



UNIVERSITY OF MINNESOTA SWINE EXTENSION

Evaluation of Air Filtration Systems to Reduce Aerosol Transmission of PRRS

Researchers from the University of Minnesota recently completed a study comparing four potential methods for reducing aerosol transmission of Porcine reproductive and respiratory syndrome virus (PRRSV). These methods included:

- (1) High-efficiency particulate air (HEPA) filtration: the HEPA-filtration system used a prefilter screen, a bag filter (Eurovent [EU] 8 rating), and a HEPA filter (EU13 rating).
- (2) 2x-low-cost filtration: The low-cost-filtration system contained mosquito netting (prefilter), 2 fiberglass furnace filters, and 2 electrostatic furnace filters.
- (3) Bag filtration: Bag filtration involved the use of a filter rated EU8 and a minimum efficiency reporting value (MERV) of 14.
- (4) Filter tested against particles derived from dioctylphthalate (DOP): The 95%-DOP, 0.3- μm -filtration system involved a pleat-in-pleat V-bank disposable filter with a 95% efficiency rating for particles 0.3 μm or greater in diameter and ratings of EU9 and MERV 15.

All filtration systems were compared against a control group with no form of intervention from aerosol transmission. Aerosol transmission was tested across 2 chambers connected by a 1.3-m-long duct containing the treatments. Recipient pigs, housed in one chamber, were exposed to artificial aerosols created by a mechanically operated mister containing modified live PRRSV vaccine located in the other chamber. Aerosol transmission of PRRSV occurred in 0 of the 10 HEPA-filtration replicates (0%), 2 of the 10 bag-filtration replicates (20%), 4 of the 10 low-cost-filtration replicates (40%), 0 of the 10 95%-DOP, 0.3- μm -filtration replicates (0%), and all 10 of the control replicates (100%).

Using a similar approach, further evaluation of the HEPA- and 95%-DOP, 0.3- μm -filtration systems was conducted. Infection was not observed in any of the 76 HEPA-filtration replicates (0%) but was observed in 2 of the 76 95%-DOP, 0.3- μm replicates (2.6%) and 42 of the 50 control replicates (84%). Although the difference between the 95%-DOP, 0.3- μm and control replicates was significant ($P < 0.0005$), so was the level of failure of the 95%-DOP, 0.3- μm system ($P = 0.02$). The researchers concluded that, under the conditions of this study, some methods of air filtration were significantly better than others in reducing aerosol transmission of PRRSV, and HEPA filtration was the only system that completely prevented transmission.

Results of this study are published, in their entirety, in the July 2006 issue of the Canadian Journal of Veterinary Research.



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