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# LUCERNE

Lucerne can be polarising as a feed ingredient, with some horse carers placing a high value on it whereas others work to avoid it completely. So what is Lucerne and how can it be used successfully?

### Lucerne – What is it?

Lucerne hay is made from the Lucerne plant (*Medicago sativa*), a temperate perennial plant which originated in the Middle East. Lucerne is a leguminous plant species, meaning that it belongs to the legume family of plants, that produce seed pods and have nodules on their roots that can take inert nitrogen from the atmosphere and convert it to organic compounds that are available to the plant. As a result of this process, legumes are often used to enrich soils.

### The Nutrient Profile of Lucerne

Lucerne hay commonly is higher in protein and energy than traditional grass hays like teff and eragrostis. Lucerne also contains high concentrations of calcium and magnesium and, when fresh, also vitamin A and E. Lucerne is however typically low in phosphorous and depending on where it was grown, contains varying concentrations of other macro and micro minerals, which can create imbalances in the diet if additional concentrates are not fed.

The biggest variable affecting nutrient content within a type of hay is the stage of maturity at harvest. Very early cut hay often has a soft texture, is very leafy, and has a high nutrient density and palatability. These grasses are good for those horses with a higher nutrient need. Mid maturity hays are the most suitable for the average horse as they contain a good combination of leaf and stems while still being

palatable. Plants harvested in late maturity will have coarse, thick stems and less leaf. The older the plant at the time of cutting, the lower the nutrient value and the palatability, meaning fussy eaters may not take well to this cut. However, this type of hay can be a more desirable feed source for horses with lower nutrient requirements because the horses can eat more hay to satisfy their appetites without becoming overweight.

Profile	Lucerne Hay	Grass Hay	Oaten Oat Hay
Digestible Energy (MJ/kg)	9.37	7.5	7.32
Crude Protein (g/kg)	180	95	86
Calcium (g/kg)	12.8	5.0	2.9
Phosphorous (g/kg)	1.9	2.2	2.3
Magnesium (g/kg)	3.1	1.9	1.5

### Imbalance in the Phosphorous to Calcium Ratio.

Calcium is essential in the development of a strong and healthy bone structure with daily requirements increasing substantially in pregnant mares, and young and growing horses (especially if in training also). Calcium is also extremely important in its dissolved

form for processes such as muscle contraction, blood clotting and as a messenger molecule in cells within the body.

Phosphorus is an essential mineral for horses, making up 14-17% of the equine skeleton. It plays an important role in enzyme systems, is an integral component of genetic material, and helps produce energy in the form of adenosine triphosphate (ATP).

However, what is significantly more important is the ratio of calcium to phosphorus in the diet rather than just the inclusion of these components. Calcium and phosphorus are strongly linked in their functions in the body which is why they need to be provided in the correct ratio. The horse's diet should always have more calcium than phosphorus, and it is best to keep the ratio of the two minerals within a range of 1.5:1 to 3:1 (calcium: phosphorus).

In general, the calcium content of Lucerne is in excess of the requirement of most horses, but if fed in correct quantities for life stage it will not have an adverse effect. Therefore, it is advised that no more than 50% of the horses total daily roughage portion be Lucerne. Excesses are not only strenuous on the body but can impact other conditions especially in the performance horse.

Calcium is required in large amounts for muscle contractions. As the duration and intensity of exercise increases the plasma calcium levels gradually fall. The body then calls upon hormones to signal more calcium to be mobilized from its storage depots. However, if an excess of calcium is always supplied within the diet then the body becomes used to this ease of access and the level of hormone signal produced reduces, meaning that not enough calcium is moved. As a result, plasma calcium levels may continue to fall, increasing the likelihood of metabolic problems such as Tying Up and Thumps.

However, in situations such as when horses are maintained on kikuyu pastures, this high level of calcium can be valuable. Kikuyu contains oxalates which bind calcium and reduce its digestibility, thus creating potential for a calcium deficiency that can lead to bone weakness and nutritional secondary hyperparathyroidism (also known as "big head"). Providing Lucerne in these situations can help to correct calcium levels.

### Lucerne and Quality Protein

Amino acids are responsible for many processes in the horse's body. Amino acids are involved in the synthesis and the release of hormones, the synthesis of neurotransmitters and enzymes, and the regulation of sleep, appetite, and blood pressure, to name a few. Most importantly, amino acids are essential for the formation and repair of muscle tissue and other soft tissues throughout the body. Growing horses, which are 'building' new tissues as they mature, and horses used for breeding, have higher protein requirements than mature horses being used for pleasure or performance.

Amino acids can be divided into two groups:

- **Non-essential** – these are amino acids that the horse can synthesize himself.
- **Essential** – these are the amino acids that must be obtained from the horses feed.

A good quality protein source such as Lucerne, provides enough of these essential amino acids, particularly the amino acid lysine. Lysine is often called the "first limiting" amino acid—meaning that if insufficient quantities of lysine are present, then the horse's body will have difficulty using any of the other amino acids available.

### Lucerne Cubes and Chaffs

With the nutrient variability inherent in hay, it can sometimes be useful to consider forage alternatives. In this instance these include Lucerne cubes and chaffs. These are ideal as they are produced to specific nutrient profiles and can therefore ensure a consistent level of nutrients, which is vital for high performance and stud horses.

Forage alternatives can help stretch supplies of hay. Having a small amount in the diet on a regular basis enables you to increase fibre levels quickly without having to introduce something new, and so keep this in mind before going into seasons where hay may become an issue.

When choosing a forage alternative be sure to look at the crude fibre content. Cubes that are made with high levels of top-quality hay will have a crude fibre content within the 20-35% range. Another good tell on forage quality is that in good quality chaff there should be a good mix of leaves and stems. The leaves have a higher level of digestible nutrients than the thick stems and thus a larger leaf content is desirable so look carefully at how your chosen chaff is made up.

In general, it is preferable that most of the horse's daily forage comes from long stemmed hay. Long stemmed forage provides the horse with much needed chew time. Chew time not only mimics the natural feeding behaviour of the horse, but it also ensures adequate saliva is produced (horses only produce saliva when they chew unlike humans). Saliva helps to lubricate food swallowed and helps to buffer the stomach acid. The more the horse chews the more saliva is produced and the more acid can be buffered which is ideal for those struggling with gastric ulcers.

Although research is still lacking it is thought that long stemmed hay can stimulate the hindgut better than short stemmed hay helping to reduce the risk of colic. Therefore, when selecting a forage alternative it is best to choose one with long coarsely chopped hay rather than fine powders and combining it with some longer stemmed roughage. However, there are situations where long stemmed forage just cannot be utilised. For example, horses with loose, damaged or lost teeth could mean that the horse struggles to chew long stemmed forage such as hay. In this situation cubes and pellets are easier. This is because the fibre length in these are smaller than hay and thus easier to consume. They also lend themselves to soaking so that the horse can simply slurp it up and swallow.

It is common for some high-performance horses to have a reduced appetite for larger volume ingredients such as hay during competitions, leading to a lower consumption of hay than at home. Thus, a forage alternative such as a cube or chaff may be an ideal way of ensuring adequate fibre intake for the performance horse.

Lucerne cubes and chaffs often have the advantage that they are higher in energy/calories making them ideal for horses that struggle





with weight gain as well as performance horses susceptible to conditions such as Tying up or Gastric ulcers. The higher energy/calorie value means that you can replace some of the starch from the diet helping keep conditions at bay without affecting performance or condition.

There is also the added advantage that cubes and chaffs are easy to store and transport which can be useful for horses travelling a lot.

#### Lucerne and Hotness

Many people feel that Lucerne makes their horse hot due to being high in protein however that is not the case. Protein can be used as an energy source, but this is metabolically expensive and a largely inefficient process and so generally the body will use other sources of energy first such as carbohydrates, fats and fibre.

The key thing to note is that if you add extra Lucerne, you are also adding extra energy/calories. If your horse doesn't require the extra energy, he could become "fizzy" or "hot" or even put on too much weight. It is thus the higher energy in Lucerne affecting the horse this way, not the protein itself. If this is taken into consideration carefully, then the amount of Lucerne and concentrates fed can be adjusted to ensure that the benefits of Lucerne are received without affecting the horse's temperament.

#### Lucerne and Gastric Ulcers

Lucerne hay has been shown in multiple studies to be effective in reducing the severity of ulcers in horses by providing superior gastric acid buffering capacity compared to other forages.

The reason for this is that Lucerne contains higher levels of protein and calcium, both of which buffer gastric acid. Also, the cell wall contains certain indigestible compounds such as lignin that gives it a greater buffering capacity than other grasses.

It is recommended that horses are fed a small amount of Lucerne hay before an exercise to put a fibre "mat" over the acidic stomach contents and reduce acid splash, as well as providing Lucerne hay before each meal to provide an increase in buffering capacity before a concentrate meal is given.

#### Lucerne and Sugar

Perhaps rather surprising for most is that Lucerne contains little fructan sugar and therefore can be safe to feed to sensitive horses that struggle with conditions such as Cushing's, Insulin resistance and Laminitis.

Although the sugar content is not as high as in some grass hays, keep in mind that it does have a high calorie content, making it unsuitable for horses that are over-weight and suffering from the above conditions.

Mid-season cut Lucerne hay generally has a lower content of NSC (non-structural carbohydrates) and sugar making it suitable for those in need of a low NSC diet. First cut Lucerne grass mixes are much riskier, as the grass is often still in its growing stage when the Lucerne is in its early bloom stage is cut for hay.

#### Conclusion

Lucerne is a valuable feedstuff for horses capable of providing them with energy, high quality protein and calcium. Lucerne hay must be used correctly in the diet, however, to realise its full benefits.

## TESTIMONIALS

Dear Epol

Thank you for a great new product.

Everyone in our herd loves the new Epol Essential Roughage cube.

Its most certainly going to be a great addition to our yard.

Leslie Lunn

