Association of Different Iowa Livestock Truck Wash Stations Service Levels with *Enterobacteriaceae* Counts

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Summary and Implications

Data from eighteen different truck washes were used to compare the association of different service levels with *Enterobacteriaceae* counts. Service levels were classified into three different categories; prewash (n=78), post wash with disinfectant (n=78), and post wash without disinfectant (n=12). A total of 168 drag swabs were used for collection for the purpose of this study. Prewash services were defined as trailers before they were scraped out and washed. Post wash with or without disinfectant services were defined as after the trailers were washed and disinfectant was or was not applied. Prewash trailers tended to have higher *Enterobacteriaceae* counts of around 5.0 Log10CFU/m^2 when compared to post wash with disinfectant *Enterobacteriaceae* counts of around 2.2 Log10CFU/m^2 and post wash without disinfectant *Enterobacteriaceae* counts of around 2.7 Log10CFU/m^2.

Introduction

Transportation is one area within the livestock industry that could impact biosecurity at different production levels. Little is known about different services offered at livestock truck washing stations within Iowa. Several studies have looked into the effect of different disinfectants or trailer baking times, but not at how different services affect *Enterobacteriaceae* counts. This study compared prewash, post wash with disinfectant, and post wash without disinfectant services at different Iowa livestock truck washes and how these services are associated with *Enterobacteriaceae* counts.

Materials and Methods

Truck washes: Data from 18 different livestock truck washes were collected within the state of Iowa from 2014 to 2015. Data were only collected from trailers that hauled swine during different service levels; prewash (n=78), post wash with disinfectant (n= 78), and post wash without disinfectant (n=12).

Swab collection: A total of 168 4" x 4" cotton drag swabs were collected. Drag swabs were pre-moistened with double-strength skim milk, which helps collect any particles gathered during the swabbing process. Double deck and single deck trailers were swabbed twice throughout the washing process. Swabbing began at the front end of the trailer floor and through the use of an attached 6 foot string, the swabs were dragged the entire length of the trailer.

Enterobacteriaceae methodology: Once collection was complete, the swabs were placed in screw cap vials that were marked with the date, location of truck wash, and the location the swabs were drug. Swabs were packed in a cooler with ice blocks for transport and brought to the Food Safety and Research lab at Iowa State University, where they were placed in 7.5 x 12 filtered bags with 10 mL letheen broth. The contents were mixed in the stomacher for 60 seconds with an agitation speed ranging from 420-520 strokes/minute. Once finished, 1 mL of the contents was transferred to 9 mL of Buffered Peptone Water and vortexed. Serial dilutions were prepared to 10^{-7} through the use of pipettes and then plated onto *Enterobacteriaceae* Petrifilm. The plates were incubated at 37°C for approximately 48 hours and *Enterobacteriaceae* populations were counted by hand through the use of the Darkfield Colony Counter. These counts were multiplied by the appropriate dilution factor and reported as Log10CFU/m^2.

Statistical analysis: The different service level data were evaluated using mixed model methods (PROC MIXED, SAS Inst. Inc., Cary, NC). This model used trailer as the experimental unit with swab location and type of wash as fixed effects. Swab number was used as a random variable. Prewash, post wash with disinfectant, and post wash without disinfectant data were obtained and assessed for differences

Results and Discussion

Enterobacteriaceae counts are associated with different service levels offered at livestock truck wash locations

within Iowa. The prewash service had a greater *Enterobacteriaceae* count of approximately 5.0 Log10CFU/m^2 when compared to post wash with disinfectant *Enterobacteriaceae* count of approximately 2.2 Log10CFU/m^2 and post wash without disinfectant *Enterobacteriaceae* count of approximately 2.7 Log10CFU/m^2 (Figure 1). There was no difference observed ($P > 0.05$) in Log10CFU/m^2 between post wash with or without disinfectant as well as between swab locations.

In conclusion, results from this study suggest that current methods for washing trailers are effective in reducing *Enterobacteriaceae* counts.

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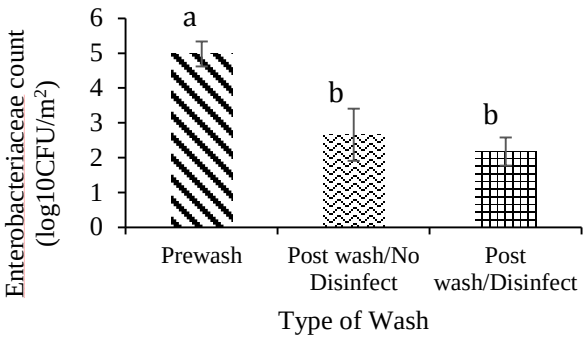

Figure 1. *Enterobacteriaceae* counts in Log10CFU/m^2 (LS means ± SE) for different service levels at livestock truck wash locations within Iowa. [a, b] Significant differences ($P < 0.05$).