

**Pseudomonas aeruginosa** mastitis in goats was also isolated from an essential oil-based teat dip

**D.J. Wilson**, DVM, MS, PhD, DACVPM; **E.J. Kelly**, DVM, DACVPM

Animal, Dairy, and Veterinary Sciences, Utah State University, Logan, UT 84322

**Introduction**

_Pseudomonas aeruginosa_ is an opportunistic pathogen that has been associated with mastitis in dairy animals, including goats (Yuan et al, 2017). An outbreak of mastitis in dairy goats was investigated at the Utah Veterinary Diagnostic Laboratory (UVDL). Identification of the etiologic agent(s) and source of infection was the primary objective.

**Materials and Methods**

The previous fall, 2 Nubian goats from a herd of 6 hand-milked does had clinical mastitis (CM) with blood and clots in milk. Milk was not cultured. Both goats were treated IM with cefotiofur sodium for 3 days and oxytetracycline and florfenicol for 2 days, along with cefotiofur hydrochloride intramammary infusion (IMM) at 2 milkings 24 h apart. A mastitis homeopathic treatment of _Bryonia alba_, carbo vegetabilis, echinacea, lachesis, laccaninum, Phytolaccac decandra, Ruta graveolens, silica, sulfur, alcohol was added at 1mL in drinking water at each milking. The doses of each substance and treatment duration (a few days) were not recorded. The owner stated that both does recovered from CM, but after kidding in April, the somatic cell count (SCC) was tested at 1 and 6 DIM, respectively, with a goat SCC kit (Porta SCC goat milk test®); SCC was 3,000,000 cells/mL for both does. The owner then submitted 1 milk sample from each doe to the UVDL for culture. Teat dip mixed by the owner contained 350 mL tap water, 3 drops soap, and 1 drop each of tea tree oil, peppermint oil, lavender oil, and grape seed extract; other samples including teat dip were requested for culture by UVDL. Culture used National Mastitis Council methods on 5% sheep blood agar and MacConkey agars.

**Results**

For samples of both goat milks, the teat dip, and a swab of the teat dip container, preliminary biochemical tests and colony morphology were typical of _P. aeruginosa_, also identified by API 20 NE® testing. Milks from the other 4 does, drinking water, feed, wood shavings bedding, and a swab of the water hose for drinking and udder wash water were all culture-negative for _P. aeruginosa_. The owner began using a commercial teat dip and culled the 2 positive does. No more mastitis was observed in the herd for the next 2 years.

**Significance**

Because no milk or teat dip cultures were done the previous fall, it is unclear whether the clinical mastitis at that time was caused by _P. aeruginosa_. It is likely that _P. aeruginosa_ in 1 or more components of the teat dip caused the outbreak. Sometimes, use of alternative medicine products is driven by a scarcity of approved products for goats or because many commercially available iodine and chlorine-based teat dips are not suitable for organic farming. However, commercial teat dip products are preferable.
ZACTRAN is indicated for the treatment of bovine respiratory disease (BRD) associated with Mannheimia haemolytica, Pasteurella multocida, Histophilus somni and Mycoplasma bovis in beef and non-lactating dairy cattle. ZACTRAN is also indicated for the control of respiratory disease in beef and non-lactating dairy cattle at high risk of developing BRD associated with Mannheimia haemolytica and Pasteurella multocida.

The effectiveness of ZACTRAN for the treatment of BRD associated with Mannheimia haemolytica, Pasteurella multocida and Histophilus somni was demonstrated in a field study conducted at four geographic locations in the United States. A total of 497 cattle exhibiting clinical signs of BRD were enrolled in the study. Cattle were administered ZACTRAN (6 mg/kg BW) or an equivalent volume of sterile saline as a subcutaneous injection once on Day 0. Cattle were observed daily for clinical signs of BRD and were evaluated for clinical success on Day 10. The percentage of successes in cattle treated with ZACTRAN (58%) was statistically significantly higher (p<0.05) than the percentage of successes in the cattle treated with saline (19%).

The effectiveness of ZACTRAN for the treatment of BRD associated with M. bovis was demonstrated independently at two U.S. study sites. A total of 502 cattle exhibiting clinical signs of BRD were enrolled in the studies. Cattle were administered ZACTRAN (6 mg/kg BW) or an equivalent volume of sterile saline as a subcutaneous injection once on Day 0. At each site, the percentage of successes in cattle treated with ZACTRAN on Day 10 was statistically significantly higher than the percentage of successes in the cattle treated with saline (74.4% vs. 24% [p <0.001], and 67.4% vs. 46.2% [p = 0.002]). In addition, in the group of calves treated with gamithromycin that were confirmed positive for M. bovis (pre-treatment nasopharyngeal swabs), there were more calves at each site (45 of 57 calves, and 5 of 6 calves) classified as successes than as failures.

The effectiveness of ZACTRAN for the control of respiratory disease in cattle at high risk of developing BRD associated with Mannheimia haemolytica and Pasteurella multocida was demonstrated in two independent studies conducted in the United States. A total of 467 crossbred beef cattle at high risk of developing BRD were enrolled in the study. ZACTRAN (6 mg/kg BW) or an equivalent volume of sterile saline was administered as a single subcutaneous injection within one day after arrival. Cattle were observed daily for clinical signs of BRD and were evaluated for clinical success on Day 10 post-treatment. In each of the two studies, the percentage of successes in the cattle treated with ZACTRAN (86% and 78%) was statistically significantly higher (p = 0.0019 and p = 0.0016) than the percentage of successes in the cattle treated with saline (36% and 58%).

Marketed by Merial Limited
3239 Satellite Blvd., Duluth, GA 30096-4640 U.S.A.

Made in Austria

®

ZACTRAN is a registered trademark of Merial.

© 2016 Merial. All rights reserved. Rev. 01/2016
150 mg/mL ANTIMICROBIAL
NADA 141-328, Approved by FDA
For subcutaneous injection in beef and non-lactating dairy cattle only. Not for use in female dairy cattle 20 months of age or older or in calves to be processed for veal.
Caution: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.
READ ENTIRE BROCHURE CAREFULLY BEFORE USING THIS PRODUCT.

INDICATIONS
ZACTRAN is indicated for the treatment of bovine respiratory disease (BRD) associated with Mannheimia haemolytica, Pasteurella multocida, Histophilus somni and Mycoplasma bovis in beef and non-lactating dairy cattle. ZACTRAN is also indicated for the control of respiratory disease in beef and non-lactating dairy cattle at high risk of developing BRD associated with Mannheimia haemolytica and Pasteurella multocida.

CONTRAINDICATIONS
As with all drugs, the use of ZACTRAN is contraindicated in animals previously found to be hypersensitive to this drug.
WARNING: FOR USE IN CATTLE ONLY. NOT FOR USE IN HUMANS. KEEP THIS AND ALL DRUGS OUT OF REACH OF CHILDREN. NOT FOR USE IN CHICKENS OR TURKEYS.

The material safety data sheet (MSDS) contains more detailed occupational safety information. To report adverse effects, obtain an MSDS or for assistance, contact Merial at 1-888-637-4251.

RESIDUE WARNINGS:
Do not treat cattle within 35 days of slaughter.
Because a discard time in milk has not been established, do not use in female dairy cattle 20 months of age or older. A withdrawal period has not been established for this product in pre-ruminating calves. Do not use in calves to be processed for veal.

PRECAUTIONS
The effects of ZACTRAN on bovine reproductive performance, pregnancy, and lactation have not been determined. Subcutaneous injections of ZACTRAN may cause a transient local tissue reaction in some cattle that may result in trim loss of edible tissues at slaughter.

ADVERSE REACTIONS
Transient animal discomfort and mild to moderate injection site swelling may be seen in cattle treated with ZACTRAN.

EFFECTIVENESS
The effectiveness of ZACTRAN for the treatment of BRD associated with Mannheimia haemolytica, Pasteurella multocida and Mycoplasma bovis was demonstrated in a field study conducted at four geographic locations in the United States. A total of 497 cattle exhibiting clinical signs of BRD were enrolled in the study. Cattle were administered ZACTRAN (6 mg/kg BW) or an equivalent volume of sterile saline as a subcutaneous injection once on Day 0. Cattle were observed daily for clinical signs of BRD and were evaluated for clinical success on Day 10. The percentage of successes in cattle treated with ZACTRAN (58%) was statistically significantly higher (p<0.05) than the percentage of successes in the cattle treated with saline (19%).

The effectiveness of ZACTRAN for the treatment of BRD associated with M. haemolytica was demonstrated independently at two U.S. study sites. A total of 502 cattle exhibiting clinical signs of BRD were enrolled in the studies. Cattle were administered ZACTRAN (6 mg/kg BW) or an equivalent volume of sterile saline as a subcutaneous injection once on Day 0. At each site, the percentage of successes in cattle treated with ZACTRAN on Day 10 was statistically significantly higher than the percentage of successes in the cattle treated with saline (74.4% vs. 24% [p = 0.0019], and 67.4% vs. 46.2% [p = 0.002]). In addition, in the group of calves treated with gamithromycin that were confirmed positive for M. haemolytica (pre-treatment nasopharyngeal swabs), there were more calves at each site (45 of 57 calves, and 5 of 6 calves) classified as successes than as failures.

The effectiveness of ZACTRAN for the control of respiratory disease in cattle at high risk of developing BRD associated with Mannheimia haemolytica and Pasteurella multocida was demonstrated in two independent studies conducted in the United States. A total of 467 crossbred beef cattle at high risk of developing BRD were enrolled in the study. ZACTRAN (6 mg/kg BW) or an equivalent volume of sterile saline was administered as a single subcutaneous injection within one day after arrival. Cattle were examined daily for clinical signs of BRD and were evaluated for clinical success on Day 10 post-treatment. In each of the two studies, the percentage of successes in the cattle treated with ZACTRAN (66% and 70%) was statistically significantly higher (p = 0.0019 and p = 0.001) than the percentage of successes in the cattle treated with saline (39% and 39%).

Marketed by Merial Limited
3239 Satellite Blvd., Duluth, GA 30096-4640 U.S.A.

Made in Austria
©2016 Merial. All rights reserved. Rev. 01/2016
Zactran® (gamithromycin) helps wipe out bovine respiratory disease (BRD), so cattle pack on pounds and you keep your hard-earned profits. Visit ZACTRAN.com.

IMPORTANT SAFETY INFORMATION: Do not treat cattle within 35 days of slaughter. Do not use in female dairy cattle 20 months of age or older, or in calves to be processed for veal. Subcutaneous injection may cause a transient local tissue reaction in some cattle that may result in trim loss of edible tissues at slaughter. NOT FOR USE IN HUMANS.