



## 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 for nutritional quality of the hay. For more information on forage testing, visit [www.foragetesting.org](http://www.foragetesting.org). The next method, and main focus of this publication, is sensory analysis. Together these two evaluations can assist producers in selecting an appropriate hay to meet animal requirements in a 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 forages 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, animal performance or product quality. For example, poisonous plants, such as poison hemlock, can cause animal mortality. Other weeds, such as field pennycress or garlic, can have a negative impact on milk taste. In addition, some weeds contain greater moisture and dry down more slowly than desirable forage species. That can result in moldy hay.



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

The next step is to evaluate the hay bale for evidence of mold. Mold can appear as areas that are white, grey, or black in color. It can also look like 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.



Mold formation caused by baling hay too wet.

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 potentially 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 consumed. Additionally, horses consuming a toxic dose of cantharadin, which can be as little as 0.80 ounces for a 1,200-pound horse, could die within 3 to 18 hours after consumption. Mortality rate associated with cantharadin toxicity can be as high as 65 percent. However, with early detection and aggressive therapy, fatality rate can be reduced to 20 percent.

Leaf retention is the next important element to evaluate, especially in legume-containing hays. Poor leaf retention will decrease quality, since leaves contain the greatest nutritional quality of the plant. High leaf retention can be hard to achieve when hay is tedded, raked or baled too dry (less than 15% moisture). In overly dry hay, leaves easily shatter from the stem and are left in the field instead of in the hay bale.



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

Crop maturity at time of harvest is another indicator of hay quality. Hays with advanced plant maturity have flowers or seed heads present. Advanced maturity forages will have lower nutritional quality when compared to hays harvested prior to seed head formation. While visual indication will help 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.

The final area for visual evaluation is identification of foreign objects in the hay. Foreign objects 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 could result in the 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.



Comparing the two alfalfa hay samples above: The sample on the top has poor leaf retention, as no leaves are present. In contrast, the sample on the bottom has high leaf retention, as indicated by an abundance of leaves.

## 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, reduced crude protein availability, 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, such as thistle, can develop sores in and around the mouth, potentially reducing hay intake or outright refusal. A forage analysis cannot detect that a bale contains weeds. Some weeds have nutritional profiles similar to legumes. However, 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 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. Ruminant animals are more tolerant, and moldy hays should be fed with caution. A burnt smell indicates hay had started to smolder, or was baled too wet and could be a fire hazard. Tobacco or caramel smells signal the presence of protein bound to fiber, which means less nutritional quality, and hay baled slightly too moist. Finally, a vinegar smell can be found in recently baled hay that has been treated with organic acids to prevent mold. This should not be a concern; 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

Producers can proactively assess forage quality by the use of sensory analysis before purchasing hay. If the hay passes your sensory analysis, then a forage test can provide further information about the nutritional quality of the hay.

## Further information

Further information can be found in the Forage Field Guide (ID-317), available through the Purdue Education Store. Additionally, information may be obtained through your county's Purdue Extension office.

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