

Experiment 2

James, R. and Moore-Colyer, M.J.S. (2013) Hay for horses: The nutrient content of hay before and after steam treatment in a commercial hay steamer. *Proceedings of British Society of Animal Science Conference*, Nottingham April 2013.

Introduction: Previous work has shown that soaking can reduce the nutrient content of hay (Moore-Colyer, 1996; Warr and Petch, 1992), whereas steaming 5 kg hay nets did not cause nutrient depletion (Blackman and Moore-Colyer, 1998). This study sought to determine the extent of nutrient loss from complete bales of hay when steamed for 50 minutes at high temperatures in the HG 1000.

Method: Samples from 5 areas of each bale, were taken from 30 different bales of hay from all over the UK. The same bales were then steamed for 50 minutes in a Haygain steamer and another 30 samples taken, using the same procedure. Samples were immediately stored in a freezer before being dried in a force-draught oven at approx 60°C whereupon they were analysed for total nitrogen by use of the Leco FP428 nitrogen determinator; sodium, potassium, calcium and magnesium by ICP-AES; phosphorous by colorimetry, water soluble carbohydrates by an automated anthrone method and trace elements by ICP-AES.

Results Nutrient losses are detailed in Table 1 below.

Table 1. Nutrient content of 30 different samples of hay before and after steaming for 50 minutes in the HG 1000

Nutrient (units)	Dry (mean)	Steamed (mean)	Standard error of mean	Significance (P)
N (%)	1.12	1.19	0.025	0.014
Ca (%)	0.39	0.41	0.027	0.428
K (%)	1.36	1.50	0.068	0.041
Mg (%)	0.12	0.12	0.007	0.407
Na (%)	0.13	0.15	0.025	0.465
P (%)	0.15	0.16	0.008	0.276
WSC (%)	12.6	10.3	0.827	0.009
Cu (mg/kg)	46.5	61.3	15.32	0.341
Mn (mg/kg)	108	124	18.03	0.390
Fe (mg/kg)	288	121	120.3	0.174
Zn (mg/kg)	17.5	23.5	1.54	0.001

Conclusions: Steaming for 50 minutes in the HG 1000 had no effect on Ca, Mg, Na, P, Cu, Mn or Fe. The only nutrient to be lost as a result of steaming was WSC which showed a 2.3% loss. This is probably due to partial heat-induced break down of the cellular structure of the hay, allowing nutrient leaching. The loss of WSC would account for the small proportional increases noted in N, K and Zn. The small but significant reduction in WSC may also make this hay a useful fodder when fed to ponies pre-disposed to laminitis.