

Bovine Rota-Coronavirus Vaccine

Killed Virus

Escherichia Coli Bacterin

ScourGuard 3® (K)

PRODUCT DESCRIPTION: ScourGuard 3 (K) is for vaccination of healthy, pregnant cows as an aid in passive maternal immunization of their calves against neonatal calf diarrhea caused by bovine rotavirus, bovine coronavirus, and enterotoxigenic strains of *Escherichia coli* (*E. coli*) having the K99 pili adherence factor. ScourGuard 3 (K) is a liquid preparation of inactivated bovine rotavirus and coronavirus propagated on established cell lines and K99 *E. coli* bacterin adjuvanted to enhance the immune response.

DISEASE DESCRIPTION: Neonatal calf diarrhea is a disease of complex origin that can be caused by both viral and bacterial agents. Enterotoxigenic *E. coli*, rotavirus, and coronavirus are commonly isolated from scouring calves, often in combination with other bacteria or viruses.^{1,2} Studies have shown that most enterotoxigenic *E. coli* strains isolated from scouring calves have K99 pili, antigenic structures which facilitate colonization of the gut lining.^{3,4} Enterotoxins produced by those strains, combined with intestinal cell damage by rotavirus and coronavirus, cause secretion of body fluids and electrolytes into the gut. Such fluid loss produces a severe diarrhea, which results in dehydration, electrolyte imbalance, and metabolic acidosis. Incidence of calf diarrhea is most frequent and severe within the first 2 weeks of life.^{2,5–7} Hence, a calf's primary source of protection is immediate consumption of colostrum containing high levels of maternal antibodies for effective passive immunization.^{8–10}

SAFETY AND EFFICACY: No adverse postvaccination reactions, either local or systemic, were observed in over 1,600 vaccinated pregnant cows during product development.

For effective passive immunization, newborn calves must immediately consume and absorb adequate amounts of colostrum containing high levels (titers) of maternal antibodies. In efficacy studies of the rota-coronavirus vaccine, the effect of vaccination on colostrum and milk antibody titers, *i.e.*, lactogenic immunity, was evaluated. Pregnant cattle were vaccinated with 2 doses, and colostrum/milk samples were collected on the day of calving and at weekly intervals after calving. Similar samples were also collected from nonvaccinated control cows. All samples were analyzed for antibody titers against rotavirus and coronavirus.

Results presented in Table 1 show that cows that calved within 40 days of vaccination had mean colostrum/milk virus-neutralizing (VN) antibody titers against rotavirus that were 45-fold higher than in nonvaccinated cows on the day of calving and were still 4-fold higher than in nonvaccinated cows at 24–29 days after calving. Vaccinated cows had mean VN antibody titers against coronavirus that were 3.5-fold higher than VN antibody titers of nonvaccinated cows on the day of calving.

Table 1. Mean Postcalving Colostrum/Milk Antibody Titers in ScourGuard 3 (K)—Vaccinated Cows and Nonvaccinated Cows

**Mean Colostrum/Milk VN Antibody Titers¹
at Days After Calving**

Test Group	0	3–7	10–14	17–21	24–29
Rotavirus					
14 Vaccinated cows	4096	91	56	88	34
9 Nonvaccinated cows	91	8	11	11	8
Coronavirus					
14 Vaccinated cows	1024	104	44	34	21
9 Nonvaccinated cows	294	38	23	28	20

¹ Virus-neutralization antibody titers expressed as reciprocals of endpoint dilutions; geometric mean.

Efficacy of the *E. coli* K99 factor was demonstrated in a controlled challenge-of-immunity study. Pregnant cows that received 2 doses of bacterin provided maternal immunity which fully protected 80% of their calves from virulent challenge. The remaining 20% of calves in that group experienced transient diarrhea lasting less than 48 hours, with no deaths occurring. Conversely, 100% of calves from nonvaccinated cows experienced severe diarrhea resulting in a 58.8% death loss after challenge.

Serological studies indicated no immunologic interference among the viral and bacterial components of ScourGuard 3 (K). After administration of this product, antibody titers to each of the viral components were slightly higher than after administration of rota-coronavirus vaccine alone.

DIRECTIONS:

1. *General Directions:* Vaccination of healthy, pregnant cows is recommended. Shake well. Aseptically administer 2 mL intramuscularly (IM) only. In accordance with Beef Quality Assurance guidelines, this product should be administered in the muscular region of the neck.
2. *Primary Vaccination:* Administer 2 IM doses at least 2 weeks apart to pregnant cows, with the second dose given 2–3 weeks before calving. If cows have not calved within 40 days after receiving their last dose, revaccination with a single dose is recommended.
3. *Revaccination:* Revaccination with a single dose 2–3 weeks before each subsequent calving is recommended.
4. Good animal husbandry and herd health management practices should be employed.

PRECAUTIONS:

1. Store at 2°–7°C. Prolonged exposure to higher temperatures may adversely affect potency. Do not freeze.
2. Use entire contents when first opened.
3. Sterilized syringes and needles should be used to administer this vaccine.
4. Do not vaccinate within 21 days before slaughter.
5. Contains gentamicin as preservative.
6. Transient temperature increases may occur following vaccination.
7. As with many vaccines, anaphylaxis may occur after use. Initial antidote of epinephrine is recommended and should be followed with appropriate supportive therapy.
8. This product has been shown to be efficacious in healthy animals. A protective immune response may not be elicited if animals are incubating an infectious disease, are malnourished or parasitized, are stressed due to shipment or environmental conditions, are otherwise

immunocompromised, or the vaccine is not administered in accordance with label directions.

REFERENCES:

1. Moon HW, McClurkin AW, Isaacson RE, *et al*: Pathogenic relationships of rotavirus, *Escherichia coli* and other agents in mixed infections of calves. *JAVMA* 173:577–583, 1978.
2. Acres SD, Saunders JR, Radostits OM: Acute undifferentiated neonatal diarrhea in beef calves: The prevalence of enterotoxigenic *E. coli*, reo-like (rota) virus and other enteropathogens in cow-calf herds. *Can Vet J* 18:113–121, 1977.
3. Isaacson RE, Moon HW, Schneider RA: Distribution and virulence of *Escherichia coli* in the small intestines of calves with and without diarrhea. *Am J Vet Res* 39:1750–1755, 1978.
4. Moon HW, Whipp SC, Skartvedt SM: Etiologic diagnosis of diarrheal diseases of calves: Frequency and methods for detecting enterotoxin and K99 antigen production by *Escherichia coli*. *Am J Vet Res* 37:1025–1029, 1976.
5. Crouch CF: Vaccination against enteric rota and coronavirus in cattle and pigs: Enhancement of lactogenic immunity. *Vaccine* 3:284–291, 1985.
6. DeLeeuw PW, *et al*: Rotavirus infections in calves: Efficacy of oral vaccination in endemically infected herds. *Res Vet Sci* 29:142–147, 1980.
7. Morin M, *et al*: Pathological and microbiological observations made on spontaneous cases of acute neonatal calf diarrhea. *Can J Comp Med* 49:228–240, 1976.
8. Saif LJ, Redman DR, Smith KL, *et al*: Passive immunity to bovine rotavirus in newborn calves fed colostrum supplements from immunized or nonimmunized cows. *Infect Immun* 41:1118–1131, 1983.
9. Snodgrass DR: Diarrhea in dairy calves reduced by feeding colostrum from cows vaccinated with rotavirus. *Res Vet Sci* 32:70–73, 1982.
10. Acres SD, Isaacson RE, Babiuk K, *et al*: Immunization of calves against enterotoxigenic colibacillosis by vaccinating dams with purified K99 antigen and whole cell bacterins. *Infect Immun* 25:121–126, 1979.

Technical inquiries should be directed to Pfizer Animal Health Technical Services, (800) 366-5288 (USA), (800) 461-0917 (Canada).

For veterinary use only

U.S. Veterinary License No. 189

Pfizer Animal Health
Exton, PA 19341, USA

Div. of Pfizer Inc
NY, NY 10017

75-4854-06