

ENVIRONMENT

Title: Development of methods to measure dust (PM₁₀) and ammonia emissions from Minnesota pig facilities **NPB# 01-074**

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Abstract:

The concentration and emission rate for ammonia, hydrogen sulfide, particulate matter or dust under 10 microns in diameter (PM₁₀), and odor were measured in a representative deep-bedded hoop pig finishing barn and a slatted-floor, curtain-sided pig finishing barn during 2+ week periods in the winter and summer in Minnesota. Ammonia and hydrogen sulfide were continuously measured with gas analyzers in an environmentally controlled instrument trailer while PM₁₀ and odor were measured roughly twice during the 2+ week sampling period. Ammonia concentrations inside both barns were quite similar in the winter and summer but the emission of ammonia were higher in the hoop barn on a per pig basis. Hydrogen sulfide (H₂S) concentrations and emissions were lower in the hoop barn compared to the curtain barn during both the winter and summer except for the per pig emissions in the winter which were similar. Fine particle dust (PM₁₀) concentrations and per pig emissions were very similar for both barn types during the winter and summer. Odor concentrations and per pig emissions in the winter were lower in the hoop barn compared to the curtain barn but both levels were similar between the barns in the summer, showing a slight advantage of lower odor emissions in the hoop barn during warm conditions. Although these results are helpful in evaluating the air quality impacts between these different finishing housing systems, it must be remembered that the winter and summer values were not measured simultaneously because of the availability of only one set of gas analyzers, dust collectors, and a single instrument trailer. Also these comparisons are only between single barn types and these specific barns may not exactly represent the general barn type. Considering these limitations, it would seem from the results that the hoop barn has lower hydrogen sulfide and odor concentrations and emissions compared to the more conventional curtain barn. Lower emissions of ammonia exist in the curtain barn than the hoop barn even though concentrations are quite similar. There seems to be no difference in concentrations or per pig emissions of dust, or more specifically PM₁₀ which represent the fine diameter particles, between the two barn types.

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