

Sensory Analysis of Hay Quality for the First Time Buyer

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When analyzing hay for quality, there are two methods producers should use together. The first method is to obtain a laboratory analysis of the forage for nutritional quality. For more information on forage testing, visit www.foragetesting.org. The next method, and main focus of this publication, is sensory analysis. Together these two evaluations can assist producers in selecting the most appropriate hay to meet animal requirements in the most cost effective manner.

Evaluate With Your Eyes

The first step in visual evaluation is to identify both the desirable and undesirable plant species contained in the hay.

Desired species include the forages you desire in the hay, such as alfalfa, red clover, orchardgrass, tall fescue, smooth brome grass, or timothy. Some hay may contain only one forage, but often hay contains a mixture of several species.

Undesired species include weeds that could compromise hay quality, animal health, and animal product quality. For example, poisonous plants, such as poison hemlock, can cause animal mortality. Other weeds, such as field pennycress, can have a negative impact on milk taste. In addition, some weeds contain high moisture and dry down more slowly than desirable forage species which can result in moldy hay.



Identifying plants dried as hay is an important skill. The left picture shows red clover blossoms before and after hay-making. Red clover is a desirable hay species. The right picture shows an undesirable species, foxtail.



Mold formation caused by baling hay too wet.

The next step is to evaluate the bale for evidence of mold. Mold can appear as obvious spots or areas that appear white, grey, or black. It can also appear as dust from the forage. Hay should not be excessively dusty when a portion is gently shaken. Presence of excess dust is likely spores from the mold. This can be a particular problem for horses who have sensitive respiratory systems, as compared to ruminant animals who are generally more tolerant of mold in hay.

Horses diagnosed with Recurrent Airway Obstruction (RAO), also known as heaves, can be particularly sensitive to spores from moldy hay. These spores can induce the condition in otherwise healthy horses causing decreased exercise tolerance, nasal discharge, and coughing.

Another important step during visual identification is looking for potential harmful insects in the hay. Some insects can be present and are not harmful; however, one insect, the blister beetle, contains a compound called cantharadin that can cause blister formation in the animal's mouth and gastrointestinal tract when eaten. Additionally, horses consuming a toxic dose, which can be as little as 0.80 ounces for a 1200 pound animal, can die within 3 to 18 hours after consumption with a mortality rate as high as 65 percent. With early detection and aggressive therapy, the fatality rate can be reduced to 20 percent.

The next important element to look for is leaf retention, especially in legume species. Poor leaf retention will decrease quality, since leaves contain the highest nutritional quality of the plant. High leaf retention can be hard to achieve because when hay is baled too dry (less than 15%) the leaves easily shatter from the stem and are left in the field instead of being in the hay bale.



Comparing the two alfalfa hay samples above, the sample on the left has poor leaf retention, as no leaves are present. In contrast, the sample on the right has high leaf retention, as indicated by the abundance of leaves.

Another indicator of hay quality is crop maturity at the time of harvest. Hays with advanced plant maturity have flowers or seed heads and will have lower nutritional quality when compared to hays that are harvested just before heading. While visual indication will help us assess general quality parameters associated with maturity, it is important to obtain a laboratory analysis to provide a clear picture of forage quality and nutritional value.



Presence of seed heads in hay indicates the crop's maturity before cutting. Seed heads with developed seeds indicate a late maturity crop and lower nutritional quality.

The final area for visual evaluation is identification of any foreign objects in the hay. This could be animal carcasses, metal, plastic or broken glass that was picked up from the field. If an animal carcass was baled into the hay, it can cause a potentially deadly condition called listeriosis.

Listeriosis is a bacterial infection that affects all species of animals. It can cause death within 24 to 48 hours without early detection and prompt treatment.

Getting a “feel” for your hay

When evaluating a bale of hay, it is also important to use your hands. Touch can offer valuable information about quality. Hay that was recently baled and feels moist and/or very warm could result in mold, excessive heat, unavailable crude protein, and fire during storage.

The softness of both plant leaves and stems, as well as the presence of spines, can provide evidence of palatability. Animals that consume coarse, stemmy hay or hay infested with weeds like thistle can develop sores in and around the mouth, which can cause a reduction in hay intake or outright refusal. A forage analysis will not be able to detect that a bale has weeds. Some weeds have high digestibility and nutritional profiles, but the presence of spines on the weed can cause refusal of what otherwise appears to be a high quality hay based on laboratory analysis.

The Nose Knows

The sense of smell can detect any offensive scents. This should be done by someone unaffected by allergies!

To begin evaluating your hay with your nose, see if you can detect a musty, burnt, tobacco, or vinegar smell. A musty smell indicates the presence of mold, and should usually not be fed to horses, and fed with care to ruminant animals. A burnt smell indicates hay had started to smolder, or was baled too wet and could be a fire hazard. A tobacco smell signals the presence of protein bound to fiber, which means less nutritional quality, and hay baled slightly too moist. Finally, a vinegar smell could be found in recently baled hay that has been treated with organic acids to prevent mold. This should not be a concern since animals will acclimate to this type of hay and it will be consumed with no negative effects on health or weight gain if the organic acids were applied at the proper rate.

Conclusion

Overall, producers can proactively assess forage quality by the use of sensory analysis before purchasing hay for their animals. If the hay passes your sensory analysis, then a forage test can provide further information about the nutritional quality of the hay. This information helps determine if the overall quality from forage analysis and sensory analysis makes the hay suitable for the livestock you intend to feed.

Further Information

Further information can be found in the Purdue Forage Field Guide, available through the Purdue Education Store. Additionally, information may be obtained through your county's Purdue Extension office.