

# Effect of Pluronic-F68 fog solution on performance and morbidity of newly received heifer calves

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## Introduction

- Metaphylaxis of an injectable antimicrobial is used in 59.3% of feedlots when receiving new calves as preventative care against bovine respiratory disease complex (BRDC; USDA, 2013).
- Stressors attributing to immunosuppression of cattle include: weaning, shipping, commingling, and processing (Edwards, 1996).
- An injectable antimicrobial is the first course of treatment in 99.0% of all feedlots affected by BRDC (USDA, 2013).
- Utilizing a fog solution containing Pluronic-F68 has been used by some cattle buyers in the southeast with anecdotal success.

## Objective

Evaluate effects of utilizing a novel breathing treatment containing a non-ionic surfactant (Pluronic-F68) on performance and morbidity of high-risk calves.

## Materials and Methods

All procedures were approved by NMSU IACUC

### Animals

- Two hundred and forty heifers (BW = 177 ± 1.35 kg)
- Source: Delhi, LA (811 mi; 14h in transit)
- Growth-promoting implant (estradiol and progesterone)
- IBR-BVD-PI3-BRSV-Mannheimia-Pasturella vaccine
- 5-mL clostridial vaccine
- Injectable anthelmintic
- Fed RAMP at ad libitum intake for 45 d

### Experimental design

- Completely randomized design by load
- Load 1 = 121 head; Load 2 = 119 head

### Treatments

- **FOG:** breathing solution containing Pluronic-F68, glycerin, and water while held in an enclosed stock trailer for 10 min (n = 8 pens/treatment and 14 to 16 heifers/pen)
- **CON:** held in enclosed stock trailer for 10 min (n = 8 pens/treatment and 15 heifers/pen)
- Person responsible for identifying morbid heifers was blinded to treatment assignments

### Statistical Analysis

- Data was analyzed as a completely randomized design using MIXED (continuous) or GLIMMIX (binomial)

## Health and Performance

**Table 1. Effects of a breathing treatment with a non-ionic surfactant (Pluronic-F68) on growth performance**

Item	CON	FOG	SEM	P-value
Initial body weight, kg	178	177	1.35	0.75
Final body weight, kg	219	217	3.61	0.74
Average daily gain, kg	0.908	0.897	0.074	0.91
Dry matter intake, kg	4.51	4.79	0.126	0.14
Gain efficiency, G:F	0.200	0.189	0.013	0.58

CON = no fog treatment administered; FOG = fog treatment administered for 10 min

**Table 2. Effects of a breathing treatment with a non-ionic surfactant (Pluronic-F68) on morbidity responses within the first 45 days on feed**

Item	CON	FOG	SEM	P-value
Cattle treated for respiratory disease <sup>1</sup>				
d 0 (Metaphylaxis at arrival) <sup>2</sup>	20.0	19.0	14.6	0.84
d 1 to d 45 <sup>3</sup>				
1 <sup>st</sup> Treatment	35.0	28.2	5.6	0.34
2 <sup>nd</sup> Treatment	7.50	5.90	5.3	0.62
3 <sup>rd</sup> Treatment	3.33	2.50	1.67	0.70
Metaphylaxis + one extra Treatment (d 1 to d 45)	8.33	5.83	4.07	0.47
Number of antimicrobial treatments required (d 1 to d 45)	1.31	1.26	0.18	0.72
Mortality (d 1 to d 45)	1.70	3.33	1.47	0.44

CON = no fog treatment administered; FOG = fog treatment administered for 10 min

<sup>1</sup> Values reported are least square means according to main treatment effect.

<sup>2</sup> All calves held inside enclosed stock trailer for 10 min regardless of TRT

<sup>3</sup> Cattle were observed daily for signs of bovine respiratory disease according to the DART system (Zoetis, Florham Park, NJ) with the modifications described by Step et al., (2008) and Wilson et al. (2015). If diagnosed with respiratory disease signs, cattle received antimicrobial treatment as described by Wilson et al. (2015).

### References

- Dennis, E. J., T. C. Schroeder, D. G. Renter, and D. L. Pendell. 2018. Value of arrival metaphylaxis in U.S. cattle industry. *J. Agric. Resour. Econ.* 43:233–250.
- Edwards, A. J. 1996. Respiratory disease in feedlot cattle in the central USA. *Bov. Pr.* 30:5–7.
- Step, D. L., C. R. Krehbiel, H. A. DePra, J. J. Cranston, R. W. Fulton, J. G. Kirkpatrick, D. R. Gill, M. E. Payton, M. A. Montelongo, and A. W. Confer. 2008. Effects of commingling beef calves from different sources and weaning protocols during a forty-two-day receiving period on performance and bovine respiratory disease. *J. Anim. Sci.* 86:3146–3158. doi:10.2527/jas.2008-0883.
- USDA. 2013. Feedlot 2011 Part IV: Health and health management on U.S. feedlots with a capacity of 1,000 or more head. USDA-APHIS-VS-CEAH-NAHMS. Fort Collins, CO.
- Wilson, B. K., D. L. Step, C. L. Maxwell, J. J. Wagner, C. J. Richards, and C. R. Krehbiel. 2015. Evaluation of multiple ancillary therapies used in combination with an antimicrobial in newly received high-risk calves treated for bovine respiratory disease. *J. Anim. Sci.* 93:3661–3674. doi:10.2527/jas.2015-9023.

## Results

- No differences were found in dry matter intake ( $P = 0.14$ )
- No differences in gain efficiency ( $P = 0.58$ )
- No differences ( $P = 0.74$ ) in final body weights
- Morbidity similar at first, second and third antimicrobial administration regardless of treatment ( $P \geq 0.34$ )
- Similar ( $P = 0.72$ ) number of antimicrobial treatments required or the management of BRDC similar between treatments
- No difference ( $P = 0.44$ ) in mortality between FOG and CON groups

## Discussion

- Pluronic-F68 solution did not improve performance or reduce morbidity of newly received heifer calves
- Further research with a different concentration and/or duration of fogging may be warranted

