RIDLEY FIBRE-BEET PRODUCT REVIEW

Presentation Script

FIBRE-BEET AS A RECOVERY FEED FOR HORSES RECOVERING FROM GASTRIC ULCERS

COMPANY SPONSORING PROJECT	RIDLEY AGRIPRODUCTS
PRODUCT BEING USED	FIBRE-BEET
MANUFACTURER OF PRODUCT	BRITISH HORSE FEEDS

Slide 1.

Hello, and thank you for attending this presentation on Feed for Gastric Ulcers and Condition, though I am concentrating on the topic of ulceration.

Slide 2.

My name is Tom Shurlock & I have been working as a nutritionist for nearly 40 years, I'Anson's being a client for over 25 years. In that time, we have researched the properties of Speedi-Beet & Fibre-Beet, particularly in their feeding alongside conditions such as laminitis and gastric ulcers.

Slide 3.

The basis of these diets are sugar beets; once harvested they are cleaned, sliced and the sugar is removed with hot water. The product that remains is less than 5% sugar, zero starch and a fibre profile rich in hemicelluloses and soluble fibres, mainly pectins

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Following the success of Speedi-Beet, we developed Fibre-Beet as a conditioning feed. We knew that Speedi-Beet played a role in EGUS, so we decided to look at the whole issue of gastric ulcers from the nutritionist's point of view.

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Unlike those animals that tend to eat in discreet meals (Dogs, humans), the horse produces a constant flow of gastric acid from parietal cells mediated by carbonic anhydrase and responding to neuroendocrine stimuli, including histamine, gastrin, acetylcholine & vagal stimulation. Insulin sensitivity also appears to be involved.

This has the potential to reduce the pH of the stomach fluid to less than 4. This will encourage a shift in the microbial population and, coupled with a feed with high starch content, release VFA, lactic acid and so further drive down the pH. This increases microbes such as Heliobacter that have the potential to penetrate the stomach wall, especially in situations where the mucus lining is compromised.

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So, we have a constant flow of acid into the stomach; if not contained this can cause acid burns at specific sites: The unprotected areas of the stomach, where mucus is thin or absent, particularly the squamous region. But also, those areas where the mucus layer is compromised in parts of the glandular region.

But when it comes to the mucus layer, we know that dietary pectins can reinforce the inherent production. At a pH range of 4-5, and in the presence of surfactants or emulsifiers, uronic based pectins can bind to, and extend the mucus layer in the stomach. Interestingly, these same pectins can stimulate the release of endogenous mucoids in the small intestine, helping support the barrier function of the subsequent microbiome.

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So, we have a scenario where there are two potential pathways to ulcerification; on one hand we have unprotected surfaces exposed to direct acid burn and, on the other, the generation of an environment that encourages acidophilic microbial expansion and impact of their end products and invasive properties across the stomach wall.

These factors can be further exacerbated by a number of other factors:

Stress (read slide)

Exercise - withdrawal of feed prior to exercise means an empty stomach so, in essence, free acid is sloshing about. This is compounded by the action of exercise itself, causing the stomach to contract and expand, forcing the acid up into the unprotected squamous area; the result being acid burns.

Also feeding:

The disruption of feeding, as above affects free acid, whilst feeding high starch feeds can be counterproductive. Not only are poor at binding up the acid, they act as a substrate for acidophilic bacteria whose end products – the volatile fatty acids and lactic acid further drive down pH. Amongst these microbes are pathogens such as Heliobacter that are capable of invading stomach wall tissue leading to infection, oxidation, inflammation and subsequent ulceration.

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Slide 8.

However, there are nutritional actions that we can use to help the horse minimise the previously mentioned impacts.
Firstly, we can ensure that feed has sufficient inherent moisture, and by inherent, I mean moisture that is present in the matrix of the feedstuff, rather than a bit of damp hay! Moist feed enables the action of chewing to stimulate saliva and impregnate it with natural buffers such as sodium bicarbonate, as well as natural bactericides such as lysosome. Chewing also helps rupture cell walls allowing subsequent access to moisture – and acid!
Secondly, we reduce starch content – low acid binding means stomach acid is not greatly absorbed into cereals, whilst it acts as food for acid producing bacteria. Restricting their inclusions helps lift pH to acceptable level, which are in the region of pH 4-5. Conversely, we can increase the acid binding capacity of feed by the use of a high fibre diet. Disrupted (chewed or micronized) cell wall material allows the ingress, not only of enzymes and moisture, but also acid binding it into the matrix which has the added benefit of allowing beneficial bacteria to start breaking down nutrients. As you can see the acid binding capacity of beet and legumes are high compared to cereals and this acts as a great buffer to the acidity of the stomach, which we can demonstrate in a bit.
Finally, we can try and reinforce the stomach mucosa; as previously mentioned [pectins at the correct acidity and in the presence of surfactants will attach to the mucal coat, deepening and extending it.
Can we, do it?

Slide 9.

Well, to quote Barack Obama or, more accurately Bob the Builder, yes, we can. And this brings us to Fibre-Beet and its role in gastric support.

Slide 10.

So, what is Fibre-Beet? As I mentioned earlier it was derived as a complementary conditioning feed. In line with the philosophy of British Horse Feeds, it was designed to be a low starch/sugar product, but also one that had a specific fibre profile. This profile has the benefits of high effective degradability, an inherent prebiotic role – beet pectins have been shown to improve the ED of other fibre sources, and in the case of alfalfa fibre and increase of 25% has been recorded, and a very good volatile fatty acid profile.
And, when looking more specifically at the components we characterised additional properties.

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Fibre-Beet has 3 major ingredients, Speedi-Beet, Lucerne/alfalfa and oat fibre.

Slide 12.

The major ingredient is Speedi-Beet, an infra-red treated beet pulp.
Beet pulp has high levels of the soluble fibre pectin, mainly arranged around uronic acid as previously stated this fibre is central to the role of Fibre-Beet in gastric support. Beet pulp has a reasonable acid binding capacity – helping maintain stomach acidity at reasonable levels. It also has the nutritional benefits of a good VFA profile, and a prebiotic effect.

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The hydrothermal treatment of beet pulp, in its conversion to Speedi-Beet, causes disruption of cell wall material.

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This allows ingress to the cell contents allowing access to endogenous enzymes, fibre fermenting bacteria and gastric secretions. In short, this disruption increases the overall digestibility of the product.

Slide 15.

The second component is lucerne, or alfalfa. As well as being a palatable product – and we have data on the palatability of Fibre-Beet in veteran horses – it has a high acid binding capacity, which will help maintain an optimum stomach acidity. It also benefits from a good amino acid and fibre profile; the former has the potential to release bioactive peptides – antioxidants that support gastric health, whilst the latter can optimise gut membrane condition. As previously mentioned, its interaction with beet fibre is beneficial.

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And oat fibre. Most importantly for gastric support oat fibre is an extremely rich source of surfactants, including polar lipids & galactolipids. Nutritionally it enhances nitrogen digestibility, immunomodulation and optimises the microbiotica. It is also a good source of tocotrienols – a form of Vitamin E – powerful antioxidants having a positive effect on gut condition.

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Slide 17.

To date this presentation has looked, from a nutritional point of view, at causes of gastric ulcers, and what can both exacerbate and also mitigate the issue. Into this we have Fibre-Beet where the properties of the individual components and the combination of pectins and surfactants can help line the stomach.

So, what data do we have to support this? Well, here are two trials, an in vitro simulation in the stomach and in vivo scoping of ex-racehorses.

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The first trial was conducted at the University of Glasgow, Faculty of Veterinary Medicine. Using their in vitro stomach model, mimicking the process from chewing through the progress along the oesophagus to the glandular region of the stomach, we can watch the development of the acidity over time.

Compared to chopped hay, whose pH drops to a value of ~3.3, Fibre-Beet maintains a value of 4.25 which is well within the optimal range. That is, a meal of Fibre-Beet can bind stomach acid, ensuring an optimal environment. It is also known that acid binding of lucerne can last for up to 6 hours, so regular feeding can help maintain normality.

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The second trial was an investigation of the level of ulceration of horses. New Beginnings is a charity that rehomes racehorses. As we would expect these animals are particularly prone to gastric ulcers, their lifestyle maybe ticking all the boxes of factors increasing risk!

Animals coming in are turned out onto grazing for a period prior to assessment and also receive a branded high fibre horse nut.

Individual horses were scoped by a specialist vet who reported on the condition of the animal's stomach and, if needed prescribed omeprazole (this happened in one incidence for a minimum period before going on trial).

The horses were then introduced to Fibre-Beet, twice a day in discreet meals. At intervals they were rescoped; the results were reported with assessments of the three areas, the greater curvature, the lesser curvature and the glandular mucosa.

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A summary of results is shown on this slide. For every horse scoped (we trialled horses), there was an improvement. Even the horse that needed omeprazole, due to the poor condition and ulceration of the glandular area, improved further after the initial treatment.

As you can see there was a vast improvement in ulcer scores, and the trend at the end of the trial was that further improvement in horses still afflicted was likely. In short, by adding Fibre-Beet to the diet, improvements in ulcer score were observed.

Slide 21.

The scoping of the horses were reported by the same specialist vet, and ulcer scores, pictures and final report are all her work. BHF has simply taken their data and summarised. Actual assessments and descriptions, as in this slide, are from the reports.

It may be argued that the work undertaken is not a controlled, statistically conducted trial, and this would be difficult to achieve. However, BHF is in discussion with RVC to repeat this trial in more carefully controlled conditions. We are confident the same results will be achieved.

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In terms of replicating our work, I would recommend these levels. We do have general data to show the benefits of the dietary components as an enteral feed where maybe colic, surgery or extreme ulceration has preceded recovery, but for general or suspected gastric ulcers a daily addition to the normal diet (preferably a high fibre diet), will be sufficient.

Slide 23.

So, finally in summary, the two-fold action of Fibre-Beet both as an acid binder and as a supplement to the stomach mucus lining, should help support the correct feeding of the horse to help reduce the incidence and severity of ulceration.

Slide 24.

Thank you

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