

# Getting the Most Out of Modified-live Vaccines (MLV) in Calves

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## INTRODUCTION

In general, vaccines are a great tool for preparing the immune system of calves to respond to a disease challenge. However, developing a sound immune foundation in calves requires multiple tools working together. The colostral immunity obtained from the dam at birth plays a key role in protecting the calf and helps prepare a calf's acquired immune response. The most common reasons why vaccinated animals still get sick or fail to fully respond to vaccines include, but are not limited to, stress, nutritional imbalances, age, genetics, improper vaccine type, improper timing or route of administration, and/or improper handling of vaccine. This is why vaccination does not always equal immunization. This guide will address some considerations in the handling and administration of live component vaccines.

In most weaning vaccination schedules, modified-live virus (MLV) or chemically altered (CA) vaccines have become an industry-recommended



standard to help build immunity against the viral pathogens associated with bovine respiratory disease (BRD). The use of MLV or CA vaccines—rather than killed vaccines—in branding and weaning vaccination programs for calves is typically recommended because the MLV and CA vaccines have been shown to provide a longer and more comprehensive immune response by triggering and enhancing a component of the immune response called cell-mediated immunity (CMI). The CMI response is the most important response in combating viral pathogens.

The safety and efficacy studies required to receive FDA approval of a vaccine are expensive and rigorous. Pharmaceutical companies producing and distributing MLV and CA vaccines have conducted multiple studies and tests to ensure their products, when handled and administered properly, will achieve a desirable and realistic level of effectiveness. The live viruses used to build broad-spectrum immunity against BRD require that the virus replicates (reproduces) inside the body to stimulate both the humoral and cell-mediated components of the immune response. Killed vaccines cannot replicate and therefore have very limited ability to stimulate CMI, unless the CMI response has already been primed. However, because these live viruses are susceptible to the damaging effects of excessive heat, ultraviolet (UV) light, and disinfectants, improper handling and storage could kill some or all of the viral particles within a bottle of MLV or CA vaccine, such that a single dose would no longer contain a sufficient number of live viral particles to properly immunize the animal. The following are a list of items to consider and review before you purchase and use vaccines.

### **Select high-quality products**

Not all live component vaccine products are the same. Do not settle for what is available in the cooler. Do some product research and look for credible research comparisons between commercially available MLVs. Consult your local veterinarian to help you compare product data objectively.

### **Read product labels**

Companies spend a lot of time and money on label development. The label will provide essential information such as vaccine type, dosage, injection method, safety considerations, storage temperature, and an expiration date, among other information. Always follow label directions unless your veterinarian instructs you to do otherwise. Don't take a chance with expired products.

### **Refrigerate vaccine and keep it cool**

All vaccines must be kept cool. When buying vaccines at a local establishment, ensure they are cool at the time of purchase and maintain the vaccines in a cool environment on the drive back to the ranch. If the ice packs with mail-order vaccine purchases are not cool upon arrival, contact the supplier and request another shipment because the integrity of the vaccine has likely been compromised. Keep vaccines refrigerated or in a cooler at all times. At processing, ensure all (mixed, un-mixed, or pre-mixed) vaccine stays cool until the vaccine is administered. Using a cooler with openings for multi-dose syringes with vaccines at chute-side can prevent the damage caused by heat and UV light. Do not mix more than you will use in one hour. Do not freeze vaccines since freezing can damage or destroy them.

### **Protect from sunlight**

Never allow vaccines to sit in direct sunlight (e.g., on dashboard, seat, tailgate, working table). Since most operations in the Southwest do not have covered facilities to process calves at weaning, storing vaccines in a cooler with ice packs is the most desirable way to handle vaccines. Use caution and do not lay the multi-dose syringe in the sunlight between calves because UV light and heat can destroy all vaccines.

### **Mix properly and only mix what can be used in one hour**

Mix MLV and CA vaccines according to label recommendations. Using a transfer needle is an inexpensive means to minimize contamination. Once the diluent and freeze-dried live fraction are combined, do not shake vigorously into solution; instead, swirl gently until all of the freeze-dried fraction has completely dissolved. Furthermore, mix only enough live component vaccine to be administered in one hour. Even properly handled MLV and CA vaccine will begin to lose effectiveness shortly after being mixed.

### **Administer the live component product properly**

Follow the label guidelines for proper route and timing of administration. It is of the utmost importance that MLV and CA vaccines be administered correctly. Use the proper route— intramuscular (IM) or subcutaneous (Sub-Q)—and the recommended needle gauge and length. Change needles frequently and always before entering a bottle of vaccine to fill a syringe.

### **Use quality assurance guidelines for syringes and needles**

Consider using multi-dose rather than continuous-fill syringes when administering vaccines at weaning because multi-dose syringes can be easily stored in a cooler. To minimize contamination, never draw vaccine out of a working bottle (bottle with mixed vaccine) with a used needle. Appropriately label and check calibration of syringes to avoid mixing different types of vaccines and to ensure adequate doses are being administered. After each use, only use boiling water to disinfect syringes. Do not sterilize syringes with chemical disinfectants (e.g., soap, bleach, Nolvasan, alcohol, Betadine) since they will kill the viral particles in live component products.

### **SUMMARY**

Live component vaccines are an integral tool in the herd health toolbox. The proper application and use of live products can increase the immune response and lower disease incidence in a cow herd. When used and handled properly, live viral component vaccines will create a more complete and robust immune response when compared to other vaccine types. Always follow the label directions and administer in accordance with Beef Quality Assurance (BQA) guidelines. Consult your veterinarian in the development of a complete herd health program.

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