

Technical Bulletin

Arm & Hammer Animal and Food Production



Efficacy of CERTILLUS Eco Dairy Bedding to reduce monthly mastitis events, SCC and bedding pathogens associated with environmental mastitis when applied directly to free stalls at a commercial California dairy.

BACKGROUND

Recycled manure solids (RMS) represent a cost-effective and sustainable bedding source on dairy farms, but also present additional risk by exposing herds to environmental pathogens that can lead to the incidence of mastitis and high somatic cell counts (SCC). Clinical mastitis is the most common cause of morbidity in dairy cows across the U.S. It has been estimated that each case of mastitis costs an average of \$444.¹

Current bedding treatment options provide limited protection from pathogens for a short time span, and present potential safety risks for those applying them.

An on-farm trial² was conducted to evaluate the efficacy of applying a proprietary blend of *Bacillus* to RMS. Water soluble CERTILLUS™ Eco Dairy Bedding was mixed into a 25-gallon tank prior to application. Treatment was applied directly to stalls twice per week at a calculated mix based on the number of stalls per pen and frequency of application.

Milk volume, energy corrected milk (ECM), SCC, and mastitis events were measured across treatment and control groups. Mastitis events were broken out by the total number of infections, percent of new infections, percent of chronic infections and percent clean. Individual cows with SCC >200,000 were classified as having an increased risk of clinical mastitis. Fresh cows were defined as newly infected if uninfected at dry off (SCC <200K) and infected at beginning of the current lactation (SCC >200K). Using the same comparative methodology, cows were categorized as chronic and clean. Positive growth milk cultures were characterized as environmental strep, *E. coli*, and Staph species (Non-*S. Aureus*).

Representative bedding samples were also collected from both the control and treated groups on days 30, 60, 90, and 150 following the start of the trial. Samples were then enumerated for *E. coli*, coliforms, group D Streptococci and *Klebsiella*.

Results are based on data collected between July 2022 and December 2022.

DATA ANALYSIS

The effects of treatment on the primary response variables Milk volume, ECM and SCC were quantified using Linear Regression Analysis. Linear Regression Analysis uses the “least squares” method to fit a line through a set of observations to assess how a single dependent variable is affected by the values of one or more independent variables. Data were analyzed according to the following model:

$$Y_{ijkl} = \mu + T_i + L_k + D_l + \epsilon_{ijklm}$$

Where

μ = overall mean

T_i = effect of the i^{th} treatment ($i = 1, 2$)

L_k = effect of the k^{th} lactation number ($k = 1, 2, 3+$)

D_l = effect of days in milk

ϵ_{ijklm} = random error

Differences in mastitis events and milk culture results between treatment and control groups are reported descriptively as percentage change during period of observation. Control and treated manure samples were compared using samples from all time points with a one-way ANOVA analysis of the log transformed microbial counts.

RESULTS

There was a statistically significant improvement in SCC in the treated group compared to the control group. The group laying in stalls treated with CERTILLUS™ Eco Dairy Bedding had lower SCC by 41,604; a 48% decrease (Table 1).

This reduction in SCC resulted from decreases in total (-25%) and new mastitis infection (-8%) respectively for cows laying on bedding treated with CERTILLUS Eco Dairy Bedding (Table 2).

Milk culture trends showed a numerical improvement in all measurements (Table 3).

Manure samples comparison indicated significantly lower levels of *E. coli*, coliforms and *Klebsiella* detected in the treated bedding compared to the control bedding (Figure 1).

CONCLUSION

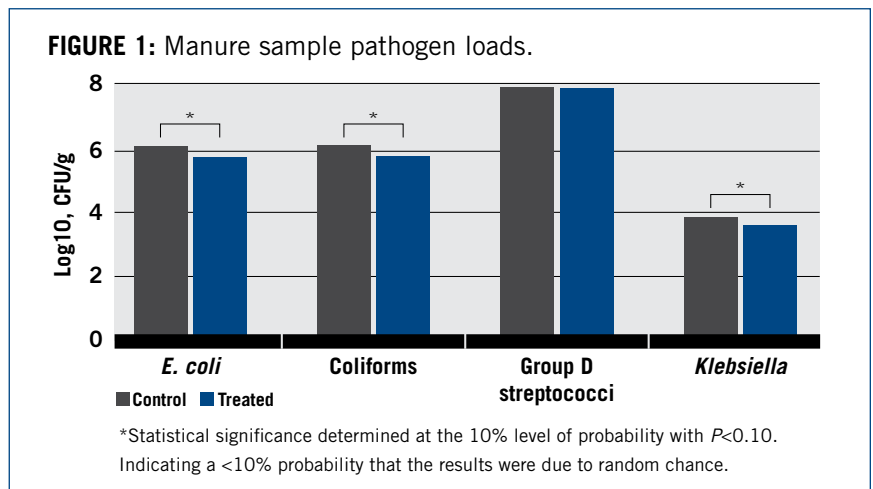
When applied directly to free stalls, CERTILLUS Eco Dairy Bedding was able to reduce targeted mastitis-causing organisms within the bedding samples. This reduction resulted in decreases in SCC, total and new mastitis infections, as well as fewer positive growth cultures including environmental Strep, *E. coli*, and Staph Species (Non-*S. aureus*).

TABLE 1		Last square means by treatment (*).		
Parameter	Control (n = 758)	Treatment (n = 757)	Improvement (%)	P-Value*
Milk (lbs./day)	103	103.5	0.5	0.784
ECM (lbs./day)	101.6	102.5	0.9	0.378
SCC	127,938	86,334	-41,604	<0.100

*Statistical significance determined at the 10% level of probability with $P < 0.10$. Indicating a <10% probability that the results were due to random chance.

TABLE 2		Mastitis event trends by treatment.		
Parameter	Control (n = 758)	Treatment (n = 757)	Improvement (%)	
Total cases (#)	89	71	-25%	
New infections (#)	53	49	-8%	
Chronic (#)	54	62	13%	
Clean (#)	430	431	0%	

TABLE 3		Milk culture trends by treatment.		
Parameter	Control (n = 758)	Treatment (n = 757)	Improvement (%)	
Positive growth (#)	1419	1282	-11%	
Environmental strep (#)	263	243	-8%	
<i>E. coli</i> (#)	613	565	-8%	
Staph species (#) Non- <i>S. aureus</i>	441	397	-11%	



To learn more about CERTILLUS Eco Dairy Bedding contact your ARM & HAMMER™ representative or visit AHfoodchain.com.

1 Rollins et al., 2015
2 Arm & Hammer Animal and Food Production. Data on File. 2023