A good calming supplement can make quite a dramatic improvement to the behaviour of anxious horses but what ingredients are having this effect and how do they work?

Natural ingredients that might be found in effective calmers include tryptophan and certain B vitamins, most often B1 (thiamine), B3 (niacin) and B6 (pyridoxine). Certain forms of clay can also be found as an ingredient, sometimes the only one.

But the commonest nutrient in single-ingredient calmers at the moment is magnesium. What it is to be in fashion!

Finally there is a strong case to be made for the inclusion of yeast products in calming supplements as they have been scientifically proven to have a marked effect on the gut environment, which appears to affect temperament in certain horses.

Do these various ingredients all work in the same way or not? If they do perhaps only one is needed in a calming supplement, but if they act in different ways it could make sense to include them all, as not all horses are anxious or ‘fizzy’ for the same reason. Indeed many individual horses may be anxious or ‘fizzy’ for more than one reason.

Tryptophan earns its place in calming supplements because it is a precursor of serotonin (5HT). This means it is a building-block from which serotonin can be manufactured in the brain.

Serotonin, which is a neurotransmitter, acts in the brain to reduce anxiety and promotes a mood of happiness, concentration, calm and relaxation. So why not just feed serotonin? Because it cannot pass through the blood-brain barrier.

There is an intermediary compound produced in the manufacture of serotonin from tryptophan called 5HTP, which does pass through the blood-brain barrier so would appear at first glance to have potential as an ingredient in a calming supplement. Unfortunately it can irritate intestinal linings when fed at effective levels, causing unpleasant side effects, whereas feeding tryptophan at effective levels does not.

Tryptophan has been proven to improve mood by boosting serotonin levels in the brain but care must be taken to administer it correctly for two reasons.

Firstly tryptophan is an amino acid. Amino acids are the building blocks of proteins. It might be assumed therefore that to calm a horse all one would need to do is feed a protein source high in tryptophan. However this does not work because tryptophan competes with five other amino acids to cross the blood-brain barrier. This explains why those scientists who thought that the reason people felt sleepy after Christmas dinner was because turkey meat is high in tryptophan were wrong! So to be effective tryptophan should be given in a supplement containing none of the competing amino acids.

Secondly the level of tryptophan given
must be correct, too little will not have a significant effect and too much will actually promote tryptophan breakdown in the liver.

**Vitamin B6**, often referred to as pyridoxine, helps to catalyse (it is a co-enzyme) the conversion of 5HTP to serotonin and therefore has a potential role to play in calming horses. Although we would expect a contented horse on a high-forage diet to obtain sufficient B6 from bacterial production in the hindgut, a stressed horse, or one on a low-forage diet, could have compromised production and therefore respond to supplemental supplies, a theory supported by anecdotal evidence.

**Niacin**, occasionally referred to as vitamin B3, justifies its inclusion in a calming supplement for three reasons. The first might seem a ‘backwards’ reason but it is correct thinking nonetheless. It is that tryptophan is used to make niacin, but it is a very inefficient process using a good deal of tryptophan to make not very much niacin. Thus by adding niacin directly in a supplement, the tryptophan present is ‘spared’ and therefore more is free to form serotonin and help to calm the horse.

Secondly niacin is a co-enzyme for the reaction that converts tryptophan to 5HTP and therefore it promotes the production of serotonin in the brain.

Thirdly niacin inhibits the enzyme that breaks down tryptophan in the liver and therefore it again, albeit indirectly, promotes the production of serotonin in the brain.

The availability of niacin to the horse from bacterial production in the hindgut is subject to the same influences described for vitamin B6.

**Vitamin B1**, commonly referred to as thiamine, is probably best known by horse owners because eating bracken is potentially fatal to horses. Bracken
contains thaminase, which destroys thiamine.

Thiamine is a candidate for inclusion in calming supplements mainly because it plays a direct role in transmission of nervous impulses. There is considerable anecdotal evidence for its effectiveness in reducing anxiety in horses. It has been demonstrated to improve concentration and reduce excitability in humans and the same appears to apply in horses.

The availability of thiamine to the horse from bacterial production in the hindgut is subject to the same influences described for vitamin B6.

Other B vitamins may have a case for inclusion in calming supplements; in particular a case could be made for folic acid, vitamin B12 and biotin. However all the B group vitamins have a myriad of functions and it is important to put any specific role into an overall context.

Clay can be justified as an ingredient for a purely physical effect. It has a huge surface area and absorbs or ‘mops up’ toxins in the horse’s gut, in theory reducing potential excess acidity in the hindgut environment, particularly when created by large cereal-based feeds. Bentonite clay was once a popular ingredient but there is a risk of dioxin contamination so sepiolite clay, which does not contain dioxins, is now considered preferable by leading nutritionists.

Clay has been used as a the sole ingredient in some calmers in the past and the odd product remains today, but as with many fashionable products it has, for the most part, been superseded by more sophisticated supplements.

Magnesium is currently a fashionable ingredient in calmers and indeed it is the only ingredient in some calmers. Whether it is advisable to rely on just one ingredient when trying to correct over-anxiety is arguable.

The main role attributed to magnesium when trying to justify its inclusion in a calming supplement is that it has an important function in the transmission of nervous impulses, as does calcium. However the problem with this argument is that most horses in the UK receive a diet that contains more than adequate magnesium to meet all their needs. Some horses do have a diet deficient in magnesium however, and others may not metabolise it efficiently and therefore it is wise to include it as an ingredient in calming products. To rely on it as the sole ingredient however, is in my opinion, less likely to succeed than to use a product containing a wider variety of approaches to solving the problem.

Yeast has been scientifically proven to improve the hindgut environment of horses, providing it is a specially selected strain. Dr Derek Cuddeford at the Royal (Dick) School of Veterinary Studies, Edinburgh University, has for example shown that one particular strain of live yeast can reduce excess acidity in equine caecal contents. At least two other strains of pure yeast have been shown to have a similar effect; however commoner yeasts e.g. brewer’s yeast, would not succeed.

It is thought in some intelligent quarters, with considerable justification but no scientific proof, that excess acidity in the hind gut can affect a horse’s temperament adversely. ‘Acid guts’ would seem a reasonable excuse for feeling grumpy! A specific pure strain of yeast, known to help reduce hindgut acidity, would therefore justify inclusion in a calmer.

MOS, which is an acronym for mannan oligosaccharides, are the dried cell walls of yeast, and because of their large, ‘spikey’ surface area they bond to pathogenic bacteria in the horse’s intestines, taking them out in the faeces. By leaving the fibre-digesting bacteria free to multiply, MOS indirectly helps to maintain a correct hindgut environment and therefore justifies inclusion in calming products.

All the ingredients described are natural and are permitted for use under HRA/FEI rules. Most of them interact with each other and can affect temperament in a complex and sophisticated way that includes feedback mechanisms, so considerable skill and experience is necessary to formulate a successful calming supplement.

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