



# UNITED STATES DRESSAGE FEDERATION™

**USDF**

**Additional Questions- The Ps and Qs of Protein Feeding in Equine Diets with Dr. Caroline Loos, PhD (University of Kentucky)**

- **Please address the issues with feeding Iberian horses, specifically Lusitanos, for high performance. Do you suggest Vitamin E supplementation?**

From my understanding you're referring to NAD/EDM, an inheritable disease affecting the nervous system. Most of the damage occurs in early development, so vit E supplementation during the first 6 months of life of the foal or the broodmare/stallion with the gene for this disease has proven to prevent or decrease severity of the condition. I would definitely advise to supplement Vit E in foals or broodmares if you know your herd is prone to develop this disease. Whether vit. E helps in a mature horse with established disease is questionable as the damage is often irreversible and adult horses can have lifelong neurologic problems. However, if done safely with a good product, supplementation with vit E can't hurt and might be worth a try to support healthy muscle function to help the horse cope with mobility issues.

- **Can you discuss feeding grass balancers and side dressings in relation to protein intake. Do you recommend them?**

My apologies, I do not know what you mean by "side dressings". However, a balancer that is specifically designed to complement a grass diet will typically be lower in protein (as grass is usually high in protein) so yes, a grass balancer would be ideal to meet all nutritional needs for horses on pasture not needing extra energy. Do ensure to add more energy/protein during times your horses does not have enough pasture (e.g., winter months), a good option would be to add high quality hay at this point.

- **Hello, would you please show us the chart that shows the essential amino acids needed in a good quality protein source?**

A good quality protein source should be rich in all essential amino acids, in particular lysine (the most essential for horses). Other important essential AA are methionine, threonine, leucine, isoleucine and valine. A complete list of all essential amino acids in horses can easily be found online as well. A good resource is: <https://feedxl.com/30-understanding-protein-quality/>

- **What are energy sources?**

Horses get energy from a variety of ingredients, including grains (energy source = starch and sugar), fat (energy source = fatty acids) and fiber (energy source = volatile fatty acids from digesting hay or grass). Depending on what kind of energy you need (fast or slow) you can play around with different energy sources in the diet to meet the needs of your horse. High level performance will typically require starch and sugar to fuel muscle contraction while horses only used recreationally can probably get by on good quality fiber to meet most energy needs. High fat diets can be used for weight gain but should never be used long term as excessive fat will eventually start overloading the organs and could in fact cause weight loss.

- **Can you comment on how to address feeding senior horses with cushing syndrome and reduced protein synthesis due to a reduction in proteases?**

The loss of muscle mass in horses with Cushing's is due to hormonal imbalances which will interfere with protein synthetic signaling pathways in the muscle, eventually causing muscle atrophy (breakdown). Treatment with Pergolide shows some effects of balancing hormones which will help mitigate the effect. As far as feeding these horses it will definitely be important to feed enough energy and protein to avoid more weight and muscle loss. As horses with Cushing's and senior horses often suffer from insulin resistance, energy should come from highly digestible fiber (hay, hay cubes, beet pulp, fiber rich feeds, etc.). Some level of fat is ok as well, but not too high as this may cause other metabolic issues. Because of ongoing muscle breakdown, it is important to make sure adequate protein intake to supply more amino acids in the hope to limit muscle breakdown. Protein balancers with good forage are a good option to provide protein and essential micronutrients for the senior horse.

- **"I have been feeding my horses Cavalor feed (Fiber Force) for a few years now. Just wondering if Cavalor will offer more products with potato protein, as the results have been quite positive?"**

We are planning to incorporate this protein source in other products in the future yes.

- **If a horse is not "happy and healthy" (lackluster coat, stumbling, stiffness) on a specific feed, do you recommend switching feed to find a better (more digestible) match for that horse?**

Changing feed always has a big impact on the horse and be a last resort if really needed. So before doing that, first and foremost I would do a thorough veterinary exam to ensure there are no underlying health issues. Ulcers (even mild ones) can cause some of these symptoms. Also verify your saddle fit and hoof/shoe

condition (maybe get a second opinion from your trainer or different farrier). If all else is excluded, you may need to think about what your diet might be contributing to the symptoms. Maybe your horse lacks energy causing him to stumble or has hindgut issues which may cause poor coat quality and lethargic attitude. At this point you might want to evaluate your diet with a nutritionist to confirm it is optimally balanced for your horse or see what can be changed. A good option is to give your horse a mental and physical break now and then. I often recommend to stop giving any supplements that are not vital and feed a fiber rich diet for a while to rebalance the hindgut flora which will naturally bring back health and energy.

- **At what age do you consider a horse senior?**

There is a big difference between “senior” and what we call “geriatric” (the point at which your older horses show symptoms of aging). The age at which your horses would be “senior” truly depends on the horse, some horses still perform effortlessly in their 20’s while others are stiff and look old at 18. More important that the actual age, is looking out for symptoms of aging (i.e., more difficulties keeping weight and muscle, difficulties eating due to teeth problems, soreness for no particular reason, skin issues, etc). At this point you need to make sure to adjust your diet accordingly to keep the horse in good condition.

- **Lysine appears often in your slides, an equine ophthalmologist recommended the supplement for my 29 yr. old horse after repeat corneal ulcers, can you give more information about the other benefits**

Lysine is often mentioned when it comes to protein sources because it is the most limiting amino acid for horses, meaning even if all other amino acids are there and lysine is missing, no protein can be made. Therefore, adequate lysine is essential in protein sources, definitely in older horses who might be struggling to maintain weight. Lysine is part of all protein (blood, immune cells, skin, muscle, organs, etc.), therefore high-quality protein containing enough lysine will help overall health in many ways. Supplementation of single amino acids is not necessarily shown to have much impact, so I prefer to provide an overall good protein source that provides ALL amino acids, not just lysine. I believe a high-quality protein balancer or more complete amino acid mixture would be more ideal for your senior horse.

- **Can you go over how to calculate how much protein you’re feeding on a daily basis regarding hay and concentrate analysis?**

You can easily calculate the amount of protein from the feed by multiplying the amount of protein per lbs of each feedstuff (obtained from % on the feed tag or hay analysis, e.g. grain with 12% CP = 0.12 lbs protein per lbs of grain) by the amount in lbs fed per day of both grain and hay. This will be the total amount of protein you feed per day. Because protein requirements are typically given in

grams of protein needed per day, I usually calculate everything in grams per kg instead of lbs for easy comparison to see if I meet my horse's daily needs. So, if your feed is 12 % CP = 120 g protein per kg feed. Multiply that by kg feed fed per day = total grams of protein per day. E.g. you feed 2.5 kg grain (would be about 5.5 lbs) then you feed 300 g of protein (2.5 x 120). Then you do the same thing for the hay and add the two numbers together to get total grams of protein supplied by hay and grain per day. You can look up your horse's protein requirements on: <https://www.equinerationcalculator.com/>

- **Any suggestions regarding PSSM and protein feeding?**

PSSM horses have protein needs like any other horse, especially if they are performing. However, do not overfeed protein. The disease generally (depending on the type) causes a dysfunction in muscle glycogen synthesis. The no. 1 hormone responsible for stimulating glycogen synthesis this is insulin (which is why we want to avoid high NSC)! BUT... high levels of protein, in particular in a single meal are also known to spike insulin levels, something that is often overlooked and definitely not wanted. Therefore, feed normal levels of protein by carefully reading the feeding instructions and choose a feed not too high in protein (also be very careful with pasture). Additionally, I always recommend splitting your daily ration up into as many meals as possible. That way you give your horses all it needs without causing a sudden hormonal overload by a large influx of nutrients.

- **Alfalfa is a main feed out West but we have been told Warmbloods may need to be just on grass/hay because they don't digest alfalfa well.**

I have not heard of issues with digestion necessarily (once the horse is adapted) but it is known that many warmbloods are more "easy keepers" than other breeds like thoroughbreds. So, alfalfa might simply be too rich for many of them and they might gain weight on it. I know alfalfa is very common in the west, I do want to point out to look for horse alfalfa, not cattle or goat alfalfa (way too rich and can cause colic). Horse alfalfa should be a bit more fibrous (stemmy looking). If you do decide to add it to the diet, gradually add it very very slowly, as it does require adjustment of the microflora to digest this initially. I would preferably feed alfalfa cubes or pellets (usually specifically designed for horses) in addition to grass hay. Alternatively try to find some grass/alfalfa mix (bermuda or teff maybe?).

- **Is there a balance or percentage for each Amino Acid? How much of each is needed? Lysine? Methionine? Is there a chart?**

Unfortunately, requirements for each amino acid have not yet been determined in horses. We only know the lysine requirement in horses, which can be found on: <https://nrc88.nas.edu/nrh/> The requirements for other amino acids are derived from other animal species. However, even if we knew these requirements you would need to do an amino acid analysis of your feed to figure out truly what it supplies (a costly analysis). On the other hand, we have very good knowledge of

what protein sources are typically high or low quality so selecting feeds from reputable brands and good hay will typically provide all the amino acids they need.

- **When do you see the senior horse info being published?**

If you mean the protein synthesis function in senior horses I mentioned during the presentation, those papers have been published: Laurel M. Mastro et al (2014) *American Journal of Veterinary Research* **75**:7, 658-667. Wagner et al (2013) *American Journal of Veterinary Research* **74**: 7, 1433-1442

- **Do you have a recommendation for a “multi-vitamin” vs. using several items, i.e.. E, magnesium, aloe, etc.?**

There are many different vit./min supplements on the market. I wouldn't select anything that oversupplements any one particular nutrient as that could cause imbalanced in other nutrients. Rather select a product that offers a balanced mixture of all micronutrients targeted for your horse's needs. That's really all your horse needs plus a good forage source. Cavalor NutriPlus is a really nice product for horses receiving good hay or pasture but simply needing additional vit/min.

- **Thinking of how soy can affect women and estrogen levels, would soy then create a stronger heat cycles in mares?**

There is no real scientific evidence this occurs in horses. The level of soy typically included in horse feed wouldn't be high enough to elicit real hormonal disturbances. The phytoestrogens you think of that are present in soy also naturally occur in legumes like alfalfa or clover. If your horse has issues with soy, it would also react to alfalfa or clover. Typically, horses eat more forage than concentrate so it might be better to lower intake of those type of forages if you have a mare with intense heat cycles. On a totally unrelated note, I've had tremendous success with the product Cavalor Venus to get strong heat cycles under control and get a more rideable/workable mare. Also works for moody geldings.

- **With all other things being equal, does the form of feed alter the digestibility. For instance, does chopped vs. pelleted have a different digestibility rating?**

Absolutely, the form of the feed defines the rate of passage through the digestive tract and the digestibility of the nutrients. Processed (meaning flaked or pelleted or puffed) are typically higher digestible than unprocessed ingredients (whole oats or corn). However, pelleted feed often times forms doughy balls in the stomach and is retained longer which is not desired and cause GI issues. Always try to provide as much “bulk” as possible for your horse as this improve gut function and motility. Horses are designed to eat bulk (forages) so it's essential they receive long stem, fibrous forage to maintain gut health. I also prefer to feed

horses textured, fluffy concentrates instead of pellets to avoid ulcers, improve dental health and improve digestion.

- **Can you comment on how to address feeding senior horses with Cushing syndrome and reduced protein synthesis due to a reduction in proteases?** (repeated question)

Answered above

- **Suggestion for old horse with metabolic disease, and no longer likes hay. He does have “pasture” - it is dry and often overgrazed.**

Feeding suggestions would depend a little bit on your horse's needs and how well he maintains weight. If he has insulin resistance, I would be cautious with overgrazed pastures and this stresses the grass and stressed grass often contains high levels of sugars which should be avoided for the metabolic horse. The fact that he “does not like hay” might be due to difficulties chewing, make sure to do dental work at least 2x year in older horses. If he really cannot chew long stem hay, then I would suggest hay cubes or pellets or find fiber-rich feedstuffs that can be fed as complete feeds (i.e., safely fed in larger quantities). Beet pulp is also a very good option for older horses to increase fiber intake. If he needs extra weight add a good senior feed that is lower in NSC.

- **Can you tell me again how to calculate the amount of g cp my horse is getting from its hay and grain?**

You can easily calculate the amount of protein from the feed by multiplying the amount of protein per lbs of each feedstuff (obtained from % on the feed tag or hay analysis, e.g., grain with 12% CP = 0.12 lbs protein per lbs of grain) by the amount in lbs fed per day of both grain and hay. This will be the total amount of protein you feed per day. Because protein requirements are typically given in grams of protein needed per day, I usually calculate everything in grams per kg instead of lbs for easy comparison to see if I meet my horse's daily needs. So, if your feed is 12 % CP = 120 g protein per kg feed. Multiply that by kg feed fed per day = total grams of protein per day. E.g. you feed 2.5 kg grain (would be about 5.5 lbs) then you feed 300 g of protein (2.5 x 120). Then you do the same thing for the hay and add the two numbers together to get total grams of protein supplied by hay and grain per day. You can look up your horse's protein requirements on: <https://www.equinerationcalculator.com/>

- **Please address the issues with feeding Iberian horses, specifically Lusitanos, for high performance. Do you suggest Vitamin E supplementation?** (repeated question)

Answered above

- **"Would you add oil to a diet for horse with metabolic issues? What kind of oil? How much? Would it add unwanted fat as well?"**

Depends on the severity of the issues. If the horse is overweight or has insulin resistance, I would be not recommended oil supplementation as and excessive fat intake can cause further metabolic disturbances and yes fat deposits, especially if used long term. In case of Cushing's without a serious insulin problem, some oil might these horses maintain weight. In case of PSSM, oil might be a good energy alternative to starch and sugars. In case of an overweight horse that still competes and need more energy, add more highly digestible fiber (fiber-rich feeds or pellets or beet pulp) and a supplement with B vitamins instead of fat, you'll have much better (and safer) results. If you do feed oils, I advise people to add oils that are enriched with vit E instead of simple vegetable oils, because fat is easily oxidized in the body, so you also want to add antioxidants during fat supplementation (vit E is a good one) to avoid health issues. You also want to make sure the oil has a good omega-3 to omega-6 ratio to provide healthy fatty acids. A nice oil I often use is Cavalor OilMega.

- **What do you suggest for a 29-year-old horse, foundered years ago with muscle loss? She is on Bermuda hay, alfalfa pellets, timothy pellets, vitamin and mineral balancer, iron supplement, sunflower seed, chia seeds and flax seeds. I try to avoid GMOs. Thanks so much.**

A protein balancer might provide that little bit of extra to help regain muscle and topline. Try out the product I did my research with that I mentioned in the presentation, Cavalor VitAmino, we've had some amazing results with this, and you only need to feed small quantities. If you feed this, I do recommend you leave out the other vit/min balancer you give as the protein balancer is also enriched with vitamin and it would not be good to feed too much. You are welcome to mention my name when you call the Cavalor sales rep to ask about the product and tell them I referred you. I would also advise you to be very cautious with iron supplementation. Unless your horses have an issue with iron metabolism or unnaturally low iron levels, excess iron has been associated with metabolic (and muscle) issues. Also, most horses receive plenty of iron from hay and sometimes their water sources depending on your geographical location. You're also feeding a vit. /min supplement that should provide more than enough iron when fed at recommended amounts.