



## Contents

- Introduction
- Milk Fever re-visited.
- A String of Sausages!
- Turning out? Why you need a buffer.
- 2021 Silage. Is your grass fit for purpose?
- Mineral market update.
- Commodity market update.



## Introduction

The last newsletter in early March was a bit of an epic but the reaction we had to the section on protein (Optigen in the main), was very favourable with quite a lot of interest, we also had enquiries about liver function and how to make the most of it.

This spring newsletter takes a fresh look at milk fever and although most of you will undoubtedly have a system in place, this item should be useful.

The string of sausages is my son Richard's way of getting his head around protein! I thought, "Why not?" This item attempts to explain why we need to look more closely at amino acids in our dairy and hi-performance diets for beef and pedigree sheep.

The item on buffering cows at turnout is becoming a bit like the annual reminder to feed extra magnesium to avoid grass staggers, I know it's something we are aware of but, hey, it's still worth a quick review!

Over the years I have analysed thousands of grass silage samples. Wearing my nutritionist hat, I focus on making the best of what ends up in the clamp. I could now wax lyrical about silage additives (**F 1 EVO**) but the real secret is the quality of what we are cutting.

The mineral markets and the feeds markets are both very firm but there are a few buying signals particularly for next winter.

**Heat Stress** is not something that many farmers will be thinking about just now. (As I type this it is about 5°C outside!). The academic world has become much more focused on the issues surrounding stress. Cooling cows with fans, cool clean water, reduced stocking rates, outdoor shade, and rumen buffering; will all be factors to consider. We now know that boosting immune response and feeding enough essential fatty acids (not from grass,) is very important, and will give great returns on investment.

# Milk Fever Revisited

## Milk Fever

It's that season again! The annual spring calving peak is now well under way, which gives me a great excuse to talk about preventing milk fever.

There is a fundamental choice to be made:

- Are you going to calve cows at grass?
- Are you going to have a single group or a Far=Off group and a Close -Up group (3 weeks and up to calving)?
- Are you going to house one or both groups?

These choices will determine the amount of control you will be able to use in managing milk fever and also other beneficial aspects of animal health with a view to setting up a trouble-free calving and a successful lactation.

Milk Fever is a metabolic disorder caused by insufficient calcium, commonly occurring around calving. Milk fever, also known as "**Hypocalcaemia**", is when the dairy cow has lowered levels of blood calcium.

Milk fever generally occurs within the first 24 hours after calving. It can still occur later in the lactation, typically two or three days after calving. Milk fever can also occur even later in the lactation but on these occasions other factors are usually involved.

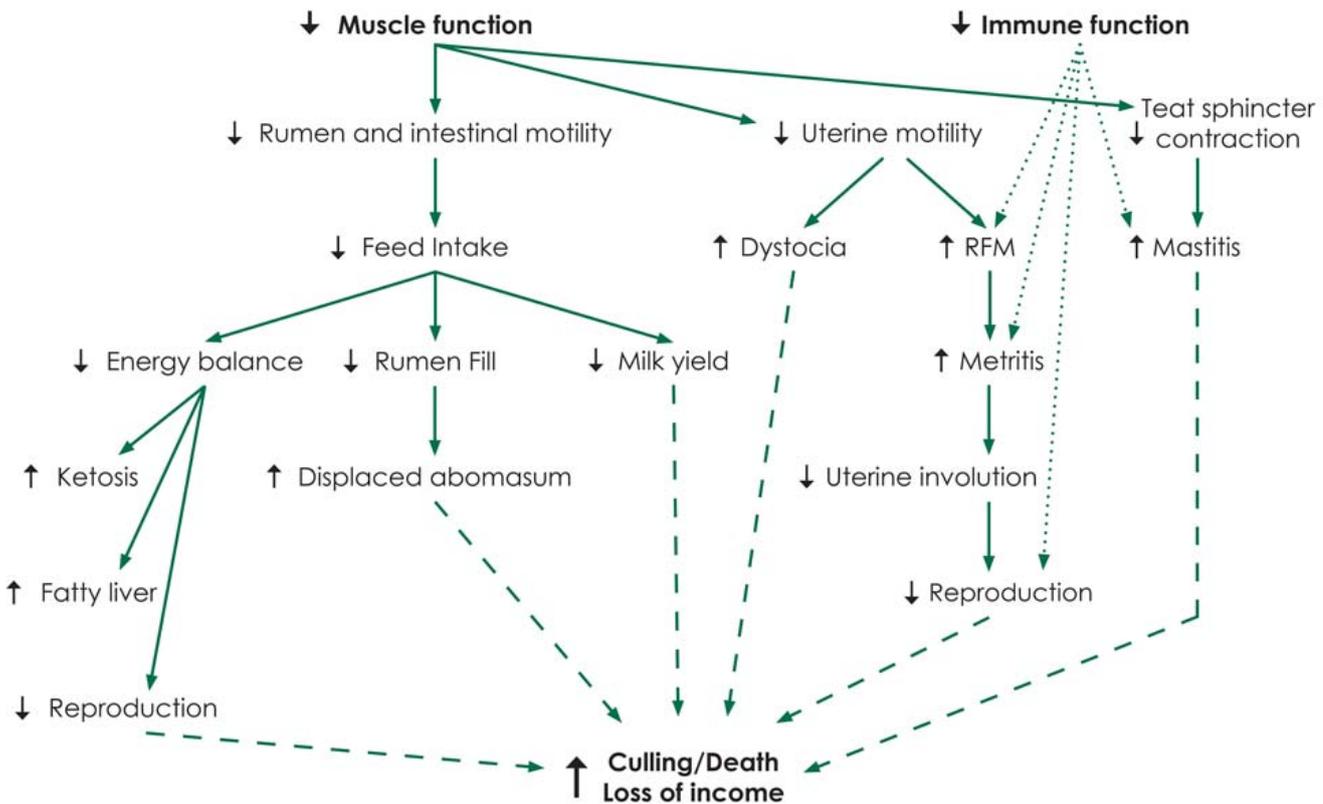
During the close-up period from 3 weeks before and up to calving, large amounts of calcium are removed from the blood and are utilized in the mammary gland to be part of the colostrum. The calcium in colostrum can be eight to ten times greater than in the blood supply. The rapid drop and the decreased mass of the calcium pool leading up to calving, and the slow rate of increase in calcium absorption after the start of lactation, can cause the symptoms of milk fever.

The close-up period is critical in determining the success of both calving itself and the up-and-coming lactation.

The main priorities of nutrition during this period, are to avoid the symptoms of both clinical and sub-clinical milk fever and to ensure liver function and immune status are at peak efficiency. We should also not lose sight of the fundamental need to encourage maximum appetite and rumen fill pre and post calving in order to minimise negative energy balance and its consequences post calving.

This should be encouraged by managing a smooth transition and using appetite aids like yeast, flavours, and (salt post calving).

## Symptoms of Milk Fever



From Vilofoss.

### Calcium is the main mineral which regulates muscle function.

Muscle fibres have to tense and flex to be able to cause controlled movement within the body as well as what we see occurring as animals move. It is caused by a tiny electrical response that is regulated by calcium.

This explains why many of the symptoms of milk fever arise from the animals restricted muscle function.

So, the key to avoiding the symptoms of milk fever is to ensure that there is enough available calcium at the point of calving.

There are two key methods of achieving this and both of them require some attention to detail. The two schools of thought on the prevention of milk fever are the DCAD (Dietary Cation-Anion Difference) approach and the non DCAD approach.

If you cannot control the DCAD elements of the diet by housing the close-up cows on a calculated ration, they have to be fed on grass.

The potassium and sodium levels in grass frequently set up the milk fever. The use of 500 grams of X-Zelit® in this situation is probably the best option. (See below).

## The DCAD Approach

The DCAD approach outlined below, effectively ensures that there is enough of a calcium reserve at calving and that the Cation-Anion (DCAD) challenge is addressed by the use of magnesium chloride and other anionic salts.

DCAD, is a measure you can apply to both dry and lactating cows.

In close-up dry cows, a negative DCAD target of @ -75 can help prevent metabolic problems. Lactating cows need a positive DCAD target of @ +380. This will help increase milk production and milk components.

The most common equation to determine DCAD is based on the dietary concentration of the cation minerals sodium (Na) and potassium (K), and the anion minerals chloride (Cl) and sulphur (S).

The DCAD formula is as follows: -

Computer models will do all of the calculations for us but the main objective is to try and achieve the targets shown above.

DCAD mEq (milli-equivalents)/100g (grams) dietary DM =  $[(\%Na \times 43.5 + \%K \times 25.6) - (\%Cl \times 28.2 + \%S \times 62.5)]$  (Mineral % are on a dry matter (DM) basis). (Don't worry about it!)

Pitfalls are that in a true DCAD system we need to monitor individual cow urine Ph.

The target is a Ph of between 6.0 and 6.5 or 5.5 to 6.0 for Jersey cows.

For the vast majority of farms, this is not very practical, so we use a Semi-DCAD system, which is pretty well the same close-up diets but monitored on the basis of forage analysis changes.

## The Calcium Blocking Approach

The practice of keeping close-up dry cows outside on tightly grazed (exercise) paddocks is not the best way of preparing the cow for her next lactation. The variables of grass quality, intake, mineral composition, and weather mean that we cannot control the diet. In this situation the X-Zelit® approach is more practical.

### • X-Zelit® Granular or Compound Pellets (with or without minerals)

**Recommended 500 grams Granular 2.5 Kg without minerals 3.0 Kg with minerals**

This product has some remarkable abilities to eliminate milk fever and increase appetite.

Vilofoss have published data in a series of webinars in March 2021 stating that the close-up dry cow's requirement for calcium is only 20 grams per day. This low figure will almost certainly be exceeded in most typical dry cow diets.

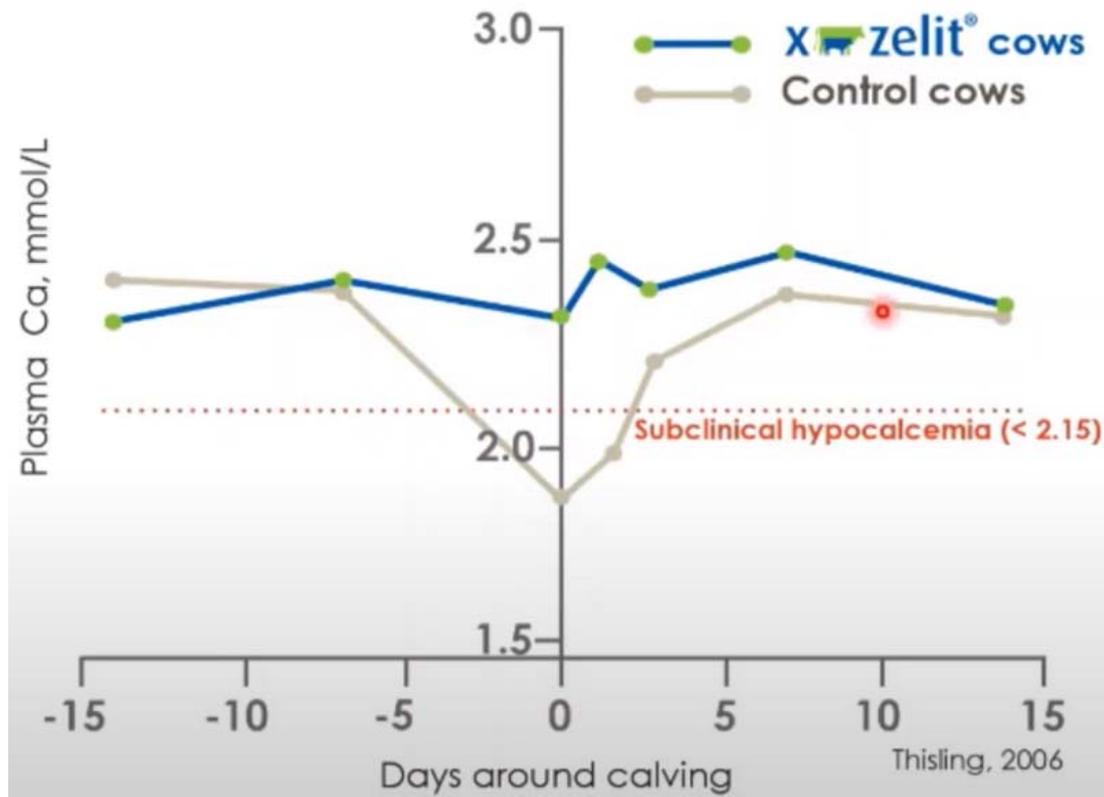
Based on sodium aluminium silicate, this synthetic zeolite clay binds calcium and phosphorous very efficiently indeed. This action effectively activates the cow's hormone system so that she is ready to absorb calcium efficiently from the moment of calving.

This should reduce the incidence of milk fever and in a big Danish trial over 22 herds reduced milk fever incidence by 86%. Grass fed dry cows should be buffer fed in any case and this is a great management tool for this type of approach.

The graph on the next page shows that when X-Zelit is used from 15 days before calving, the blood calcium levels at calving are available at normal levels right from the start.

The control animals which were fed on a traditional low calcium diet with a dry cow mineral, were much more prone to sub-clinical milk fever when they calved. The symptoms of sub-clinical milk fever are shown on the previous page.

## Blood Calcium levels around calving.



This also indicates that we should revise our dry cow mineral supplements to reduce the Phosphorous inclusion to typically around 3% when we are using calcium blockers.

The latest trial data shows that blood calcium is increased by 20% at calving. This is achieved by the activation of the release of calcium from body reserves and the initial post calving diet. Current research has also shown that colostrum yield may not be as high as in some DCAD systems but the IGG content is higher.

Note: - If the close-up diet is targeted at 1300 grams of metabolisable protein, I am not aware of lower colostrum yields.

Because calcium release has a positive effect on muscle function, we do not see as much incidence of retained placentas. We also see improved rumination and research and trials have shown an increase in dry matter intake of 0.5Kg per day. This is of major significance because the energy gap is reduced and we see improved yields and fertility when intakes increase more rapidly after calving!

Vilofoss have also run trials comparing X-Zelit to BioChlor. The conclusion was that the blood calcium levels post calving were lower when BioChlor was used. The milk solids were also worse. If anyone fancies a comparison, asking the vet to take blood samples for calcium will show the difference if a trial can be set up.

(Use when the choice is not to feed supplemental calcium).

X-Zelit® does not affect trace minerals.

X-Zelit® **(Not for use with DCAD systems)**

## Close-Up Dry Cows Key Factors

Housing these cows on a straw based diet is a far more effective way of allowing the cow to calve down where help can be given more easily if needed and start the lactation without a check. We recommend a minimum space of 10 square metres per cow though more is preferable. When the space is increased the cow stress levels reduce.



Stress reduction is hugely important so good housing environment with at least 30 inches (850cm) trough space per animal is recommended. Some experts suggest 1 metre is better.

The focus of recent nutrition research places much emphasis on maximising rumen space right up to calving. This is now known to have a very significant effect on post calving appetite and as such links in with the argument that high post calving intakes reduce the issues of condition loss and negative energy balance and gives a very positive response to fertility and improved pregnancy rates.

(See **Goldilocks!**)

### The key tasks are as follows: -

- Maintain a physically large rumen by feeding a lot of clean straw. This will help to avoid displaced abomasums after calving by allowing the unravelling squashed rumen to fill the space left in the body cavity by the calf more rapidly.
- Restrict high in potassium forages to 3 or 4 kilograms of dry matter.
- Feed a target of 1200 to 1300 grams of metabolisable protein dry matter.
- Feed a minimum level of 6Kg DN of NDF (Neutral Detergent Fibre).
- Where the post calving diet is a TMR, feed 3 or 4 kilograms (DM) / (9 to 12 Kg fresh weight) of this, but make sure the production minerals and any limestone are not included unless you are following an **X-Zelit®** regime or you can compensate the positive DCAD of the production diet with extra anionic salts.
- Feeding yeast helps with rumen microbe population efficiency and provides a more stable rumen environment during the transition from the dry cow diet to the production diet. We should not underestimate the advantage it provides in this role!
- As the time for calving approaches dry matter intake (DMI) levels drop to around 1% of body weight, just at a time when the cow's requirements for energy are at the peak for the foetus and the act of calving itself.
- The "**Goldilocks**" (Dr Gordie Jones) diet maintains that provided the NDF intakes are maintained at a minimum of 6Kg using clean and sweet forages (lots of straw), the dry

matter intakes will remain more constant with the close-up dry cow diet until the day before calving. This is a great approach but sometimes the diets are very dry and adding water on a daily basis to keep the TMR at @ 40% DM using clean fresh water will help to achieve the target intakes of @ 1.75 to 1.5% bodyweight.

- Some of the “close up” calving supplements now include valuable energy precursors in order to alleviate the problems brought about by naturally low energy intakes at this time. Top dressing once a day with 300ml of **F 1 Elevator** (a very special secret formula of monopropylene glycol, glycerol, and a special flavour enhancer), was shown by the Institute for animal health to increase intakes by around 1.25 Kg DM per day and contribute overall around 20Mj of energy over diets where it wasn't being used.

**Notes:** - protected fats are not recommended at this stage of the cow's cycle.

Improvements in intake at this stage can have very beneficial effects.

The University of British Columbia has concluded that a 1 kilo reduction in dry matter intake at this stage can double the risk of sub-clinical ketosis, and cows were three times more likely to have hung cleansings. One key and pretty obvious piece of advice is that to maximise intakes, the close-up dry cows should be presented with fresh food at the trough and this means feeding more than once per day!

## **CLEAN WATER**

Water is a nutrient that is not really discussed that much, and yet it is the most fundamentally important feed of all!

Current research shows that cows that are stressed are much more likely to succumb to disease challenges. This includes metabolic diseases as well as infectious diseases.

Water intakes tend to drop in the few days before calving and this has been shown to put more stress on the cow. The drop in intake will undoubtedly be greater if the water sources are not clean.

Stress free hydration at this stage is very beneficial because it reduces the opportunity for infection. Clean water is essential for these cows.

The minimum temperature of drinking water should not be less than 4°C because this will result in low intakes and reduced appetite at a time when the cow needs to achieve her target nutrient demand. Conversely the maximum temperature recommendations vary from 20°C to 12°C these are less critical but indicate that the cow prefers cool clean water.

# A String of Sausages!

## What are amino acids?

Why are they important to me? and, why do I need to know?

What is in it for me?

Some of you will already have a good working knowledge of this subject but there are many farmers and students who find it all a bit too much and would rather just trust that their feed company and nutritionist will sort it all out without them having to think about it.

I guess that delegating the technical stuff is a good solution for many but “Knowledge is Power” as they say and this little piece of nutrition can open up the potential of animals to perform even better and improve profits at the same time.

I have spent years talking about this “stuff” and I think that breaking it down to simple logic is the best way of explaining it. Then my son Richard said, “It could be done with sausages!” so here goes: -

Note this is not strictly biochemically accurate but it does cover the simplified theory!

### What are amino acids?

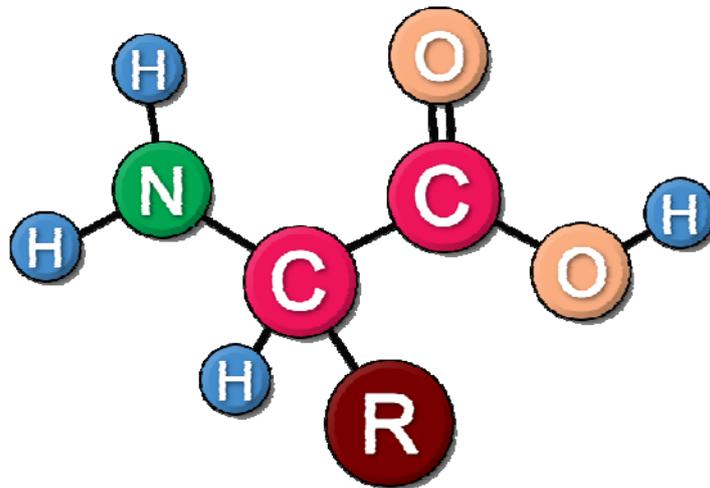
Imagine that a protein is like a piece of string.

There are millions of different proteins but they all look like pieces of string! They can range from simple structures to complicated looking tangles but they are all strings.

All proteins are made up of chains of amino acids.

An amino acid is an organic compound containing [amino](#) ( $-\text{NH}_2$ ) and [carboxyl](#) ( $-\text{COOH}$ ) [functional groups](#). They also have a [side chain](#) (**R** group) which is specific to each amino acid and makes them all different.

The key [elements](#) of an amino acid are [carbon](#) (**C**), [hydrogen](#) (**H**), [oxygen](#) (**O**), and [nitrogen](#) (**N**)



### Why are amino acids important? and, why do I need to know?

Theoretically there are many different amino acids (“sausages!”) but of these only **22** are really important. In order to make a complete protein all 22 have to be present.

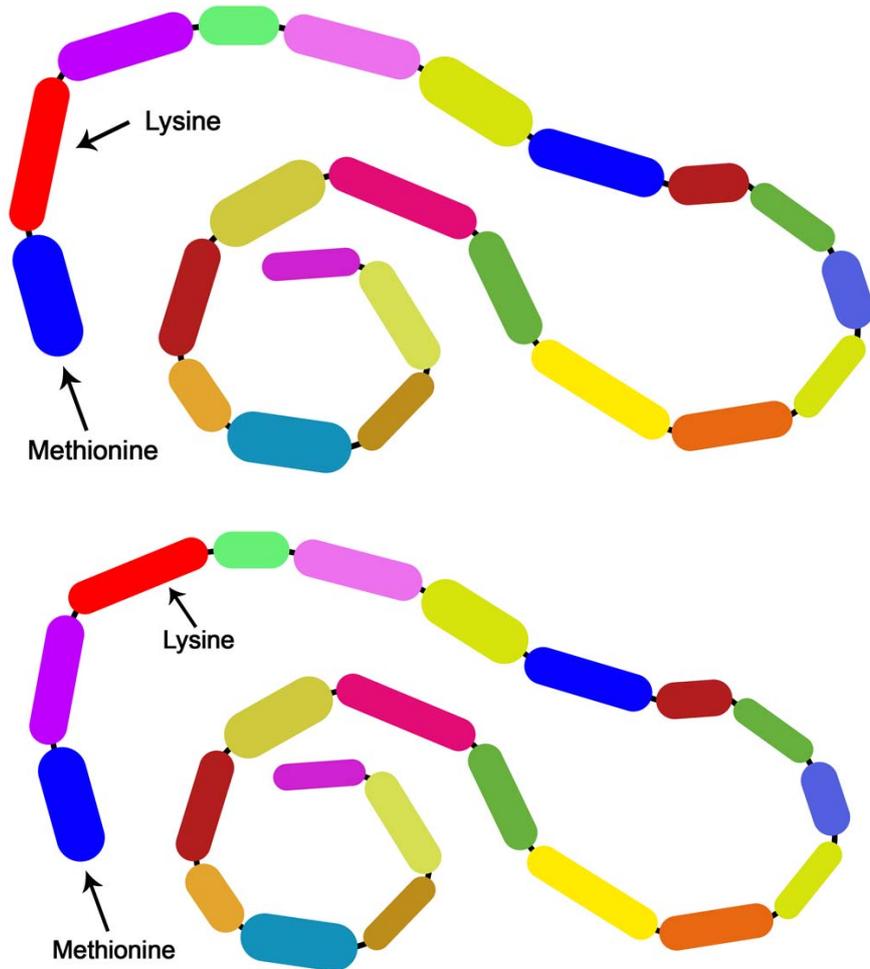
The different proteins contain all of the 22 key amino acids but in different orders (sequences).

Complex proteins can be made up of several chains and may contain many more than the 22 key amino acids.

The amino acids form little strings called peptides and when they all become bonded together to form a protein, they are polypeptide chains (more than two peptides) !

The 22 amino acids are naturally incorporated into polypeptides and are called proteinogenic or “Key” natural amino acids see **figure 1**.

**Figure 1**  
**Two similar but different theoretical protein amino acid chains**



The different positions of the two named amino acids Lysine and Methionine indicate that these are two different protein structures.

Of the 22, 20 are encoded by the universal genetic code.

The remaining 2 are Selenocysteine and Pyrrolysine, are incorporated into proteins by unique synthetic mechanisms.

**Peptides** are basically slices of the protein string (amino acid chain). See **figure 2**.

**Figure 2**  
**A theoretical simple Tripeptide**

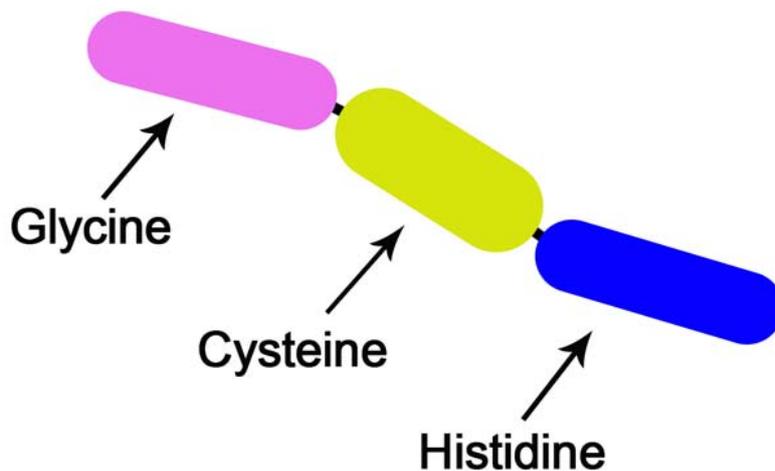
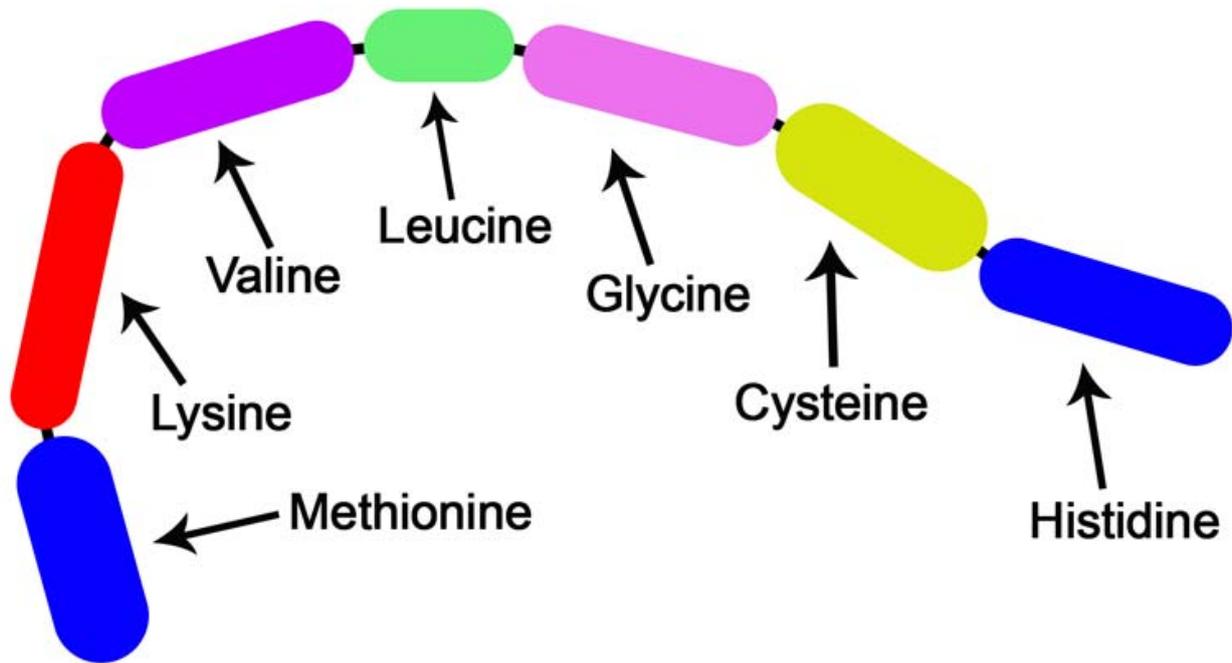


Figure 3  
A theoretical more complex oligopeptide



**Peptides** are short chains of between 2 and 50 [amino acids](#), linked by [peptide bonds](#). Small chains of less than 10 or 15 amino acids are called [Oligopeptides](#), and include [Dipeptides](#), [Tripeptides](#), and [Tetrapeptides](#). Sometimes the more simple peptides can be formed using the same amino acid. ie: - 3 lots of glycine.

A **polypeptide** is a longer, continuous peptide chain of up to approximately fifty amino acids.

Peptides are described as [biological polymers](#) and [oligomers](#), alongside [nucleic acids](#), [oligosaccharides](#), [polysaccharides](#), and others but now we are getting technical!

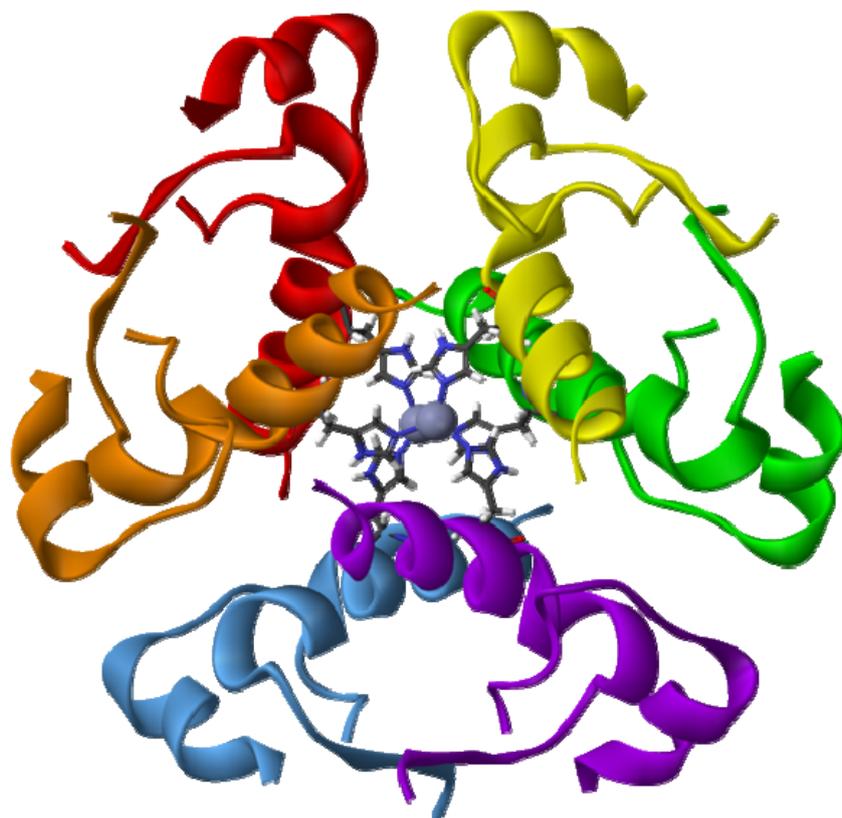
A protein is a polypeptide that contains more than approximately fifty amino acids.

Proteins consist of one or more polypeptides arranged in a biologically functional way.

The sequence of amino acids in insulin was discovered by [Frederick Sanger](#), establishing that different proteins have defining amino acid sequences.

[Insulin](#) is composed of 51 amino acids in 2 chains. One chain has 31 amino acids, and the other has 20 amino acids. (The whole protein will contain all 22 key amino acids.)

Insulin is a relatively simple protein but there are many structures of protein with the amino acid chains forming many different structures.



From Wikipedia

The 22 Key amino acids are the ones that we nutritionists concentrate on because we know that if any are missing, the performance of the animal will be reduced.

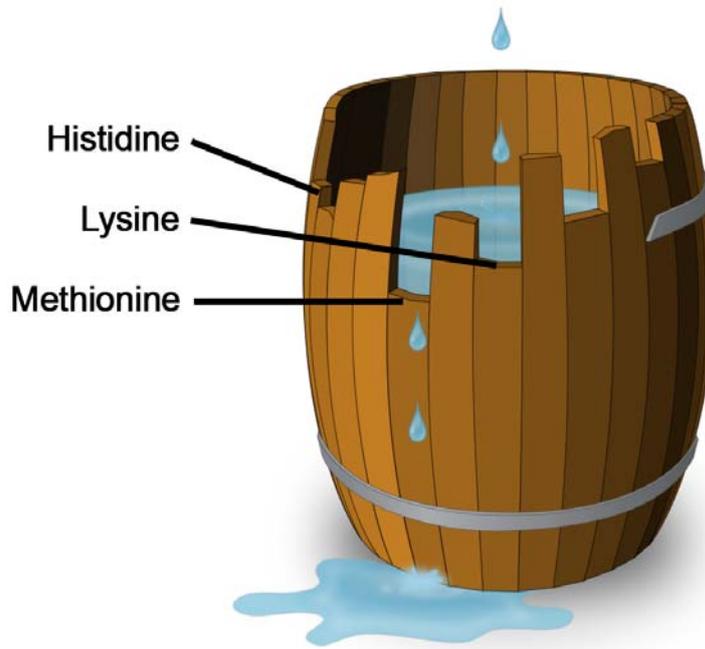
Of the 22, **nine** of them are **essential** which means that they cannot be synthesised by the animal itself and so they have to be supplied in the diet.

**The essential amino acids** are therefore the most important ones and are the focus of attention by nutritionists for all livestock enterprises.

They are lysine, methionine, isoleucine, leucine, phenylalanine, histidine, threonine, tryptophan, and valine.

Of these **Methionine and Lysine** are normally the first two **limiting amino acids**. This means that in order to boost performance they will be the first two amino acids that have to be added to the diet. In the case of dairy cows these amounts are very small indeed but the effect can be highly significant.

In 2017 CG Schwab cited methionine, lysine, and histidine as the first three and some sources also quote leucine for dairy diets.



In 2019 research in China confirmed that for growing cattle, the first three limiting amino acids are lysine, methionine, and threonine. With the ratios of the three stated as 100:32:57. The ratios indicate that the growth tissues for the seven- to nine-month-old Holstein heifers on trial, gave the best response when they received enough of each of the essential amino acids in this ratio. Any excess would have been excreted.

The simple example of the leaky barrel is a great way to visualise this. Plugging the lowest leak on the side of the barrel will give a boost to the amount of water the barrel will hold. There is no point in plugging any of the leaks at higher points until that lowest one is sealed because the barrel will always only fill to the lowest point.

**Non-essential amino acids** include glycine, cysteine, alanine, arginine, asparagine, aspartic acid, glutamic acid, glutamine, proline, serine, and tyrosine.

Note: - glycine and cysteine (which are commonly used to (protect copper, zinc, and manganese as in the form of glycinate) are **not** essential amino acids. (Which is another reason why I prefer the methionates and proteinates which are based on methionine which **is** an essential amino acid!)

So that is the basics of how amino acids and proteins are linked and why we need to think about protein quality to supply enough of the limiting essential amino acids so that we can exploit the potential of and improve the health and fertility status of our animals.

### **What's in it for me ?**

The focus on global warming and reducing carbon footprints has prompted the consumer industry to increase demand for lower carbon footprint products.

Most farmers are aware of this and the drive to reduce imported soyabean meal imports. This is a worthy ambition but Soyabean meal is one of the richest plant-based sources of the key amino acids and in particular lysine and methionine.

Farmers are also aware of the focus of many in the feed industry to switch from soyabean meal to oil extracted rapeseed meal. There are a few issues with this change, and it has naturally prompted the industry to look at other possible substitutions.

All nutritionists should be aware that microbial crude protein (MCP) or rumen microbes themselves, are the richest source of the essential and key amino acids that the cow or sheep can receive.

This means that **the first priority of any diet regime should be to optimise rumen function and output of MCP.**

There are some great ways of helping the cow or sheep to achieve this.

- First step is to balance the diet for all of the major nutrients and minerals.

- The second step is to adjust the diet for rumen Ph and buffering capacity.
- The third step is to reassess the major protein inputs for essential amino acid supply and carbon footprint issues.
- The fourth and some would say most important step is to use the essential amino acid supply data to re-balance the overall protein inclusion.

This last step will usually enable a cutback overall crude protein supply which in turn will **reduce the carbon footprint and the diet costs**. Not only will this be possible, in most cases there will also be an improved production response.

Now, I know that dairy, beef, and sheep husbandry systems are subject to many other effects like environment, genetics, routine management, and other variable influences, but we should aspire to create healthy diets.

**Products that can help include the following: -**

- **F 1 Yeast**
- **Smartpro** (Rumen Protected Methionine on carrier feed @50 grams)
- **Optigen 2**
- **Nitroshure** (Similar to Optigen)
- **Novatan** (Rumen microbe selection and net increase by herbal oil extracts)
- **Rumen Buffers like Acidbuf, Vitalbuf and Sodium Bicarbonate**
- **Novapro**

All of these products have great proofs and are published and peer reviewed.

Our web site contains much more detail on the products mentioned above and in some cases links to more detailed papers.

Visit [www.lakescot.co.uk](http://www.lakescot.co.uk)

## Turning out ? Why you need a buffer

I Included most of this at the end of the last newsletter but it seems even more appropriate just now. The rumen needs to be like a well-tuned engine, Smooth running with no friction!

Spring grass and TMR diets based on low fibre forages (young ryegrasses and meadow grasses), are notorious for causing Sub-Acute Rumen Acidosis.

This all down to highly fermentative spring grass causing frenzied rumen bug activity and extra lactic acid being produced until everything starts to drop the rumen Ph.

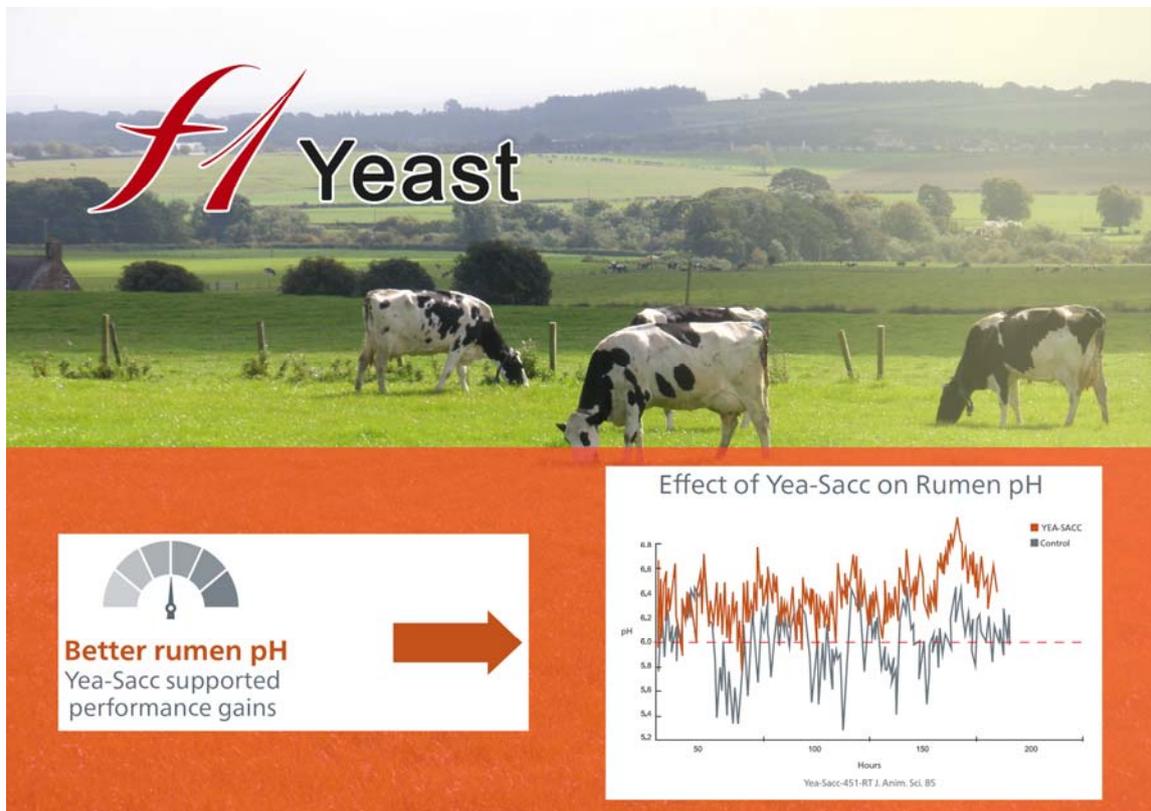
The increased acidity has many effects.

- Reduced levels of fibre digesting bacteria.
- Lower butterfat.
- Reduced milk yield.
- Scouring cows.
- Reduced immune response.
- Laminitis.
- Reduced appetite,
- Etc, etc.

The cost of this management inflicted syndrome is huge.

There are several fairly easy steps that can be taken to prevent this issue from ruining the performance of the herd.

- Feed enough structural fibre (ADF). Try grabbing a handful of the TMR and gently rolling it around in your hands. If you can't feel any scratch fibre, it's a good sign that the diet needs some extra. Use chopped wheat straw or (the best of all) lucerne hay.
- Feed a rumen buffer. Acidbuf/Vitalbuf/PhUK, which are all much better than straight Sodium Bicarbonate.
- Feed **F1** Yeast. There is so much work and trial data showing that this strain of live yeast is more than capable of encouraging fibre digestion and lactic acid utilising bacteria.



## • 2021 Silage. Is your grass fit for purpose?

The quality of the grass that is cut for conservation obviously affects the end result. I suppose that I shouldn't really be surprised by the fact that many silage samples reveal less than ideal results.

Here is a little list of obvious facts to consider : -

- Are the conservation leys past their best and have less of the high-quality grasses and too much of the less productive meadow grasses and weeds?
- Are we picking up soil?
- Did we get the fertiliser timing and quantity right?
- If we are leaving it too late, will we be able to balance the forage with enough of the right concentrates?
- Did we get our clamp and sheeting management right?
- Did we dominate the fermentation by using a good enough additive?
- Does the contractor allow enough time for rolling and does he get the application of the additive right?

I could go on but sometimes, its just down to a re-seed and being realistic!

# Mineral Markets

Minerals prices continue to be more stable than we expected. This is primarily down to the level of cover taken by the big supplement house prior to Brexit.

The prices to the end of March have had some minor changes but it's a relief that we haven't seen any major jumps as we enter quarter 2.

There is a warning though, some products are affected by the extra paperwork needed to clear customs after Brexit and there may also be some delays in delivery.

Some conversations have indicated that we in the UK may well look at manufacturing some of our own versions of imported ingredients in the future if the "Free Trade" tariffs agreed with the EU continue to get stalled in bureaucracy.

Most mineral and vitamin sources were fairly stable in quarter 1, this is good news because we haven't needed to make many price changes in quarter 2 this year.

# Raw Material Markets

Current Soya prices are hovering around £360 ex-port spot to £350 for November- April 22.

It was £367 and £325 ex-port a year ago!

Current Maize prices are also hovering around £216 ex-port spot to £190 November – April 22.

It Was £175 and £168 ex-port a year ago!

Current London Wheat Futures are around £192 ex store spot and drop to £162 November 21.

It was £159 and £169 ex store a year ago!

If you average those three spot feed costs, they alone are up 24%!

Interesting that Hipro Soya is now actually cheaper on the spot market than a year ago.

The difference in value between Hi Pro Soya, IMSA Soya and Rapeseed Expeller meal is not reflected in the prices.

This little table is simple but it shows the difference quite well! Note that whilst Rapeseed meal seems fairly cheap, Argentinian Soya (IMSA) and Low Pro (also IMSA) are more expensive than Hi-Pro Soya! Optigen microbial protein generation and truly available methionine content would make them all look expensive!

	Price £	Dry Matter	Cost per	Energy	£ Cost per MJ	Protein	£ Cost per % CP
	Per Tonne	%	Tonne DM	Mj/Kg DM	Per tonne D M	% DM	Per tonne D M
De Hulled (Hipro) Soya Ext Meal	380	89	494.38	13.8	35.82	52.53	8.38
Argentinian Soya Ext Meal	380	89	480.90	13	36.99	42.4	10.09
Lo Pro Soya Ext Meal	380	89	480.90	13	36.99	44	9.73
Soypass	560	90	622.22	13.6	45.75	48	11.67
NovaPro	335	88.5	414.69	13.1	32.15	34.83	10.54
Rapeseed Ext Meal	295	91	263.74	11.8	22.35	37	6.49
Rapeseed Exp Meal	295	89	280.90	13.2	21.28	35.4	7.06
Optigen	2000	99	2020.20	0	N/A	275	7.35

Cereal futures continue to drop slowly. This is quite normal because as harvests approach in the summer many stores try to run down stocks to make space for the new seasons crop. London futures quoted a spot wheat price @ £190 per tonne ex store dropping to @ £163 per tonne in November. This is down from a peak of £213 spot in mid-January.

For many farmers, the key question is, “What do we buy when we run out of our winter stocks?” That is not an easy question to answer. There are a few reasonable looking prices being quoted for Rapeseed meal and, dare I say it, soya meal for next winter, but the period between April and mid-summer looks a bit bleak for most commodities until harvest breaks the trend. I think ordering as and when you need product will be the best policy because there is an underlying downward trend in most feed prices but I don't think we can expect any sudden changes at the moment. (Famous last words maybe?)

Good buys still include Pea & Bean meal, and Molasses, which looked fairly pricey until everything else caught up and overtook it.

#### Topical signals

- Check out our website for **F1 Evo and F1 Sprint** state of the art silage additives to give great results and dominate grass protein preservation. [www.lakescot.co.uk/f1-evo/](http://www.lakescot.co.uk/f1-evo/)
- Check out our website for Optigen to help reduce protein costs. [www.lakescot.co.uk/optigen/](http://www.lakescot.co.uk/optigen/)
- Don't forget Lakeland-Scottish Feeds & Services can offer the best bespoke and standard design mineral supplements available in the UK just now. We are using new sophisticated computer formulation models in conjunction with our suppliers we can offer the best availability of trace elements at the most competitive rate. The latest **F1 TMR Dairy 21** is probably one of the best dairy minerals available anywhere for the money!
- **F1 Elevator** and **Reashure** are both working incredibly well and are both growing their customer acceptance. The web links are as follows: - [www.lakescot.co.uk/f1-elevator/](http://www.lakescot.co.uk/f1-elevator/) and [www.lakescot.co.uk/reashure/](http://www.lakescot.co.uk/reashure/)
- **SHEEP.** We don't often talk about sheep but I have had the time to have a complete update of the notes for sheep nutrition. This is a comprehensive guide and will serve as a great workaday guide for the student and the farmer alike. We published this work on the website on March 2nd.



For more information on any of the items mentioned in this newsletter please get in touch with Jerry or Richard. Our phone numbers are always available during normal working hours. You can also email Jerry or visit the Lakeland-Scottish website.

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