

OPTIMIZING OF A SPRINKLING SYSTEM USING UNDILUTED CANOLA OIL FOR DUST CONTROL IN PIG BUILDINGS

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Background

Swine producers are exposed to high dust levels in pig barns and different methods have been tested for controlling dust concentrations over the last decade. Oil sprinkling/spraying has proven to be one of the most effective methods so far for reducing dust concentration in pig buildings. In most of those previous experiments, the oil had to be manually applied once or twice a day. The swine industry has not easily adopted oil application technology because of the very intensive labour required for manual sprinkling of oil and because of its perceived high cost. An oil sprinkling system has been designed to control dust levels in pig buildings using undiluted crude canola oil and proved to be effective in reducing dust in tests performed over a two-week period at PSCI (Lemay et al., 1999).

Objectives

The objectives of this project were to provide more information on the optimum oil application rate that could be used in grower-finisher barns, and to verify the necessity of sprinkling operator walkways and applying a booster dosage every two weeks.



Oil sprinkling system installed in a commercial room at PSCI.

Experimental procedure

The experiment was conducted using the system developed by Lemay et al. (1999). The system was installed in a grower-finisher room at PSCI and only the spray nozzles above the pens were used so that no sprinkling occurred on the walkways.

The experiment was conducted in two identical rooms, one equipped with the sprinkling system and the other one acting as a control. Each room housed 72 pigs in six pens; these animals entered the rooms at a same average weight and at the same time and they were fed the same diet. The system provided 40 ml of oil/m²-day on the first two days, 20 ml of oil/m²-day on the next two days, and 5 ml of oil/m²-day on every day for the rest of the experiment. No booster application was performed every other week as suggested by Zhang et al. (1995). Dust particle counts and total dust mass concentration were measured in both rooms during the seven-week period.

Results

Over the seven-week period, the dust mass concentration was reduced by 87% comparing the room sprinkled with oil to the control room where no oil was applied (Figure 1). As shown on Figures 2 and 3, inhalable (>0.5 µ) and respirable (0.5 to 5.0 µ) dust particle counts were lowered by 90 and 86%, respectively.

When compared with the oil application rates recommended by Zhang et al. (1995), similar dust reduction results were obtained by using 36% less oil (18.5 L compared to 29.0 L of canola oil) over the seven-week period of the experiment. The system was effective in replicating previous dust reduction data collected with automated and manual systems and could be automated to control dust levels in grow-finish barns.

*Automated
oil
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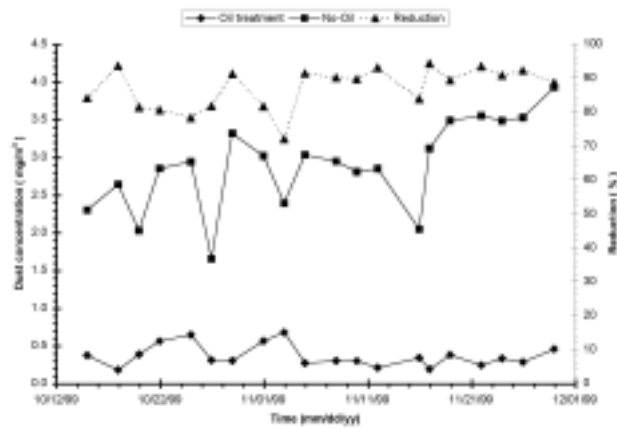


Figure 1 Dust mass concentration in both control and oil treated rooms from October 15th to November 29th, 1999.

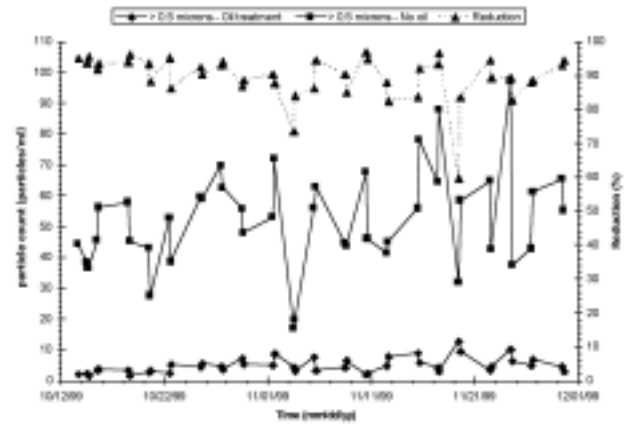


Figure 2 Inhalable dust particle counts in both control and oil treated rooms from October 15th to November 29th, 1999.

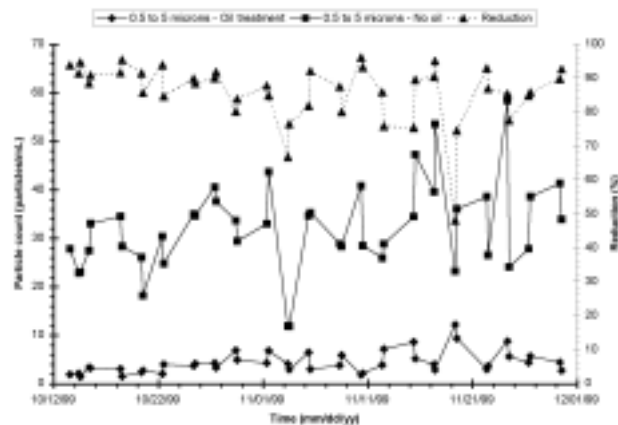


Figure 3 Respirable dust particle counts in both control and oil treated rooms from October 15th to November 29th, 1999.