

Air filtration system

MURPHY-BROWN LLC, North America's largest hog producer, has generated an additional \$1.896 million in five months at its commercial nurseries in Milford, Utah, thanks to a new air filtration system.

Based on 194,000 nursery spaces, an enhanced environment created by EPI (electrostatic particle ionization) Air is adding \$3.16 per pig placed (Table), according to the company. EPI Air is the patented product of Baumgartner Environics Inc. (BEI) of Olivia, Minn.

The technology generates electrically charged ions that clear the air of dust and other harmful emissions such as ammonia and hydrogen sulfide.

In February, Murphy-Brown released system-wide pig performance data comparing pre-EPI versus post-EPI technology and involved 600,000 nursery pigs.

With a five-week nursery period, the net value per turnover feed cost was \$5.318 million for the pre-EPI environment and \$5.932 million for the post-EPI regime.

Bob Coffelt, business development director at Murphy-Brown, said the company is pleased with the results and noted that they were better than projected from initial trial runs. He also believes the company will be installing the technology into all of its grower/finishing facilities as well. Murphy-Brown markets 17 million pigs annually.

"We're tremendously excited about these results and thankful that Murphy-Brown continues to be visionary in this entire cleaner air issue," said Matthew Baumgartner, general manager and head of development of the EPI technology for BEI. "They recognize the ongoing value of EPI Air and are now reaping significant economic benefits of the technology."

Next on the horizon is an improved version of the original EPI technology that positions the corona points (discharge points) 50 in. above the floor level and concentrates cleaner air in the "pig breathing zone." The new generation also reduces dust accumulation on the ceiling and

Industry Insider

with
KRISSA WELSHANS*



lowers capital costs.

"This will likely increase the overall efficiency because you are placing this blanket of ions closer to the pigs. Plus, inside walls and ceilings may stay cleaner because the dust collection process will be at a lower level. Making 'nuisance dust' less prevalent is a good thing for employees," Coffelt said.

The original system provides ionization for about 6,000 sq. ft. per unit; the new generation system will handle 15,000 sq. ft. of floor space per unit.

Baumgartner said his firm will be marketing turnkey packages, meaning his recommended crew will be doing the installation. For a 60 ft. x 100 ft. nursery structure, the installation time would be about eight hours. Operating costs are comparable to the cost of running a 100-watt bulb for 24 hours, he said.

The air system has proven to improve the environment and increase profits, but it may also reduce the threat of porcine reproductive and respiratory syndrome (PRRS), which continues to be the most costly disease plaguing the swine industry.

Current estimates indicate that PRRS costs swine producers \$650 million per year.

"It continues to be the disease that shakes the industry," according to Coffelt.

Is it possible that cleaner air may lessen the PRRS threat? While Coffelt's theory has not been confirmed, Dr. Montserrat Torremorell, Leman chair in swine health and productivity at the University of Minnesota, is currently researching this very issue for EPI Air and non-EPI Air environments.

Additional PRRS research using EPI Air is also being conducted by Dr. Qiang Zhang at the University of Manitoba.

"It will be most interesting to see if

5-month impact of EPI Air at Murphy-Brown LLC

Growth Performance	EPI	None
Initial weight, day 3 post-placement, lb.	14.9	14.8
Days 3-45 post-placement		
Avg. daily gain, lb.	1.05	0.93
Weight, 45 days, lb.	62.1	56.7
Mortality, %	1.4	3.3
Weight difference relative to control, lb.	5.3	0.0
Value of weight at market, \$/head	2.68	—
Feed cost to achieve higher weight, \$/head	0.88	—
Net value over feed costs/turn, million \$	5,932	5,319
Value of EPI/system turn, \$	613,224.40	—
Value/pig placed, \$	3.16	—

Assumptions: market value = 50 cents/lb., nursery feed cost = 11 cents/lb., F/G for lot = 1.5 and pig nursery spaces = 194,000.

Source: Baumgartner Environics Inc.

these tests do reduce the overall level of PRRS virus density. Logic suggests that as you move the dust particles out of the air, you are removing bacteria also, so perhaps this might be a positive result, but I certainly wouldn't make that claim at this time," Coffelt said.

Soybean meal alternatives

University of Illinois researchers examined the acid amino digestibility of canola and other products that can replace soybean meal in diets fed to pigs.

Hans Stein, University of Illinois professor of animal sciences, said, "Soybean is by far the biggest oilseed crop in the world, but canola, cottonseed and sunflowers are grown in areas where soybeans can't grow. When the oil is taken out of the seed, meal is left over, as with soybean meal."

His team looked at amino acid digestibility in both intact canola seeds and canola meal, as well as in cottonseed meal, intact sunflower seeds, dehulled sunflower meal and sunflower meal with hulls, on which there has been little recent digestibility research. The study included soybean meal for comparison.

Digestibility of amino acids in canola, cottonseed and sunflower meal was lower than in soybean meal mainly because these products have a higher fiber content than soybean

meal. All of them except for the dehulled sunflower meal included hulls, whereas the soybean meal did not.

In addition, Stein explained, "Soybeans do not contain as much oil as canola and sunflower. When you take more oil out, the seed hull becomes a bigger proportion of what you have left over — and that's where you have all the fiber. So, sunflower is over 50% oil, and canola is about 40% oil. (Soybeans have) only 19% or 20% oil, so you concentrate the fiber more when you produce those meals."

Among the alternative meals, sunflower meal had the greatest values for crude protein digestibility and the most amino acids. In cottonseed meal, digestibility values for most amino acids were the same as or greater than those in canola seeds or canola meal.

Canola meal and cottonseed meal contained the greatest concentrations of crude protein and indispensable amino acids after soybean meal. Stein said cottonseed is not used as much as it could be in pig production because it contains gossypol, an anti-nutritional factor that prevents pigs from utilizing lysine.

However, he noted that "low-gossypol varieties are available now, and it's been shown that if you add enough iron to the diet, it can bind the gossypol, which will then not bind the lysine, so you can use some cottonseed in the

Lysozyme-enhanced milk speeds recovery from diarrhea

MILK from goats that were genetically modified to produce higher levels of a human antimicrobial protein has proved effective in treating diarrhea in young pigs, demonstrating the potential for food products from transgenic animals to one day also benefit human health, according to researchers at the University of California-Davis (UC-Davis).

Their study is the first on record to show that goat's milk carrying elevated levels of the antimicrobial lysozyme, a protein found in human breast milk, can successfully treat diarrhea caused by bacterial infection in the gastrointestinal tract, the announcement said.

The findings, reported in the online scientific journal *PLOS ONE*, offer hope that such milk may eventually help prevent human diarrheal diseases that each year claim the lives of 1.8 million children around the world and impair the physical and mental development of millions

more.

"Many developing parts of the world rely on livestock as a main source of food," said James Murray, a UC-Davis animal science and veterinary medicine professor and lead researcher on the study. "These results provide just one example that, through genetic engineering, we can provide agriculturally relevant animals with novel traits targeted at solving some of the health-related problems facing these developing communities."

In this study, Murray and colleagues fed young pigs milk from goats that were genetically modified to produce milk with higher levels of lysozyme, a protein that naturally occurs in the tears, saliva and milk of all mammals.

Although lysozyme is produced at very high levels in human breast milk, the milk of goats and cows contains very little lysozyme, prompting the effort to use genetic modification to boost lysozyme levels in the milk

of those animals, UC-Davis explained in its announcement.

Because lysozyme limits the growth of some bacteria that cause intestinal infections and diarrhea and also encourages the growth of other beneficial intestinal bacteria, it is considered to be one of the main components of human milk that contribute to the health and well-being of breast-fed infants.

Pigs were chosen for this study as a research model because their gastrointestinal physiology is quite similar to that of people and because pigs already produce a moderate amount of lysozyme in their milk.

Half of the pigs in the study were fed pasteurized milk that came from the transgenic goats and carried greater amounts of lysozyme — 68% of the level found in human breast milk. The other half of the pigs were fed pasteurized milk that came from non-transgenic goats and, thus, contained very little lysozyme.

The study found that, although

both groups of pigs recovered from the infection and resulting diarrhea, the pigs fed the lysozyme-rich milk recovered much more quickly than the pigs that received goat's milk without enhanced lysozyme levels. Overall, the pigs fed the lysozyme milk were less dehydrated, had less intestinal inflammation, suffered less damage to the inner intestines and regained their energy more quickly than the pigs in the control group. Also, the researchers detected no adverse effects associated with the lysozyme-rich milk.

The lysozyme-enhanced milk used in this study came from a transgenic line of dairy goats that Murray, co-author Elizabeth Maga and their colleagues developed in 1999 to carry the gene for producing human lysozyme in their milk.

Milk and other food products from transgenic animals are not currently approved to enter the human food chain. ■