

Research Summaries 3

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Comparison of Bacteria Populations within Clean and Recycled Sand used for Bedding in Dairy Facilities

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Introduction

Sand is widely considered the best bedding for cow comfort and udder health. Advances in manure handling technology has enabled sand to be separated from manure by either active (mechanical sand separator) or passive (gravity) means. The objective of this study is to evaluate the safety of recycled sand as a bedding material for dairy cows.

Materials and Methods

Bedding samples were collected two times from dairy facilities using either recycled sand or clean sand in both winter and summer. Samples were taken from the back one-third of 10% of the free stalls beginning the day sand was taken from the pile (day 0) and continued for five to seven additional days. The number of colony forming units (CFU) per gram of each sand sample was determined for gram-negative bacteria, coliform, *Streptococcus* spp, and *Klebsiella* spp, as well as dry and organic matter. Particle size composition of each sand sample taken from the pile was estimated.

Results

Clean and recycled sand had the same bacterial counts when compared at each sampling time. The mean bacterial counts did vary over time for both clean and recycled sand. There was a significant increase in bacterial counts from day 0 (pile) to day 1 (24 hrs after sand was added to the stalls) for gram-negatives, coliforms and *Streptococcus* spp in both winter and summer. Counts of bacteria did not differ from day 1-7 in the winter for gram-negatives, coliforms, *Klebsiella* spp and

Streptococcus spp. In the summer, total counts of gram-negatives did not differ from day 1-7. On day 1 in the summer, total counts of coliforms were lower than days 5-7, and *Klebsiella* spp counts were lower than days 3-7. *Streptococcus* spp counts were high on day 1 and did not vary from day 1-7 in both the winter and summer. Clean sand had lower organic matter, higher dry matter and smaller particle size compared to recycled sand in both winter and summer. Different management systems influenced the numbers and types of bacteria in sand.

Significance

Results from this study suggest that bacterial populations are similar in clean and recycled sand when compared to each other in winter and summer. The mean number of coliform and *Klebsiella* spp were below the threshold of 1,000,000 CFU/gram thought to cause mastitis, which is in agreement with data from Bernard *et al.*¹ Cows bedded on either clean or recycled sand should have a decreased risk of mastitis caused by coliform or *Klebsiella* spp. *Streptococcus* spp were high in both clean and recycled sand from days 1-7 in both winter and summer. The numbers of *Streptococcus* spp bacteria were as high as in organic bedding. Zdanowicz *et al.*² reported 10 times more *Streptococcus* bacteria on teat ends of cows housed on clean sand compared to sawdust. These results suggest cows housed on either clean or recycled sand could be at increased risk for mastitis caused by *Streptococcus* spp, and that stalls should be bedded more frequently than once a week to decrease numbers of *Streptococcus* spp. Further studies are needed to identify factors that might decrease the number of *Streptococcus* spp in the bedding and on the teats of dairy cows.

References

1. Bernard JK, Bray DR, West JW: Bacterial concentrations and sand usage in free stalls bedded with fresh or recycled sand. *Proc Nat Mast Council Annual Meeting*, pp 153-158, 2003.

2. Zdanowicz MJ, Shelford A, Tucker CB, Weary DM, von Keyserlingk MAG: Bacterial populations on teat ends of dairy cows housed in free stalls and bedded with either sand or sawdust. *J Dairy Sci* 87:1694-1701, 2004.

The Relationship between Locomotion Scores and Lameness Lesions in Dairy Cattle

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Introduction

To preserve and improve the perception that the dairy industry has among consumers, there is a need to be able to identify and act upon animal welfare concerns. Lameness is the dairy industry's most visible animal welfare concern. Unfortunately, dairy producers often underestimate the level of lameness on their farm. Bovine practitioners need to take a leadership role in assisting the dairy industry in monitoring and reducing lameness. To meet this challenge, accurate methods to diagnose lameness early is needed. A variety of locomotion scoring systems are used to assess lameness. However, few of these systems have correlated the score assigned to a cow with the lesion present in the claw. The objective of this project was to evaluate the association between locomotion scoring and lesions found at the time of foot trimming.

Materials and Methods

Five professional hoof trimmers were asked to recruit from among their clients to participate in this locomotion scoring study. In these herds, locomotion scoring was carried out 1-2 weeks prior to the scheduled hoof-trimming visit. During their scheduled visit the hoof trimmers were asked to record lesions on a standardized recording form for all cows they trimmed. The standardized recording form was based on the lesions descriptions and codes proposed by the American Association of Bovine Practitioners Lameness Committee. Locomotion scoring in free stall herds was done using a four-point scale (normal, mild, moderate, severe). In tie

stall herds in addition to a leg score the presence of back arch was recorded. The leg score evaluates the angle between the spinal column and the interdigital space. This angle is categorized into mild (17-24 degrees) and severe (greater than 24 degrees). Locomotion and lesion data were combined with Dairy Herd Improvement (DHI) data where available.

Results

A total of 2077 cows were locomotion scored in 18 tie stall and 14 free stall herds. Average back arch prevalence in tie stall herds was 23%. Mean prevalence of cows with a severe leg score was 13%. For locomotion scored cows, 5.5% of the cows were in the severely lame category. Overall, 28% of the locomotion scored cows were either moderately or severely lame. Lesion, locomotion and DHI data was available for 807 animals. Of these cows, 53% had at least one lesion at the time of hoof trimming. For cows scored in tie stalls, those with a severe leg score tended to be twice as likely to have a lesion than cows with a normal or mild leg score. When only infectious lesions were considered, cows with a severe leg score were 2.5 times as likely to have an infectious lesion compared to cows with a normal or mild leg score. For locomotion scored cows, those with a moderate locomotion score were 1.7 times as likely to have any lesion than cows with a normal or mild score. Similarly, cows with a severe locomotion score were 4.7 times as likely to have any lesion. When only severe non-infectious lesions were considered, cows with either a moderate or severe score were 2.7 and 8.7 times as likely to have a severe non-infectious lesion than normal or