



## Testing Hay and Pasture for Nutrient Levels

*Submitted by Carol Layton B.Sc M.Ed*

It is often recommended by vets and nutritionists to feed your horses a balanced diet. A horse needs the right amount of nutrients; carbohydrates, protein and fats, as well as vitamins and minerals for proper digestive function. A balanced diet is essential for optimum performance and in avoiding health issues. Symptoms like a dull coat, poor hoof quality or topline, less than optimal performance and a weak immune system are the more obvious signs. So what is a balanced diet?



A balanced diet is one where all the nutrients are more than adequate to avoid deficiencies and the amount of each of the minerals avoids competition with another. One example is copper and zinc, too much zinc in the diet has been found to interfere with the intake of copper. Another is calcium and phosphorus; too much calcium can interfere with phosphorus and vice versa. There are many other examples.

To determine whether nutrient levels are sufficient and balanced in a horse's diet, the amounts consumed from forage, feeds and supplements can be compared with the amounts recommended in the Nutrient Requirements of Horses, published in 2007 by the National Research Council (NRC), the reference for equine nutritionists. Providing an insurance buffer by using at least 150% of NRC target minimums and keeping mineral ratios in a tight range will protect the horse from suboptimal intakes of minerals.



Feeding a perfectly balanced feed or supplement can't correct an out of balance forage whether it's pasture or hay or a combination of both, especially when it's the bulk of the diet.

The best way to find out what your horse needs is to find out the amounts of nutrients he is getting from the pasture and/or hay. **Equi-analytical** in Ithaca, NY is my lab of choice offering quality testing at affordable prices.

Note: soil testing only tells us what is in soil, not what is in a horse's diet.

Soil testing and treatments are highly recommended for the long term health of soils though often, supplementing what is missing and/or out of balance in the horse's feed is the cheaper and easier approach.

### **Collecting a Hay Sample**

Laboratories recommend using a hay corer which can be purchased from labs like **Equi-analytical** or you may be able to ask your local state extension office if they have one you could borrow. The usual recommendation is to take a small amount from 15 – 30 bales to get a good representative sample. The lab will specify how much a hay sample should weigh.

If you haven't got a hay corer you can simulate what it does by removing samples of hay with your hands or stainless steel scissors but it does mean you have to open all the bales to get hay from the middle.

### **Collecting a Pasture Sample**

Observe your horses to see what plants they like to eat and which ones they ignore. Walk over the pasture and collect 15 to 30 or more random samples by using stainless steel scissors or your fingers to cut at the same height that your horses graze. Try to collect the different plants in similar proportions to what is in the paddock and represent what they eat. For example, if you have 75% of plant A and 25% of other plants in your pasture use one plastic bag for plant A and a second plastic bag for the other plants.

Mix the plants together in a small clean plastic bucket with the different plants in similar proportions to what is in your pasture.

If you are in the USA, **Equi-analytical** advises to freeze the sample and send to the lab as soon as possible without the sample defrosting. If you live further away in places like Australia, the better approach is to dry the sample as soon as possible as the plant continues to metabolise carbohydrates even when cut. A microwave or food dehydrator is an excellent way to dry your sample or if you don't have a big enough microwave, spread the grass out on newspaper in the sun.

For drying grass in a microwave, place a glass of water on the turntable and use the medium/low or low setting. Check the grass every 3 minutes to see how dry it is, turning the grass over regularly to help dry the sample out



evenly. When the grass feels dry to touch then you know you have done enough drying. The color of the grass will still be green though may look a bit faded. Every time you check, refill the glass with cold water but be very careful you don't burn yourself when touching the glass as a microwave is very good at heating up glass and glass is very good at retaining heat. You may want to do the sample in 2 or 3 batches depending on the size of your microwave. Once your sample feels dry, fill a snap lock bag and squeeze all excess air out.



It's a good idea to cut the grass into small pieces with stainless steel scissors or your fingers; a lot easier to mix together, work with, microwave and pack in a plastic bag when ready to post the sample. Cutting up the hay into small pieces makes it easier to mix together and work with too.

When ready to post your sample off, choose an appropriate test package provided by the lab. For hay, if you need an accurate test for sugars (ESC and WSC) and starch for sugar sensitive/insulin resistant horses choose the wet chemistry test. For Equi-analytical, it's the 603 Trainer, if sugars and starch are not so crucial; choose the cheaper 601 Equi-tech test. Both packages use the more accurate wet chemistry test for minerals.

For pasture there is no point testing sugars and starch, researchers in the field have to flash freeze their samples in liquid nitrogen to stop the plants from metabolizing. Also consider that carbohydrate levels will vary over time.

*Carol Layton B.Sc M.Ed does feeding plans for horse owners in the USA, Australia and other countries. To learn more about mineral interactions and hay and grass testing, head to <http://www.balancedequine.com.au> and check out the nutrition articles.*

*To learn how to put together mineral balanced diets for your horses, enroll in Dr Eleanor Kellon's VMD NRCPlus course: <http://www.drkellon.com>.*

*NRCPlus is based on the nutritional research determining minimum requirements for nutrients and the concept that the balance of nutrients is equally important because they can compete with each other for absorption.*