

Vaccination Program for Calves

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ABSTRACT

Vaccination plays an important role in maintaining the health and productivity of calves. It prevents infectious diseases, which are the main causes of economic losses in the livestock industry. A strategic vaccination program is necessary for effective disease management. This article highlights a comprehensive vaccination schedule for calves, explaining the types of vaccines administered, their mode of action, and the prevention of diseases. The vaccination schedule includes vaccines for diseases such as Hemorrhagic Septicemia, Clostridial diseases, Foot and Mouth disease, Lumpy Skin Disease, and Brucellosis. Various types of vaccines, including killed, live attenuated, subunit, toxoid, and emerging mRNA vaccines, are discussed in relation to their immunological response and practical applications. The analysis includes the route of administration, booster dose requirements for enhanced immunity, and the efficacy of each vaccine. The application of a well-planned vaccination program minimizes economic losses, improves herd health, and reduces disease prevalence. This article presents a detailed guide for veterinarians, researchers, and livestock farmers to enhance calf vaccination protocols for sustainable livestock productivity.

Keywords: Vaccination, Calves, Disease Prevention, Herd Immunity, Livestock Management, Veterinary Immunization

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Introduction

The dairy sector is growing day by day at high speed. It is not only growing but also becoming modernized with modern and high-tech dairy farms to get more production and profits. Dairy sector is shifting towards corporatives with huge amount of investments. A lot of work done on improving genetics of indigenous cows so that they will produce calves with new beneficial traits. Many big company invest a lot of money and time for the production of calves with best genetic makeup and high production ability. In Pakistan dairy farm import these calves from USA and Australia. This cost thousands of dollars per calf. There are many local diseases that can cause huge motility and morbidity in these calves, leading to the loss of calf that would have to be the best producer for the farm for few next years. So, it is very important to take action against these diseases. There are many ways to tackle these diseases include bio-security, eradication of vectors and vaccinations.

Vaccination is a strategic factor in the management of calf health, ensuring the prevention of various infectious diseases that can severely affect productivity and profitability in dairy farming [1, 2]. To improve calf health, a properly planned vaccination program is very vital at different time of year. Some diseases need mass vaccination program in the whole country for complete eradication of diseases. Many examples are present in which disease is eradicate from country by using vaccination e.g. eradication of rinderpest from Pakistan or eradication of FMD from USA. But if this is not possible then the vaccination should be given to exotic calves at farms on time. Timely vaccinations not only protect individual animals but also help keep the entire herd healthy, reducing the chance of outbreaks. Proper and well managed vaccination can lower veterinary costs and boost the overall immunity of the herd. By focusing on good vaccination practices, farmers can support farming methods that lead to lasting benefits.

A detailed and structured vaccination schedule is necessary to protect calves from a range of diseases, ensuring their health at an early age. This article figures a vaccination program for calves, describing the vaccines, their administration schedule, and the diseases that they can prevent [3].

Vaccination Schedule

A typical vaccination schedule for calves includes the following:

S. No.	Disease	Vaccine	Age of Calf at 1 st vaccination	Dose	Age of Booster Dose
1	Hemorrhagic Septicemia (HS)	HS vaccine	30 th Day	2ml (I/M)	50 th Day
2	Clostridium	Clostrivax	60 th Day	5ml (S/C)	80 th Day

3	Foot and Mouth Disease	FMD	83 rd Day	2ml (I/M)	100 th Day
4	General Protection	Supravec	120 th Day	5ml (S/C)	140 th Day
5	Lumpy Skin Disease	LSD	130 th Day	1ml (I/M)	150 th Day
6	Brucellosis	RB-51	6 th Month	2ml (S/C)	12 th Month

Types of Vaccines

Body has a very unique way to prevent disease by using different ways. Skin helps in preventing the invasion of various microbes but if it invades body has complete immune system that kill these pathogens. Vaccination helps to improve the immune system of body by various methods. Several types of vaccinations are present and are classified based on their composition and the way they stimulate the immune system. Following are the types of vaccination.

Killed Vaccines

Killed vaccines contain pathogens that have been inactivated so they cannot cause disease. These are commonly used for diseases like rabies and certain bacterial infections in calves [10]. Killed vaccine are used against such diseases which have high fatality rates and have zoonotic importance. One example is the inactivated polio vaccine (IPV), which is often used in human medicine.

Live Attenuated Vaccines

Use weakened versions of pathogens that are alive but are not capable of causing serious disease in healthy animals. In calves, these vaccines are primarily used to prevent diseases like infectious Bovine Viral diarrhea (BVD) and Infectious bovine rhinotracheitis (IBR). In humans these types of vaccines are used against Rubella, Measles, and Mumps [11].

Messenger RNA Vaccines

mRNA vaccines work by using mRNA to instruct cells to produce proteins that elicit an immune response. These are prominent in human medicine, such as the Pfizer-BioNTech and Moderna COVID-19 vaccine. Not widely used in veterinary medicine but their potential use in calves could offer new preventative strategies in the future [12].

Subunit and Recombinant Vaccines

These vaccines use specific pathogen components like proteins or sugars to stimulate immunity. In calves, these vaccines are commonly employed for diseases such as Leptospirosis and some bacterial pneumonia [13].

Toxoid Vaccines

Use inactivated toxins produced by pathogens to generate an immune response against the toxin itself. In calves, Toxoid vaccines are essential for preventing diseases such as botulism and tetanus, much like the human diphtheria and tetanus vaccines [14].

Vaccination against various Diseases of Calf

Hemorrhagic Septicemia (HS)

The gram-negative bacterium *Pasteurella multocida* causes this infectious disease in cattle. This serious infection often results in symptoms like throat and neck swelling, elevated body temperature, breathing difficulties, and sudden fatality. While various chemical treatments and antibiotics have been used to manage the condition, early intervention through the administration of a specialized vaccine, known as the HS vaccine, is crucial for preventing economic losses and reducing mortality.

Clostridial Diseases

These diseases are caused by several species of Clostridium bacteria. Blackleg, caused by *Clostridium chauvoei*, leads to lameness, sudden death, and gas swelling in muscles. Tetanus, from *Clostridium tetani*, results in difficulty swallowing, muscle stiffness, and death. Enterotoxemia, caused by *Clostridium perfringens* types C and D, is characterized by abdominal pain, severe diarrhea, and sudden death. To prevent these severe conditions, the Clostrivax vaccine is given [5].

Foot and Mouth Disease (FMD)

The *Foot and Mouth Disease Virus* (FMDV) causes this viral infection. Symptoms include blisters in the mouth and on the feet, high fever, lameness, decreased milk production and drooling. FMD is highly contagious and can cause severe economic losses due to decreased productivity and trade restrictions. The FMD vaccine is administered to control this disease [6].

General Protection

Supravec or Cattlewin vaccines are broad-spectrum options tailored for specific needs. By improving overall immunity. Supravec and Cattlewin help decrease the incidence of various common diseases, ultimately enhancing herd health and productivity [7].

Lumpy Skin Disease (LSD)

The *Lumpy Skin Disease Virus* (LSDV) causes this disease. Symptoms include nodules on the skin, enlarged lymph nodes, fever, reduced milk production, weight loss, and sometimes death. The LSD vaccine is administered to prevent productivity loss, skin damage, and secondary infections, which can cause economical losses due to trade restrictions and treatment costs [8].

Brucellosis

Brucellosis is caused by *Brucella* species, leading to symptoms such as abortions, reduced milk production, infertility, retained placenta, and

arthritis. Persistent reproductive issues and declining productivity can lead to substantial financial setbacks due to impaired fertility and lower dairy output. The RB-51 vaccine is used for prevention of Brucellosis [9].

Conclusion

A vaccination program for calves makes sure the protection from a range of serious diseases from an early age. It helps to minimize the risk of calf motility and morbidity which help in increasing the production and profit of farms. It also helps in decreasing the cost of medicine that will give after the outbreak of disease. By sticking to a structured schedule, the health and productivity of the calves are maintained, resulting in a more profitable dairy farming operation. This program highlights the importance of timely vaccination and disease prevention in livestock management.

References

- [1] Radostits OM, Gay CC, Hinchcliff KW, Constable PD. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs, and goats. 10th ed. Saunders; 2014.
- [2] Smith BP. Large Animal Internal Medicine. 5th ed. Elsevier; 2014. 3. OIE. Terrestrial Manual 2013. World Organisation for Animal Health; 2013.
- [3] Grooms DL. Reproductive losses caused by bovine viral diarrhea virus and leptospirosis. Theriogenology. 2013;80(8):633-638.
- [4] Callaway TR, Edrington TS, Loneragan GH, Carr MA, Nisbet DJ. Shiga toxin producing Escherichia coli (STEC) ecology in cattle and management based options for reducing fecal shedding. Agric Food Anal Bacteriol. 2013;3(4):39-69.
- [5] Lyons NA, Lyoo YS, King DP, Paton DJ. Challenges of generating and maintaining protective vaccine-induced immune responses for foot-and-mouth disease virus in pigs. Front Vet Sci. 2016;3:102.
- [6] Rich KM, Perry BD. The economic and poverty impacts of animal diseases in developing countries: New roles, new demands for economics and epidemiology. Prev Vet Med. 2013;112(3-4):225-233.
- [7] Ackermann MR, Derscheid R, Roth JA. Innate immunology of bovine respiratory disease. Vet Clin North Am Food Anim Pract. 2010;26(2):215-228.
- [8] Dubovi EJ. Laboratory diagnosis of bovine viral diarrhea virus. Biologicals. 2013;41(1):8-13.
- [9] Abbas RZ, Muqadas ZS, Qureshi MA, Fatima Z. Bovine brucellosis. Biological Times. 2024 Jun 3;6:27-8.
- [10] Seeger C, Mason WS. Hepatitis B virus biology. Microbiol Mol Biol Rev. 2015;79(1):48-70.
- [11] Gerlach GF, Anderson KL, Van Donkersgoed J, Berg J. Prevention of respiratory disease in calves and young cattle. Vet Clin North Am Food Anim Pract. 2014;30(3):1-21.
- [12] Schweizer M, Peterhans E. How the bovine viral diarrhea virus induces immunosuppression. Clin Microbiol Rev. 2014;27(2):282-293.
- [13] Koury JC, Silva EB, Mafra L. The impact of infectious diseases on dairy cattle production: Economic and productivity perspectives. J Dairy Sci. 2015;98(6):4334-4344.
- [14] Meissner HC, Bocchini JA Jr, AAP Committee on Infectious Diseases. The place of vaccines in the control of infectious diseases: A historical perspective. Pediatrics. 2013;131(2):301-309.