

An understanding of how hay storage conditions affect hay losses and quality changes can help producers reduce feeding costs. Maintaining hay quality after harvest depends on proper storage. Total loss for high quality hay stored outside on the ground could be 25 percent to 30 percent, while losses for animal feeding could reach 40 percent. This dry matter (DM) loss from poorly stored hay also translates to significant dollar losses when lost nutrients have to be replaced by protein or energy products.

Hay that is baled at moisture contents greater than 20 percent can develop mold and lose dry matter and quality to bacterial degradation. In rare cases, hay baled at a high moisture content can spontaneously heat or combust. Moldy hay can be detrimental to livestock health.

The amount of storage losses are directly related to several factors, including moisture content at baling and the time of storage, storage conditions (outdoor vs. indoor), environmental conditions (relative humidity, air temperature, and air movement), and forage species.

The extent and duration of temperature rise in hay depends on moisture content. All hay baled at moisture contents between 15 and 20 percent will undergo some elevation in temperature in the first 2 to 3 weeks after baling. This heat buildup is referred to as "sweating" and is due to plant respiration and microbial activity. This temperature increase continues for up to 10 days. At a moisture level of about 30 percent, a bale may maintain a higher temperature for up to 40 days regardless of the forage species or bale shape. An electronic hay moisture and temperature probe that is 18 to 24 inches long can monitor these changes in moisture and temperature. The electronic probe can measure many samples quickly. At least 12 to 20 random samples are necessary to determine forage moisture accurately. Heat generated by metabolic activity of the microorganisms and plant respiration will increase the temperature of hay. Temperatures can range from 130 to 140 °F during the initial stage and decrease to 60 °F after 40 days. Equilibration usually occurs independently from moisture level. If temperature increase is no greater than 130 °F, then the hay should suffer no great reductions in hay dry matter and quality. However, during the sweat, measurable losses of 4 to 5 percent in hay DM may be recorded. Once stored hay has reached moisture equilibrium, there will be a 1 percent DM loss for every 1 percent loss in the original field baling moisture. For example, if hay was originally baled at 20 percent moisture and after 3 weeks reaches 12 percent moisture, there should be a corresponding 8 percent DM loss.

It is important to store bales in a well drained area. Most storage losses occur where hay bales touch soil. Place round bales on gravel, pallets, or tires to minimize dry matter losses, but be aware that tires may hold water. Elevation is not necessary for bales covered in solid plastic because the plastic layer provides a barrier against moisture movement from the soil. Some ways to reduce loss in hay dry matter and quality include curing hay to less than 15 percent moisture, protecting the bales from rain and other weather elements, allowing room for proper ventilation and air circulation, and elevating hay from ground. Monitor hay for mold and increasing heat, especially during the initial 30 days of storage.

Please come by the office or call if we can be of further assistance.

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