Public Abstract

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Title:THE USE OF DISPERSION MODELING TO DETERMINE THE FEASIBILITY OF VEGETATIVE ENVIRONMENTAL BUFFERS (VEBS) AT CONTROLLING ODOR DISPERSION

Vegetative environmental buffers (VEBs) have been suggested as a possible odor control technology. They have been found to impact odor plume dispersion and have shown the possibility of being an effective tool for odor abatement when used alone or in combination with other technologies.

The main objective of this study was to use Gaussian-type dispersion modeling to determine the effectiveness of a VEB at controlling the spread of odor from a swine feeding operation. First, wind tunnel NH₃ dispersion trends were compared to model generated dispersion trends to determine the accuracy of the model at handling VEB dispersion. Next, facility-scale model simulations with and without a VEB were run to determine its viability as an option for dispersion reduction. Finally, dispersion forecasts with numerical weather data were developed and compared to collected concentration data to determine forecast accuracy.

The results of this study found that dispersion models can be used to simulate dispersion around a VEB with model-generated dispersion trends following similar patterns to those of both wind tunnel simulations and previous research. The results of this study also showed that a VEB has an effect on odor dispersion by reducing downwind concentrations (confirmed by both wind tunnel and AERMOD simulations) and that VEBs have the potential to act as an odor control option for CAFOs. This study also found that numerical weather prediction could be integrated into dispersion modeling to accurately forecast areas of high concentrations.