

## Original Research Article

# Management of Endometritic Repeat Breeding Cross Bred Cow with Herbal Extract to Improve the Conception Rate

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## ABSTRACT

A total of 36 repeat breeders with homogenous endometritic symptoms were screened out and randomly allotted to six groups containing six animals in each group, viz. A, B, C, D, E and F and different regimens of herbal extracts and antibiotics were given for five days. Estrual cervical mucus samples were collected on the day of estrum before and after treatment (on next estrus) and tested for pH, white side test and bacterial load. The pH of estrual cervical mucus in all the groups before treatment was alkaline (more than 7.91). After treatment with herbal extract of Ashwagandha, Garlic & Turmeric alone or in combination and levofloxacin, the significant reduction ( $p < 0.05$ ) in pH in different groups was observed which ranged between 7.08 to 7.91. All the cows were positive for white side test before treatment. However, after treatment, 83.33% cows in group A, 33.33% cows in group C, 16.66% cows in groups B, D, E and F were found positive to white side test. Higher bacterial load was recorded prior to treatment which ranged from  $202.32 \pm 7.893$  to  $257.33 \pm 8.256 \times 10^6/\text{ml}$  in the cervical mucus of repeat breeders. A marked decline in bacterial load was observed in all the groups from pre-treatment to post treatment. Bacterial load was lowest in levofloxacin treated group B followed by rest group with herbal extract.

## Keywords

Herbal extract,  
Physio-chemical  
properties,  
Endometritis,  
Repeat breeder,  
Estrum

## Introduction

The productivity of the dairy cow is influenced by genetics and environment. The reproductive efficiency of animals and productivity are complementary to each other and are essential for the expression of total production potential. There is need to optimize the reproductive performance to maintain the efficient production cycle.

Optimizing reproduction means cattle should give birth to a calf every year despite reproductive challenges and limitations. The biggest concern for us is to ensure and maintain the reproductive challenges of our cattle. Uterine infection implies adherence of pathogenic organism to mucosa, colonization, penetration of the epithelium

and release of bacterial toxins, leading to establishment of uterine diseases (1). Incidence of clinical and subclinical endometritis in crossbred cows was (12%) and (29.69 %), respectively (1). Endometritis was diagnosed in (23.07%) with clinical endometritis in (15.31%) and sub-clinical in (7.77%). Previous history of dystocia resulted in (40.59%) of clinical endometritis and (47.52%) of sub-clinical endometritis (2). Placental retention caused clinical and sub clinical endometritis in (43.18%) and (37.50%) of the cows respectively.

Among various causes of Repeat breeders, the subclinical endometritis has been the main cause of conception failure (3). Bacterial endometritis constitutes a major cause of repeat breeding especially in crossbred cattle (4). Disruption of uterine defense mechanism, however, allows various opportunist pathogens, mostly microorganisms found in the posterior gastro-intestinal tract and around the perineal area, to induce endometritis (5). Several approaches have been employed to treat repeat breeding crossbred cows having endometritis including, antibiotics, antiseptic and hormonal therapy (6 and 7). However, there are certain limitation in the use of antibiotic & hormonal therapy, like development of drug resistance, residual effect of antibiotics & hormones in the milk & meat causing human health hazard, high cost of treatments, inhibition of normal uterine defense mechanism *etc.* (8). Existing hormonal therapy is believed by the masses to render harmful effects and impairs the physiological activity causing another disorder (9).

Herbal plants have been used as a source of valuable medication in virtually all cultures worldwide due to presence of important antimicrobial principles, immunomodulatory

activities, and maintenance of general health, precious therapeutic properties and healing potentials; thus, ensure prevention and cure for several diseases and disorders of humans and animals (10 and 11). Therefore, herbal preparations were used for treatment of infectious-endometritis and repeat breeding condition in cows in the present study.

## **Materials and Methods**

A total of 36 repeat breeding crossbred cows with similar endometritis symptoms were selected based on history, symptoms, breeding records and per rectal examination. Further, subclinical endometritis was diagnosed by white side test. The endometritic repeat breeding cows were then randomly allotted to six groups containing six animals in each group, viz. A, B, C, D, E and F and different regimes of drugs were followed for five days. In group A, 30 ml NS was administered, once a day (OD), intrauterine (I/U). In group B, 30 ml Levofloxacin was administered, OD, I/U. In group C, 30 ml Ashwagandha extract was administered, OD, I/U. In group D, 30 ml Garlic extract was administered, OD, I/U. In group E, 30 ml Turmeric extract was administered, OD, I/U. In group F, 30 ml (Ashwagandha+ Garlic +Turmeric) extract was administered, OD, I/U. Estrual cervical mucus samples were collected on the day of estrus before and after treatment (on next estrus) and tested for pH, white side test and bacterial load. At subsequent estrus after treatment, all the animals treated were inseminated. Cows, which returned to heat after first insemination were again inseminated at second and third subsequent estrus after treatment. Pregnancy was confirmed per-rectal after 45-60 days of insemination. The data generated were analyzed using analysis of variance (ANOVA) and Chi-square test (12).

**Results and Discussion**

The efficacy of treatment by herbal extracts & antibiotic were assessed based on recovery rate and subsequent conception following insemination. Perusal of table- 1 revealed that after treatment by Ashwagandha, Garlic and Turmeric extract alone or in combination in different groups, maximum recovery and conception rate as 83.33% & 66.66% respectively were achieved in combined herbal extract treated group F followed by 83.33% & 50% respectively in both Garlic and Turmeric treated groups D & E. Among herbal extract treated groups lowest recovery and

conception rate as only 66.66% & 33.33% respectively were achieved by Ashwagandha treated group C in comparison to control group A(16.66 & 0%).

Higher recovery rate in Garlic & Turmeric treated groups D & E might be due to significant reduction in bacterial load as Garlic & Turmeric extract has good antimicrobial property (15, 16, 17 and 18). Better recovery & conception rate observed in combined herbal extract treated group might be due to their synergistic effect, combined broad spectrum antibacterial & good immunomodulatory properties (13 and 14).

**Table.1** Recovery rate (%) and conception rate (%) in different groups of endometritic repeat breeding crossbred cows after treatment

S. No.	Groups	No. of animals	Recovery Rate (%)	Conception Rate (%)
1	Group A (Control)	6	16.66 (1) <sup>B</sup>	0 (0) <sup>B</sup>
2	Group B (Antibiotic)I/U	6	83.33 (5) <sup>A</sup>	83.33 (5) <sup>A</sup>
3	Group C (Ashwagandha) I/U	6	66.66 (4) <sup>AB</sup>	33.33 (2) <sup>AB</sup>
4	Group D (Garlic) I/U	6	83.33 (5) <sup>A</sup>	50 (3) <sup>A</sup>
5	Group E (Turmeric) I/U	6	83.33 (5) <sup>A</sup>	50 (3) <sup>A</sup>
6	Group F(Ashwagandha + Garlic + Turmeric) I/U	6	83.33 (5) <sup>A</sup>	66.66 (4) <sup>A</sup>

Values bearing different superscripts (A, B) vary significantly (p<0.05) between groups. Values in parenthesis indicated number of animals.

**Table.2** Average zone of inhibition & *In-vitro* antibacterial sensitivity of herbal extracts and antibiotic against bacterial samples in cervical mucus of endometritic repeat breeding crossbred cows

S. No.	Drug / extract	Zone of inhibition (mm)
1	Ashwagandha	8 – 12
2	Garlic	10 – 14
3	Turmeric	13 – 17
4	Ashwagandha + Garlic + Turmeric	15 – 19
5	Amoxicillin (10 mcg)	10 – 14
6	Ciprofloxacin (10 mcg)	17 – 20
7	Enrofloxacin (10 mcg)	16 – 18
8	Gentamicin (10 mcg)	12 – 16
9	Levofloxacin (5 mcg)	18 – 24

**Table.3** Average zone of inhibition & *In-vitro* antibacterial sensitivity of diluted herbal extracts of Ashwagandha, Garlic, Turmeric and Ashwagandha + Garlic + Turmeric against bacterial samples in cervical mucus of endometritic repeat breeding crossbred cows

Sl. No.	Extract	Dilution	Zone of inhibition
1	Ashwagandha	1:5	4 - 8
		1:10	2 - 3
		1:15	0
2	Garlic	1:5	6 - 10
		1:10	3 - 7
		1:15	0
3	Turmeric	1: 5	5 - 9
		1:10	2 - 4
		1:15	0
4	Ashwagandha+Garlic+Turmeric	1:5	8 - 12
		1:10	3 - 7
		1:15	0

The treatment of endometritic cows with Garlic extract enhances the immune system by stimulating the release of cytokines such as IL-2, IFN- $\alpha$ , IFN- $\gamma$  and increase the natural killer activity and phagocytic activity of peritoneal macrophages (19). Curcumin an active ingredient of Turmeric potent immunomodulatory agent modulates the activation of T cell, B cells, macrophages, neutrophils, natural killer cells, and dendritic cells. It also regulate the expression of various pro inflammatory cytokines including TNF, 1L-1, 1L-2, 1L-6, 1L-8, 1L-12 and chemokine's, most likely through inactivation of the transcription factor NF-Kappa B (20).

About 75% recovery rate and 50 % conception rate after treatment with Ashwagandha extract alone as compared to control group. However, in the present study only 66.66% recovery rate & 33.33% conception rate was recorded as compared to control group (13).

In the present study 83.33% recovery and conception rate was recorded in Levofloxacin treated group B as compared to control group A. (21, 22 and 23) had been

found similar findings However lower recovery & conception rate as 78.26% and 72.22% respectively was recorded (24). Chi-square analysis revealed significantly greater values ( $p < 0.05$ ) for conception rate in group B and F as compared to control group A. The difference between group B and group F was non-significant. However, there was no significant difference in conception rate among other groups also.

### References

1. Pillai, V.V. (2012). Efficacy of simultaneous use of enrofloxacin and metronidazole in the treatment of endometritis in cross bred cattle a field trial. *JIVA*, 10(2): 37- 39.
2. Zobel, R Thalcici S, Buic, V., Pipal I., Geres, D and Samardzija M. (2011). Repeat breeder syndrome in dairy cows influence of breed and age on its prevalence and the success of a hormone therapy. *Turkistan J. Vet. Anim. Sci.*, 35(6): 405-411.
3. Arthur, G.H., Noakes, D.E. and Pearson. H. (1989). In *Veterinary Reproduction and Obstetrics*. 61 ed. Billiere, tindall, London. pp. 384-388.

4. Maurya, S.N., Dabas, Y.P.S. and Gupta, R.S. (1992). A note on bacteriological studies of cervical secretion of infertile cows and buffaloes. *Indian J Anim. Reprod.*, 20(1): 49-50.
5. Singh, B. (2005). Therapeutic efficacy of neem (*Azadirachta indica*) in cows with endometritis. Thesis, M.V.Sc. IVRI, Izatnagar. 2p.
6. Hussain, A.M. and Daniel, R.C.W. (1991). Bovine endometritis current and future alternative therapy. *J. Vet. Med. Ser. B.3*: 641-651.
7. Vijayanjan, A., Chandrasan, C. And EzakialNepolean, R.Z. (2007). Effect of Pre and post insemination substitution of GnRH in repeat breeding buffaloes. *Indian Vet. J.*, 84: 940 – 943.
8. Whitmore, H.L. and Anderson, K.L. (1986). Possible adverse effects of antimicrobial, treatment of uterine infections. In: Morrow, D.A. ed. current therapy in *Theriogenology*. 2<sup>nd</sup> ed. Philadelphia, W.B. Saunders Company. PP. 42-44.
9. Jadhav, A. N. and Bhutani, K.K. (2005). Ayurveda and gynaecological disorders. *J. Ethnopharmacol.*, 97: 151-159.
10. Mahima, A. Rahal, R. Deb, S.K. Latheef H.A and Samad. (2012). Immunomodulatory and therapeutic potentials of herbal, traditional/indigenous and ethno veterinary medicines. *Pak. J. Biol. Sci.*, 15: 754-774.
11. Rahal, R., Mahima, A., Verma, A. K., Kumar, A. and Tiwari, R. (2014). Phytonutrients and nutraceuticals in vegetables and their multi-dimensional medicinal and health benefits for humans and their companion animals: A review. *J. Biol. Sci.*, 14: 1-19.
12. Snedecor, G. W. and Cochran, W. G. (1989). *Statistical Methods*. 8<sup>th</sup> ed. Iowa, The Iowa State University Press. pp. 503.
13. Rahi, S. (2011). Immunotherapeutic effect of Ashwagandha and Garlic on endometritis in repeat breeding crossbred cows. M.V.Sc. Thesis, G.B. Pant University of Agriculture and Technology, Patnagar. Pp 68.
14. Mishra, L.C., Singh, B, B. and Dagenasis, S. (2000). Scientific basis for the therapeutic use of *Withania somnifera* (Ashwagandha). A review. *Altern Med Rev.* 5(4): 334-346.
15. Kim, K.J., Yu, H.H., Cha, J.D., Seo, S.J., Choi, N.Y. and You, Y.O. (2005). Antibacterial activity of *Curcuma longa* L. against methicillin-resistant *Staphylococcus aureus*. *Phyther. Res.*, 19: 599-604.
16. Hedge, M.N., Shetty, S., Yelapure, M. and Patil, A. (2012). Evaluation of antimicrobial activity of aqueous and hydro-alcoholic *Curcuma longa* extracts against endodontic pathogens. *IOSRJ. Pharmacy.* 2(2): 192-198.
17. Meriga, B., Mopuri, R., & Murali Krishna, T. (2012). Insecticidal, antimicrobial and antioxidant activities of bulb extracts of *Allium sativum*. *Asian Pacific journal of tropical medicine*, 5 (5): 391-395.
18. Viswanathan, V., Phadatare, A.G. and Mukne, A. (2014). Antimycobacterial and Antibacterial Activity of *Allium sativum* Bulbs. *Indian J. Pharm. Sci.*, 76 (3):256-261.
19. Sarkar, P., Kumar, H., Rawat, M., Varshney, V.P., Goswami, T.K., Yadav, M.C. and Srivastava, S.K. (2006). Effect of administration of Garlic extract and PGF2 alpha on hormonal change and recovery in endometritis cow. *Asian Australian J Anim. Sci.*, 19(7): 964-969.
20. Jagetia, G.C. and Aggarwal, B.B.

- (2007). "Spacingup" of the immune system by curcumin. *J. Clin. Immunol*, 27(1):19-35.
21. Bhat, F.A., Bhattacharya, H.K., Hussain, A., Nadeem, M. and Wani, A.R. (2013). Microbial profile, Antibiogram and Conception rate following treatment in Repeat breeder cows *Intas Polivet*, 14 (1): 42-48.
22. Singh K.P., Singh B, Singh S.V., Singh J.P., Singh P, Singh H.N.(2014). Comparative Evaluation of Anti-microbial in Treatment and Improving Conception rate in Endometritic Crossbred cows *Intas Polivet*, 15: 79-82
23. Kumar M., Pant, S. S., Ram, R., Kumar, S. and Gupta. P. K. (2014). Therapeutic efficacy of levofloxacin along with vitamin-E for the management of repeat breeding syndrome in cow under field condition. *Inter J Vet Sci.*, 3(3): 155-157.
24. Bhattacharyya, H. K., Makhdoomi, D.M., Hafiz, A. and Fazili. M.R. (2011). Clinico-Therapeutic management of sub clinical metritis in cows. *Intaspolivet*, 12: 26-27.