THE SHORT TERM SUPRESSION OF DUST IN PIGGERY BUILDINGS

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It is widely acknowledged that the exposure of workers and animals to dust is detrimental to their health (Iversen 1999) and could also have a harmful effect on productivity. Farm workers are likely to be exposed to very high concentrations of dust during work activities associated with high levels of animal movement, such as vaccination or weighing pigs. During such physical activities, the respiration rate of farm workers is usually increased, further increasing the risk for dust inhalation. Measures are therefore required to reduce dust levels during such work activities. Applying oil onto the floors of pig pens has been well recognised as a practical long-term dust reduction technique (Pedersen 2001). However, the short-term dust reduction potential of oil-spraying immediately applied before the work activity, has not been studied in Australia. Therefore, the objective of this study was to investigate the effect of spraying an oil and water mixture on weaner room floors and horizontal dust collecting surfaces on dust and bacteria concentrations immediately before a simulated work activity.

Respirable and inhalable dust, and bacteria levels were recorded for three hours in four identical mechanically ventilated farrowing and weaner rooms housing approximately 11 sows with the litter and 90 pigs (mean live weight 20.5 Kg), respectively. The floor and all other horizontal dust collecting surfaces of the trial rooms were sprayed with a canola oil, water and surfactant mixture at a 4:5:1 ratio, at the rate of 20-30ml/m^2 using a hand sprayer. Intensive worker activity was simulated by moving within and between pens for 25 minutes per hour in each room with a five minute break while moving between rooms for three hours.

The dust and airborne viable bacteria levels were measured using previously described methods (Banhazi and Cargill 1997). The levels of inhalable and respirable dust and viable airborne bacteria were measured and compared using one-way ANOVA. The concentration of inhalable dust and viable bacteria were significantly improved in the trial rooms (Table 1).

Table 1. Concentrations of respirable and total airborne dust and viable bacteria in the control and treatment rooms.

Treatment	Respirable dust (mg/m^3)	Inhalable dust (mg/m^3)	Viable bacteria (CFU/m^3)
Control (farrowing)	0.188^a	2.044^a	$60,288^a$
Treatment (farrowing)	0.109^b	0.721^b	$14,828^b$
Control (weaner)	0.580^a	2.333^a	$36,341^a$
Treatment (weaner)	0.259^a	0.5171^b	$13,736^b$

[ab] Values in the same column with different superscripts differ significantly ($P<0.02$).

This experiment demonstrated that spraying an oil and water mixture immediately before a simulated high intensity work activity can be used to reduce dust and bacteria levels. It was casually observed that plastic slats could become slippery when sprayed with oil, posing a potential Occupational Health and Safety risk for workers. However, based on the results of these trials, spraying an oil and water mixture on concreted areas prior to high intensity work activities should be recommended and is likely to reduce the workers' exposure to potentially harmful airborne particles and bacteria.

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