

STUDIES ON IMMUNOMODULATION AND THERAPEUTIC EFFICACY OF INMODULEN IN REPEAT BREEDING CROSSBRED COWS

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Introduction

Bacterial endometritis in cows leads to 'repeat breeding' and economic losses. Conventional treatment with antibiotics is expensive, hazardous and with inconsistent results. Intrauterine infusion of certain bio-immunomodulators improves fertility but the procedure is cumbersome and has risks of adding new infections. Present work envisaged general immunomodulation with parenteral administration of Inmodulen (25 mg cells of *Propionibacterium granulosum* and 2.0 mg *E. coli* lipopolysaccharide per 100 ml; Calier, S.A., Barcelona) in repeat breeding cows and to study its effects on fertility and udder health.

Material and methods

Twenty four repeat breeding cows (HF x zebu) having dirty (n=11, Group A) or clear (n=13, Group B) estrous discharge were injected intramuscularly with 10 ml Inmodulen each on days zero and two of estrous cycle. Ten normal cycling cows (Group C) served as untreated controls. Cows in Groups B and C were inseminated on day zero of the first cycle. Cows in Group A and the returning cows of Groups B and C were inseminated on next estrus. Uterine swabs, blood and milk samples were collected for investigations just before and at different intervals after Inmodulen.

Results

Uterine swabs taken on days zero (96%) and 21 (22%, in returning cows only) yielded pure or mixed growth of *E. coli*, *Staphylococcus*, *Streptococcus*, *Arcanobacter*, *Bacillus* and *Klebsiella*. The pre-treatment TLC and DLC were similar in each group ($p > 0.05$). Following Inmodulen, TLC increased from 8227 829 to 11845 1054 by day three ($p < 0.05$) and declined towards normal by day six of the cycle. The DLC in each group remained unchanged. Total serum immunoglobulin concentrations in Inmodulen-treated cows increased from 14.8 0.62 mg/ml on day zero to 22.08 0.58 mg/ml on day three ($p < 0.05$) and receded towards normal by day six. No change was observed in untreated cows. Pre-treatment milk somatic cell count (SCC) was higher ($P < 0.05$) in Groups A (576857 64170) and B (678585 50864) than in C (364646 22821). Following Inmodulen, it decreased ($P < 0.05$) towards normal by day six but fluctuated thereafter. Pregnancy rate to 1st AI was 9, 38 and 30% and to upto three AIs was 64, 69 and 60% in Groups A, B and C, respectively. In conclusion, cows with bacterial endometritis had elevated milk SCC indicating association of mastitis (subclinical) with metritis.

Table 1: Average total serum immunoglobulin concentration (mg/ml) in normal and Inmodulen-treated repeat breeding cows at different stages of estrus cycle.

Group of cows	Average per cent change (x ± s.e.m.)		
	Day 0	Day 3	Day 6
A (n = 11)	14.8 ± 0.6	22.1±0.6	15.9±0.8
B (n = 13)	16.4±0.6	23.8±0.5	18.2±0.7
C (n = 10)	17.1±0.7	17.8±0.6	18.0±0.8

Table 2: Blood TLC in normal and Inmodulen-treated repeat breeding cows on different days of estrus cycle

Group of cows	Days of estrus cycle		
	Day 0	Day 3	Day 6
A (n = 11)	8.227±829	11.845±1054 ^a	8.171±760
B (n = 13)	8.648±806	11.962±1291 ^a	9.123±1.033
C (n = 11)	7.955±784	7.735±798	7.850±654

Table 3 : Average milk somatic cell count (Cells/ml) in normal and Inmodulen-treated repeat breeding cows at different stages of estrus cycle.

Group of cows	Days of estrus cycle			
	Day 0	Day 6	Day 14	Day 21
A (n = 9)	576.857±71.858	439.843±49.424	486.352±40.420	497.609±40.693
B (n = 10)	632.524±49.540	459.252±51.218	506.201±22.389	538.631±32.067
C (n = 7)	364.646±22.821	378.221±20.810	398.585±22.196	408.282±22.118

Table 4: Overall conception in normal and Inmodulen-treated repeat breeding cows

Group	Conception from 1 st AI		S Overall conception from 3 AI's		AI/conception
	Number	Per cent	Number	Per cent	
A (n = 11)	1/11	9.09%	7/11	64%	2.00 AI/conception
B (n = 13)	5/13	38.4%	9/13	69%	1.44 AI/conception
C (n = 10)	3/10	30%	6/10	60%	1.66 AI/conception

Discussion

Parenteral treatment with Inmodulen improved fertility and udder health and was also effective in treating the bacterial endometritis, probably for its effect of general improvement in specific and non-specific immune systems.

The Inmodulen-induced rise in Ig's concentrations helped to phagocytosis and elimination of bacterial infections in the organism, including the uterus and the udder. The present study, supports the preliminary findings that parenteral administration of Inmodulen is effective against bacterial endometritis, thereby improving fertility in repeat breeding cows.



CALIER

This study has been published in WBC 2006.