

HAYGAIN Steaming versus Manual Soaking of Hay: A Comparison in Order to Determine the Most Nutritious Option

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Introduction

Walham (2004) states that horse owners are responsible for making sure that the horses diet meets the requirements for energy, fibre, fat, protein, vitamins and minerals. It is essential to meet the horses daily nutrient requirements in forage and concentrates in order for the equine athlete to perform the tasks that the rider asks of them.

James, *et al* (2009) states that the domestication of equines has led to them eating their forage and spending long periods of time in a stable environment, which has exposed the horse to plant and dust particles, bacteria and fungal spores. These can result in digestive and respiratory disorders within the animal.

Aims & Objectives

- To produce a nutritional profile comparing calorific value, water content, dry matter, protein, ash, crude fat and fibre content in steamed hay and soaked hay in order to identify the most nutritious option.
- To outline the current state of knowledge on the types of hay, feed value, production, importance of its cut, storage methods and other aspects that may affect the quality of the hay.
- Full references from other information sources and research papers will be used to produce this report, which is intended to guide other professionals and outline the key areas within this subject.

Table 1: Methodology

Bale A	Bale B
2 samples taken from dry bale to be used for control of the experiment	2 samples taken from dry bale to be used for control of the experiment
Bale steamed for 50 minutes	Bale soaked for 20 minutes
After steaming - 4 samples were taken, 2 from the end of the bale and 2 from the middle.	After soaking - 4 samples were taken, 2 from the end of the bale and 2 from the middle.
Labelled samples collected in A4 sized bags e.g. Steam (A) 1 (mid)	Labelled samples collected in A4 sized bags e.g. Soak (A) 1 (mid)
Once collected, 6 samples taken to lab.	Once collected, 6 samples taken to lab.
Samples put in moisture balance machine for Dry Matter Content	Samples put in moisture balance machine for Dry Matter Content
All samples milled to a fine power and divided between 2 bags.	All samples milled to a fine power and divided between 2 bags.
1 bag used for fat extraction, 1 used for remaining experiments	1 bag used for fat extraction, 1 used for remaining experiments



Figure 1: Hay sample in moisture balance machine (Authors own, 2010)

Results

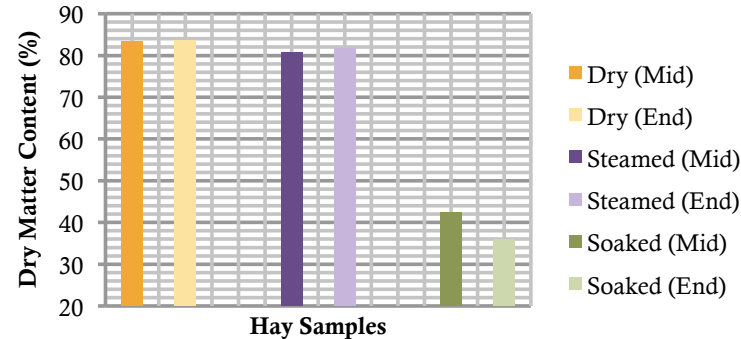


Figure 2: Graph showing the Dry Matter Content in the Hay Samples



Figure 3: HAYGAIN Hay Steamer (Authors own, 2010)



Figure 4: Bale of hay inside HAYGAIN Hay Steamer (Authors own, 2010)

Table 2: Dissertation Timeline

Timeline	Date To Be Achieved	Progress
Task		
Search for dissertation topic	Sep-10	Complete
Choose topic, access requirements	Oct-10	Complete
Plan experiment design, book time in labs	Nov-10	Complete
Complete experiment and calculations from results obtained	Dec-10	Complete
Dissertation poster and plan dissertation chapters	Jan-11	Complete
Formulate results into tables, write hypothesis, abstract, introduction & method, begin review of literature	Feb-11	In progress
Complete review of literature	Mar-11	In progress
Produce graphs, write up results, statistical tests, discussion, conclusion, references, appendices	Apr-11	In progress
Submit dissertation through 'Turnitin', print and bind hard copy to submit	May-11	In progress
Submit	May-11	In progress

Review of Literature

The horse is a monogastric animal therefore it has a simple stomach that through post-gastric fermentation can utilise both concentrated feeds and forage efficiently (Harris, 2006). Pasture and hay are the main sources of roughage, and act as the foundation for formulating a feeding programme (Johnson, *et al* 1995).

Nutritional health in the equine athlete is vital for bodily function. The digested nutrients are used to promote the production and repair of cells and tissue. This helps to protect the animal from invading antigens reducing its susceptibility to illness and disease (Highleyman, 2005).

Manual soaking of hay has been used for decades as a method of reducing mould/ dust particles. However, there is actually little research on the effects or benefits of soaking hay (Johnson, *et al* 1995). It is generally recommended that it is soaked for short periods of time as soaking for 24 hours or more causes large deductions in the nutritional value of the hay. HAYGAIN have developed a hay steamer that claims to reduce these particles by 94% with no nutrient loss (Blackman, *et al* 1998).

Discussion

Dry matter (DM) is the proportion of food remaining after all of the water has been removed. Therefore, all the nutrients required for an equines maintenance and performance are contained in the DM portion (Chase *et al*, 2010).

Figure 2 shows the dry matter content in the three different hay samples. Dry Matter determination is important for ensuring an animal receives the correct amount of nutrients in their diet. An increase or decline in DM content can cause under or over feeding of the animal (Chase *et al*, 2010). The graph clearly shows that the dry mid hay samples have a higher DM content than that of the dry end samples. The DM content of the steamed samples are almost as high as the dry samples whilst the soaked are significantly lower. This demonstrates that soaking hay will cause a decrease in nutrient levels, and although there is a small drop in the DM content of the steamed mid ($\leq 2.7\%$) and end ($\leq 1.75\%$) it is unlikely to cause a significant effect on a horse as they can tolerate a variety of nutrient intakes. Providing they do not fall to a level of deficiency or increase resulting in toxicity then nutrient intake should be adequate (Pagan, 1995).

Conclusion

Further research is required in all areas of hay preparation and the conditions that affect the quality of hay fed to horses.

Steaming hay is more successful than soaking as it is more effective at reducing respirable particles and maintaining the nutritional value, making the forage safer and more palatable for horses to eat.

References

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