

## Clinical field trial to assess efficacy of Kolibin Neo

### Background

Kolibin Neo is a polyvalent, inactivated vaccine. It is administered to pregnant cows and heifers to provide passive immunisation of calves, via colostrum and milk, against gastro-enteric diseases caused by rotavirus, coronavirus and enteropathogenic *E. coli* strains.

### Study Objective

To demonstrate the efficacy and safety of Kolibin Neo in commercial heifers and cows.

### Design

The study enrolled 19 healthy, pregnant cows and 12 pregnant heifers from a commercial dairy farm. Cows had prior vaccination history, having been vaccinated with Kolibin Neo at their previous calving.

Each study cow received an annual booster vaccination with 2mL Kolibin Neo into the gluteal musculature 2 - 4 weeks before the expected calving.

The heifers were vaccinated with 2mL Kolibin Neo intramuscularly into the gluteal musculature 5 - 7 weeks before the expected calving, and a booster dose (2mL) was similarly administered three weeks later.

The animals were identified according to their numbers given on ear tags. Local site reactions at the vaccination site and the general health of the cows and heifers were observed after each vaccine administration. The rectal temperature was measured in animals one day before vaccination, at administration, 4 hours after administration, and on the 1st, 2nd, 3rd and 4th day after the product administration. General health was monitored in newborn calves for at least 28 days after their birth.

Blood samples were collected from the dams and titres of antibodies to bovine rotavirus, bovine coronavirus and *E. coli* were measured in at least 10 of the cows or heifers after each vaccination and at calving. Blood samples were collected from calves and antibody titres for antibodies to the same enteropathogens were measured in the calves within 48 hours of birth, and at 14 and 28 days of age.

### Results

Titres of neutralising antibodies against bovine rotavirus, bovine coronavirus and *E. coli* in heifers and cows vaccinated with Kolibin Neo are shown in figure 1, next column.

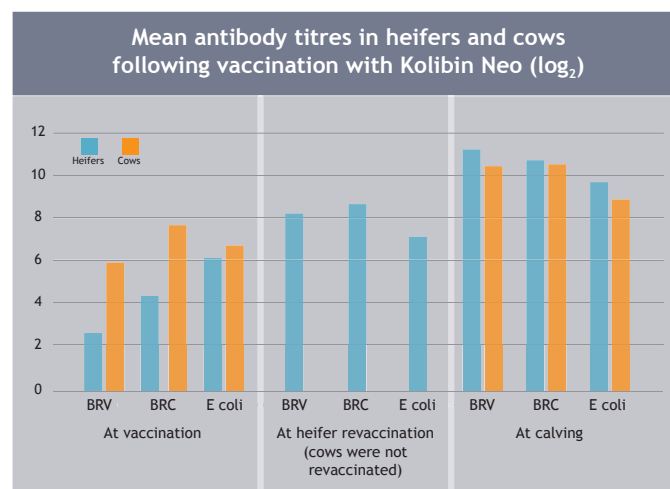


Figure 1. Mean antibody titre to each of the enteropathogens in Kolibin Neo in heifers and cows at vaccination, at revaccination and at calving.

Titres of neutralising antibodies against bovine rotavirus, bovine coronavirus and *E. coli* in calves born to heifers and cows vaccinated with Kolibin Neo are shown in figure 2 below.

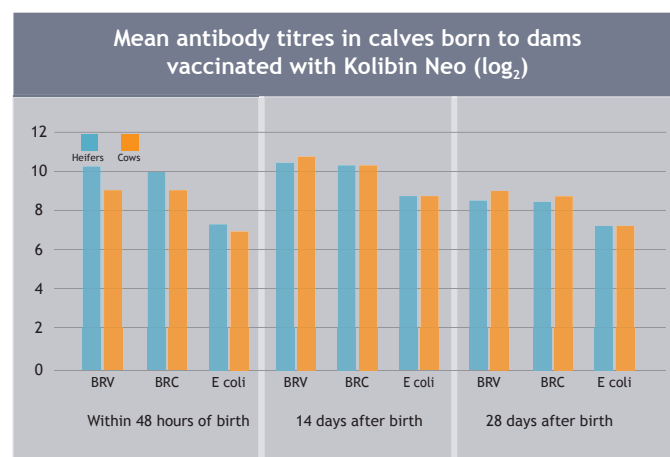


Figure 2. Mean antibody titre to each of the enteropathogens in Kolibin Neo in calves born to heifers and cows at within 48 hours of their birth and at 14 and 28 days of age.

Key : BRV = bovine rotavirus      BCV = bovine coronavirus

In cows previously vaccinated against rotavirus, coronavirus and *E. coli* pathogens, a single dose of Kolibin Neo administered before the expected calving was sufficient to stimulate solid lactogenic immunity.

No local reactions at the injections site were seen in any of the vaccinated cows and heifers. Body temperatures remained within normal parameters in all cows and heifers after each vaccine administration and all study animals remained healthy throughout. Symptoms of gastrointestinal disease were monitored in the calves. None of the calves were observed with any symptoms of gastrointestinal disease.

## Discussion

Calves that suckle or are fed with colostrum collected from their vaccinated dams, obtain passive protective immunity that protects them against infection from rotavirus, coronavirus and enteropathogenic *E. coli* for the first 2-4 weeks of life. Ingestion of colostrum and milk from vaccinated dams also provides local immunity in the gastrointestinal tract of calves.

Lactogenesis and colostrum production begins as early as 5 weeks prior to calving in cattle. To ensure maximal immunoglobulin secretion into colostrum, it is important to have sufficient antibody titres during this time. The secretion of antibodies into colostrum in the mammary gland intensifies during the last week before calving. Immunoglobulins are secreted based on the antigens to which the dam has been previously exposed. Where a cow has been recently vaccinated with Kolibin Neo, antibodies to rotavirus, coronavirus and *E. coli* will be secreted into the colostrum to protect the calf.

The colostrum with concentrated antibodies should ideally be ingested by calves within 12 hours of birth to maximise absorption of large immunoglobulins into the bloodstream. After this time, absorption reduces and the antibodies have a local effect within the gastrointestinal tract itself. It is essential that each calf receives an adequate quantity of good quality colostrum within 8 – 12 hours after birth.

The level of immunoglobulins in colostrum will depend on the antibody titres of cows to each antigen. Vaccinating cows too close to calving will not allow the immune system time to raise antibody titres to the desired antigens. Vaccinating at least two weeks prior to calving will allow these titres to rise to a desired level in the cow, to enable good quantities of antibodies to be secreted into milk.

## Conclusion

This study shows that Kolibin Neo is a safe vaccine that is efficacious against gastro-enteric diseases caused by rotavirus, coronavirus, and enteropathogenic *E. coli* strains. Kolibin Neo vaccination results in high antibody responses to all three antigens included in the vaccine. The study shows that a single annual booster stimulates a high antibody response to all three target antigens. Calves born to vaccinated animals, and subsequently fed their colostrum, also have high antibody levels, providing high levels of passive immunity in these animals, to protect against gastrointestinal disease.

## Addendum

Kolibin Neo does not cause any local or systemic reaction following vaccination and can be safely administered to pregnant cattle.

Between July 2007 and December 2013, over 2 million doses of Kolibin Neo have been sold internationally, mainly in Europe. During this time, there have been no reported cases of adverse events in cattle administered the vaccine.