

MicroSource® S Improves Cleanup

a DSM Product

In a commercial study microbial load was reduced by seventy five percent in houses being fed MicroSource® S. MicroSource® S acts by breaking down organic matter, which promotes better cleaning, enabling the disinfectants to do their job.

Following normal cleaning and disinfecting, total facultative bacterial populations in commercial nursery barns were reduced from 574,442 CFU per cm² in the control barns to 138,719 CFU per cm² in the MicroSource S barns after two turns. This was a Seventy Five percent reduction and was statistically significant ($P < 0.01$). This represents a reduction in the bacterial challenge that will be placed on the young pigs when they are housed in this facility, helping to optimize performance.

The Importance of Cleaning and Disinfection

Ensuring that a house is properly cleaned and disinfected between groups is essential for maintaining optimal health and performance of growing swine. Just looking clean is not enough. It is important that the microbial load be reduced so that the residual microbiological challenge on the incoming pigs is as low as possible. Most diseases are dose dependent, so the more pathogens pigs are exposed to the sicker they get. At lower levels the pigs may not exhibit clinic signs of disease but the pathogens can reduce pig performance. So the goal of cleaning should be to reduce the pathogen load as much as possible. MicroSource® S is a heat stable microbial feed additive that contains microorganisms selected for their ability to improve the decomposition of swine manure. MicroSource S begins to work by providing a source of live microorganisms in the gastrointestinal tract. These microorganisms begin to work quickly on the manure breaking down the proteins and complex carbohydrates in it. These proteins and complex carbohydrates are what make the manure sticky and hard to clean off.

How MicroSource® S Works

Disinfectants, sunlight, drying and warm temperatures will all reduce pathogen loads, however the presence of organic matter and biofilms will prolong pathogen viability on a surface. In order for disinfectants to work effectively the



organic matter and biofilms need to be removed from the surfaces. This is where MicroSource® S comes in. The microorganism in MicroSource® S break down the proteins and complex carbohydrates in manure responsible for making it adhere tightly to surfaces. So when the facility is washed organic matter is more completely removed from the surfaces, reducing the amount of organic matter remaining to protect the pathogens from the disinfectants. This enables the disinfectants to do a better job of decreasing the pathogen load which results in better performance for the next group of pigs.

Most producers understand the importance of cleaning and disinfection for the prevention of disease, however many do not realize the impact that it can have on performance. A study at the University of Prince Edward Island (Hurnick, 2005) showed that doing a better job of cleaning could significantly reduce the days to market (Table 1). Using either soap or a disinfectant significantly decrease the days to market by more than 2.5 days. When both soap and disinfectants were used the days to market were decrease by 5 days over just washing the facilities.

Unlimited. **DSM**

Table 1

Washing Method	Day to Market 25kg to 110kg
No Disinfectant	98.14 ^a
Disinfectant 1	95.40 ^b
Disinfectant 2	95.11 ^b
Soap Only	95.59 ^b
Soap and Disinfectant 1	92.96 ^c
Soap and Disinfectant 2	92.66 ^c

MicroSource® S Commercial Study

MATERIALS AND METHODS. The commercial nursery production facility chosen for the study consisted of four identical 2,000 pig barns each with two rooms and 40 pens per room with steel tri-bar flooring. A commercial nursery feeding program consisting of five separate phases, formulated to meet the needs for growth was utilized. Treatments were either the control diet for all five phases (d 0 to 42) or the control diet with MicroSource® S (MSS) at 1 lb per ton being added to the final three phases (d 12 to 42). Each treatment was applied to four of the rooms. Two different methods were used to determine the prevalence of bacteria on the flooring after normal washing and disinfecting was completed. Samples were taken prior to beginning the test to establish baseline values and after each of two groups of pigs had been through each house on test. A single sterile culture swab with modified Stuarts media (Fisher Healthcare, Houston, TX) was used to collect residue from a 34.4 cm² area in three separate pens for a total area of 103.2 cm² for each sample. A total of four samples per room were evaluated for total facultative bacterial counts (cfu/cm²) using tryptic soy agar (BD Diagnostic Systems, Sparks, MD). A second swab (Charm Sciences, Inc. Lawrence, MA) was used to measure the total amount of residual ATP found in 103.2 cm² areas adjacent to the areas sampled with the first method. The residual ATP was measured in luminator-T (Charm Science, Inc., Lawrence, MA). Twelve samples were collected per room with this method.

RESULTS AND DISCUSSION

Bacterial populations were not different between the barns at the start of the trial as indicated by the analysis of baseline samples (Table. 2). After one turn there was a numerical decrease in the total facultative bacterial populations CFU (colony forming units) from 2,635 CFU per cm² in the control to 40 CFU per cm² in the MicroSource S treated. After the second turn the total facultative bacterial populations were significantly (P<0.01) less in MicroSource® S treated (138,719 CFU per cm²) versus the control (574,442 CFU per cm²).



Table 2

Pig Group	Control	MSS	P<
	Total (CFU per cm ²)		
Baseline	10,441	3,992	0.44
1	2,635	40	0.30
2	574,442	138,719	0.01

Residual ATP is an economical alternative indicator of bacterial concentration and cleanliness commonly used in the food industry. The presence of ATP bioluminescence as measured by relative light units per cm² (RLU/cm²) showed the same trends as the total facultative bacterial counts. These results suggest that the ATP bioluminescence measurement can be used as a quick and inexpensive alternative to measure the effectiveness of barn cleaning and disinfecting.

The residual ATP levels were not different between the barns at the start of the trial as indicated by the analysis of baseline samples (Table. 3). After one turn there was a numerical decrease in the presence of ATP bioluminescence as measured by relative light units per cm² (RLU per cm²) from 2,110 RLU per cm² in the control barns to 1,512 RLU per cm² in the MicroSource® S treated barns. After the second turn the ATP bioluminescence measures were significantly (P<0.04) less in MicroSource® S treated barns (2,298 RLU per cm²) versus the control barns (4,575 RLU per cm²).

Table 3

Pig Group	Control	MSS	P<
	RLU per cm ²		
Baseline	1,210	2,468	0.19
1	2,110	1,512	0.46
2	4,575	2,298	0.04

Overall, this study suggests the use of MicroSource® S improved the effectiveness of a standard cleaning and disinfection program in a commercial nursery and has the potential to reduce the initial bacteria challenge placed on young pigs transferred into the growing environment.



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