Email: biovetinnovator@gmail.com Official Website: https://biovetinnovator.in/
Fueling The Future of Science… ISSN: 3048-8397

Bio Vet Innovator Magazine
(Fueling The Future of Science…)
Volume 3 (Issue 3) MARCH 2026
OPEN ACCESS World Tuberculosis Day – 24th March Popular Article

Calf Diarrhea: A Silent Threat to Dairy Farming

[1*]Martha Pasar and [2]Saroj Rai
1Ph.D scholar,
2Senior scientist,
Livestock Production Management. ICAR-National Dairy Research Institute, Eastern Regional Station. Kalyani. West Bengal.
***Corresponding Author:** pasarnakut@gmail.com
DOI: https://doi.org/10.5281/zenodo.19420484

Received: March 24, 2026
Published: March 28, 2026

Abstract:

The sustainability of a dairy farm largely depends on calf health. Calf diarrhoea is a globally recognized disease affecting the cattle industry, leading to significant economic losses due to high morbidity and mortality rates, impaired growth, and increased treatment expenses. It is a common clinical condition and typically arises from multiple causes. It is characterized by loose stool, evident by high frequency and volume of defecation. It also influences the haematology and biochemical changes in blood and serum, respectively. Additionally, altering the histopathology of the small intestine. It is preventable, and the effective preventive measures include proper colostrum feeding, good management and biosecurity practices, while herbs and probiotics offer promising alternative approaches for control.

Keywords: Antimicrobial resistance, Calf diarrhoea, Colostrum, Poor growth, Prevention

Introduction:

Calf diarrhea, commonly known as scours, is one of the most significant health problems affecting young calves, particularly during the first few weeks of life when their immune system is still developing. It is characterized by frequent passage of loose, watery feces, which can quickly lead to dehydration. If not treated promptly, calf diarrhea can result in severe health complications and even death, making it a major concern in calf rearing and livestock management. Calf diarrhea is a leading cause of pre-weaning calf mortality, poor growth, and significant economic losses in dairy and livestock farms. In developing countries like India, its impact is particularly severe, causing substantial long-term financial losses to farmers. Studies have reported that calf mortality due to diarrhea in Indian farming conditions can be as high as 40%, which is far above the acceptable level of about 5% for a sustainable and economically viable production system (Malik *et al.,* 2012). Bekele *et al.* (2009) identified it as the single most important cause of calf mortality in the dairy industry. Most calf deaths occur within the first month of life, accounting for about 80–85% of total mortality, with the highest risk observed during the third week. Apart from

mortality, diarrhea also creates several production-related problems. Affected calves often suffer from long-term growth retardation, reduced reproductive performance, and lower milk yield in the future. As a result, both short-term and long-term productivity of the herd declines. Additionally, the increased need to replace lost or poorly performing animals raises the overall cost of maintaining the farm. A study conducted by Abuelo *et al.* (2021) showed that calves treated for diarrhea had lower weight gain and produced less milk during their first lactation.

Calf diarrhea is a multifactorial disease influenced by infectious agents, calf age, and management practices, leading to a 11–30% reduction in weight gain (Parlatir *et al.,* 2025). Although potentially fatal, it is preventable and manageable through proper early-life care. Complete eradication is difficult due to persistent environmental pathogens, but incidence can be reduced by improving immunity and management.

Cause of Calf Diarrhea:

The cause of calf diarrhea can be broadly classified into infectious and non-infectious.

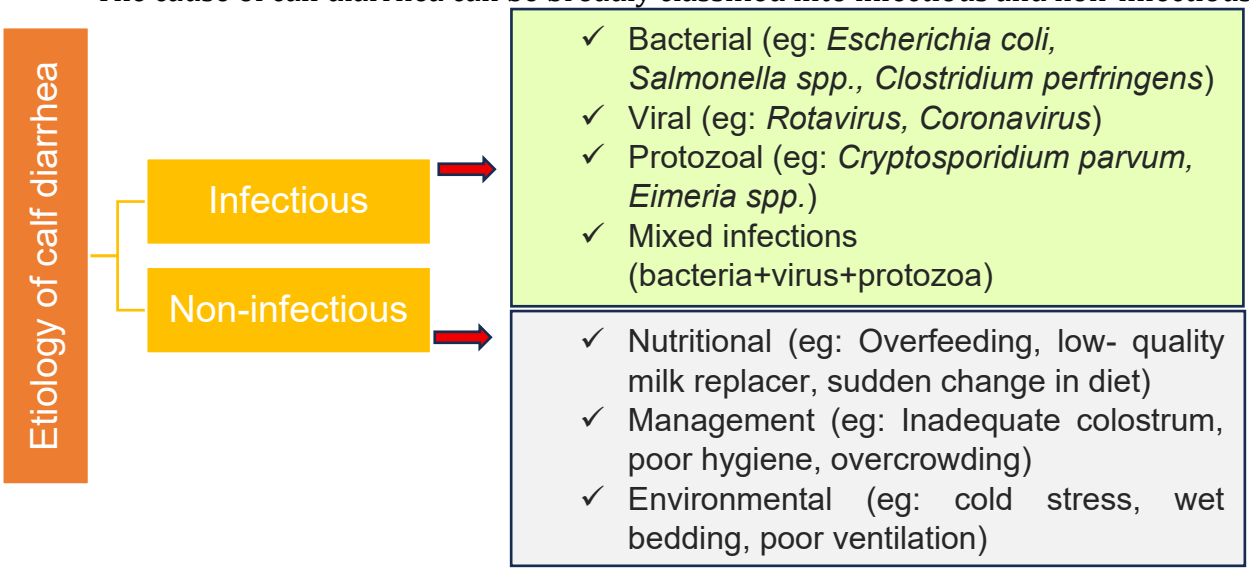

Figure 1: Etiology of calf diarrhea

Among the infectious causes, the most prevalent is diarrhea due to *Escherichia coli (E. coli).* It is a predominant facultative anaerobic, gram-negative, rod-shaped, flagellated, motile, oxidase-negative bacterium classified under the family Enterobacteriaceae. They remain as obligate microorganisms in the intestine but flare up and become a threat under stressful conditions like inadequate nutrition, hypothermia, etc. The different pathotypes of *E.Coli* are Enterotoxigenic *E.Coli* (ETEC), Enteropathogenic *E. coli* (EPEC), Enterohemorrhagic *E. coli* (EHEC), Enteroaggregative *E.Coli* (EAEC), Diffusely adherent *E.Coli* (DAEC), Adherent-invasive *E. coli* (AIEC), and Entero-invasive *E.Coli* (EIEC). Among different types of *E.Coli*, ETEC is the major pathogen causing calf diarrhea, and the animals are most susceptible to ETEC during 1-5 days of life (Brunauer *et al.* 2021). ETEC induces diarrhea by colonisation of the gut. The bacteria adhere to the gut (fimbriae receptors) through fimbriae or adhesins (F5/K99 and F41 in calves)

with the help of colonisation factors, so that they can't be removed from the gut easily despite strong peristaltic activity. The overall percentage distribution of the infectious etiology of calf diarrhea is given below.

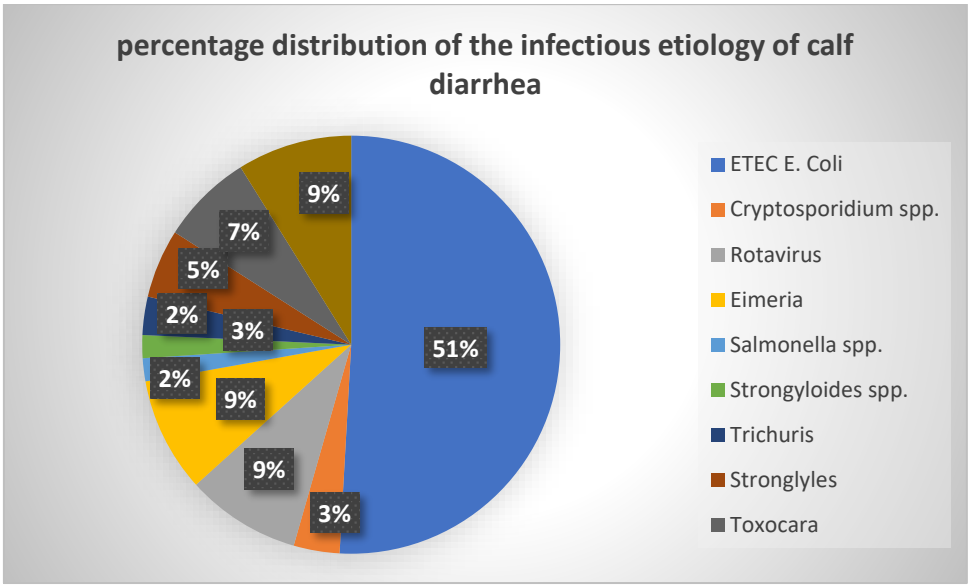

Figure 2: Percentage distribution of infectious etiology of calf diarrhea.
(Source: Sharma and Joshi, 2020)

Signs and Symptoms:

Calf diarrhea shows a combination of physical, physiological changes, and histopathological changes. Affected calves pass loose to watery feces, often leading to soiling of the tail and hindquarters. In calf diarrhea, dehydration is a prominent feature, which can be noticed by sunken eyes, dry muzzle, and reduced skin elasticity. Calves typically show weakness, lethargy, loss of appetite, and depression, along with reduced activity. In infectious cases, fever might be present. While the severely affected calves may develop subnormal body temperature, rapid weight loss, and eventually die.

Physiological changes in calf diarrhea can be classified as hematological and biochemical changes. It is characterized by significant electrolyte imbalance, including loss of sodium, potassium, and chloride, along with metabolic acidosis due to bicarbonate loss in feces. Because of dehydration, hemoconcentration is observed, which is reflected by increased packed cell volume (PCV), and is often accompanied by hypoglycemia. Elevated blood urea nitrogen (BUN) and creatinine levels may occur due to reduced kidney.

Leukocytosis or leukopenia can be seen depending on the causative agent, and overall nutrient absorption is impaired (Gupta *et al.,* 2020). Histopathology changes are evident in the mucosa of the intestinal lining especially, the small intestine. Histopathology of the infected animal's intestine shows destruction of the intestinal villi. The villous shows atrophy, blunting and fusion, which destroys the microstructure of the villi and alters absorption of nutrients from the intestinal wall. Additionally, hyperplasia of goblet cells has been observed along with lymphocytic infiltration (Foster and Smith, 2009).

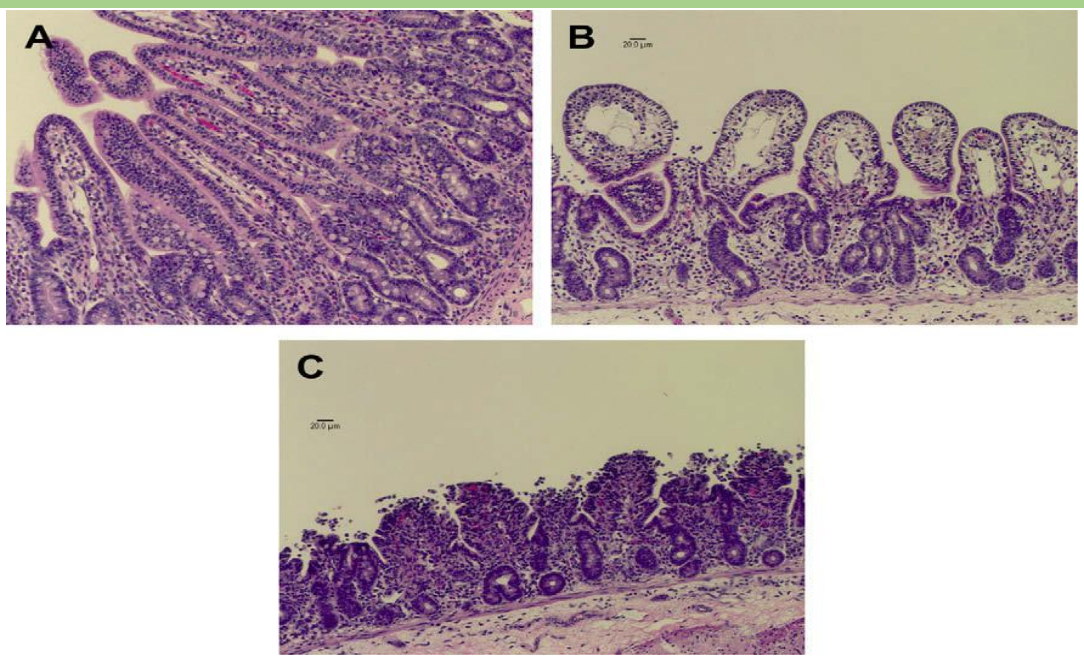

Figure 3. A. Normal intestinal mucosa of calf ileum, B&C. Intestinal mucosa of calf ileum infected with *Clostridium parvum.* (Source: Foster and Smith, 2009)

Management of Calf Diarrhea:

Effective management of calf diarrhea involves both prompt treatment of affected calves and strong preventive measures at the farm level. The primary goal of clinical intervention is to correct dehydration and restore electrolyte balance. Oral rehydration therapy using solutions that do not interfere with milk clotting is essential. In mild cases, electrolyte solutions containing approximately 90–130 nmol/L sodium, along with alkalinizing agents such as propionate, are recommended. In severe cases, especially when calves are unable to stand, they require intravenous administration of isotonic sodium bicarbonate solution to correct metabolic acidosis (Constable *et al.,* 2017). When a specific infectious cause is identified, targeted antibiotic therapy may be used. However, antibiotic use should be judicious and based on clear indications, as inappropriate use can be ineffective and contribute to the growing problem of antimicrobial resistance (AMR) (WHO, 2020).

Preventive management plays an equally important role in reducing the incidence of calf diarrhea. Ensuring timely and adequate colostrum feeding during the first 3–5 days of life is critical for developing passive immunity. Vaccination of pregnant dams 6–8 weeks before calving against common enteric pathogens further enhances calf protection. Good farm management practices, including maintaining clean, dry bedding, proper ventilation, and strict hygiene protocols, help minimize pathogen exposure. Regular disinfection of feeding and watering equipment, along with isolation and quarantine of sick animals, are essential biosecurity measures that significantly reduce disease transmission within the herd (Cho & Yoon, 2014; Meganck *et al.,* 2014). Recently, Herbs and probiotics have gained importance as supportive and preventive tools in managing calf diarrhea, especially as alternatives to antibiotics. Herbal agents such as garlic (*Allium sativum*), neem (*Azadirachta indica*), turmeric (*Curcuma longa*), and bael

(*Aegle marmelos*) exhibit antimicrobial, anti-inflammatory, and gut-protective properties, helping to control enteric pathogens, reduce intestinal inflammation, and improve fecal consistency. Many plant compounds, including tannins and flavonoids, also aid in reducing intestinal secretions and enhancing immunity (Patel *et al.,* 2020; Kumar *et al.,* 2023). Probiotics, including species of *Lactobacillus*, *Bifidobacterium*, and *Saccharomyces*, help maintain gut microbial balance by inhibiting pathogenic bacteria, strengthening gut barrier function, and enhancing immune responses. Their use in calves has been associated with reduced incidence and severity of diarrhea, along with improved growth performance (Uyeno *et al.,* 2015; Lu *et al.,* 2022). In several studies, a combination of herbs with distinct modes of action, such as antibacterial, antioxidant, and immunomodulatory, etc., with probiotics has been used to manage calf diarrhea.

Conclusion:

Calf diarrhea remains the leading cause of mortality in young calves, resulting in significant economic losses for farmers in both the short and long term. It also compromises animal welfare and adversely affects growth and future reproductive performance. Despite extensive antibiotic use, complete eradication is difficult due to the multifactorial nature of its etiology. However, the disease is largely preventable through effective management practices that enhance calf immunity, including timely colostrum feeding, proper hygiene, balanced nutrition, and strict biosecurity measures. Additionally, the use of probiotics and herbal interventions offers a promising approach for managing calf diarrhea more sustainably.

References:

Abuelo, A., Cullens, F., and Brester, J. L. (2021). Effect of preweaning disease on the reproductive performance and first-lactation milk production of heifers in a large dairy herd. Journal of Dairy Science. 104(6): 7008-7017.

Bekele, M., Yacob, A., Regassa, A., Abuna, F., Asmare, K., and Amenu, K. (2009). Prevalence and incidence rates of calf morbidity and mortality and associated risk factors in smallholder dairy farms in Hawassa, Southern Ethiopia.

Brunauer, M., Roch, F. F., and Conrady, B. (2021). Prevalence of worldwide neonatal calf diarrhoea caused by bovine rotavirus in combination with bovine coronavirus, Escherichia coli K99 and Cryptosporidium spp.: a meta-analysis. Animal. 11(4): 1014.

Cho, Y. I., and Yoon, K. J. (2014). An overview of calf diarrhea Infectious etiology, diagnosis, and intervention. Journal of Veterinary Science. 15(1): 1–17.

Constable, P. D., Hinchcliff, K. W., Done, S. H., and Grünberg, W. (2016). Veterinary medicine: A textbook of the diseases of cattle, horses, sheep, pigs, and goats (11th ed.). Elsevier.

Foster, D. M., and Smith, G. W. (2009). Pathophysiology of diarrhea in calves. Veterinary Clinics of

North America: Food Animal Practice. 25(1): 13-36.

Gupta, R., Agrawal, A., Shukla, P. C., Patel, S. K., Verma, N. K., and Roy, K. (2020). Therapeutic management of acute calf diarrhoea in pre-weaned buffalo calves with herbal electrolyte combination regimens. Journal of Pharmacognosy and Phytochemistry. 9(1): 666–671.

Lu, Q., Niu, J., Wu, Y., and Zhang, W. (2022). Effects of Saccharomyces cerevisiae var. boulardii on growth, incidence of diarrhea, serum immunoglobulins, and rectal microbiota of suckling dairy calves. Livestock Science. 258: 104875.

Malik, S., Verma, A. K., Kumar, A., Gupta, M. K., and Sharma, S. D. (2012). Incidence of calf diarrhea in cattle and buffalo calves in Uttar Pradesh, India. Asian Journal of Animal and Veterinary Advances. 10(7): 1049-1054.

Meganck, V., Hoflack, G., and Opsomer, G. (2014). Advances in prevention and therapy of neonatal dairy calf diarrhoea: a systematic review with emphasis on colostrum management and fluid therapy. Acta Veterinaria Scandinavica. 56(1): 75.

Parlatir, Y., Tuncel, S., and Demir, P. A. (2025). The Relationship of Neonatal Calf Diarrhea and Yield Losses with Managerial Factors in Dairy Cattle Farms.

Patel, D. K., Patel, K., Rahman, M., and Chaudhary, S. (2020). Therapeutic potential of "Aegeline," an important phytochemical of Aegle marmelos: Current health perspectives for the treatment of disease. In Nanomedicine for Bioactives: Healthcare Applications. 383–392.

Sharma, S. K., and Joshi, M. (2020). Etio-Epidemiological Studies on Diarrhoea in Cattle and Buffalo Calves. Indian Journal of Animal Research. 54(11).

Uyeno, Y., Shigemori, S., and Shimosato, T. (2015). Effect of probiotics/prebiotics on cattle health and productivity. Microbes and Environments. 30(2): 126–132.