion of the fetal membranes within the duration of physiological third stage of labour. The retention of fetal membranes for about 3-8 hours after calving is considered physiological but its retention beyond 12-24 hours postpartum in cows and buffaloes constitute pathological condition (Paisley *et al.*, 1986). Retention of placenta is one of the major reproductive problems, second to anoestrus in buffaloes (Khar, 1980). Similarly, retained placenta has been found to be the single largest post partum complication (Pattabiraman and Bawa, 1977). The retention of fetal membrane costs the United Kingdom dairy industry more than 25 million pounds per year (Laven and Peters, 1996). Heavy losses due to this condition to the dairy industry

was also reported by Bhalaru and Tiwari (1986). Several non hormonal herbal preparations have been used with variable results in prevention and treatment of retention of fetal membranes in cattle and buffaloes. However, systematic studies on the effects of herbal products in inducing the uterine contraction *in vitro* and their efficacy in the prevention and treatment of RFM *in vivo* are lacking. The present experiment was designed to study the effect of exapar on estrus goat uterine muscles *in vitro* and to evaluate its efficacy in the prevention and treatment of RFM in buffaloes.

MATERIALS AND METHODS

Test material : Exapar, a liquid polyherbal formulation obtained from M/s Dabur India Ltd, SP-C-162, M.I.A., Alwar (Raj), 301 030 was used in this study.

***In vitro* studies :** Estrus goat uteri were collected from slaughter house in De-Jalon solution (composition in mM-NaCl-154, KCl-5.6, CaCl₂ -0.55, NaHCO₃-6.0 and Glucose-2.78) at 2-8°C temperature. Small pieces (25 mm x 2 mm) of tissues were cut from uterine greater curvature and kept into a petridish in De-Jalon solution at 28-30°C with continuous aeration. Tissues were then mounted

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on a tissue bath with 30 ml bath volume. A tension of 1gm weight was put on the tissues with continuous aeration and allowed to equilibrate for about 60 minutes. The bath solution was changed every 10 min interval.

After equilibration, tissues (n=6) were treated with exapar 1 ml, 2 ml and 4 ml in tissue bath and the uterine contraction were recorded on a student Kymograph. The effects of different doses of oxytocin (syntocinon, Novartis India Ltd.) viz. 5, 10 and 20 milliunit (mu) per ml of bath solution was also studied on uterine tissues (n=6).

For prevention : Buffaloes after calving were randomly divided into two groups (n=6). Buffaloes in group 1 served as control and no treatment was given to the animals. Buffaloes in group 2 were orally treated with exapar just after calving at the dose rate of 100 ml two times a day at 12 hr interval on the first day of calving and then 50 ml twice a day at 12 hr interval for next consecutive 3 days. Buffaloes in both groups were observed for 12 hr after calving for the time required for expulsion of fetal membranes and 3 months for the time required for the involution of uterus and appearance of first post partum estrus.

For treatment : Buffaloes with retained placenta for 12 hr after calving, were divided into two groups (n=6). Group 1 buffaloes with 12 hr of placental retention after calving were kept as control and no treatment was given. Group 2 buffaloes were orally treated with exapar at the dose rate of 100 ml twice a day 12 hr after calving for one day and then 50 ml twice a day for next 3 days. Animals in both the groups were observed for 12 hr post-treatment for expulsion of fetal membranes and 3 months for appearance of first post partum estrus.

The efficacy of exapar was analysed by complete randomized design (CRD).

RESULTS AND DISCUSSION

In *in vitro* studies, oxytocin, a standard oxytocic, showed a dose-dependent contractile response on estrus goat uterine tissues and the mean contractions were 16.00 ± 1.73 mm, 29.33 ± 3.08 mm and 49.83 ± 6.23 mm at the doses of 5, 10 and 20 mu per ml of bath solution respectively. Exapar also induced a similar type of contractile response on estrus goat uterine tissues in a dose-dependent manner and the mean contractions were 37.33 ± 1.48 , 73.67 ± 1.28 and 86.33 ± 2.14 mm at the doses of 1 ml, 2 ml and 4 ml exapar liquid per 30 ml of bath volume

respectively. This indicated that the exapar was capable of inducing contraction on estrus goat uterus *in vitro*.

The effects of replanta on the time of expulsion of fetal membranes, time required for involution of uterus and onset of first post partum estrus are presented in Table 1. The exapar given for expulsion of fetal membranes in non-RFM buffaloes for prevention, resulted in significantly earlier expulsion of fetal membranes (4.88 ± 0.51 Vs 7.33 ± 0.74 hr, $P < 0.05$) and early involution of uterus (43.29 ± 2.41 vs 49.00 ± 2.20 days) but showed no effect on the time of appearance of first post-partum estrus. In experiment 3, replanta treatment in RFM buffaloes did not reveal any significant effect in terms of time of expulsion of fetal membranes and onset of first post partum estrus.

Very few reports are available regarding controlled experiments to evaluate the efficacy of exapar for induction of uterine contraction *in vitro*, prevention and treatment of RFM in buffaloes. However, Sharda *et al.* (1998) in a clinical trial with exapar in bovines reported earlier expulsion of fetal membranes (4.3 hr), earlier disappearance of lochia (2.9 days) and earlier onset of post first partum estrus (32.1 days) in exapar treated group than in control group. Singhal (1996) in a clinical trial with bovines reported average 5 hr for expulsion of fetal membranes, 5 days for disappearance of lochia while

Table 1. Effect of exapar in prevention and treatment of retention of fetal membranes in buffaloes (Mean \pm SE)

Parameters	Control	Treatment
Prevention		
1. Time required for expulsion of fetal membranes (hr)	7.33 \pm 0.74 (4 to 11)	4.88 \pm 0.51* (3 to 7)
2. Time required for uterine involution (days)	49.00 \pm 2.20 (42 to 54)	43.29 \pm 2.41 (39 to 54)
3. Exhibition of first post-partum estrus (days)	64.00 \pm 4.08 (48 to 78)	70.50 \pm 6.83 (54 to 72)
Treatment		
1. Time required for expulsion of fetal membranes (hr)	8.37 \pm 1.41 (2 to 12)	9.50 \pm 0.96 (6 to 12)
2. Exhibition of first post-partum estrus (days)	63.66 \pm 5.20 (45 to 84)	67.16 \pm 8.20 (52 to 94)

*Significant ($P < 0.05$); figures in parentheses indicate range

Khanna *et al.* (1997) reported earlier expulsion of placenta (3.10 hr) and 50 days for onset of first post-partum estrus in exapar treated buffaloes.

It can be concluded that exapar is having oxytocic effect on estrus goat uteri and a similar effect might have resulted in early expulsion of fetal membranes and early involution of uterus when given after parturition in non-RFM buffaloes. However, detailed studies may be conducted to purify the active ingredient(s), standardization of dose/tissue responses in post -partum uterus *in vitro* and *in vivo*.

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