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Haematological effect of garlic and turmeric in endometritic cattle

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Abstract
Total 24 endometritic cattle selected and randomly allotted to four groups (A, B, C and D) containing six animals in each group and given herbal extract for 5 days. Estrus cervical mucous and blood were collected before and after treatment. Estrus cervical mucous was collected for pH and white side test estimation and blood was collected for estimation HB, PCV, TEC, TLC, Neutrophils and Glucose estimation. The pH of cervical mucous before treatment was alkaline (more than 8.10) in each groups. After treatment with herbal extract of Garlic and Turmeric alone or in combination we were observed the significant reduction (p<0.05) of pH in different treatment groups which ranged between 7.10 to 7.90. Hb, PCV, TEC, Lymphocyte and Glucose were significantly increased in all the treatment groups whereas we observed the TLC and Neutrophil were significantly decreased in all treatment groups.

Keywords: Endometritis, haematological, garlic, turmeric, herbal extract

Introduction
Postpartum endometritis in dairy cows has been defined as inflammation of endometrium occurring 21 days or more after parturition without systemic signs of illness (Sheldon *et al.*, 2006) [23]. Presently, treatment of such infertility is mainly achieved using intrauterine antibiotics, antiseptics and less commonly by hormones (Mahour *et al.*, 2020) [18]. Postpartum reproductive disorders cause heavy economic losses in dairy sector. Uterine infections include endometritis, metritis, mucometra, and pyometra. Among all these uterine inflammatory diseases, endometritis is one of the major gynecological problems affecting reproductive efficacy and economy of milk production in dairy animals (Mandhwani *et al.*, 2017) [19]. Incidence of clinical and subclinical endometritis in crossbred cows was (12%) and (29.69 %), respectively (Kumar *et al.*, 2018) [15]. However, there are certain limitation in the use of antibiotic & hormonal therapy also, 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 defence mechanism etc. (Whitmore & Anderson, 1986) [25]. Various sesquiterpenes and curcuminoids have been isolated from the rhizome of Turmeric (*Curcuma longa*), it attributes a wide array of biological, anti-inflammatory, wound healing, anticancer and antibacterial activity (Gul and Bakht 2015) [8]. The anti-inflammatory action of turmeric includes lowering histamine levels and increasing the production of natural cortisone by adrenal glands. It inhibits release of the pro-inflammatory cytokine TNF-α and the gene that makes inflammatory COX-2 enzymes (Kumar *et al.*, 2018) [15]. Hydro-alcoholic and aqueous extract of turmeric showed inhibitory activity against *Staphylococcus aureus*, *S. epidermis*, *Klebsiella pneumoniae* and *E. coli* (Kumar *et al.*, 2018) [15]. The methanol extract of turmeric revealed MIC values of 16 μg/mL and 128 μg/mL against *Bacillus subtilis* and *Staph. aureus* respectively (Ungphaiboon *et al.*, 2005) [24]. Many pharmacological properties are attributed to garlic or its ingredients (Jawad 2007) [10]. One of the active principles of freshly cut garlic homogenates is allicin, which has a variety of antimicrobial activities, and the antibiotic activity of 1mg of allicin is equated to that of 15 IU of penicillin (Alagar *et al.*, 2018) [1]. 200mg dose of garlic per day for 30 days did not have any significant change in the red blood cell count (RBC) and packed cell volume (PCV). However at 100mg per day for the same duration, garlic increased red blood cell count and packed cell volume significantly. The same dose (100mg) of garlic similarly and significantly increased total white blood cell count (WBC), neutrophil and lymphocyte counts (P<0.05). Garlic thus promote leucopoiesis and increases neutrophil (Oluwole 2010) [21].

The present study was carried out to evaluate the efficacy of Garlic and Turmeric extract I/U infusion in repeat breeding cows.

Material and Method

24 animals were selected for on the basis of History and breeding records, Per-rectal examination, pH of estrual mucus and White side test of cervical mucus. The animal were devided into four groups with six animals in each group, viz A, B, C and D. In group A 30 ml NS intra uterine once daily. In group B 30 ml garlic intra uterine once daily. In group C 30 ml Turmeric intrauterine once daily and in group D 30 ml Garlic and Turmeric intrauterine once daily. All the groups were treated for 5 days. Estrus cervical mucous and blood were collected before and after treatment (At subsequent estrus). Estrus cervical mucous was collected for pH and white side test estimation and blood was collected for estimation HB, PCV, TEC, TLC and Glucose estimation. The generated data were analyzed using paired sample t-test.

Preparation of crude extract of garlic

Garlic cloves were peeled off and taken in a sterilized pestle-mortar and crushed properly to make paste. The crushed material was first filtered twice through muslin cloth and finally through filter paper. The filtrate was centrifuged at 3000 revolution per minute (rpm) for 15 minutes in a refrigerated centrifuge and supernatant was decanted and stored at 4 °C for further use.

Preparation of hydro-alcoholic extract of turmeric

Turmeric rhizomes were taken and dipped in water for overnight to dissolve and remove the foreign particles and dust. The rhizomes were washed properly with tap water followed by three changes of distilled water and disinfested for 2 minute in 70% ethanol. The sample was dried in incubator at 37 °C for a period of 5-6 days. The dried material was pulverized by a mechanical mixer grinder (Sterilized) and passed through muslin cloth to obtain fine powder, which was stored in a sterilized, clean, wide mouthed, air tight bottle at room temperature for further processing.

Treatment protocol

A total of 24 screened out endometritic crossbred cows were then randomly allotted to four groups containing six animals in each group and different regimens of herbal extracts were given as per following schedule.

Group A (Control): NS @ 30 ml IU/Animal once daily.
Group B (Garlic): @ 10% IU/Animal once daily.
Group C (Turmeric): @ 30 ml IU/Animal once daily.
Group D (Garlic + Turmeric): @ 30 ml IU/Animal once daily.

Result and Discussion

The efficacy of treatment by herbal extract was valuate on recovery rate. Fig 1 concede that after treatment by Garlic and Turmeric extract alone or in combination in different groups, maximum recovery rate as 83.33% achieved in combined herbal extract, Garlic and Turmeric in comparison to control group (16.66%).

Garlic extract bears antimicrobial property against Gram positive and Gram-negative bacteria it also stimulate the release of cytokines such as IL-2, IFN-α, IFN-γ and increase the natural killer activity and enhances phagocytic activity of peritoneal macrophages (Chung *et al*., 2003) [4].

Turmeric shows anti-inflammatory action includes lowering histamine levels and increasing the production of natural cortisone by adrenal glands (Rathaur *et al.,* 2012). It inhibit the growth of *Staphylococcus aureus, Salmonella paratyphi, Trichophyton gypseum, Mycobacterium tuberculosis* (Khanna, 1999 and Hedge *et al.,* 2012) [12, 9].

Haemoglobin (gm/dl) value at post treatment subsequent estrus in all the treatment groups B-D was significant increase whereas, in control group A the difference between pre & post treatment haemoglobin value was non-significant. Haemoglobin value increase after treatment with different herbal extracts in endometritic repeat breeding cows Kumar *et al.* (2013) [14]. Haemoglobin increased after treatment with turmeric Amin *et al.* (2010) [2].

PCV value recorded in the present study were significant increase in all the treatment groups B-D. But in control group A, the difference between pre and post treatment value was non-significant. The present pre and post treatment PCV values were in agreement with the findings of Kumar (2013) [14]. After treatment with herbal extracts of garlic and turmeric restoration of normal PCV might have been achieved by activation of non-specific uterine defense mechanism Amin *et al.* (2010) [2].

TEC value significant increase from pre to post treatment in all the treatment groups (B to D) except control group A. The present finding is in agreement with the findings of Kumar (2013) [14]. The significant improvement in mean TEC to its physiological range at post treatment subsequent estrus indicated the effectiveness of antibiotic and herbal extracts. Amin *et al*. (2010) [2] also found that RBCs increased after treatment of endometritis with neem & turmeric. Kumar (2013) [14]. RBCs increased after treatment of endometritis with turmeric Amin *et al.* (2010) [2].

TLC value which decreased at Post treatment with herbal extracts subsequent estrus in all the treatment groups (B to D). After treatment, the mean TLC values in all the treatment groups were significantly low as compared to Control group indicating recovery of the treated cows. The present findings of TLC of pretreatment are in agreement with the findings of Sarma (2007) [22].

The neutrophilia in the present study at pre-treatment might be due to chronic walled of inflammatory lesions. A significant decrease ($P \leq 0.05$) in the mean neutrophil count was recorded from pre to post treatment in all the herbal extracts treated group. After treatment mean neutrophil in all the treated group were significantly lower than control group. The present findings are in accordance to the findings of Kekan *et al.* (2005) [11] who reported neutrophilia in endometritic cows.

The lymphopaenia observed in the present study might be a relative lymphopaenia developed as a result of neutrophilia and/or due to extravasation of lymphocyte from the circulation to the site of inflammation or infection (Benjamin, 1985) [3]. Lymphopenia was observed at pre-treatment in all the groups. Similar mean lymphocyte percent count in infections repeat breeding cow was reported by Kumar *et al.* (1985) [14].

The present findings are lower than the normal blood glucose concentration found in cyclic fertile cows (Dickson., 1984) [5]. Lack of sufficient energy, carbohydrate, proteins and other elements as glucose & cholesterol are necessary to maintain body weight may cause a failure in fertility (Nejad & Cheraghi, 2003) [20]. Suggest that glucose may be a metabolic signal providing information for the control of GnRH

secretion (Foster and Nagatani 1999) [7]. Glucose thus appears to be centrally involved in the release of LH and this presumably reflects its role in modulating GnRH release (Diskin *et al.*, 2003) [6].

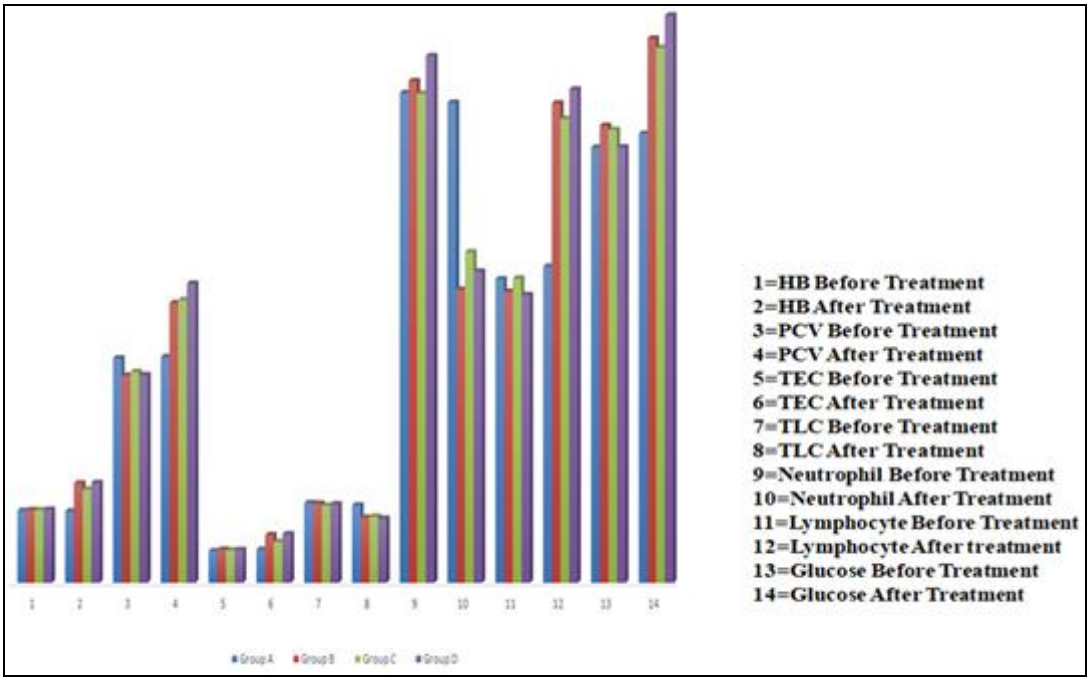

Fig 1: Blood profile estimated before and after treatment. The figure clearly explains that value of HB, PCV, TEC, Lymphocyte and Glucose increased after treatment applied whereas value of TLC and Neutrophil decreased after treatment

Conclusion

On the basis of the result of the present study, it may be concluded that the hydroalcoholic extract of turmeric alone or in combination with garlic may be recommended as alternative treatment for endometritic repeat breeding crossbred cows over conventional antibiotic therapy.

Future scope

Present study was designed to find out the antibacterial, immunomodulatory & therapeutic efficacy of garlic & turmeric alone or in combination. The study also compared and recommended the standard dose of different plant extract for the treatment of endometritis in repeat breeding cows but many aspects are not understood from this study which may be evaluated subsequently to achieve better understanding on therapeutic management of endometritis using different herbal plants.

1. Elaborative study maybe under taken to find out effective, safe medicinal plants to treat different stage of endometritis in cows.
2. Major molecule extraction from different plant source may be carried out to find the exact molecule responsible in treatment of endometritis.
3. Further investigations on many more plants can be carried to get most effective phytochemical agent for treatment of endometritis.
4. Detail investigations on dose and concentration of several phytochemicals can be carried further.

References

1. Alagar S, Selvaraju M, Napolean RE. Phytotherapy (Garlic-*Allium sativum*) in Endometritis Affected Buffalo. International Journal of Current Microbiology and Applied Sciences. 2018;7(3):762-765.
2. Amin MR, Mostofa M, Islam MN, Asgar MA. Effects of neem, betel leaf, devil's tree, jute and turmeric against gastrointestinal nematodes in sheep. Journal of the Bangladesh Agricultural University. 2010;8(2):259-263.
3. Benjamin MM. Outline of Veterinary Clinical Pathology, 3rd Edn., Kalyani Publishers, New Delhi. 1985;44:79-92, 127-129, 145-146.
4. Chung KS, Kang SY, Kim JY. The antibacterial activity of garlic juice against pathogenic bacteria and lactic acid bacteria. Korean J Microbiol. Biotech. 2003;31(1):32-35.
5. Dickson WM. Dukes Physiology of Domestic Animals. 10th edition Comstock Publishing Associates, London, 1984.
6. Diskin MG, Mackey DR, Roche JF, Sreenan JM. Effects of nutrition and metabolic status on circulating hormones and ovarian follicle development in cattle. Animal Reproduction Science. 2003;78(3-4):345-370.
7. Foster DL, Nagatani S. Physiological perspectives on leptin as a regulator of reproduction: role in timing puberty. Biology of Reproduction. 1999;60(2):205-215.
8. Gul P, Bakht J. Antimicrobial activity of turmeric extract and its potential use in food industry. Journal of food science and technology. 2015;52(4):2272-2279.
9. Hedge MN, Shetty S, Yelapure M, Patil A. Evaluation of Antimicrobial Activity of Aqueous and Hydro-Alcoholic Curcuma Longa Extracts against Endodontic Pathogens. IOSR Journal Pharmacy. 2012;2(2):192-198.
10. Jawad Ala Al Deen H. Some haematological and biochemical effects of garlic on broiler chicken. Bas. J Vet. Res. 2007;6(2):56-63.
11. Kekan PM, Shirbhate RN, Nimbukar MV. Haematological studies during oestrous cycle in regular and repeat breeding cows. The Indian veterinary journal. 2005;82:805-806.
12. Khanna NM. Turmeric-Nature's precious gift. Current Science. 1999;76(10):1352-1356.
13. Kumar A. Evaluation of immunomodulatory and therapeutic efficacy of turmeric (*Curcuma longa*) neem

(*Azadirachta indica*) and garlic (*Allium sativum*) on endometritis in repeat breeding crossbred cows. M.V.Sc. Thesis, G.B. Pant University of Agriculture and Technology, Pantnagar, 2013.
14. Kumar A, Gupta HP, Prasad S. Studies on the immunomodulatory and therapeutic efficacy of Neem (*Azadirachta indica*) on endometritis in repeat breeding cross bred cows. The Indian Journal of Animal Reproduction. 2013;34(2):1-5.
15. Kumar A, Gupta HP, Prasad S. Studies on the immunomodulatory and therapeutic efficacy of turmeric (*Curcuma longa*) on endometritis in repeat breeding crossbred cows. International Journal of Agriculture Sciences. 2018;10(2):5069-5072.
16. Kumar N, Singh B. Some pathological conditions involving tubular genitalia in female buffaloes (*Bubalus bubalis*). Indian Journal of Animal Sciences. 1985;55:159-163.
17. Kumar R, Sinha MP, Kumar A, Kurmi DJ. Management of Endometritic Repeat Breeding Cross Bred Cow with Herbal Extract to Improve the Conception Rate. International Journal of Current Microbiology and Applied Sciences. 2018;7:4621-4626.
18. Mahour SS, Nema SP, Rajput N, Chhabra D, Karmore SK. Therapeutic efficacy of ethanolic herbal extracts and ciprofloxacin in metritis crossbred cows. 2020;8(5):1221-1224.
19. Mandhwani R, Bhardwaz A, Kumar S, Shivhare M, Aich R. Insights into bovine endometritis with special reference to phytotherapy. Veterinary World. 2017;10(12):1529-1532.
20. Nejad SG, Cheraghi J. The study of serum level of glucose, cholesterol, triglyceride, Albumin and total protein in repeat breeder native cows In Ahwaz (Iran). Acta. Vet. Scand. Suppl. 2003;44(1):98.
21. Oluwole FS. Effects of garlic on some haematological and biochemical parameters. African Journal of Biomedical Research. 2010;4(3):139-141.
22. Rathaur P, Raja W, Ramteke PW and John SA. Turmeric: the golden spice of life. International journal of Pharmaceutical sciences and research. 2012;3(7): 1987-1994.
23. Sarma DK. Efficacy of certain immunomodulators in the treatment of endometritis in catte. Ph.D. Thesis submitted to B.A.U., Kanke, Ranchi, 2007.
24. Sheldon IM, Lewis GS, LeBlanc S, Gilbert RO. Defining postpartum uterine disease in cattle. Theriogenology. 2006;65(8):1516-1530.
25. Ungphaiboon S, Supavita T, Singchangchai P, Sungkarak S, Rattanasuwan P, Itharat A. Study on antioxidant and antimicrobial activities of turmeric clear liquid soap for wound treatment of HIV patients. Songklanakarin Journal of Science and Technology. 2005;27(2):269-578.
26. Whitmore HL, Anderson KL. Possible adverse effects of antimicrobial, treatment of uterine infections. In: Morrow DA. ed. current therapy in Theriogenology. 2nd ed. Philadelphia, W.B. Saunders Company, 1986, 42-44.