

Distribution of dust, endotoxin and DNA after oil sprinkling in a swine facility

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Oil sprinkling has shown promise as a viable method for dust control in swine production facilities. However, there is concern that oil sprinkling may alter the distribution of particulate matter; directly impacting the distribution of airborne dust, endotoxin and DNA. This pilot study was designed to investigate the impact oil sprinkling has on the distribution of dust, endotoxin and DNA. Air sampling took place in August and December of 2001 at Prairie Swine Centre Inc., a research swine facility, near Saskatoon, Saskatchewan, Canada. The distribution studies were conducted in two identical grower/finisher rooms. One room was sprinkled with oil, daily, whereas the control was not. Collection of total dust was achieved using an eight-stage nonviable cascade impactor. The impaction filters were weighed before and after the sampling events to obtain a dust weight at each stage (particle size range). The dust was then extracted from the filter with sterile nonpyrogenic water during incubation in a sonicator. The extract was analyzed for endotoxin, using a *Limulus* Amebocyte Lysate test kit, and DNA, using phenol:chloroform extraction and ethanol precipitation. While oil sprinkling is an effective method to reduce total dust, it appears that the reduction is observed predominantly on large particles ($\geq 2.1\mu\text{m}$). The proportion of endotoxin associated with smaller particles increased in the treatment room, potentially favoring the penetration of endotoxin to the lower respiratory tract. The distribution of DNA does not demonstrate a consistent trend and requires further research.

Implications:

Although the benefit of oil sprinkling has proven to significantly reduce total dust in swine production facilities, smaller particles and endotoxin associated with them appear to remain in suspension, suggesting the impact oil sprinkling has on particle distribution requires further study.