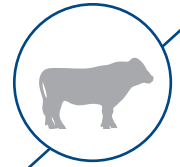


Research Notes

Arm & Hammer Animal and Food Production



BoviBrom delivers effective bacterial control across multiple beef harvest antimicrobial interventions.

Research confirms effectiveness in a multi-hurdle food safety program.

INTRODUCTION

The use of postharvest microbial interventions is a standard food safety practice in the U.S. beef packing industry. There are numerous antimicrobials commonly used in the multi-hurdle approach proven effective in today's beef intervention systems¹. Processors look for a product that supports multiple intervention points, is easily configured to fit existing systems, and delivers broad-spectrum pathogen control.

A third-party research trial conducted by Colorado State University was designed to evaluate the efficacy of BoviBrom™ antimicrobial compound on bacterial growth when used in multiple interventions in beef packing facilities².

STUDY DESIGN

- Carcasses were inoculated on the rail in 4 target zones (Figure 1)
- The inoculum consisted of a five-strain mixture of non-pathogenic *E. coli* biotype 1, which are considered surrogates for pathogenic *E. coli* and *Salmonella*
- The following treatment systems were administered on two separate production days (Table 1)

FIGURE 1: Zone locations for beef carcasses (chuck area)

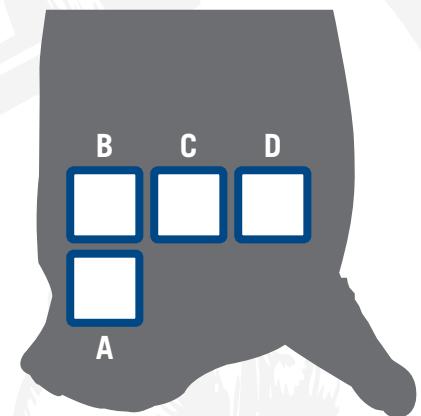


TABLE 1	Treatment and sampling scheme for inoculated beef carcasses			
Treatment Systems	Sample: Zone A	Sample: Zone B	Sample: Zone C	Sample: Zone D
1 Hot Water	Before Hot Water Wash	After Hot Water Wash	After Lactic Acid Spray	After BoviBrom Spray Chill
2 DBDMH	Before BoviBrom Final Wash	After BoviBrom Final Wash	After Lactic Acid Spray	After BoviBrom Spray Chill
3 Hot Water + DBDMH	Before BoviBrom Final Wash and Hot Water	After BoviBrom Final Wash and Hot Water	After Lactic Acid Spray	After BoviBrom Spray Chill

- Samples were collected before the initial intervention, and following each subsequent intervention, from the corresponding Zones as outlined in Table 1
- Inoculated samples were analyzed for *Enterobacteriaceae* (EB) populations to enumerate *E. coli* surrogates, and comparisons between the three treatment systems were made after all interventions were complete

RESULTS

Overall, all systems were effective ($P<0.05$) against the inoculated *E. coli* biotype 1, surrogates for pathogenic *E. coli* and *Salmonella*. Treatment system 3, which combined the effect of the BoviBrom™ and hot water wash, provided the greatest potential for pathogen control ($P<0.05$).

At the end of the treatment interventions, treatment system 3 had the lowest (<0.5 log CFU/cm²) remaining microbial counts compared to both system 1 (<1.2 log CFU/cm²) and system 2 (<3.8 log CFU/cm²).

TABLE 2		<i>Enterobacteriaceae</i> plate counts (log CFU/cm ²) for zones before and after intervention treatments			
System	Control	Hot Water, BoviBrom or Combination	Lactic Acid Spray	BoviBrom Spray Chill	% BDL ¹
A	6.6 ^a (0.3)	3.2 ^b (0.3)	3.0 ^b (0.3)	<1.2 ^{bx} (0.3)	25.0
B	6.6 ^a (0.3)	4.9 ^b (0.3)	4.8 ^b (0.3)	3.8 ^{by} (0.3)	0.0
C	6.6 ^a (0.3)	2.2 ^b (0.3)	2.2 ^b (0.3)	<0.5 ^{bz} (0.3)	33.3

^{a,b} LSM means bearing different superscript letters within the same row are different ($P<0.05$) from the control (comparisons were not made between interventions, only to the control)

LSM means with a less than symbol (<) indicate at least one sample within the treatment had counts that were below the detection limit (<0.6 log CFU/cm²)

^{x,y,z} LSM means bearing different superscript letters within the same column are different ($P<0.05$) by direct contrasts

¹ % BDL: indicated the percent of samples below the analysis detection limit after the complete intervention system

CONCLUSION

In all 3 systems, BoviBrom was effective in reducing bacteria counts as an antimicrobial. The data demonstrate that with the application of BoviBrom in postharvest antimicrobial interventions, bacterial growth is effectively controlled, and overall bacterial activity of the carcass is significantly reduced across multiple food safety control systems.



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¹ Ruby JR, et al. Using Indicator Bacteria and *Salmonella* Test Results from Three Large Scale Beef Abattoirs Over an 18-Month Period to Evaluate Intervention System Efficacy and Plan Carcass Testing for *Salmonella*. *Journal of Food Protection* 2007;70(12):2732-2740.

² Bullard BR, et al. Investigation of the use of 1,3-Dibromo-5,5-Dimethylhydantoin (DBDMH) in beef harvest interventions. Center for Meat Safety and Quality, Department of Animal Sciences, Colorado State Univ. 2018.