

Maintain or Improve Stored Hay Quality¹

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Quality is a highly variable factor in any product or service. Webster's Ninth New Collegiate Dictionary defines quality as a "peculiar and essential character, or nature; an inherent feature, or property; a degree of excellence, or grade." Stored forage (hay) quality can mean different things to different people; it all depends on your perspective and how you intend to use the hay product. Depending on the animal to which the hay will be fed – horses, goats, sheep, mature gestating beef cows, growing beef calves, lactating dairy cows – the quality standard can be quite different.

Hay quality could be described with the following criteria, in this order: Palatability – Will the animals eat it?; Intake – How much can they eat?; Digestibility – How many of the nutrients are available to the animal (and/or ruminal bacteria, especially in the case of ruminant animals)?; Nutrient Density – What's really in there?; Anti-quality factors – What's in there that shouldn't be?; Animal Performance – Conversion of plant matter to animal product(s). Ultimately, the critical test for any feed is how well animals perform when fed a particular feed or diet. Therefore, hay quality is very important.

Assuming that you've produced the hay crop with optimal quality – fertilizer, forage species,

maturity, processing conditions – you could easily and quickly negate all that work and expense by storing the hay incorrectly. Losses due to improper storage generally fall under two broad categories: Dry matter losses, and losses due to reduction in forage quality.

Here are some things to remember when storing hay outside: Weathering of hay results in reduced feed intake (or even refusal), dry matter losses, and reduced forage quality; where hay contacts the soil, the largest decline in hay quality will occur; water should not accumulate in or around stored hay; plenty of sunshine helps to minimize losses; bales oriented in north-south rows get more exposure to sunshine, and thus stay dryer; rounded sides of bales should not touch and more dense bales tend to have lower forage losses. Furthermore, a reduction in forage quality reduces nutrient delivery to animals, thus requiring supplementation to offset the animal's nutrient requirements.

Table 1 displays some of the nutrient changes that occur when hay is stored covered or in a barn, versus being stored outside in the weather. Interestingly, crude protein becomes concentrated (+17.7%) when hay is weathered. This is not because protein resists degradation, but because dry matter

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losses effectively increase the percentage of protein available compared with the original value. Likewise, the relative feed value of the two hays (+4.0%) is not significantly different. However, there is a significant reduction (27.9%) in the dry matter digestibility (*in vitro* dry matter digestibility or IVDMD) of hay stored inside, or covered versus that stored outside. This is the critical factor. A crude protein value of 13.5% is very adequate for nearly any beef cow; therefore, an increase in crude protein is not of any extra value. A significant reduction in digestibility, however, can cost *you*. Because of the significant reduction in IVDMD, supplementation will likely now be required. Not only is there an economic loss in the value of the hay alone, there will now be an added expense because supplementation, primarily a function of the energy requirement, will be required.

List of References

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Table 1. Forage quality changes when storage method differs¹

Hay	Storage Method	Crude Protein (% DM)	<i>In vitro</i> Digestibility (% DM)	RFV	Economic Loss (\$/T)
Grass	Barn	13.5	58.8	72	---
	Outside	16.4	42.5	75	\$9.72

¹Adapted from Ball, D.M., et al., 1998. Minimizing losses in hay storage and feeding.