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## RESEARCH ARTICLE

### EFFICACY OF *E. COLI* LPS AND OYSTER GLYCOGEN IN TERMS OF RECOVERY AND CONSEQUENT CONCEPTION RATE IN THE TREATMENT OF METRITIS IN COWS

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#### ABSTRACT

A total of 36 crossbred cows with confirmed metritis were divided into 3 groups each comprising 12 cows and treated intrauterine separately with single dose of 100 µg *E. coli* LPS in 20 ml PBS solution, 500 mg of oyster glycogen in 20 ml PBS solution and 60 ml suspension of 125mg Ciprofloxacin hydrochloride and 150mg Tinidazole / 5ml respectively on first day of oestrus. Metritis was diagnosed on the basis of mucopurulent discharge, thick uterine wall, alkaline pH and white side test. Six cows under each group were inseminated on 2nd day of treatment and the remaining 6 on 2nd day of subsequent oestrus after testing for metritis just before insemination. The result indicated that frequency of occurrence of mucopurulent discharge, thick uterine wall, alkaline pH and positive white side test was 100 % before treatment and 0.00 % after treatment in *E. coli* LPS treated cows. Corresponding frequencies for oyster glycogen and Ciprofloxacin hydrochloride with Tinidazole treated cows were 100, 100, 100 and 100 % before treatment and 16.67, 16.67, 33.33 and 0.00 % after treatment. The conception rates in the 3 treated groups were 16.66, 0.00 and 0.00 % when inseminations were carried out in the same oestrus and 83.33, 50.00 and 50.00 % in the subsequent oestrus. The study concludes that *E. coli* LPS has superior immunomodulatory effect over oyster glycogen for treatment of metritis in cows on intrauterine use.

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#### INTRODUCTION

Uterine infection is the most common reproductive disorder in dairy cows. Intrauterine infusion of antibiotics is a common practice for treatment of metritis in cattle and has met with varying degree of success (Shukla and Pandit, 1989). Inconsistent success rate, high cost of treatment, loss of milk and development of microbial resistance to antibacterial drugs, reduced conception rate and post-treatment oestrus irregularities are obvious disadvantages of the use of antibiotics (Singh *et al.*, 2000). Immunomodulators like *E. coli* lipopolysaccharide, oyster glycogen and autologous serum when infused intrauterine in different species of animals are reported to increase opsonizing capacity of the neutrophils and enhance uterine defence mechanism (Saini *et al.*, 1999).

The present research was planned to study the efficacy of *E. coli* LPS, oyster glycogen and Ciprofloxacin hydrochloride

with Tinidazole in the treatment of metritis in terms of rate of recovery and consequent conception in crossbred cows.

#### MATERIALS AND METHODS

A total of 36 crossbred metritic cows maintained in the Instructional Livestock Farm, College of Veterinary Science, Assam Agricultural University, Khanapara and Private cattle farms around the college campus were divided into 3 groups each comprising 12 cows. Diagnosis of metritis was done on the basis of characteristic changes of uterine discharge, thickness of uterine wall, pH of uterine discharge and white side test as follows.

Cows having mucopurulent, cloudy or milky vaginal discharge and thick uterine wall as felt on rectal palpation were considered as metritic.

The pH of uterine discharge was recorded by using pH indicator strip as described by Tsiligianni *et al.*, (2001). For

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this the pH paper was allowed to saturate in a drop of uterine discharge on a clean glass slide and pH value was recorded by matching the colour. Alkaline pH 8 or more was considered as the indication of metritis in the cows.

The uterine discharge was subjected to white side test following the procedure of Popov (1969). Two ml of uterine discharge was taken into a 15 ml test tube and equal volume of 5 per cent sodium hydroxide solution was added to it. The mixture was then boiled using a spirit lamp for a few minutes. Development of colour (light yellow to dark yellow) in the test sample on boiling was considered positive for metritis.

The three groups of metritic cows were treated intrauterine separately with single dose of 100 µg *E. coli* LPS in 20 ml of sterile phosphate buffer saline (pH 7.2), 500 mg of oyster glycogen in 20 ml of sterile phosphate buffer saline (pH 7.2) and 60 ml of Ciprofloxacin hydrochloride 125mg + Tinidazole 150 mg / 5ml respectively on first day of oestrus. Six cows under each group were inseminated on 2<sup>nd</sup> day of treatment and the remaining 6 cows in each group were inseminated on 2<sup>nd</sup> day of subsequent oestrus. Each cow inseminated in the subsequent oestrus was tested for metritis just before A.I. and recovery rate was found out. Pregnancy was detected after 2 months of A.I. in all cows and conception rate was worked out.

## RESULTS AND DISCUSSION

**Recovery rate:** All metritic cows (100%) under the 3 treatment groups showed mucopurulent discharge, thick uterine wall, alkaline pH and positive reaction to white side test before intrauterine treatment. Following treatment frequency of occurrence of mucopurulent discharge, thick uterine wall, alkaline pH of uterine discharge and positive reaction to white side test was 0.00, 0.00, 0.00, and 0.00 % respectively in *E. coli* LPS, 16.67, 16.67, 33.33 and 0.00 % respectively in oyster glycogen treated and 16.67, 16.67, 33.33 and 0.00 % respectively in Ciprofloxacin hydrochloride with Tinidazole treated cows (Table 1).

**Table 1** Frequency of occurrence of diagnostic characteristics of metritis following intrauterine treatment with *E. Coli* LPS, Oyster glycogen and Ciprofloxacin with Tinidazole in cows

Treatment	Before treatment				After treatment			
	Mucopurulent discharge	Thick uterine wall	Alkaline pH( 8)	White side test	Mucopurulent discharge	Thick uterine wall	Alkaline pH ( 8)	White side test
<i>E. coli</i> LPS (6)	100 %	100 %	100 %	100 %	0.00 %	0.00 %	0.00 %	0.00 %
Oyster Glycogen (6)	100 %	100 %	100 %	100 %	16.67 %	16.67 %	33.33 %	0.00 %
Ciprofloxacin + Tinidazole (6)	100 %	100 %	100 %	100 %	16.67 %	16.67 %	33.33 %	0.00 %

Figures in the parentheses indicate No. of cows treated

**Table 2** Conception rate in metritic cows treated with different immunomodulators and antibiotic and inseminated in the same and subsequent oestrus

Treatment	Same oestrus			Subsequent oestrus		
	No. of cows inseminated	No. of cows conceived	C.R (%)	No. of cows inseminated	No. of cows conceived	C.R (%)
<i>E. coli</i> LPS	6	1	16.66	6	5	83.33
Oyster Glycogen	6	0	0	6	3	50
Ciprofloxacin with Tinidazole	6	0	0	6	3	50

It was evident from the present finding that all metritic cows recovered from metritis following intrauterine infusion of *E. coli* LPS, while in case of oyster glycogen and Ciprofloxacin

with Tinidazole, 16.67 to 33.33 per cent showed positive signs of metritis. This clearly indicated greater efficacy of *E. coli* LPS over Oyster glycogen and Ciprofloxacin with Tinidazole in controlling uterine infections.

Deori (2002) and Sarma (2007) using intrauterine LPS for treatment of endometritis in cows also recorded 100 per cent recovery rate, while it was only 66.67 - 80 per cent in case of oyster glycogen treatment (Singh et al., 2003 ; Sarma, 2007). More than 80 per cent recovery rate of metritis using intrauterine *E. coli* LPS in cattle was also reported by Shaktawat et al., (2006) - 85.71% and Prasad et al., (2009) - 83.00% . The higher rate of recovery of metritis following intrauterine infusion of *E. coli* LPS observed in the present study might be due to greater immune response of the metritic uterus to LPS following intrauterine infusion as compared to that of oyster glycogen.

### Conception rate

Conception rate in metritic cows treated with *E. coli* LPS, oyster glycogen and Ciprofloxacin with Tinidazole has been presented in Table 2. When post treatment inseminations were carried out in the same oestrus in which treatment was given, conception rate in *E. coli* LPS treated, oyster glycogen treated and Ciprofloxacin with Tinidazole treated cows was recorded as 16.66, 0.00 and 0.00 respectively. But when inseminations were carried out in the subsequent oestrus following treatment, conception rate was found to be 83.33, 50.00 and 50.00 % in *E. coli* LPS, oyster glycogen and Ciprofloxacin with Tinidazole treated cows respectively.

The desired level of conception rate following intrauterine treatment of metritis with *E. coli* LPS, Oyster glycogen and Ciprofloxacin with Tinidazole was obtained only when insemination were done in the subsequent oestrus following treatment.

Conception rate in *E. coli* LPS treated cows was found to be highest (83.33 %) followed by both oyster glycogen (50 %) and Ciprofloxacin with Tinidazole treated (50 %) cows indicating

superior immunomodulatory effect of *E. coli* LPS over oyster glycogen on intrauterine use.

Saini *et al.*, (1999) and Deori *et al.*, (2004) observed 78 and 83.33 per cent conception rate respectively in endometritic cows treated with LPS. The conception rate obtained in *E. coli* LPS treated cows under the present study (83.33 %) was similar to those recorded by the above mentioned workers. Singh *et al.* (2003) recorded lower conception rate of 66.66 % in endometritic cows following intrauterine treatment with Oyster glycogen. Shaktawat *et al.* (2006), Prasad *et al.*, (2009) and Kumar *et al.*, (2013) recorded conception rate in LPS treated cows as 71.43, 75.00 and 75.00 % respectively which was higher than that observed for oyster glycogen. This might be due to variation in uterine defence mechanism stimulatory effect of different immunomodulators.

## CONCLUSION

It might be concluded that *E. coli* LPS was more effective for treatment of metritis in cows as compared to oyster glycogen when used intrauterine.

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