

# Treatment of Bovine Reproductive Illnesses using Traditional Medicines: A Systematic Review

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## Abstract

Grazing animal creatures rose for milk, meat and various agricultural purposes are known as cattle. These animals are referred to as bovines. Bovine reproductive disorders comprise a range of illnesses that affect cattle's reproduction systems in both sexes. These diseases can have a major effect on the herd's overall fertility and reproductive health. Mastitis, endometritis, dystocia, retained placenta, metritis and other sexually transmitted disease are found in reproductively troubled cattle. This comprehensive review, which assesses a range of traditional medical approaches applied in multicultural contexts, addresses endometritis and infertility among other reproductive issues in cattle. Apart from assessing the effectiveness of these traditional treatments, the study provides an overview of their comparative analysis with antibiotics, which are used for disorders related to cow reproduction. Using conventional medical techniques as potential remedies, it explores a range of problems affecting cow reproduction. This study broadens its scope to include a detailed analysis of anestrus as well as how it is classified, uterine infection diagnosis techniques, the causes and management of cow mammary gland infections. This investigation seeks to provide important data to advance our knowledge of alternative approaches for managing the reproductive health of cows. It can influence the development of comprehensive, sustainable solutions to these pressing problems in livestock production.

**Keywords:** Bovine, Mastitis, Medicines, Reproductive, Disorder, Anestrus

## INTRODUCTION

One of the main factors influencing an animal's lifetime performance is its fertility. Reproductive efficiency is negatively impacted by reproductive diseases. Infertile dairy animals hurt milk yield, the number of calves born and the rate of culling, which results in significant financial losses for both the farmers and the country (1). Cattle are not as good at reproducing as other livestock species that are fertile or give birth to a litter. A herd's ability to produce dairy, meat along with heifer replacements at a cost depends on the number of calves produced and raised throughout each breeding cycle. Accordingly, one of the top priorities in the cattle industry is keeping the reproductive performance of cows at its peak (2). Factors both infectious and non-infectious can influence the multi-factorial trait of bovine reproduction performance. One of the most destructive illnesses in dairy herds globally is bovine mastitis, which is caused by multiple distinct bacteria. *S. aureus* is the most common pathogen among these bacteria, responsible for the most severe cases of bovine mastitis and poses the biggest threat to the dairy industry worldwide. This bacteria consequence in major financial losses, such as a sharp drop in milk sales, issues with reproduction as well as costs associated with killing diseased animals, paying more for veterinary care and have to replace spoiled milk (3). One of the primary strategies for controlling mastitis is the use of antibiotics. Treatment results are influenced by several factors such as the severity of the condition, the medication of choice, the right dosage and usage of the medication and avoiding risk factors. The therapy of mastitis with antibiotics is under dispute to design an established regimen that can yield satisfying results because of its persistent intracellular presence in many forms that protect it from drugs and host defence mechanisms. They can revert to a more contagious wild-type phenotype, which increases the probability of further infections. Food, environment and genetic diversity in fertility are a few examples of non-infectious variables. A biological revolution has been brought by the rapid changes in the research of host-

associated microbial populations (4). In civilizations where animal husbandry is the main source of sustenance, ethnoveterinary medicine is pertinent. It is practiced wherever humans have a close relationship with animals. According too many theories, veterinary medicine evolved alongside human medicine and as a result of observing animals taking care of themselves.

### **Innovative strategies for mastitis management in dairy cows**

We measure the degree to which the two interrelated medical systems align with human health interventions and evaluate some possible reasons for these alignments (5). Gathering and documenting ethnopharmacological data about herbal remedies that Palestinian healers in the rural West Bank have traditionally used to treat male and female infertility (6). Using communication technology for epidemiological and educational uses, developing novel diagnostic and treatment approaches, employing contemporary mastitis vaccines, drying cows by protocols, cleaning teats, housing, feeding and breeding dairy cows resistant to the disease were examined in (7).

### **Advances in Cattle Reproduction**

The most recent advances in our understanding of the micro-biota in cow's reproductive tracts were detailed in article (8). The micro-biota compositions in each of the reproductive tract niches are explained. The production of in vitro fertilized embryos (IVP) and related technologies for cattle have evolved in recent years (9). IVP is used in conjunction with genomic selection (GS) along with sexed semen (SS) throughout North America, South America and Europe. The complex interactions are between the care and welfare of cattle and their reproductive processes (10). We contend that methods using sexed semen coupled with artificial insemination can enhance wellbeing by lowering the danger of harm and spreading illnesses for the selection of particular advantageous features.

### **Controlling Mastitis: Traditional Medicines & Contemporary Methods**

Using plant extracts and essential oils as herbal medicines has advantages and disadvantages that are covered in the article (11). The article discussed current problems with mastitis standard of care as well as the possible use of essential oils and plant extracts as stand-in agents for the treatment of these conditions and the accompanying risks (12). Information presented on a variety of plants used in medicine, animal husbandry and reproduction. To gather details regarding the historical use of herbal items in animal husbandry, they carried out an extensive analysis of the scientific literature (13). Using communication technology for epidemiological and educational purposes, developing novel diagnostic along with treatment approaches, employing modern mastitis vaccines, drying cows in accordance with protocols, cleaning teats, housing, feeding and breeding dairy cows immune to the disease were examined in this study on novel approaches to mastitis management (14). The objective of this systematic study is to assess traditional medicines efficacy in treating reproductive disorders of cows.

### **ANTIBIOTIC TREATMENT**

Every birth causes uterine illness, which most cows eliminate during uterine involution. However, the extent of pathogen colonization and the cow's capacity to mount an immune response determine the type of infection that can result, which can range from severe, life-threatening metritis to mild, non-persistent, or chronic endometritis and pyometra (15). Retaining foetal membranes (RFM) is a risk factor for dystocia, induced birth, abortion and delayed pregnancy. RFM has been found to have a significant role in the genesis of these postpartum problems. Bacterial isolates linked to uterine infections, such as *E. coli*, *A. pyogenes*, *M. hemolytica*, *Pseudomonas* spp., *Streptococcus* spp., *Staphylococcus* spp., *Clostridium* spp., *Fusobacterium* spp. and *Prevotella* spp., lower animal fertility by decreasing the probability of conception. Since manual RFM removal raises the risk of endometritis and metritis, it should be strictly forbidden. While antimicrobial therapy is not recommended for RFM alone, it is suggested to lower the chance of developing new problems. Parenteral therapy is recommended for puerperal inflammation since intrauterine antibiotics are not very effective in treating the ailment. Some people prefer to use bactericidal antibiotics to treat pyaemia and systemic infections when broad spectrum cephalosporins and penicillins work well. The recommended medication is ceftiofur since it can reach levels in

uterine tissue and fluid that are higher than the majority of frequent metritis infections of minimum inhibitory concentrations (MIC). Table (1) shows the herbal medicines for the treatment of mastitis.





**Table (1).** Treatment of mastitis by using plants (Source: Author)




S.no	Name of the plant	Parts used	Local name	Reference
1.	Aloe vera	Leaves	Aloe	(16)
2.	Curcuma longa	Rhizome	Turmeric	(17)
3.	Acacia nilotica	Leaves	karijali	(18)
4.	Neem	Bark, seeds, leaves	Azadiractaindica	(19)

## DISORDERS OF CATTLE REPRODUCTION

Despite more awareness and professional attention over the past ten years, reproductive indices that are used to evaluate reproductive management have shown a negative trend (20). Low fertility is caused by insufficient estrus detection (21). It was widely accepted that the farmer's lack of commitment was the reason for the poor detection of estrus (22). Nonetheless, studies (23) demonstrated that the low detection rates are caused by cow-related factors. The idea of giving dairy cows nutritional supplements to enhance their reproductive health has gained traction in recent years. The postpartum phase is linked to diseases that are related to reproduction and veterinary expenses. The most important temporary stage in cow lives is the postpartum period, during which several physiological, gynecological and biochemical changes take place (24). Cattle are at a significant risk of uterine infection during this time because the genitalia stay open for a few days and the anatomical barriers are relaxed (25). A lengthy state of sexual quiescence is called anestrus. It can be pathological, where the ovaries are either quiescent (real anoestrus) or include progesterone-secreting luteal tissue as a result of some uterine pathology, or it can be physiological (pubertal, a brief period postpartum, or during pregnancy). Numerous approaches have been proposed to control real anestrus with different medications (26). Early postpartum oestrus initiation and an increased pregnancy rate have been linked to the supplementation of antioxidant and immune modulator agents during the transition phase (27). Treatment for reproductive problems and other related reproductive diseases has been discovered that benefit from a wide variety of medicinal plants and their preparations as shown in Table (2).

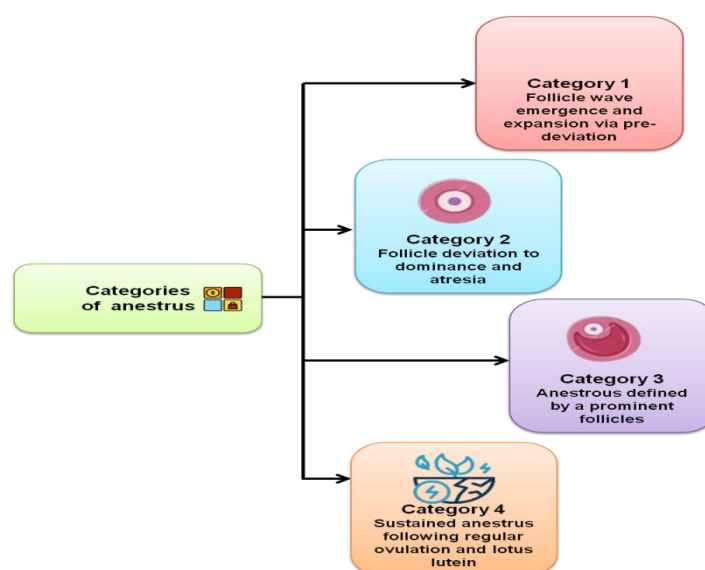
**Table (2).** Plants used to treat reproductive issues in cows (Source: Author)

S. No	Plants Botanical Name	Disorder
1	Myrtus communis 	Prolapse of uterus
2	 Nigella sativa, Pedalium murex	Puerperal and uterine diseases
3	Entadapursoetha 	Uterine disorders
4	Plantago species 	Postpartum complaints

5	Viola species 	Uterine prolapse
6	Viburnum foetidum 	Post partumhaemorrhage, threatened abortion
7	Pandanusodoratissimus 	Sterility and threatened abortion

## ANESTRUS

Anestrus is defined as a condition in which there is no oestrus for more than two months and total sexual inactivity. Inactive ovaries are linked to the anestrus state and while follicular development occurs, none of the developing follicles mature to the point of ovulation. Based on ovarian activity, three general categories can be used to categorize anestrus: ovulatory, anovulatory and inactive. The anestrus distinguishes three kinds of anovulation: anovulation with follicular expansion up to emergence, anovulation with follicular growth up to divergence but not ovulatory size and anovulation with follicular improvement up to ovulatory size. Figure (1) shows the categories of anestrus.

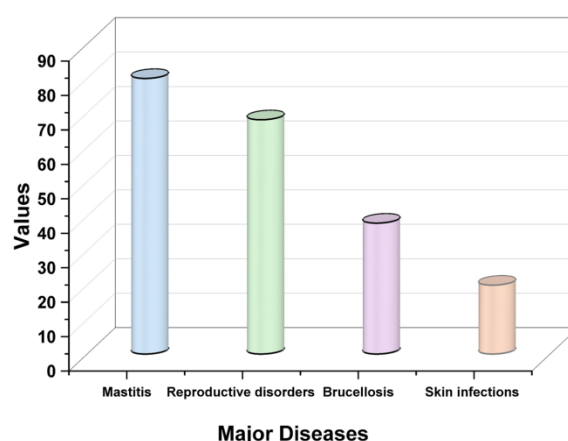


**Figure (1).** Types of anestrus (Source: Author)

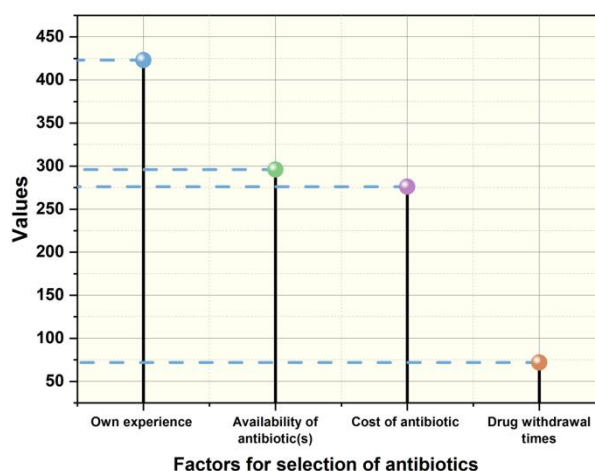
Anestrus is the outcome of several interrelated circumstances, including physiological, pathological, managerial and dietary aspects. These variables affect the length of postpartum anestrus and include breed, age and body condition at calving, pre and postpartum nutrition, suckling, calving season, milk yield, delayed uterine involution, absence or presence of the bull, dystocia, as well as general health status. The placenta's heavy production of steroids, particularly progesterone and E2, in the latter stages of pregnancy has a strong negative feedback loop that lowers the hypothalamus's release of GnRH. Follicle development and maturation, ovulation and the continuation of cyclicity are caused by elevated gonadotropin levels, as well as the release of gonadotropins from the anterior pituitary and GnRH from the brain.

## DIAGNOSIS OF UTERINE INFECTIONS

The aggressiveness of the causing organisms and the existence of disease-predisposing variables influence the clinical symptoms of uterine infection. In the first few weeks following calving, lochia is discharged from the reproductive canal; if uterine involution is delayed, this discharge can last for up to 30 days. A regular discharge can be dark brown, white, or red in colour. Unless the fluid is malodorous or there are other aberrant clinical indicators, it shouldn't be considered abnormal (28). Feminine serosanguineous discharge from the reproductive system is a common symptom of uterine infections during the puerperal stage. In addition to diminished milk production and the cow's potential inability or unwillingness to stand up, further clinical symptoms of puerperal metritis include depression, partial, fever or total anorexia and laminitis (29). Vaginal discharge that is white or whitish-yellow mucopurulent is one of the clinical indicators of endometritis (30). While the cervix dilates and vaginal mucous is abundant during oestrus, the amount of the discharge differs but increases. A systemic sickness in cows is unusual, yet they could exhibit mild depression in their appetite and milk supply (31). Figure (2) lists the main illness problems that affect cows and necessitate the use of antibiotics. The top three illness situations in cows where antibiotics are administered, according to veterinarians, are hemo-protozoan infections ( $n = 231$ ), reproductive abnormalities ( $n = 343$ ) and mastitis ( $n = 410$ ). Many factors affected the decision on which antibiotics to use for different illnesses and conditions in cows. Figure (3) shows the factor selection of antibiotics.



**Figure (2).** Significant illness issues in Indian cows that call for the use of antibiotics (Source: Author)



**Figure (3).** Factors influencing veterinarians' decisions about which antibiotics to use (Source: Author)

## THE MAMMARY GLAND'S INFECTION MECHANISM

In dairy cows, the main cause of intra-mammary infections (IMIs) is bacterial invasion of the mammary gland. The mammary gland is invaded by a variety of microbial infections, including gram-positive and gram-negative species. The mammary gland can become infected directly from the environment or by animals interacting with one another; these conditions are known as contagious mastitis and environmental mastitis, respectively. The main culprits of environmental mastitis in cows are microorganisms found in their surroundings (32), such as the soil, tainted water, dung and bedding. Environmental streptococci like *Streptococcus uberis* and coliform organisms like *Escherichia coli* are the most prevalent infections that cause mastitis in the environment. Coliform bacteria are the primary cause of 70–80% of instances of community-onset pneumonia. It has been shown that coliform infections in the mammary gland last for 10 days (33). Nonetheless, research indicates that 1.5% of *E. coli* infections persist for more than 100 days (32). The infection-causing pathogen's serotype can account for the variation in duration. It has been discovered that the duration inside the mammary gland is three times longer than that of streptococci germs. Bacteria that cause contagious mastitis spread from cow to cow, usually through the milker or milking machinery. To minimize spreading, it has become crucial to dry, wash and dip each teat during milking (34). *Staphylococcus aureus* is the primary pathogen of concern for infectious mastitis and has been demonstrated to be one of the more challenging infections to manage and treat (35). According to research by (36), *S. uberis* and *S. aureus* were responsible for the majority of clinical mastitis (CM) cases.

## Management of Infections in the Mammary Gland

Antibiotics have been used to treat and prevent illness in animals raised for food and this is one of the best strategies to lower IMI. It has been shown that the highest risk for a cow to establish a new IMI that occurs around parturition and the beginning of dry-off (37). An antibiotic medication known as dry cow therapy (DCT) is given to cows during their dry off period. DCT has the advantage of lowering the quantity of pathogenic microorganisms in the mammary gland, which lowers the risk of new IMI after delivery. Farmers who do not use DCT on their cows raise the occurrence amount of new IMI by 11-16%, claims (38). Researchers have shown that dry cow therapy is 90–93% efficient against illnesses caused by *S. agalactiae*, 70–80% efficient against infections caused by *S. aureus* and 70–90% efficient against environmental streptococci. Because there is a chance that antibiotic residues can find their way into the milk, the dosage of antibiotics is lower for treating mastitis infections during lactation than when using DCT (39). Therefore, since bigger doses can be given and the frequency of new IMI is reduced, cows getting DCT at dry off are more advantageous.

## CONCLUSION

The comprehensive review concludes by demonstrating the significant influence that bovine reproductive diseases which affect both males and females have on the general fertility and reproductive growth of cow herds. The frequency of illnesses including endometritis, mastitis, retained placenta, dystocia, metritis and sexually transmitted diseases highlights how difficult it is to maintain the reproductive health of cattle. The methodical assessment of traditional medical practices in various cultural contexts, especially when it comes to treat endometritis and infertility offers a nuanced perspective on their effectiveness and establishes the foundation for well-informed veterinary care decision-making. With the addition of anestrus, detection of uterine infections, causes and treatment of mammary gland infections, the research covers a wide range of topics related to cow reproductive health. This systematic review has several limitations, such as limited standardized methods, variances in traditional practices and potential bias in research using traditional medicine. Further research ought to investigate evidence gaps, carry out controlled trials that examine areas of overlap between conventional and contemporary veterinary treatments.

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