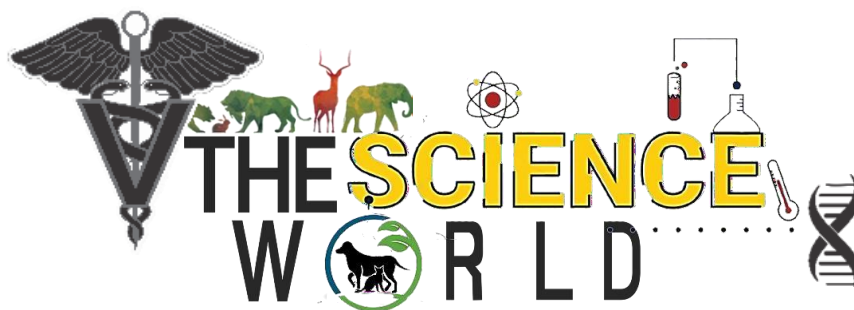




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The First 24 Hours of a Calf's Life: Small Steps, Lifelong Benefits

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Abstract

The first 24 hours of a calf's life are critical for survival, immune protection and future growth. During this period, the newborn must adapt to independent breathing, regulate body temperature and obtain essential nutrients while facing microorganisms in its environment. Early feeding of clean, high-quality colostrum is particularly important because it provides maternal antibodies that help protect the calf against infectious diseases. Prompt drying, hygienic navel care, clean housing, adequate nutrition and regular monitoring further support newborn health. Delays in colostrum feeding, inadequate passive transfer of immunity and poor hygiene can increase the risk of illness and mortality. This article highlights the physiological challenges faced by newborn calves and describes practical, science-based management practices that dairy farmers can adopt during the first day of life to improve calf survival, health and future productivity.

Keywords: Calf health; Colostrum; Immunity; Newborn care; Thermoregulation.

Introduction

A newborn calf represents the future of a dairy farm. Every healthy heifer can contribute to future milk production, while every healthy bull calf may have value for breeding or other livestock purposes. However, the transition from life inside the uterus to the outside environment is a major physiological challenge. The calf must begin breathing independently, maintain its body temperature, establish circulation and obtain nutrients while facing microorganisms present in its surroundings. The first day of life is therefore not simply a period of rest after birth; it is a critical window for establishing health and survival. Research reviews identify effective colostrum management as one of the most important management factors influencing calf health, survival



and subsequent performance (Godden et al., 2019). For farmers, the good news is that many essential newborn-care practices are straightforward, affordable and achievable with proper planning.

A Newborn's First Challenge: Adapting to Life Outside the Womb

Before birth, the developing calf receives oxygen and nutrients through the placenta. After birth, it must breathe through its lungs, regulate its own circulation and begin obtaining nourishment through its digestive system. The umbilical circulation also changes as the cord closes and the newborn adapts to independent life. A normal, vigorous calf should begin breathing promptly, show movement and gradually attempt to stand. The dam may lick the calf, helping stimulate it and remove moisture from the coat. Farmers should ensure that the calf's nose and mouth are clear of visible obstructions and that breathing is not laboured. If the calf is not breathing normally, appears extremely weak or has experienced a difficult birth, prompt veterinary assistance is essential. Gentle drying and stimulation may be helpful, but they must not delay appropriate resuscitation when needed. A calf should never be swung upside down to remove fluid from its lungs. The first few minutes set the stage for everything that follows. Observation, calm handling and timely assistance can make a meaningful difference.

Colostrum: The First Food and the First Protection

The single most important feeding decision during the first hours of life is providing colostrum. Colostrum is the first secretion produced by the mammary gland after calving. Unlike ordinary milk, it is especially rich in immunoglobulins, particularly immunoglobulin G (IgG), along with energy, protein, vitamins, minerals and other biologically active components.

Why is this so important?

In cattle, the placenta normally prevents significant transfer of maternal antibodies into the fetal bloodstream before birth. Consequently, the newborn calf depends heavily on colostrum to obtain early immune protection. When antibodies are absorbed from the intestine into the bloodstream, the process is called *passive transfer of immunity*. These maternal antibodies help protect the calf against infectious agents while its own immune system matures (Godden et al., 2019). Colostrum is therefore much more than the calf's first meal. It is the calf's first major source of immune protection.

Why timing matters?

The intestine of a newborn calf can absorb intact antibodies during a limited period after birth. This ability declines rapidly as the intestinal lining matures, a process often described as intestinal closure. Delayed feeding reduces the amount of antibody that can reach the bloodstream.



Godden et al. (2019) emphasised the importance of providing sufficient quantities of clean, high-quality colostrum within the first few hours of life. The practical recommendation for dairy farmers is to offer the first feeding as soon as possible, ideally within one to two hours after birth, and to follow a suitable second-feeding plan based on the calf's size and the farm's veterinary protocol.

How much colostrum is needed?

The appropriate quantity depends on the calf's body weight, species, colostrum quality and the feeding protocol being followed. A commonly used cattle-management guideline is to provide approximately 10% of body weight in good-quality colostrum at the first feeding. The quantity should be adjusted to the individual calf and local veterinary recommendations, particularly when managing smaller calves or buffalo calves. For example, a 30-kg calf receiving colostrum at 10% of its body weight would receive approximately 3 litres. This is an illustrative calculation, not a universal prescription for every calf. If a calf is weak or unable to suckle effectively, do not assume that it has received enough colostrum merely because it is standing near its mother. Seek trained assistance with safe feeding. Tube feeding should only be performed by someone competent in the technique because incorrect placement can cause serious complications.

Quality and cleanliness matter too

Good colostrum management depends on three factors: timing, quality and quantity. Colostrum should be collected using clean hands and equipment, and it should be fed promptly or stored correctly if immediate feeding is not possible. Dirty collection containers and contaminated colostrum can introduce disease-causing microorganisms. Where available, a Brix refractometer can help estimate colostrum quality. A reading of around 22% Brix or higher is commonly used as an indicator of high-quality dairy-cattle colostrum, although the reading is an indirect measure and should be interpreted appropriately. Farmers should not judge colostrum quality by colour or thickness alone. Clean, timely feeding of adequate high-quality colostrum gives the calf a much stronger start than delayed or inconsistent feeding.

Keeping the Newborn Warm: The Role of Thermoregulation

Immediately after birth, the calf is wet and loses heat to its surroundings. Evaporation from the wet coat, contact with a cold floor, wind and low environmental temperature can increase heat loss. Newborn calves have limited energy reserves and may struggle to maintain normal body temperature in cold or wet conditions. The process by which the body maintains a relatively stable internal temperature is called *thermoregulation*. Newborn calves must quickly shift from relying on the maternal environment to regulating their own heat balance. A calf exposed to cold stress



uses energy to produce heat. If it remains wet, cold or poorly nourished, this extra demand may interfere with normal activity and feeding. A weak calf may become less willing to suckle, creating a further risk of inadequate colostrum intake. Farmers can support thermoregulation by drying the calf promptly with clean towels or dry material, providing clean and dry bedding, and protecting it from strong draughts and extreme weather. In cold conditions, additional warming may be necessary. During hot weather, the calf should still be protected from direct sunlight and excessive heat, with adequate ventilation and access to an appropriate resting area. The goal is not simply to keep the calf warm at all costs; it is to provide a comfortable environment that allows normal temperature regulation without adding unnecessary stress.

Navel Care: A Small Structure with Important Consequences

The umbilical cord connects the fetus to the placenta before birth. After delivery, the remaining umbilical stump becomes a potential route through which microorganisms can enter the body. Infection around the navel can extend to deeper tissues and, in severe cases, contribute to systemic illness. Clean calving areas and careful handling are therefore essential. The calf should be placed in a reasonably clean, dry environment, and the navel should be inspected for bleeding, swelling, pain, discharge or an unusual smell. Navel disinfection is widely used in newborn-calf management, but the evidence for the effectiveness of specific products and protocols is not entirely consistent. Lang et al. (2022), in a critical review, found that the available studies had important limitations and did not establish a clear overall preventive benefit for navel disinfection. This does not make hygiene unimportant; rather, it highlights the need for clean surroundings, careful observation and a veterinarian-approved navel-care protocol. Farmers should use an appropriate antiseptic product and method recommended by their veterinarian, avoid contaminated solutions and equipment, and seek advice if the navel becomes swollen, painful or discharges fluid. Navel care should be part of a wider hygiene programme rather than treated as a substitute for it.

Clean Housing: The First Line of Defence Against Infection

Feeding and Monitoring During the First Day

After the initial colostrum feeding, the calf should be observed regularly. Farmers should check whether it is alert, breathing comfortably, attempting to stand and showing a strong suckling response. The calf should receive the planned additional colostrum feedings according to its needs and the farm's veterinary protocol. A weak suckling reflex, refusal to feed, persistent recumbency, abnormal breathing or unusual body temperature should not be ignored. These signs may indicate difficult-birth complications, inadequate energy reserves, infection or other illness. Early



veterinary examination can help identify problems before they become severe. The dam also needs attention. Difficult calving, retained fetal membranes, udder problems or illness may affect the availability and quality of colostrum. If the mother cannot provide adequate colostrum, a suitable alternative should be arranged promptly with veterinary guidance. Farmers should also maintain a simple birth record that includes the date and time of birth, the calf's identification, birth weight where possible, whether assistance was needed during delivery, the time and amount of colostrum fed, and any health concerns. These records help identify recurring problems and improve future calf management.

A Practical Checklist for the First 24 Hours

The following checklist can help farmers organise newborn care.

- **Immediately after birth:** Check breathing, observe the calf's condition and obtain veterinary assistance when necessary.
- **During the first hour:** Dry the calf, provide a clean resting area and inspect the navel.
- **Within one to two hours:** Offer an adequate quantity of clean, high-quality colostrum.
- **During the following hours:** Provide planned additional colostrum feedings, monitor suckling and maintain comfortable housing.
- **Throughout the first day:** Observe appetite, alertness, breathing, body temperature and the condition of the navel. Seek veterinary help if the calf appears weak or unwell.
- **Before the end of the first day:** Check that feeding has been adequate, record important details and make a plan for continued milk feeding and routine calf care.
- The precise feeding volumes and subsequent management should be adjusted for the calf's size, species, condition and local veterinary recommendations.

From Survival to Future Productivity

The benefits of newborn care extend beyond the first day. Calves that receive adequate passive immunity and appropriate early management are better positioned to withstand infectious challenges and grow successfully. Conversely, poor early care can lead to disease, treatment expenses, delayed growth and avoidable mortality. The scientific literature also links successful passive transfer with longer-term benefits, including improved growth and aspects of later productive performance (Godden et al., 2019). These outcomes depend on many factors, including genetics, nutrition, housing, disease prevention and management throughout the calf's life. Good care during the first 24 hours cannot guarantee future productivity, but it establishes an essential foundation. For dairy farmers, the economics are straightforward: preventing avoidable illness is generally more desirable than treating a sick calf after problems have developed. Preparing a clean



calving area, arranging colostrum supplies and observing the calf carefully require planning, but they can prevent substantial losses.

Conclusion

The first 24 hours of a calf's life provide a vital opportunity to establish the foundation for healthy growth and future productivity. Timely feeding of adequate, high-quality colostrum, maintenance of body temperature, hygienic navel care and provision of a clean, comfortable environment are essential components of newborn management. Farmers should also monitor the calf's breathing, suckling response, activity and general condition, seeking veterinary assistance whenever warning signs appear. These simple practices can help prevent avoidable illness, reduce calf mortality and protect the economic value of the dairy herd. Successful calf rearing begins with careful attention to the smallest details from the moment of birth. **A healthy calf today is an investment in a healthier and more productive dairy herd tomorrow.**

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