COMPARASON OF AIR QUALITY IN HORSE STABLES

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Adequate air quality, including low dust levels, in stables is an important component of good quality housing for horses (Blunden *et al.* 1994). Horses appear to be more sensitive to dust than other species of livestock, and the association between dust and respiratory diseases is much stronger (Woods *et al.* 1993). The concentration of airborne particles is influenced by many factors in straw-based pig shelters, including the quality of bedding (Banhazi *et al.* 2000). The effects of three different bedding treatments on air quality in horse stables were assessed during the experiment and compared to "standard" sawdust bedding (control). The effects of (1) sawdust impregnated with canola oil at the inclusion rate of approximately 7% (w/w), (2) straw bedding and (3) "horse-nappies", which prevent the bedding material to be contaminated with faecal material on the concentration of airborne particles inside four horse stables were studied, using 4x4 Latin Square experimental design over four weeks.

Air quality parameters were recorded for 28 days in four naturally-ventilated horse boxes housing one horse each. Airborne inhalable particles and temperature were measured as previously described by Banhazi and Cargill (1997). Dust pumps were operated from 09.00 to 15.00 hours. Carbon dioxide was monitored using Masterman Gas Monitoring Machines, to confirm that ventilation rates were similar in the boxes. The air quality data were analysed using ANOVA and parameters were compared between the treatments.

Temperature and the concentration of carbon dioxide did not vary significantly between treatments, but there was a statistically significant difference in the concentration of airborne inhalable particles (Table 1).

Table 1. Temperature and the concentrations of inhalable airborne particles and carbon dioxide for the control and treatment boxes

Treatment	Temperature (^oC)	Inhalable dust (mg/m^3)	Carbon dioxide (ppm)
Control (saw dust)	22.2^a	0.397^a	499^a
Straw bedding	22.5^a	0.606^b	488^a
Horse-nappy	22.2^a	0.287^c	508^a
Oil-impregnated saw dust	22.3^a	0.298^c	504^a

[ab] Values in the same column with different superscripts differ significantly ($P<0.05$).

The results demonstrate a significant reduction in the concentrations of inhalable airborne particles in the horse boxes using either oil-impregnated bedding material or horse nappies. These techniques would enable horse keepers to improve the environmental quality of horse stables at a relatively low cost. However, further studies are needed to determine the best method of incorporating oil into the bedding material, the minimum concentration of oil necessary and the effects of oily bedding material on the health and wellbeing of the animals.

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