



U of M Horse Newsletter

Providing research-based information to Minnesota Horse Owners

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UNIVERSITY OF MINNESOTA

EXTENSION

Equine Hay Analysis

By: Martinson, PhD and Peterson, PhD, U of M

Most Universities and equine nutritionists are encouraging horse owners to have their hay analyzed, especially if the quality of hay is a concern, or the horse is having nutritional problems. However, most horse owners need help interpreting the results of their analysis.

When your sample is returned, there will be two columns of numbers; As Sampled and Dry Matter. As sampled reports nutrient in their natural state, including water. Dry matter reports nutrients with the water (moisture) removed (water can have a diluting effect on the results). Either can be used for ration balancing, but be consistent. Below is a list of some (not all) common components analyzed for in hay.

• **Moisture:** the optimum horse hay moisture ranges from 10 to 17%. Hay under 10% may be too dry, leading to brittle and dusty hay. Hays over 18% moisture have a high probability of molding (unless propionic acid is used), and hays over 25% moisture poses the threat of severe heat damage and serve as a potential fire hazard.

• **Crude Protein (CP)** : a measure of the protein concentration of the hay. CP can range from 8 to 14% in grass hays (depending on nitrogen fertilization), 14 to 17% in mixed hays, and 15 to >20% in legume hays. Since most horses require approximately 10% crude protein, CP not likely to be limiting, except in lactating mares and foals.

• **Acid Detergent Fiber (ADF)** - ADF is composed of cellulose, lignin, and other poorly digested components. The lower the ADF value, the more digestible the nutrients in the hay are. Values of 30 to 35% are good and values above 45% maybe of little nutritional value.

• **Neutral Detergent Fiber (NDF)** - NDF is a measurement of the insoluble fiber. In theory, the higher the NDF, the

less a horse will consume. NDF levels between 40 and 50 are good, and those above 65 will likely not be consumed by most horses.

• **Relative Feed Value (RFV)** : RFV is commonly used when selecting dairy quality hay. The utility of RFV in selection of horse hay is unknown, but can be used as a guideline. A RFV of 100 is considered the average. An equine nutritionist will not use RFV to balance a horse's ration.

• **Equine Digestible energy (DE)** - Measure of the digestible energy in the hay, and used to balance the energy portion of the equine diet. For a light working horse, DE should be about 20 Mcal/day, and most hays range from 0.76 to 0.94 Mcal/lb of DE.

• **Equine Total Digestible Nutrients (Equine TDN)** : This is a measure of the total digestible nutrients in the hay or its energy value, which may range from 40 to 55%. TDN is rarely used in evaluating horse hay.

• **Calcium (Ca) and Phosphorus (P)** : These two macro-minerals are required in the diet by all horses in specific amounts, and vary among different types of hay. For the adult, maintenance horse, the CA:P ration should be between 3:1 to 1:1.

Once your hay has been analyzed, work with an equine nutritionists to balance your horse's ration. Generally speaking, a horse's ration is balanced in the following order: energy (fiber), protein, minerals, and vitamins.

DHIA (320-352-2028), Dairyland (320-240-1737), and Equi-Analytical (877-819-4110) can test hay for nutrients. Be sure to request an equine analysis, and remember that each type of hay (cutting, field, etc..) will need a separate analysis. A basic hay analysis cost about \$20. Next month, testing your hay for sugar and carbohydrate content will be discusses.

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Upcoming Events

FALL REGIONAL HORSE OWNER PROGRAMS REGISTRATION REQUIRED

Register online (secure) at: www.extension.umn.edu/horse

Saturday, October 18th

Northwest Technical College
Bemidji, MN

1:00 pm to 4:00 pm

Registration Deadline: Oct. 15

Saturday, October 25th

Minnehaha Elementary School
Two Harbors, MN

1:00 pm to 4:00 pm

Registration Deadline: Oct. 22

Saturday, November 22nd

Cambridge-Isanti High School
Cambridge, MN

9:30 am to 12:30 pm

Registration Deadline: Nov. 19

MN Equifest

October 11th and 12th
St. Paul Fair Grounds
St. Paul, MN

www.minnesotaequifest.com

Behavior Change Seminar with Sue McDonnell

October 24th at 5:00 pm
Leatherdale Equine Center
\$12.00 at the door

Fee includes meal

Sponsor: U of M Equine Club
Contact: thei0164@umn.edu



Know a Horse Hay Supplier or Auction ?

By: K. Martinson, PhD, U of M

In response to the hundreds of inquires from horse owners seeking hay, the U of M is compiling a list of farmers who specialize in horse hay sales, as well as hay auction sites in Minnesota. The list will be

distributed to individuals who are seeking horse hay. The list is not an endorsement of the listed individuals/auction sites by the University of Minnesota. If you would like to be included on the list

(i.e. you are a hay seller), know a farmer(s) specializing in horse hay sales, or an auction site, please contact Krishona at krishona@umn.edu or 612-625-6776.

Tying-up Gene Found

By: S. Valberg, DVM, U of M

For hundreds of years, horses have suffered from painful muscle cramping following light exercise. In draft horses, this condition was called Monday morning disease because it tended to occur after a day of rest. In light breed horses, it has been called tying-up.

Veterinarians at the University of Minnesota recognized that there was a specific form of tying up called polysaccharide storage myopathy (PSSM), characterized by excessive and abnormal storage of sugar (polysaccharide) in muscle cells. Fifteen years after this

discovery, researchers found the gene mutation that is responsible for PSSM. An article about the research will be published in an upcoming issue of Genomics.

The researchers found that the mutated gene is inherited in a dominant fashion, meaning that one copy of the mutation can cause PSSM. Each horse has two copies of every gene, one inherited from the dam and one from the sire. To develop PSSM, a horse only needs to inherit the mutant gene from one parent.

Up to 50 percent of some draft

horse breeds and 10 percent of quarter horses are affected by PSSM. The research also showed that the PSSM gene likely arose 1,600 years ago at the time that the "Great Horse" was being developed to take knights into battle. The genetic mutation has since been disseminated to more than 20 horse breeds.

Horse owners and veterinarians can now test for PSSM using a DNA blood or hair test commercially available through the University's Veterinary Diagnostic Laboratory. More information is available at www.cvm.umn.edu/umec/lab/Advances_in_PSSM.html.

Research Update: Equine Vocalization Project

Equines vary frequency during vocalization, giving them the potential for expression. Of the sounds that horses make, whinnies have the greatest potential for long range communication. The challenge is to build up a large equine vocalization data base to determine if a particular acoustic spectrum might be associated with a particular situation.

An analysis of previously recorded whinnies indicates that, in general, there are two principal components: a tonal or constant frequency component; and a frequency dependent component, typically characterized by a rapid increase in frequency followed by a more gradual decrease. The latter produces the sound we usually associate with a whinny and we refer to as the "call".

The objective of this research conducted at the University of Connecticut was to find a situation where a number of whinnies were collected under constant, known condition.

A total of 100 sonograms from four separated mare/foal pairs were collected. The acoustic structure of the whinnies were very consistent. There was a tonal structure, which tends to be slightly different for each mare's "voice", comprising of a basic frequency and its harmonics. Imbedded in this, however, was a distinct persistent call with a characteristic frequency structure: a sharp rise to about 2,000 Hertz and then a gradual decline. The call was consistent throughout the whinnies of an individual mare and was very similar when comparing different mares.

Based on this initial research, it appears that horses have the ability to produce a distinct and repeatable call as part of a whinny. The spectra of the call in the whinnies recorded were similar to a softer call made by a mare looking for her foal while being relocated to the barn. What is not known at this time is whether this particular call might apply to other situations too. As a horse is primarily visually oriented, most whinnies occur when vision is.

The next step is to determine if whinnies can contain distinctly different calls under different circumstances as a tool for communicating information, stress, or feelings to other horses or people.

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