

## Effect of Two Bedding Systems on Udder Health Management of Dairy Cows

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### Abstract

Managing and maintaining of healthy udder of the dairy cows has a significant impact on farm economy. In intensive cattle farming, cows spend between 50% -65% of their time lying down. Bacteria in lying surface can be transferred to the teats. This increases the risk of contamination of the mammary glands via teat channels, once after every milking. Objective of this study was to investigate the effect of two bedding systems on udder health management. Twelve lactating cows, in same breed, age and parity were selected for the study. Selected animals had neither shown any sign of mastitis nor treated with any antibiotic. Chosen animals were separated into two sheds. One group was given dried softwood sawdust as the bedding material and the other group was on the rubber carpet. Samples of fore-milk and teat-milk were collected once a week up to five weeks. There has been a significant reduction in Coliform counts in sawdust system ( $567.54 \pm 5.06$  colony forming units (cfu)/ml) compared with carpeted system ( $2523.5 \pm 3.16$  cfu/ml). Total Bacterial Counts (TBC) significantly reduced in sawdust system ( $16865.5 \pm 2.40$  cfu/ml) than the carpeted system ( $39627.9 \pm 2.8380$  cfu/ml). TBC levels of fore-milk were not significantly different in both systems, TBC values were  $58344.5 \pm 3.32$  cfu/ml for sawdust and  $85506.6 \pm 2.80$  cfu/ml for carpet system, respectively. In conclusion, dry sawdust bedding surfaces helped to keep the dairy cows getting less microbial contaminations compared to the carpeted system.

**Keywords:** Coliform, TBC, Foremilk, Teat-ends, Bedding

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### Introduction

In intensive cattle farming cows spend between 50- 65% of their time lying down. Bacteria can be transferred between the lying surface and the teats (Manninena *et al.*, 2002). There is a high potential to contaminate the teat ends and teat canal during lying down on beddings in between two milking intervals (Dechamps *et al.*, 1989). Effective bedding management should ensure that teats contact a clean, well-bedded surface each time at cow lays down. Clean dry bedding will insure minimal contamination of teat skin with bacteria.

Therefore current study was focused to investigate and compare bacterial populations on the teat-ends and in foremilk of lactating cows housed on daily washed (WRC) and sawdust cushioned rubber carpet (SCRC). The effect of daily wash and saw dust cushioned rubber carpet systems as a bedding material on cows' udder health management was also investigated.

### Materials and Methods

All animal experiments were conducted with prior approval of the Institutional Animal Care and Use Committee (IACUC) guidelines of Sabaragamuwa University of Sri Lanka. Twelve lactating cows were selected using the following criteria: 1). Animals had no history of mastitis, 2) Not been treated with any antibiotic 3) Animals were subjected to CMT (California mastitis test). All selected animals were in average of 100 days in milking. All animals were examined prior to the treatment allocation, for the presence of teat damage.

Selected cows were housed in two different sheds. Also cow sheds were disinfected before starting the trial. Each shed had two rows of rubber carpets, tail to tail position. The dried softwood sawdust was obtained from reliable source; it had been stored in dry place which was free from natural hazards. Visible fecal matter was removed twice daily to keep stalls visibly clean and fresh sawdust was added twice every day. In Other group, rubber carpets were

washed by regularly checked, washed with clean water.

Teat-end samples and foremilk samples once a week up to five weeks, before the day milking were collected. Finally, Coliform and total bacterial counts were enumerated. Data were analyzed using two sample *t*-test in Minitab (14) version.

**Results and Discussion**

According to the results, teat-end Coliform counts of sawdust cushioned system (567.54±5.06 colony forming units (cfu)/ml) was significantly low (P<0.001) compared to that of rubber carpet system (2523.5±3.16 cfu/ml). Total bacterial counts (TBC) of sawdust cushioned (16865.5±2.40cfu/ml) was significantly low (P<0.01) compared to that of rubber carpet system (39627.9±2.8380cfu/ml).

Washed rubber carpet system shows four times greater Coliform counts and two times greater TBCs than sawdust cushioned system. Fore milk TBCs of sawdust cushioned system (58344.5±3.32cfu/ml) was not significantly

different (P>0.05) compared to that of rubber carpet system (85506.6±2.80cfu/ml). Furthermore, Coliform count of sawdust cushioned system (39±5.63 cfu/ml) was not significantly different (P>0.05) compared to that of washed rubber carpet system (69.02±6.65 cfu/ml).

In addition, although there were no appreciably different TBC and Coliform counts in foremilk samples, in many of experimental weeks there was a notable amount of total bacterial count.

In addition, although there was no different in TBC and Coliform counts in foremilk samples, many weeks had notable amount of total bacterial population in washed rubber carpet system than in sawdust cushioned system. Physical properties of the bedding surface of washed rubber carpet was maintained wet damp conditions. Sawdust cushioned bedding surface was maintained in dry conditions. After milking cows are directed to the stalls and when they lying down, teats directly get contact with

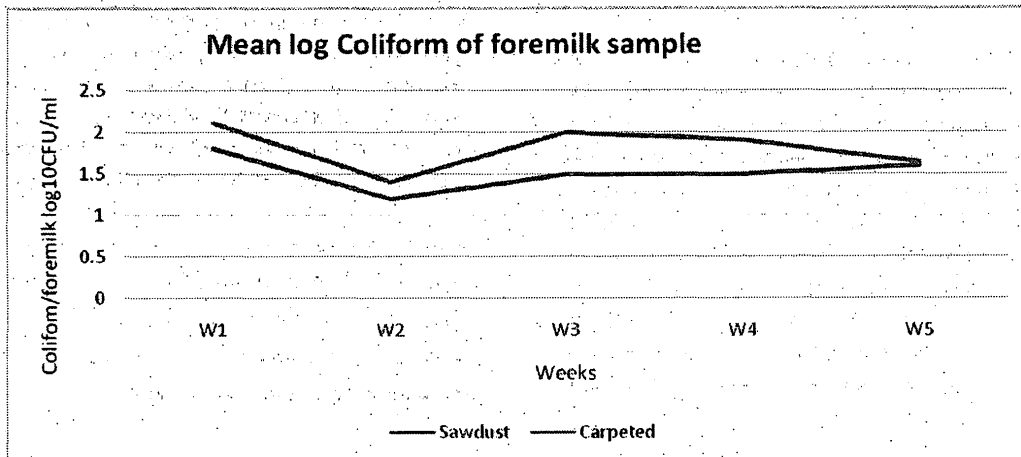


Figure 1: Weekly Mean log values of Teat-end Coliform counts in Sawdust and Carpeted systems

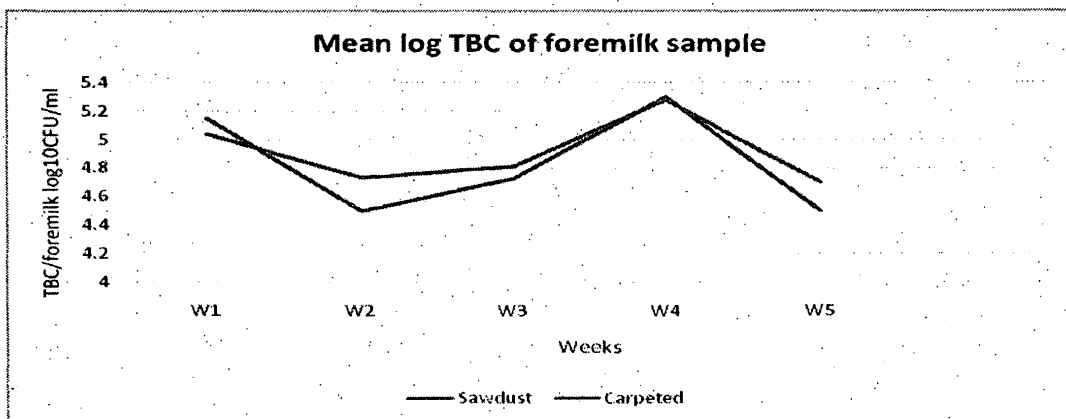


Figure 2: Mean log values of fore milk Total Bacterial counts in Sawdust and Carpeted systems

wet bedding surface and induce contamination of the teat-ends. Present data also was in the agreement with previous studies of (Bramley and Neave, 1975; József and Terry, 1994)) which showed that bacteria only multiply in warm, damp conditions. It is very important that beddings are kept dry to minimize the mastitis causing pathogens growth

Bedding counts were positively correlated to stall cleanliness. Zdanowicz *et al.* (2004) showed that feces and urine contamination of bedding plays an important role in bacterial multiplication. Bacterial populations found on teat surfaces closely reflect those found in bedding materials. Organisms associated with bedding materials that contaminate the surface of teats and udders include Streptococci, Staphylococci, Coliforms, and other Gram-negative bacteria.

Coliforms are found in soil, water and manure and they also inhabit the intestinal tract of cows. In present experiment when rubber carpet was cushioned daily by sawdust, it kept surface dry and there was minimum chance to fecal dissolve in water; consequently, it reduced the potential to bacterial transmission through teats. Bedding temperature and moisture influence the Coliform growth and transmission (Bramley and Neave, 1975).

### Conclusions

Keeping bedding surface dry using saw-dust was able to minimize the teat-end microbial

contamination than cows on washed rubber carpets. In addition to that minimum teat-end microbial contaminations can minimize the risk of predisposing animal to environmental mastitis. In conclusion, dry sawdust bedding surfaces was help to keep the dairy cows getting less microbial contaminations with compared to the carpeted system.

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