Experiment 7

Leggatt, P. and Moore-Colyer, M.J.S (2013). The effect of steam treatment on the bacteria yeast and mould concentrations in haylage for horses. *Proceedings of British Society of Animal Science Conference*, Nottingham April 2013. p 103

Introduction: An increasing number of horse owners choose to feed haylage to their stabled horses. Good quality haylage if well conserved has a high nutrient value and low dust content and can make excellent long forage for performance horses. However, as conservation of haylage is more dependent on air-tight storage than lactic acid fermentation (Muller, 2005), once opened it must be used within 5 days. Exposure to air causes rapid bacterial and fungal growth rendering the forage unpalatable and potentially hazardous to feed. Previous work has shown that steaming hay in the Haygain range of steamers has reduced bacteria and fungi concentrations by >95% (James and Moore-Colyer, 2010; Moore-Colyer and Fillery, 2012) and so this study sought to determine if similar reductions in microbial concentrations could be achieved when steaming haylage.

Method: Five bales of commercially produced *Lolium perenne* haylage were randomly selected from a farm in Gloucestershire. Each bale was divided into 4 equal portions. Portion 1 was tested immediately, portion 2 left for 4 days then tested. Portion 3 and 4 were steamed in the HG 600 (Haygain Ltd). Portion 3 was tested immediately post steaming and portion 4 was left for 4 days before testing. All 4 portions underwent the following procedure. One gram was weighed into separate stomacher bags with 79 ml of maximum recovery solution and processed for 2 minutes. Sequential dilutions were prepared down to 10^{-4}. Two x 1 ml from each were placed onto 2 x 3 M ™ petrifilms, (3M Microbiology, St Paul, MN 55144-1000), and incubated for 3-5 days at 20^{o}C (mould films) and 2- 3 days at 32^{0}C (bacteria), before counting using a standard colony counter. Differences between treatments were determined using ANOVA on log transformed data.

Results: *Total bacterial counts (TVC) and fungi in fresh haylage, haylage opened for 4 days, freshly steamed haylage and steamed haylage left open for 4 days*

CFU	Fresh	Fresh + 4 days	Steamed	Steamed + 4 days	s.e.d
Fungi /g	420	2786	12	128	
Log fungi	2.48c	3.38d	0.45a	1.58b	0.304
TVC/g	41,600	114,000	10	304	
Log TVC	4.556c	5.048c	0.823a	2.092b	0.2701

abc Values in the same row not sharing letters differ significantly (P<0.05)

Conclusions: TVC and mould concentrations increase by 64 and 75% respectively in haylage opened for 4 days. Steaming significantly reduced microbial growth and this reduction was maintained (99 and 70% lower respectively than freshly opened haylage) after 4 days aerobic exposure.