

## EFFICACY OF IMMUNOMODULATORS FOR TREATMENT OF ENDOMETRITIS IN COWS

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### ABSTRACT

The relative efficacy of intrauterine (IU) immunomodulators, viz., E. coli lipopolysaccharide (LPS), Oyster Glycogen (OG) and Autologous Plasma (AP) in the treatment of endometritis in cows was investigated. Forty endometritic cows were randomly divided into 4 groups (n=10) and were marked as T1 T2, T3 and T4. The T4 group was kept as control with single dose Phosphate Buffer Solution (PBS) infusion. White side test, pH and bacterial load were estimated before and after treatment in uterine discharge for diagnosis and clinical evaluation, respectively while at estrus. At post treatment subsequent estrus A.I. was done in the recovered cows. Recovery and conception percentage out of total animals treated were 100.00, 80.00, 60.00, 20.00% and 90.00, 80.00, 50.00 and 20.00 in group T1 T2, T3 and T4, respectively. The results indicated the efficacy and possibility of using E. coli LPS, OG and AP as alternative therapy of endometritis in crossbred cows.

**Key words:** Endometritis, Cows, Treatment, Immunomodulators

The endometritis treatment protocols followed in cows with endometritis have so far revealed conflicting results, from beneficial (Sheldon and Noakes, 1998) to no beneficial (Dowlen *et al.*, 1983). Antibiotic sensitivity test is inevitable for effectiveness of antibiotics (Koleff *et al.*, 1973). Sometimes the antibiotic even causes the more complication (Hussain and Danial, 1992) and human health hazard (Kaneene *et al.*, 1986). Hence, at present various immunomodulators have been tried as alternative to conventional treatment which act non specifically to upregulate the uterine defence mechanism (UDM) to cure endometritis (Singh *et al.*, 2003; Deori *et al.*, 2004; Methai *et al.*, 2005; Sahadev *et al.*, 2007a).

Forty crossbred cows in and around Ranchi, Jharkhand with endometritis were selected for the experiment. The cows were diagnosed and clinically evaluated by white side test (Popov, 1969), pH (Tsiligianni, 2001) and bacterial load (Diliello, 1979) in uterine discharge at estrus and also at post treatment

estrus. The cows were randomly grouped into four (n=10) and marked as T1, T2, T3 and T4. T1 (n=10) cows were subjected to single I/ut infusion of E. coli LPS (100ug/cow in 60 ml PBS). T2 (n=10) cows received single dose of 500 mg of OG/cow in 60 ml PBS. The cows in group T3 (n=10) were treated with 50 ml AP daily for 3 days as per the plasma preparation procedure and treatment protocol given by Ward (1985). The T4 (n=10) cows were kept as control with single infusion of 60 ml PBS.

The recovered animals were artificially inseminated during post treatment subsequent estrus and pregnancy was confirmed per rectum at about 50-60 days post insemination.

Paired 't' test between pre and post treatment values and one way analysis of variance between groups were performed following the procedure of Snedecor and Cochran (1989).

The result of the white side test before treatment was 100.00% positive in all groups. At subsequent post treatment estrus 0.00, 20.00, 40.00 and 80.00% positivity were recorded in group T1, T2, T3 and T4 respectively indicating the efficacy of immunomodulators in controlling endometritis. The reports of Deori *et al.*, (2004) with LPS and Methai *et al.*, (2005) with AP are in accordance with the present findings.

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The pH of uterine discharge before treatment ranged between  $9.16 \pm 0.41$  (T3) and  $9.45 \pm 0.26$  (T1). At subsequent estrus, except T4, significant ( $P < 0.01$ ) reduction in pH was observed in all the treatment groups substantiating *E. coli* LPS as the most effective in restoration of normal uterine environment followed by OG and AP. Higher pH value in endometritis was due to metabolites of bacteria and inflammatory exudates (Salphale, 1993) which declined towards normal on recovery. However, the present pre and post treatment pH levels were in accordance with the reports of Sahadev *et al.* (2007b).

Before treatment bacterial colony count ranged from  $264.70 \pm 17.23 \times 10^6$ /ml (T1) to  $322.00 \pm 10.85 \times 10^6$ /ml (T4) which reduced significantly ( $P < 0.01$ ) after treatment in T1 ( $10.30 \pm 1.97 \times 10^6$ /ml), T2 ( $19.10 \pm 3.75 \times 10^6$  ml) and in T3 ( $48.80 \pm 6.92 \times 10^6$ /ml). The reports of Singla *et al.* (2004a) with LPS and Singh *et al.* (2003) with OG were in concurrence with the present findings.

The *E. coli* LPS and OG might have stimulated macrophages which in turn produced Interleukin-1 and Interleukin-8 that upregulated the production of Granulocyte Macrophage Colony Stimulating Factor (GM-CSF) for rapid recruitment of PMN cells into uterus and thus, clearance of bacteria by phagocytosis and ultimately recovery (Izard, 1996).

The IgG and complement in AP have been reported to enhance opsonization and helped effective control of infection (Asbury, 1984). Moreover, AP augmented phagocytosis by activating PMN cells (Hakansson *et al.*, 1993) and lysis of bacteria directly (Taylor, 1987). The component of complement (C5a) acts as strong chemoattractant. Thus, AP favoured nonspecific UDM and cured endometritis in a good proportion of cows. However, remaining bacterial load did not interfere with recovery and conception as mild infection in uterus with less than 100 colonies is regarded as non infected (Takacs *et al.*, 1990).

The recovery rate was 100.00% in group T1 followed by T2 (80.00%), T3 (60.00%) and T4 (20.00%). The per cent conception out of total animals treated was 90.00, 80.00, 50.00 and 20.00% in group T1, T2, T3 and T4 respectively. Almost similar recovery and conception rate with LPS treatment were reported by Shaktawat, *et al.* (2006) and Devaraj *et al.* (2006) with OG and Methai *et al.* (2005) and Sahadev *et al.* (2007a) with AP treatment. However, the recovery and

conception in control group might be due to self recovery under the influence of UDM.

In the light of foregoing results and other references it can be concluded that *E. coli* LPS, OG and AP are effective IU immunomodulators while *E. coli* LPS and OG are almost equally effective and better than AP for treatment of endometritis.

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