

Paromomycin reduces diarrhea frequency and oocysts shedding compared with halofuginone in dairy calves naturally exposed to *Cryptosporidium parvum*

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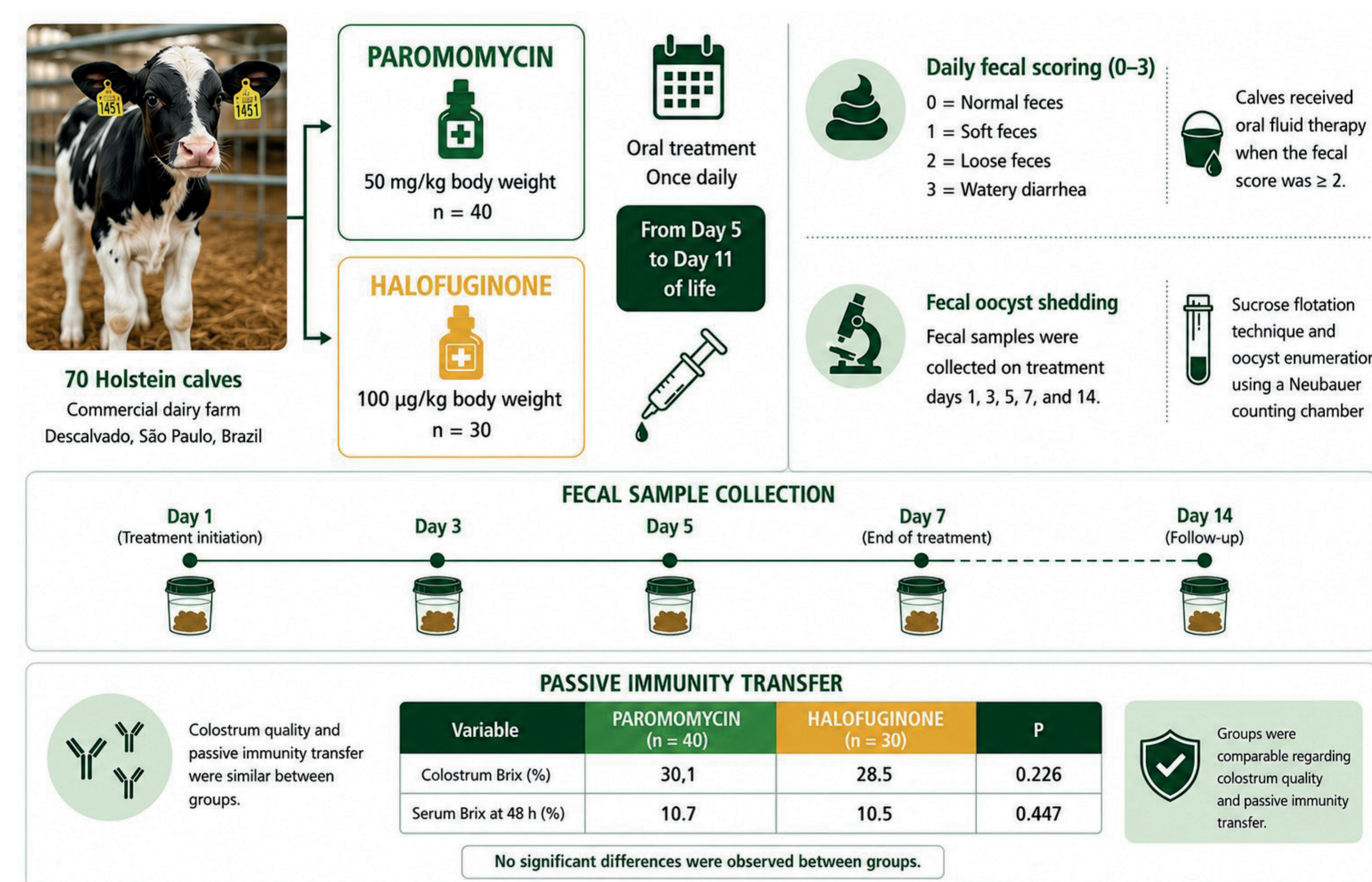
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Background and Objectives

Neonatal diarrhea remains a leading cause of morbidity and economic loss in preweaned dairy calves, with *Cryptosporidium parvum* recognized as one of the most prevalent enteric pathogens during early life. This study compared the effects of halofuginone and paromomycin on diarrhea occurrence, duration, fecal oocyst shedding, and hydration requirements in Holstein calves naturally exposed to *C. parvum* under commercial conditions in São Paulo State, Brazil.

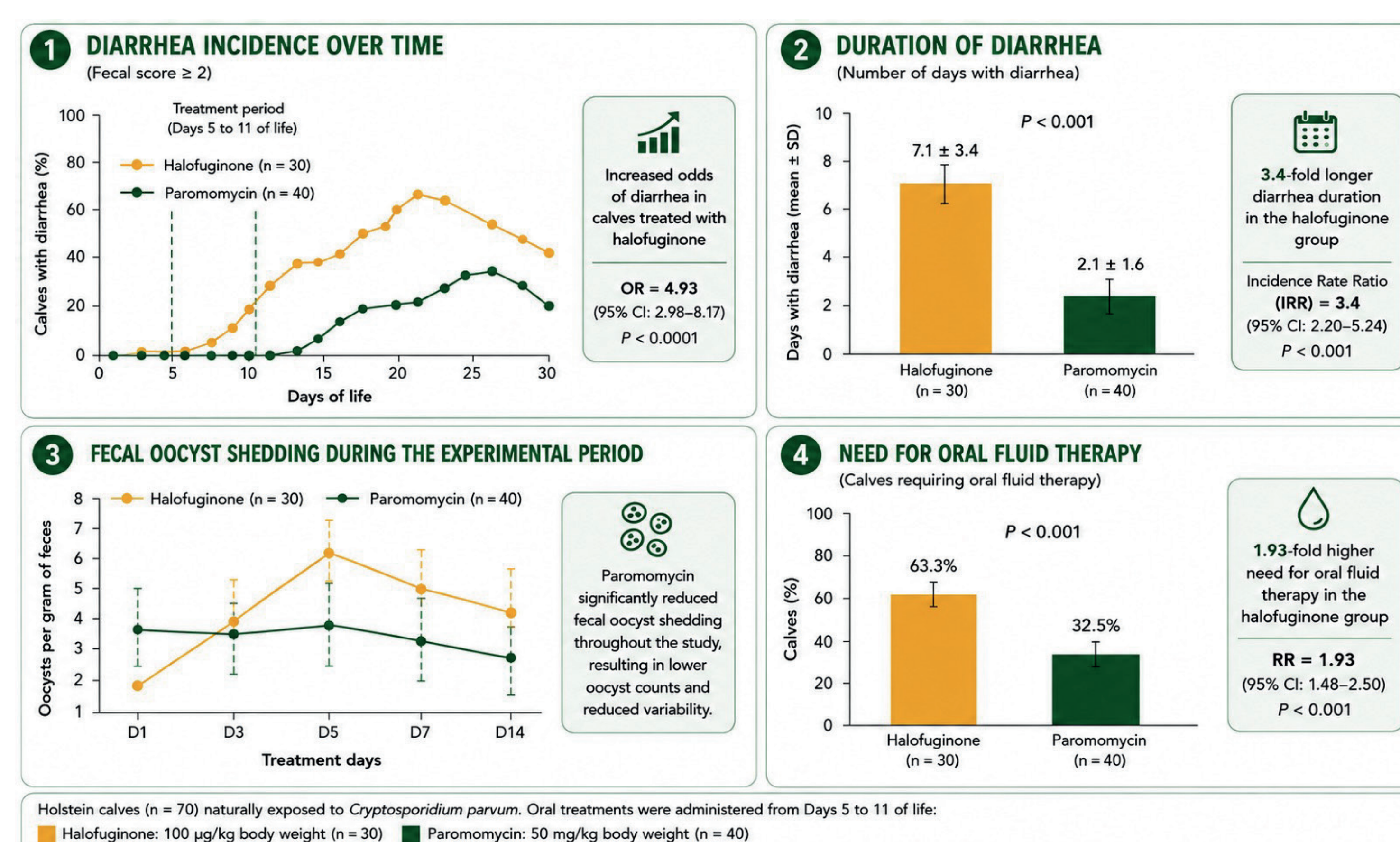
Materials and Methods

Seventy newborn calves were randomly assigned to receive halofuginone (100 µg/kg BW; n = 30) or paromomycin (50 mg/kg BW; n = 40; Paro for oral solution®, Huvepharma) orally once daily for 7 consecutive days (d 5 to 11 of life). Calves were housed individually, fed whole milk, and monitored throughout the preweaning period. Fecal consistency (score 0-3) was recorded daily, hydration status was clinically assessed, and oral electrolyte therapy was provided when fecal score ≥ 2. Fecal samples were collected at d 1, 3, 5, 7, and 14 for quantitative oocyst enumeration using sucrose flotation and Neubauer chamber counting.



Results

Colostrum quality and passive transfer of immunity did not differ between groups, confirming adequate early-life management. Median colostrum Brix values were 30.1% and 28.5% for paromomycin and halofuginone groups, respectively ($p = 0.226$), while serum Brix at 48 h averaged 10.7% and 10.5% ($p = 0.447$). The temporal diarrhea incidence differed markedly between treatments. Calves receiving halofuginone exhibited an early and pronounced increase in diarrhea beginning at d 8, peaking at approximately 70% around d 19. In contrast, paromomycin-treated calves maintained near-zero incidence during the first 10 days, followed by a moderate peak (~40%). A generalized estimating equation (GEE) model revealed a strong treatment effect ($p < 0.0001$), with halofuginone-treated calves having significantly higher odds of diarrhea (OR = 4.93; 95% CI: 2.98-8.17). Paromomycin also significantly reduced diarrhea duration, with halofuginone-treated calves experiencing 3.40 times more diarrheic days (95% CI: 2.20-5.24; $p < 0.001$). The need for oral hydration was greater in the halofuginone group (RR = 1.93; 95% CI: 1.48-2.50; $p < 0.001$). Oocyst excretion differed over time, with paromomycin-treated calves showing lower and less variable counts, particularly at peak infection (d 5: $4.41 \pm 0.9 \times 10^5$ vs. $6.78 \pm 1.6 \times 10^5$ oocysts/g; $p = 0.04$).



Conclusion

In conclusion, paromomycin markedly reduced diarrhea incidence, duration, and clinical intervention requirements, while also mitigating *Cryptosporidium* shedding. These findings support paromomycin as an effective strategy for controlling neonatal cryptosporidiosis and improving calf health under commercial dairy conditions.

Keywords

dairy cattle • gut health • neonatal diarrhea • enteropathogens

