

Experiment 3

Stockdale, C and Moore-Colyer, M.J.S (2010) Steaming hay for horses: The effect of three different treatments on the respirable particle numbers in hay treated in the Haygain steamer. *European Workshop for Equine Nutrition*, Cirencester, Sept 2010. The Impact of nutrition on the health and welfare of horses. EAAP publication No. 128. Ed Ellis, A., Longland, A.C., Coenen, M and Miraglia, N. p136-138

Introduction: It is widely known that even good quality hay contains a high number of respirable particles (those < 5 µm in diameter) and that these particles can initiate the debilitating condition Recurrent Airways Obstruction (RAO) that causes respiratory distress, coughing and nasal discharge. This study sought to determine the efficacy of the HG 1000 steamer at reducing respirable particle numbers in 4 different hays, representing typical hay fed to horses across the UK.

Method: Two replicate bales of hay from four different sources (n= 8) were subjected to 3 treatments: dry, 50 minutes steam in the HG 1000 + shaken immediately, and 50 minutes steam and left to dry for 24 hours before shaking. Respirable particle (RP) numbers were measured from a 5 kg sample by shaking vigorously under a cyclone air sampler for 3 minutes. Differences in respirable particle numbers were determined using analysis of variance and lsd test = $t_{(error\ df)} \times s.e.d.$

Results : *Table 1. Mean Respirable particle numbers (/kg hay / litre of air) from 2 replicates of four different dry hays*

	Hay 1	Hay 2	Hay 3	Hay 4	s.e.d	Sig
RP numbers	51254 ^c	28506 ^b	12327 ^a	10711 ^a	3897.3	0.005

^{abc} Values in the same row not sharing common superscripts differ significantly (P<0.05).

Table 1 shows that significant differences (P<0.05) exist between respirable particle numbers in hays from different areas of the UK. These differences are most likely due to weather conditions during conservation and the dry matter of the hay when stored.

Table 2. Respirable particle numbers (/kg hay/litre of air) detected in dry, steamed and steamed +24 hours in 4 different hay

	Dry hay	Steamed Hay	Steamed Hay + 24 hours	s.e.d	Sig
RP numbers	25699 ^a	1586 ^b	5398 ^b	1937.5	0.001

Table 2 demonstrates that steaming a wide range of hays for 50 minutes in the HG 1000 significantly (P<0.001) reduced the respirable particle numbers by 94% compared with dry hay. Moreover steaming the hay and leaving it to rest for 24 hours did not significantly increase the respirable challenge indicating that even after being left for 24 hours steamed hay reduced the respirable challenge to the horse by 79%.

Conclusions: Steaming in the HG 1000 was an effective method for reducing respirable particles numbers in all hays, whether only slightly dusty (hay 4) or highly contaminated (hay 1).