

FORAGEPLUS HORSE TALK

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LEARNING IS OUR JOURNEY
HORSES OUR PASSION



UNDERSTANDING QUALITY PROTEIN

Protein is life! Understand what protein for horses is.

PROTEIN IN HORSE DIETS

Will there always be enough in your horse's diet?

PROTEIN FOR HORSES PRONE TO LAMINITIS

Protein is vital for repair. Will your good doer have enough?

A photograph showing the back of a white horse and a person wearing a red quilted vest and a white shirt, walking away from the camera. The background is slightly blurred, showing what appears to be a parking lot or outdoor area.

Protein for your Horse

Understanding quality protein for equines



UNDERSTANDING QUALITY PROTEIN

By Forageplus Horse Talk

Do you need to understand all about quality protein for horses? Horse owners should be concerned to provide their horse with protein which contains adequate and diverse essential amino acids because these can not be synthesised in the body.

Protein is quite literally life! It is fundamental to every process in the body but not many people understand what protein for horses is; why protein for horses is so important; what it looks like when your horse is low in protein; the best place to get protein for horses and how you can make sure there is enough protein to create a robust healthy horse.

Protein can be thought of as being like the alphabet, each letter is an amino acid which forms a chain to make a protein in the same way as letters strung together make words. Just as out of the alphabet many thousands of words can be constructed, out of amino acids ALL the proteins in the body are made.

The alphabet has two categories of letter, consonants and vowels. With these 26 letters many thousands of words can be made just by arranging them in different orders.

However, without the very important vowels many words would not be able to be made. Letters make words that in turn make sentences for unlimited information and the ability to transmit that information. Amino acids are the same, they make proteins that in turn make structures which build and run the amazing living things on our planet.

There are two categories of amino acid, essential and non-essential. Essential amino acids (EAAs) MUST be present in the diet just like vowels must be present in the alphabet because these essential amino acids can only be obtained from food. The non-essential amino acids (NEAAs) can be created within the animal as long as there

are adequate amounts of essential amino acids.

The 10 Essential Amino Acids for Horses

As it stands now, there are twenty two commonly occurring amino acids and nine of these are considered to be essential. Each amino acid has a unique structure and all of them contain nitrogen. Amino Acids form chains. Peptide chains are less than 10 amino acids and like the syllables in words. Polypeptides are chains of more than 10 amino acids and are like whole words. The sequence of these amino acids in the protein polypeptides determines the biological role of a protein.

The wall of the horse's digestive tract (stomach, fore and hind gut) cannot absorb polypeptide protein because the molecules of protein are too large. Instead every protein your horse eats is broken down into its smaller amino acid building blocks or the small peptide groups of amino acids and these absorbed through the intestinal wall into the body. Then these amino acids and peptides are transported to individual cells and reassembled into what ever protein that cell needs.

Protein provides the structure that makes connective tissue of bones, ligaments, tendons and muscle. Protein also makes a lot of other things in the body; defense

mechanisms for strong immune systems, sensors, hair, skin, hooves. Examples of proteins are glutathione, which is critical for immune function and the pituitary hormones vasopression and oxytocin. ACTH (adrenocorticotrophic hormone), which is a topic of hot conversation because high levels are currently being used to diagnose cushings disease in horses, is also a protein.

Proteins can further be classified into globular and fibrous categories. Examples of globular proteins include antibodies; the catalysts known as enzymes; carrier proteins, such as haemoglobin, which transports oxygen through the blood steam. Fibrous proteins are long, coiled strands or flat sheets which give strength and elasticity. Examples of a fibrous proteins are keratin (found in hair, skin and hooves), collagen (the connective tissue of skin, tendons and bones) and myosin which is a muscle fibre protein.

If you are still reading and your brain hasn't spun off! It will now be obvious to you that the 'quality of protein' means whether the protein has a good availability of all the essential amino acids because the whole of the horse's complex structure, its immune system, hormonal regulation and its metabolic functions are highly dependent upon the presence of adequate quantity and quality of protein in the diet.

Essential Amino Acids

Lysine
Methionine
Isoleucine
Leucine
Tryptophan
Histidine
Phenylalanine
Threonine
Valine

Non-essential Amino Acids

Alanine
Arginine
Asparagine
Aspartic acid
Cysteine
Glytamic acid
Glutamine
Glycine
Proline
Selenocysteine
Serine
Taurine
Tyrosine



Protein absorption is like a factory making cars

Just as if some vowels are not present in the alphabet, if there are some essential amino acids missing or short then some proteins for the correct functioning of the body cannot be made. Immune function, muscle repair and building, tissue regeneration and repair, weight gain, keratin (hoof, skin and hair quality), growth etc. depend extensively on protein quality and availability.

So when you think protein, think amino acids and the chains that are just like letters making thousands of words which are making thousands of sentences which are making thousands of different things to read in many different forms. Now perhaps you fully realise that protein is quite literally life!

When your horse, on a daily basis, repeatedly has less of some of the essential amino acids than it needs for optimum healthy function then it cannot make some of the proteins it needs for health. An added complication is that the amount of each EAA contained in the diet affects the absorption of all the other EAAs. This means that if just one of the EAA's is low then all the other EAAs will be absorbed at that lower rate, a case of the lowest common denominator really upsetting the apple cart.

A good way of understanding this is to think of protein absorption like a factory making cars. Each car needs four wheels, a steering wheel, two axles and one body to be made and be shipped out to the garages who are selling the cars to the public. The car factory needs to make ten cars a day to keep its finances healthy but everyday when the supplies are brought into the factory there are only ever thirty nine wheels. It doesn't matter what the workers do they can only make nine cars because they are always going to have one car which cannot be completed because it only has three wheels. Each day they are always one car short of their target. This is one less car to sell to a garage and one less car to keep their finances healthy so the company can run efficiently. Pretty soon over time the company starts to struggle not being able to run itself and finance more stock. Cumulatively the shortage of parts creates a shortage of cars which creates a shortage of finances and something has to give. It might be the laying off of workers. Maybe the tools to fit the cars together break and can't be mended. Whatever way you look at it the company can't remain healthy and a slow demise sets in. Now you can see why you should think differently about protein for your horse and give it your up most priority!

An interesting fact is that one bacteria cell has about 2 million proteins. Some muscle proteins are called titan proteins because they are made of almost 27,000 amino acids each! Next to water, proteins are the most abundant molecule in the body. NOW! Are you starting to see the enormity of the situation and why shortage of protein in the horse's diet is such a big issue if the greatest proportion of the diet, the grass hay and haylage eaten is low in protein and of a poor quality!

How can you tell if horses are short of protein?

From our experience many horses have access to poor quality pasture and poor quality hay or haylage. This is the norm in the testing we carry out through analysis of forage at Forageplus. Poor quality pasture, hay and haylage is poor in protein levels and quality.

The horse's body constantly breaks down protein from the process of living and needs a constant supply of new protein as the building material to repair itself. Movement such as galloping, jumping and collection required in horse sports such as eventing, dressage, racing, endurance or even just hacking round the block causes additional wear and tear. But where are the building blocks for repairing bones, ligaments, tendons and muscles coming from? Proteins are life! They are everything and if your horse does not get enough and their EAAs and reserves are used up then you will see sickness, lameness or even both.

If your horse's diet has minerals balanced to the grass, hay or haylage fed and you are still seeing niggling health issues then it is likely that protein levels need to be increased in the daily diet. Horses which can't get access to the right levels and right quality of protein year after year are likely to become protein deficient. This chronic deficiency is likely to manifest itself as poor top line, skin issues, poor hoof quality, white line disease and abscesses, lung issues, lameness, tendon and ligament weakness, pituitary dysfunction, digestive tract inflammation, metabolic dysfunction with a predisposition to be overweight. Whilst vets and owners are treating the symptoms of horse ill health no one is looking for the cause!

Another little discussed symptom is a ravenous appetite. Protein is so crucial that the body will keep the 'I must eat' switch fully on if it is not getting enough. Many forages don't contain enough protein even when consumed at enormous levels. So if your horse is always hungry consider upping food and substituting some of the forage for a high protein food or whey protein and see if you see a decrease in appetite. An interesting aside is that this works for humans too. You can only eat so much protein, such as steak, before you feel full because your body has hormonal mechanisms for detecting when enough protein has been consumed and switching the appetite off so you physically just can't eat anymore.

What should you feed for good quality protein for horses?

It all starts with forage. Since grass, hay or haylage is the greatest proportion of your horse's diet this is the most sensible and cost effective place to start. An average 500 kg horse will consume around 10kg of hay per day if allowed ad-lib access, on green and growing pasture this will convert to around 50 kg of grass, assuming a dry matter content of 20%. So a year of hay consumption will equate to a staggering 3.6 tonnes a year, grass consumption will equate to 18.25 tonnes!

So ignoring the forage component of a horse's diet and concentrating solely on the bucket feed each day is not sensible or cheap!



Since the forage proportion of the diet is going to be the primary source of protein it is critically important to know whether your hay or pasture is a reserve of poor or high quality protein. If you can this should be the best and greatest source of protein, ideally it should supply all the horse's protein needs.

Try not to get over consumed with the bucket feed straight away but become obsessed with the quality of forage your horse eats because that has the greatest impact on health. Feeding protein through forage is also the cheapest way to feed protein. If you see any of the signs discussed above then either have your hay tested or change your hay and understand that low protein for horses in forage might mean a bigger bucket feed.

If however you are unable to change the forage you feed your horse and it is low in protein and has poor quality, you can feed extra protein in the form of fibre feeds like alfalfa or beet pulp or a better quality forage chop. The inclusion of soya or copra or oats in the diet can also help. Whey protein is another way to boost protein and amino acids levels. Linseed gives good protein levels and replacing a percentage of the forage with feeds which have good protein levels at the same time as supplementing extra methionine, lysine and or essential amino acids in powder form can be very helpful.

It is also important to know the mineral levels in forage. If you balance mineral, vitamin and protein to the grass, hay or haylage eaten, feeding a bucket feed matched to balance to this forage, this often transforms horses in many different ways.

But what is the cause of poor quality protein for horses?

Unbalanced soil fertility is usually the reason for high levels of non-nitrate protein (NPN). All land needs to be looked after, applying either the wrong applications or fertilisers or not applying anything can result in deficiencies and excesses which then upset the mineral balance of the soil. This harms the delicate underground balance and eco-system and ultimately it damages our horses.






Many people in the horse world believe that if they apply no fertilisers to their land then it makes the land suitable for horses and 'organic'. They are fearful of applying anything to the land and so do nothing but this is as bad as applying the wrong thing.

Where horse owners are in charge the soil often becomes sick with over grazing and compaction which then means the grass grown is sick. Sick soil and sick grass result in sick horses, and NPN and poor quality protein is one result of this in forage. Equally, many hay producers are interested in cash crops. Applying NPK fertilisers without reference to the mineral balance of the soil might result in heavy crops which make money but the quality of that crop is highly compromised due to NPN and other imbalances.

Forage analyses which test for protein are really just tests for nitrogen. Crude protein is actually the amount of nitrogen found in plant tissue multiplied by a factor of 6.25. That's because on the average, all protein contains 16% nitrogen. This arbitrary calculation then has no bearing on quality because it is not measuring individual amino acids (this would, by the way be really expensive). However, if you also have a mineral analysis of your hay showing sulphur levels you can use this number to work out the nitrogen to sulphur ratio. This really should be a maximum of 10 parts nitrogen to one part sulphur. If the ratio is higher then you have a proportion of the protein which is not correctly formed, will be unavailable to the horse, and possibly be a NPN threat.

The picture on page 7 shows the values on both a nutritional and a full mineral analysis and we have ringed the figures used in red. Always choose the dry matter figures. The forage looks like it has good levels of protein, 10.3% (DM), but sadly much of this protein is NPN.

You can see that the nitrogen sulphur ratio in the forage is 15:1 which is unacceptable and means that what on first sight looks like excellent protein levels in the forage tested, actually is revealed to be poor in terms of quality. This is a very common problem in UK forages and is caused by poor mineral balance in the soil and over application of nitrogen to fertilise.

Antagonists			Analysis	Very Low	Lo
Lead	Pb	mg/kg	0.3		0.5
Iron	Fe	mg/kg	408		50
Aluminium	Al	mg/kg	94		70
Molybdenum	Mo	mg/kg			0.01
Sulphur	S	%	0.11		0.10

Digestible Energy (DE), Mcal/kg			1.72	
			%	g/kg
Crude Protein			8.1	80.7
Estimated Lysine			.28	2.8
Acid Detergent Fiber (ADF)			29.3	293.4
Neutral Detergent Fiber (NDF)			46.0	460.2
WSC (Water Sol. Carbs.)			12.1	120.9
ESC (Simple Sugars)			5.9	59.1
Starch			.3	3.4
Non Fiber Carbo. (NFC)			17.1	170.8

		(MJ/kg)	(MCal/kg)	S	N/S Rat
05	0.41	9.21	2.2	0.11%	15.0
		0.00			#DIV/0!
		0.00			#DIV/0!
		0.00			#DIV/0!
7	3.8	90.9			

To determine the ratio you need to find the nitrogen level in the protein figure. Do this by dividing crude protein by 6.25 then multiply by 10 and use this figure with the sulphur figure to determine the ratio.

While you are learning about N:S ratio take time to investigate William Albrecht Ph.D of the University of Missouri. If you can find his book 'Soil Fertility and Animal Health' you will start to realise that unbalanced soil fertility is the main culprit for imbalanced mineral ratios, high nitrates and NPN leading to sick forage, grass, haylage and hay which in turn creates sick

horses. Producing a forage crop which is nutritionally complete for your horse and looking after your land, is likely to improve the health of adult horses in many different ways and lead to you preventing problems in unborn future generations. For us it has meant an end to abscesses, better skin health, better tolerance to exercise, better muscle health, calmer behaviour and all round better health. We are still improving the soil in our pasture over a 5 year programme, but this has to be the key to long term health of our horses. Dr Albrecht points out, human's and animals are ultimately a soil crop. We thrive or fail according to the wealth of the soil.

Protein in horse diets

Will there always be enough in the total feed eaten?

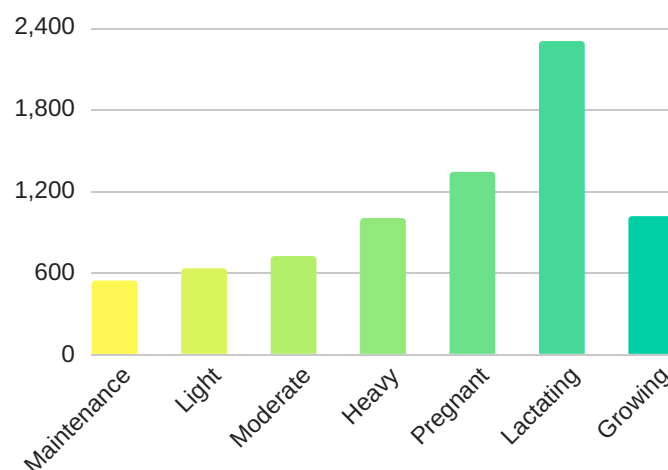
PROTEIN IN HORSE DIETS WILL THERE ALWAYS BE ENOUGH?

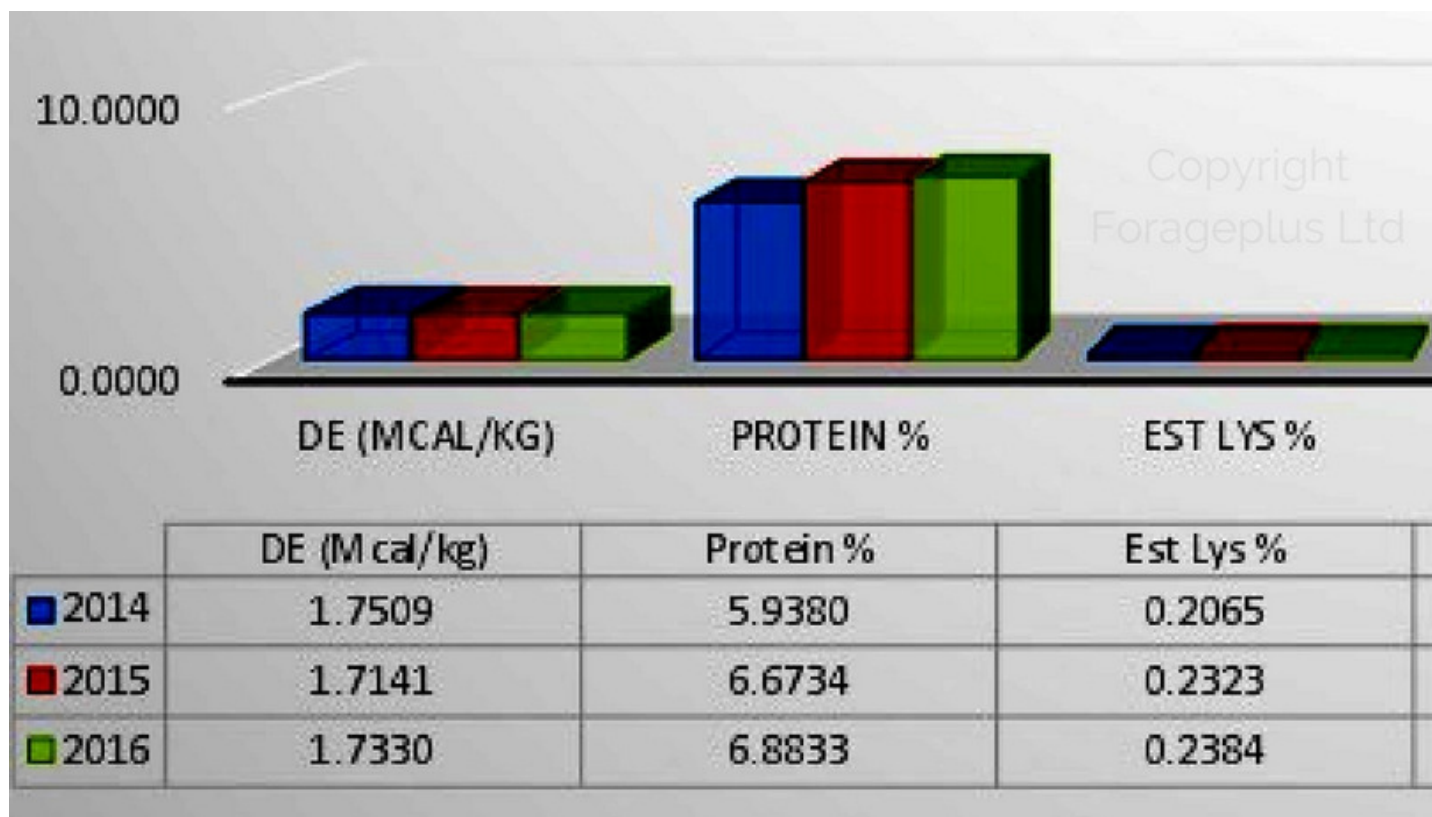
It is impossible to tell what the level of protein is in your horse grass, hay or haylage by just looking at it. Forage protein levels are affected by growing temperature, rainfall and nutrient levels in the soil. In addition the quality of the crude protein in forage can be affected by the way amino acids have formed in relation to levels of certain minerals in the soil.

Here in the UK through the hundreds of forage analysis we carry out each year we have found that amounts of protein in horse diets are often at both a poor level and of a poor quality. Many forages, particularly grass in spring, will cover basic and higher needs for protein but many samples of hay and haylage show poor protein amounts. Statistically the average is well below that

needed for an adult horse even at maintenance. Where the horse is a good doer, and that hay or haylage is restricted to control weight, then the picture is even worse with many of these horses being very deficient in protein.

The table below shows the amount of protein an average 500kg horse needs for all the levels of work, including those doing no exercise who are classified as being at maintenance. We have also included amounts for pregnant, lactating and growing horses so you can see the huge amounts needed by these classes of horse. Note that these amounts are minimum amounts as determined by the NRC - Nutrient Requirements for Horses 2007.





The graph above shows Forageplus™ statistical analysis of UK hay and haylage samples collected in 2014, 2015 and 2016. The percentages are based on 100% dry matter rather than as fed.

Now let's look at what these results mean when you calculate how much protein will be available to a 500kg horse eating 10kg of forage listed from each year. Dry matter has been calculated to be 85% which represents many hays here in the UK. Be aware however that dry matter content can vary so these amounts will vary depending on the dry matter figure, with lower dry matter figures resulting in lower protein amounts.

The table below shows that the average amount of protein in hay and haylage in the UK falls short of what is needed as a minimum daily amount for a 500kg horse.

Specifically if we take the 2016 level, which is the highest, then many horses will only have enough protein for life at maintenance, as soon as they start light work they will be short of even the minimum amount of protein needed each day if only fed forage as hay or haylage

Adequate amounts of protein in horse diets are vital to keep horses healthy, support muscle maintenance and development and many other important processes connected with supporting the health of skin and hooves and maintaining strong robust and resilient health.

You should also be aware of exactly how much protein will be available to each horse in each category and what the surplus and deficit will be on just forage and forage including 1 kg of a concentrate bucket feed of 10% protein fed per day. The table on the next page gives you these

Year	Percent of Protein	Protein Provided by 10kg of Hay (85% dry matter)
2014	5.9%	501.5 grams
2015	6.6%	561.0 grams
2016	6.8%	578.0 grams

figures for a 500 kg horse.

You can see now that by testing hay or haylage you can look at the protein in horse diets so that the levels are adequate for the age of your horse and the work level of your horse. Breeding horses and young horses need especially high levels of protein and supplying correct levels is crucial for healthy growth and development. Older horses also need higher levels of protein to maintain muscle mass as their digestion often becomes less efficient. So if you have any issues with hoof health, skin health, pot belly appearance, poor muscling and failure to thrive it is wise to find out how much protein is in horse diets each day. You should carry out analysis or assume that your horse is short and needs additional protein in the form of a higher quality forage or a high protein, high fibre bucket feed, each day, to replace some of the lower level hay or haylage fed.

Where a horse is on restricted forage, working at a moderate to heavy level, needing to maintain or recover

health, elderly, growing or breeding it is especially important to understand that protein from hay or haylage alone is very unlikely to provide enough available protein.

As well as protein level it is important to look at the quality of that protein. The quality of protein affects the range of amino acids available to horses. To be certain of maintaining the best horse health certain amino acids which are commonly low in all forage, grass, hay and haylage should always be supplemented each day

To be certain of enough protein being available to horses to maintain strong healthy keratin for optimum hoof, skin and coat quality and maintenance and development of healthy muscles you should consider carrying out a forage nutritional analysis of your hay or haylage. This is particularly important for the maintenance of breeding stock, young growing horses, large heavy boned horses, elderly horses and horses in heavy work such as racing, endurance, hunting or eventing.

Category of horse	Daily protein needs 500kg horse	Deficit or surplus of protein contained in 10 kg 6.8% protein hay	Deficit or surplus of protein contained in 10 kg 6.8% protein hay plus 1kg of 10% protein concentrate feed
Maintenance	540 grams	surplus 38 grams	surplus 138 grams
Light Work	630 grams	deficit 52 grams	surplus 48 grams
Moderate Work	720 grams	deficit 142 grams	deficit 42 grams
Heavy Work	1000 grams	deficit 422 grams	deficit 322 grams
Preganant Mare	1340 grams	deficit 762 grams	deficit 662 grams
Lactating Mare	2303 grams	deficit 1725 grams	deficit 1625 grams
Growing Young Horse	1014 grams	deficit 436 grams	deficit 336 grams

PROTEIN FOR HORSES PRONE TO LAMINITIS

WILL YOUR HORSE ALWAYS HAVE ENOUGH IN THE DIET?

An article from Forgeplus

Have you thought about protein levels for horses prone to laminitis? A client who has a laminitis prone horse contacted us to check that the sugar levels in hay, fed to her horse, were low enough to be suitable without soaking.

The hay was tested using a nutritional analysis hay test for horses (see page 12). The sugar levels (ESC and starch combined) were borderline at just under 10% so we advised her to soak if her horse was not a well controlled laminitic horse. But something else caught our eye about the protein levels. The levels were low but this is a common occurrence in the reports which we see here at Forgeplus.

On average we see hay and haylage with protein levels around the 5% – 6% mark. These averages come from

statistical analysis of all yearly forage results using multivariate analysis. This enables us to help customers feed their horses accurately by starting with the grass, hay and haylage eaten. You can remind yourself of these averages by looking at the graph on page 9.

A lower protein level in hay might not be a problem where you have a horse, at maintenance, which is not overweight or not prone to weight gain eating ad-lib hay. However where you have a good doer type of horse, protein levels may not be sufficient. Where a horse needs both forage and bucket feed limiting to control weight gain, you might find that these horses don't even have the minimum levels of protein suggested by the Nutrient Requirements for Horses 2007 NRC tables. Without correct levels of protein it will be difficult for that horse to maintain a good level of health.



Protein for Horses Prone to Laminitis
Will your horse always have enough in the diet?

Horse Work Level (450kg Bodyweight)	DE (MJ/Kg) needed to maintain bodyweight	Amount of forage to be fed (Kg)
Maintenance Level	62.9	8.1
Light Level	75.4	9.7
Moderate Level	87.8	11.3
Heavy Level	100.2	12.9

Protein is crucial for all life and without good levels of good quality protein in the diet, horses may struggle to maintain muscle mass and support and maintain good health in many different ways. Good doer horses are vulnerable to low protein due to calorie restriction.

This particular hay nutritional analysis was carried out for a good doer horse, but the customer was managing the weight well. The horse weighed 450 kg. The table on the next page is a guide to how much this horse, fed this hay, had to eat to provide enough calories for the different work levels. This is based on the hay tested having DE level of 8.58 MJ/kg, which is a good calorific value.

Maintaining body weight with this hay was relatively easy but supplying enough protein was a different matter.

If you look at the Forageplus Nutritional Report, protein in the hay is reported at 5.1%. This amount is well below the ideal of 8% for forage fed to all horses. This means that a 450kg horse will be short of protein when fed the amount needed to maintain weight. This horse will need feeding an additional protein form other than this forage to boost protein levels when calorie levels are correct.

The following information shows you just how much protein a 450 kg horse needs and how much it receives


Sample Type:

Hay

Sample Received:

21.09.2016

Order Number:



Nutritional Analysis Report

Dry Matter	Analysis	Units
Dry Matter	90.2	%
Digestible Energy	Mcal/kg	MJ/kg
Digestible Energy	2.05	8.58
Nutritional Analysis	%	g/kg
Crude Protein	5.1	51.0
Estimated Lysine	0.2	1.8
Acid Detergent Fibre (ADF)	39.7	397.0
Neutral Detergent Fibre (NDF)	66.0	660.0
Water Soluble carbohydrates (WSC)	17.9	179.0
Ethanol Soluble Carbohydrates (ESC)	9.4	94.0
Starch	1.2	12.0
Non-Fibre Carbohydrates (NFC)	19.7	197.0
Nitrate Analysis	Units	
%Nitrate	0 %	
PPM Nitrate-Nitrogen	0 ppm	
Nitrogen / Sulphur Ratio		
Nitrogen / Sulphur Ratio		

For desirable levels please see the text below and on page 2.

Nitrate levels will only be reported if you have had nitrates tested.

Nitrogen/Suphur ratio will only be reported if you have also had a full mineral analysis

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Nitrate levels will only be reported if you have had nitrates tested.

Nitrogen/Sulphur ratio will only be reported if you have also had a full mineral analysis



Nutritional
Analysis
Hay
Report
Forageplus

when fed the weight of this hay for each work level. Red text is the protein level provided by the hay. Green text is the NRC (Nutrient Requirements for Horses 2007) minimum daily protein levels for a horse weighing 450kg:

Maintenance

Feeding 8.1kg: 372 grams 486 grams

The horse will be 113 grams short of minimum levels.

Light Work

Feeding 9.7kg: 446.2 grams 567 grams

The horse will be 120.8 grams short of minimum levels.

Moderate Work

Feeding 11.3kg: 519.8 grams 648 grams

The horse will be 128.2 grams short of minimum levels.

Heavy Work

Feeding 12.9kg: 593.4 grams 900 grams

The horse will be 306.6 grams short of minimum levels.

Remember that this article is only about good doer horses, however you can see that all horses would be affected by the low protein in this hay.

So what is the best way to feed extra protein to horses?

With a horse prone to laminitis you are more restricted than with other horses. However we suggest that some of the hay is substituted for a higher protein bucket feed. The amount you need to substitute can be as great as you like if you use fibre based feeds, with some grass nuts being able to be used as total hay replacers as long as the ESC sugar and starch total is below 10%. You could choose a higher protein grass or alfalfa nut, beet pulp or a small amount of micronised linseed which will be safe for a pony prone to laminitis. You need obviously to be very careful about the feed you choose that it is suitable for a horse prone to laminitis with sugar and starch below 10%. You could also use whey protein to top up levels

We will assume vitamins and minerals are being fed matched to that needed to balance the hay or grass eaten. This could be matched to the forage fed through a

full mineral analysis or levels established by statistical analysis such as the ones contained within the Forageplus 'forage focused'™ balancers.

With the vitamins and minerals covered then you would need the following to maintain calorie (DE) levels to maintain weight but also boost protein. Understand that some of the hay must be substituted with a bucket feed to boost protein levels but calculated to keep calories at the right level. Below are examples of what would be needed for a horse in maintenance or light work using the hay tested by the customer.

Maintenance

7 kg hay

600 grams unmollased beet pulp or Speedi-beet (dry weight, rinse through before soaking and then again after soaking using a large sieve across a bucket).

250 grams micronised linseed

If you want to add a handful of chop or high fibre cubes for palatability at a small amount this is fine.

This will give you a protein level of 463.5 grams against a needed protein level of 486 grams. The level is nearly there but adding 50 grams of whey protein into the bucket feed as well will top it up to minimum levels.

Light Work

8 kg hay

700 grams unmollased beet pulp or Speedi-beet (dry weight, rinse through before soaking and then again after soaking using a large sieve across a bucket).

350 grams micronised linseed

If you want to add a handful of chop or high fibre cubes for palatability at a small amount this is fine.

This will give you a protein level of 552.1 grams against a needed protein level of 567 grams. The level is nearly there but adding 50 grams of whey protein into the bucket feed as well will top it up to minimum levels.

If you don't have an analysis then we would suggest

you still assume a shortage of protein as this is what the average statistics from our nutritional reports suggest. It might therefore be beneficial to substitute a higher protein bucket feed in place of the hay; feeding 1 kg of beet pulp in place of 1.5 kg of hay; 1 kg of grass nuts for 1 kg of your hay; and weighing your horse each week to check that weight is being maintained at the correct level. Always feed micronised linseed at 42 grams per 220kg of bodyweight if your horse is not eating on green and growing spring or summer grass to supply essential omega 3 fat which is always deficient in winter grass and hay and haylage.

If you don't know the calorie/energy (DE) level of your forage then you can calculate the amount to be fed to maintain weight at 2% of body weight or 1.5% the body weight if the horse needs to lose weight. It is important that weight loss is slow so never go below 1.5%. Fast weight loss can fuel laminitis.

Another approach to weight loss is to decide how much weight you want your horse to lose and calculate

2% of that number. You can then choose either 1.5% of present bodyweight or 2% of the future bodyweight you want the horse to be and feed whichever gives you the greatest feed amount.

What you should never do is feed a horse or pony prone to laminitis less than 1.5% of bodyweight as this could lead to weight loss at speed which fuels further laminitis.

We hope this helps horse owners understand the implications of understanding just how forage protein levels can affect all horses, especially good doers and horses prone to laminitis. A simple nutritional analysis of forage can help you manage your horse's diets so they are healthy, at the right weight and those prone to laminitis are managed correctly.

If you have any questions about any of the articles in this issue of Forageplus Horse Talk then please contact us through our website at www.forageplus.com. We are always happy to advise and talk to horse owners and have extensive knowledge of all horses.

