

# Pain responses associated with four caprine disbudding methodologies: heat cautery, clove oil injection, short-term application of caustic paste, and freezing

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## Introduction

An overwhelming majority of domestic goats are born with horns and require disbudding either for safety considerations or as a requirement by show organizations and breed registries. Heat-cautery disbudding is typically performed by producers without adjunct anesthesia or analgesia, and is both painful to the animal and aversive to the owner. Although heat-cautery disbudding currently provides a common compromise between welfare, efficacy, and production constraints, there is demand for a stand-alone disbudding option that improves welfare in the absence of adjunct anesthesia, is technically straightforward to perform, and reliable. The objective of this study was to evaluate indications of pain for 3 alternative caprine disbudding methods (clove oil injection, 1-hour application of caustic paste, or freezing) against sham-disbudded and heat-cautery controls.

## Materials and Methods

In this study, 65 Alpine and Saanen commercial dairy buck kids (approximately 1 week of age or less) were randomly assigned to 1 of 6 treatment groups: SHAM disbudding with a room temperature disbudding iron; HEAT-cautery with a narrow-edge commercial butane disbudding iron; 0.2 mL injection of CLOVE oil into the center of the horn bud; 1-hour application of commercial caustic PASTE; 40s FREEZE with a liquid-nitrogen immersed disbudding iron; and 10s flooding

and boil-off with a commercial CRYOGEN fluid. Frequency of vocalization and escape behaviors were collected by direct observation during the disbudding process. Postsurgical behavioral responses were collected by a trained observer, blind to treatment groups, using video recordings of each pen from T -24h through T 72h and an ethogram for quantifying frequencies and durations of behavior. Mechanical nociceptive thresholds were collected daily using pressure algometry around the horn bud from T -24h through T 48h. A 2-tailed Student's T distribution will be used for statistical analysis of vocalization and escape behavior frequency data ( $\alpha=0.05$ ), and a repeat measures mixed model will be used for pressure algometry and postsurgical behavioral data.

## Results

The animal phase of the project has been completed and the efficacy and safety portion has been completed. Analysis of the behavioral data will be conducted this summer prior to the conference in September.

## Significance

Results of this study complement the efficacy and safety components of this study to better inform clinical recommendations for caprine disbudding practices.



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# ZACTRAN<sup>®</sup>

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For subcutaneous injection in beef and non-lactating dairy cattle only.  
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### 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 injection 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 *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%).

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**IMPORTANT SAFETY INFORMATION:** For use in cattle only. 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, or in calves to be processed for veal. The effects of ZACTRAN on bovine reproductive performance, pregnancy and lactation have not been determined.

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