Investigation into the effects of steaming hay , using the Happy Horse Hay Steamer on moulds and yeasts

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Introduction

It has always been recognised that dry hay fed to horses is a major contributor to respiratory and other problems found in horses, commonly known as RAO or COPD. To deal with this hay is soaked or dampened down to prevent the dust and other particles from becoming airborne or to swell the mould spores contained within the hay. This method of preparing hay is not just an arduous and messy job but leaches out the required nutrients necessary for the horse diet. It has also been found by studies carried out at Myerscough College, Lancashire, that waste water from soaking hay is highly polluted, with an excessively high BOD - up to 6 times greater than that found in the waste water from steaming hay. The research found that the BOD of waste water from soaking hay could be as high as 7.97 mg/litre, a level considered to be highly polluted.

Methodology

- All testing and sampling was carried out in a stable yard environment.
- Multiple hay samples were taken from different areas of each bale, logged and stored separately ready for analysis as a control sample.
- Hay samples from each bale was taken and soaked for 60 minutes in cold tap water and drained for 15 minutes then logged and stored ready for analysis.
- The remainder of the bale of hay was steamed in The Happy Horse Professional Hay Steamer for the specified 60 minutes.
- The temperature of the hay was monitored to 100 degrees centigrade throughout this period.
- After the steam cycle was completed multiple samples were taken from different areas of the bale and again logged and stored ready for analysis.
- This methodology was repeated for multiple samples obtained from different bales of hay taken from various locations and harvest years.
- It was also repeated for a sample of Haylage taken from a wrapped un-damaged Haylage bale.
- All samples were packaged and sent overnight to Sciantec Analytical Services in Yorkshire, who specialise in equine feed analysis.
- Analysis was performed for mould, yeast colony forming units/gram (cfu/g).

Sciantec Analytical Services Methodology

- Add a 10g sample to a sterile Stomacher bag.
- Add 90ml Maximum Recovery Diluent, stomach for 30 seconds and dilute in series of 9ml MRD to produce a series of decimal dilutions.
- Spread 1.0ml aliquots onto well dried plates of Orthotetracycline Glucose Yeast Extract Agar
- Allow to soak and incubate for 5 days at 25C.
- Count moulds and yeasts on the plates.
- Use the plates with counts between 15 and 150 to calculate the colony forming units per gram.
- Certificate of analysis issued for each sample tested.

Results

From the returned Sciantec certificates of analysis the following results have been compiled and summarised below.

Summary of Results

	2009 Hay	**2008 Hay**	**2008 Haylage**
Moulds and spores per gram BEFORE steaming:	260000	580000	700
Moulds and spores per gram AFTER steaming:	<10	10	<10
OVERALL EFFECTIVNESS ON MOULDS AND SPORES:	**99.9%**	**99.9%**	**99.9%**
Yeasts per gram BEFORE steaming:	79000	130000	60
Yeasts per gram AFTER steaming:	<10	<10	<10
OVERALL EFFCTIVNESS ON YEASTS:	**99.9%**	**99.9%**	**99.9%**
The 2008 Hay sample soaked had a start mould count from the control bale of 580000 and after soaking for 60 minutes and drained for 15 minutes had a count of 220000 cfu/g			
Note: < 10 means less than 10. This means that the count was undetectable but in reality they cannot guarantee a count of 0.			

These results show that compared to soaked hay or haylage the steamed hay, using the Happy Horse Hay Steamer system, reduces the levels of bacteria, mould, and yeast colony forming units per gram (cfu/g) contained in stored hay considerably.