

MEGALAC[®] range



Right Fat, Right Time

Feeding dairy cows to enhance
productivity and profit

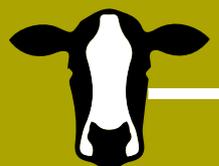


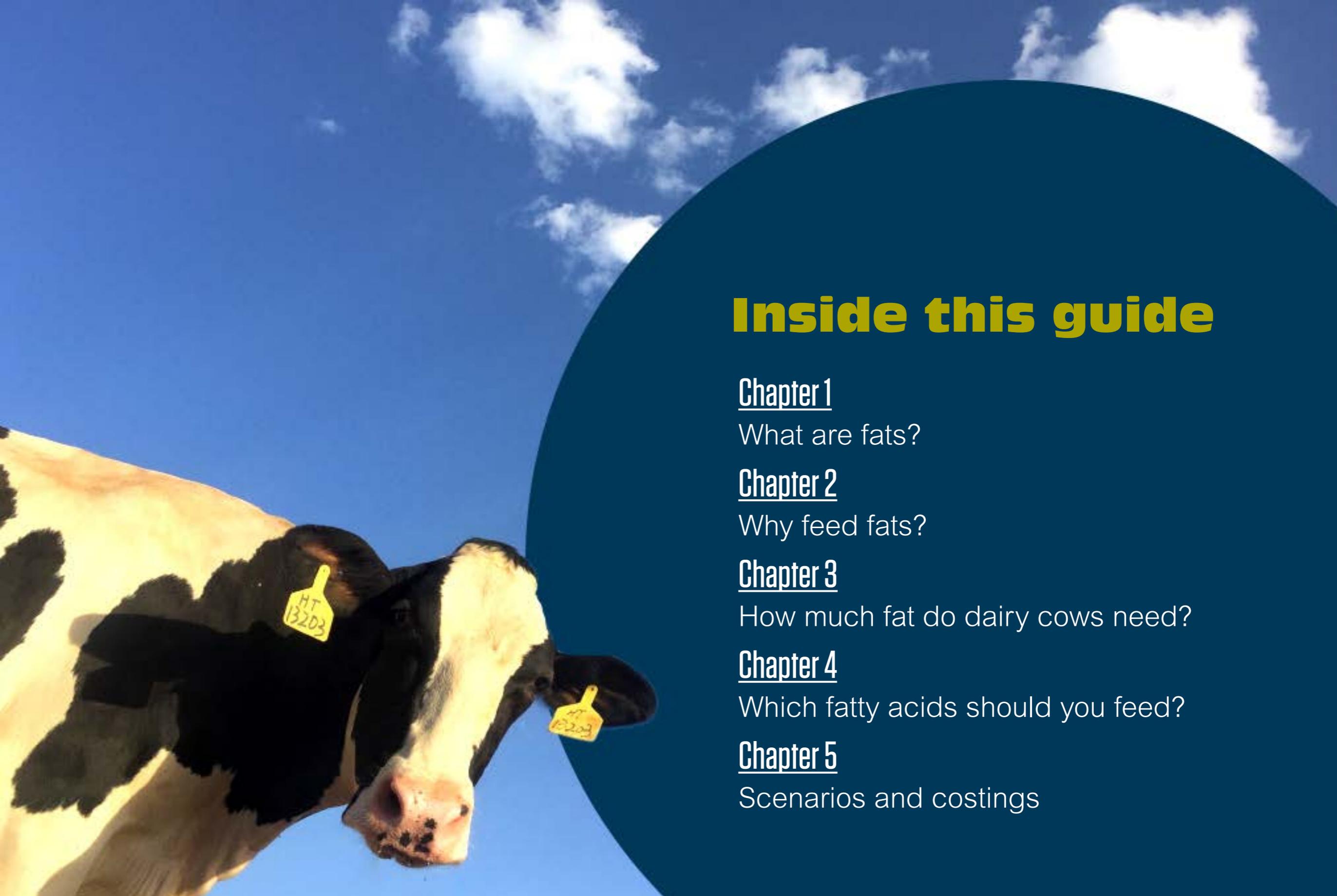
VOLAC WILMAR
FEED INGREDIENTS

Introduction

Dairy farming is fiercely competitive. Low margins mean that you must do everything you can to optimise productivity in your herd. There's a clear link between nutrition, health and productivity. Yet perfecting nutritional balance through lactation isn't easy. Worse, feeding too little or too much of key nutrients may present health risks. The stakes are high.

In this short eBook we will explore how dairy farmers like you can enhance profit margins through the use of rumen-protected fat supplements. You will learn about the risks of rumen-active fats (i.e. those which are not rumen-protected) as well as the benefits of adding targeted fatty acids to your herd's diet. Those benefits include enhanced fertility, improved milk production and increased milk fat percentage. Let's get started.





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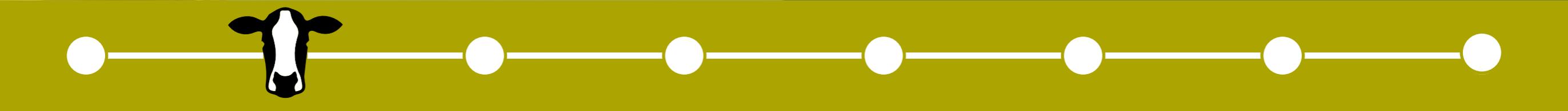
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Chapter 1: What are fats?

We encounter them every single day, but what exactly are fats? And what is their relation to fatty acids?

Fat is a type of nutrient, just like carbohydrate and protein is a type of nutrient. It's an essential part of daily nutrition and neither human nor cowkind can live without it. A large proportion of fats in nature are present in the form of triglycerides, in which three individual fatty acids are attached to a molecule of glycerol.

So, if fats are formed of fatty acids, the next question is...

What are fatty acids?

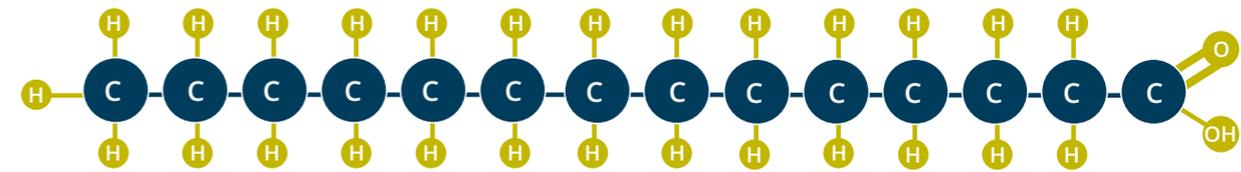
Fatty acids are long chains of carbon (C), hydrogen (H) and oxygen (O) atoms. Different fatty acids have different length chains. All fats are composed of fatty acids and it is the mix of fatty acids that primarily determine the properties of the fat, such as its nutritional value and whether it is a solid or liquid at room temperature.

With each type of fatty acid having its own nutritional properties, some fats are more appropriate than others when it comes to the nutrition and productivity of your dairy herd.

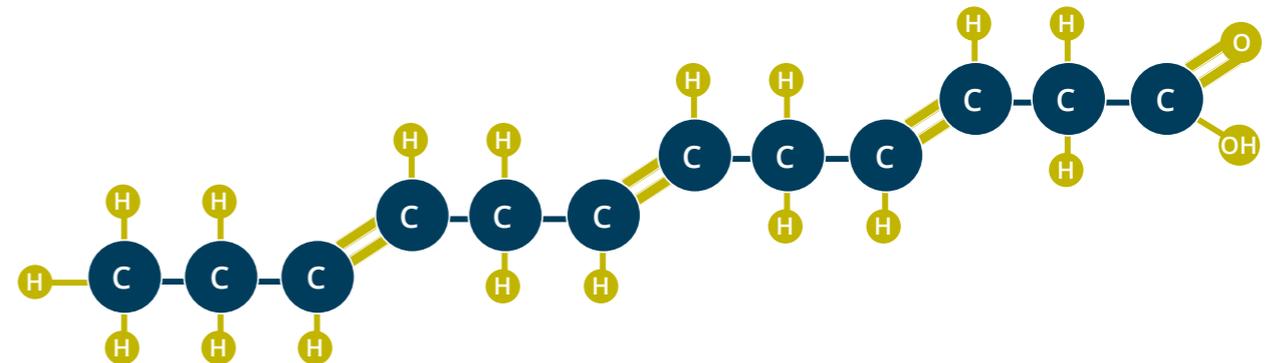
There are several distinct categories of fatty acid including:

Saturated and unsaturated fatty acids

Saturated Fatty Acid



Unsaturated Fatty Acid



Fatty acids are categorised according to the number of carbon atoms in the molecular chain and the number of double bonds. For example, a fatty acid with a chain length of 18 carbons and two double bonds is symbolised as C18:2.



Chapter 2: Why feed fats?

Fat is an essential nutrient that supports all kinds of biological functions. Your herd cannot live without it. Yet some fats also provide a number of specific additional benefits that can promote productivity in your herd. Let's take a look.

Unrivalled energy supply

Fat is an energy powerhouse. It has the highest energy density of any nutrient, with around 2.5-times the energy concentration of cereals. Pound for pound, nothing is more effective than fat for meeting energy demands. So what does this mean for your dairy herd?

Fat can be fed at any time. But it's a particularly valuable nutrient when a cow's demand for energy is high or you need to minimise loss of body condition. Dairy cows require supplementary fat in their diet to improve milk yield, overall productivity and fertility. In early lactation, for example, dairy cows are unable to eat sufficient feed to meet the demands for milk production. As you know, this results in cows 'milking off their back' - using their own fat stores to provide the energy they require.

The net result here is a loss of body condition. Fat is an ideal supplement at this stage as the high energy concentration supplies more energy in every bite of feed. Crucially, fat supplies energy without increasing the acid load in the rumen as is the case with starchy sources of energy such as cereals.

Improved fertility

Fertility falls by around 10% for every 0.5 unit loss in body condition score. The energy density of fat makes it a key nutrient in helping to restore a healthy body condition. Fats are also known to increase progesterone – a hormone that plays an important role in facilitating pregnancy. Some fat sources have even been proven to increase the quality and viability of eggs at ovulation. Fats in green grass, linseed and fish oil also contain essential omega-3 fatty acids – these are also very important in helping to maintain pregnancy.

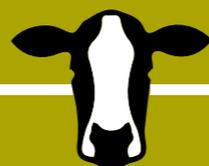


Reduction of heat stress

As cows digest and metabolise food, heat is produced inside their bodies. In hot weather, this can increase risk of heat stress - which is as unpleasant as it sounds. Fat however generates considerably less heat than all other energy sources. That provides you with a nutritional method to reduce and mitigate against heat stress.

Summary: Why feed fats?

- Unrivalled energy supply to improve milk yields and body condition
- Improved fertility
- Reduction of heat stress



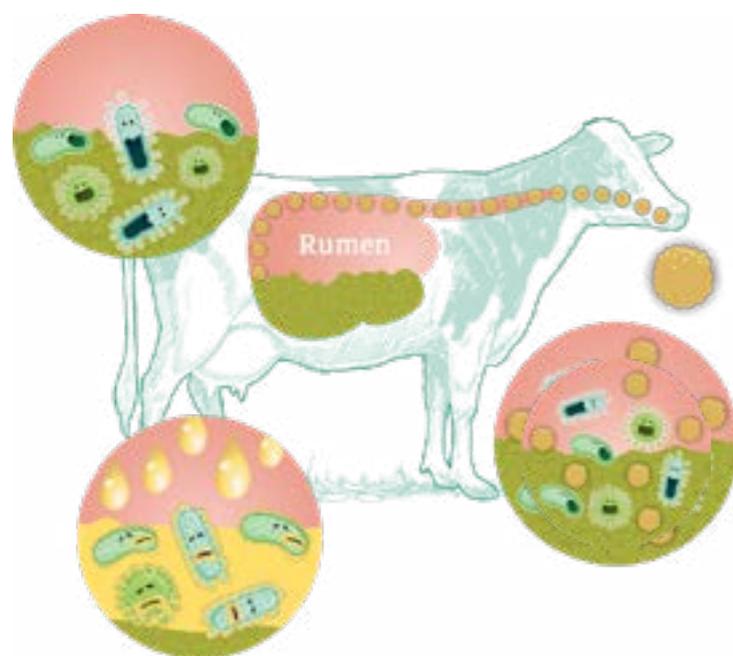
Chapter 3:

How much fat do dairy cows need?

As with any diet, balance is the key to success. So how do you get the balance right for a healthy, productive and profitable herd?

Calculating a cow's fat requirement can be a complex science. As a guideline, 15-20% of the metabolisable energy in a dairy cow's diet should come from fat. Basal forage-concentrate rations will typically supply around 3-3.5% fat in the dry matter, though high-yielding dairy cows may require more than 6% fat in the dry matter. A general rule of thumb for dairy cows is that the amount of fat to feed should equal the amount of fat the cow produces in her milk (when body condition is stable).

So we have ascertained that dairy cows may need 6-8% fat in the dry matter for maximum productivity. Yet it's crucial to understand that feeding much over 3.5% fat in the dry matter can be detrimental to a cow's health as well as your profits. To understand why, we need to look at how cows digest fats.

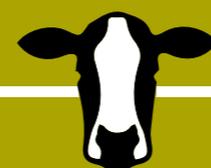


Inside the rumen...

The rumen plays an essential role in a cow's digestive process. Think of the rumen as a large fermentation chamber, bristling with good bacteria that break down food into smaller components to later be absorbed and used as energy.

Two things are vital to good rumen function: a healthy microbial population and a pH of around 6.5 to 7.0. Without these, the rumen becomes less and less efficient at digestion. That leaves cows susceptible to health complications such as acidosis and laminitis.

Oil from high fat ingredients can interfere with bacteria in the rumen - and that can cause a number of complications.



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Fats and the risk to rumen function

Fat in most feed ingredients are released in the rumen and can cause an oil 'slick' that coats the fibre in the rumen and prevents rumen bacteria from breaking it down. Some of the fatty acids are also directly toxic to strains of fibre-digesting bacteria.

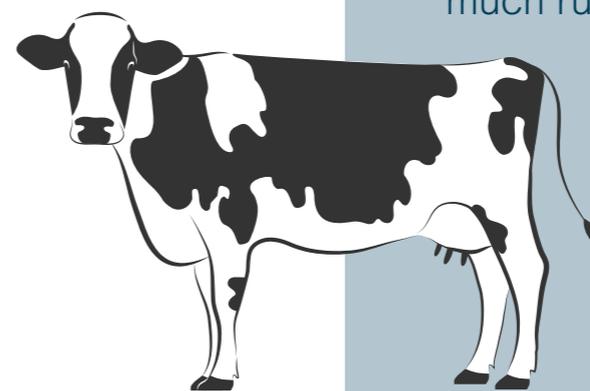
Fewer rumen bacteria means reduced fibre digestion, reduced rumen function and reduced feed efficiency. That's not all. Rumen bacteria can alter some of the fatty acids from the diet to other fatty acids which are very potent at reducing milk fat %.

So you can see the problem. Dairy cows may require over 6% fat in the dry matter, but only around 3-5% rumen-active fat in the dry matter can be tolerated before potentially serious health issues begin to develop. How do you square the circle?

Incorporate rumen-protected fats

Unlike rumen-active fats, rumen-protected fats have no detrimental impact on regular rumen or digestive function. Volac Wilmar's range of rumen-protected fat supplements allow you to safely increase your herd's fat intake, with proven benefits including improved milk yield, milk fat and enhanced fertility.

There are secondary benefits too. With dairy cows, up to 12% of feed energy intake can be lost as methane gas, produced in the rumen as a result of fermentation of feed. Supplementary fats reduce methane production, leading to improved feed efficiency and reducing undesirable environmental emissions.



Summary: How much fat do dairy cows need?

- Dairy cows may require over 6% fat in the dry matter to maintain productivity and body condition
- Unprotected fats are released in the rumen and feeding above 3.5% of fat in the dry matter can result in poor digestion
- Rumen-protected fat supplements allow you to increase fat intake without the harmful effects of feeding too much rumen-active fat



Chapter 4: Which fatty acids to feed?

From increased milk yields to improved fertility, individual fatty acids have different benefits. Choosing which fat supplements to add to your dairy herd's diet depends on the results that you would like to achieve.

Feeding fatty acids

Of course, basal feed supplies a proportion of your dairy herd's fat requirements. Yet to maximise the productivity of your cows, it's often essential to add fat supplements to their diet. Rumen-protected fat supplements have several different metabolic functions and come with a number of benefits for dairy cows. Depending on the type of fatty acids your chosen supplement contains, you can improve milk production, enhance the fat percentage of milk, boost fertility, improve body condition and more.

| Fatty Acid | Name | Challenge to Solve | When to Feed | Why |
|------------|----------------|---|--|--|
| C16:0 | Palmitic acid | To lift milk fat% | Most beneficial in mid to late lactation | Increases partitioning of nutrients to milk to improve fat production. |
| C18:0 | Stearic acid | - | - | Digestibility decreases with increasing intake of C18:0. No supplementation required. |
| C18:1 | Oleic acid | To improve body condition score To increase milk yield To improve fertility | Most beneficial in early lactation | Improves digestibility of total diet fat and increases partition of nutrients to improve body condition. Also promotes development of eggs to improve fertility. |
| C18:2 | Linoleic acid | - | - | Plentiful in diet. No specific supplementation required. |
| C18:3 | Linolenic acid | To improve fertility | Early lactation | Improves embryo survival to increase fertility. |



Chapter 5: Scenarios and costings

When you are spending money on a fat supplement, you want to make sure it achieves the desired results in your dairy herd. Here's how you can make sure that happens time after time.

Choosing the best fat supplement for your herd

A dairy cow's nutritional requirements change as the lactation progresses. It's often best to vary the fat supplement you are adding to your dairy herd's diet to make sure they receive the optimum mix of fatty acids for productivity and profits.

For example, the high concentrations of palmitic and oleic acids in Megalac improves digestibility of total diet fat and increases partition of nutrients to improve body condition and milk yields. That's particularly beneficial during early lactation.

The type of milk contract that you have with your buyers is particularly important. Milk contracts pay differently according to the fat or protein content of your milk, in addition to milk volume produced. The Mega-Fat range - with its high concentration of palmitic acid - can increase the fat percentage of your milk while stimulating enhanced milk production, which is particularly beneficial during mid-late lactation.

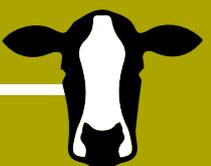
Finally, Mega-Flax contains a uniquely-formulated blend of linolenic acid (omega-3), palmitic and oleic acid. That promotes the development of eggs and improves embryo survival - perfect for increasing fertility rates during early lactation.

| Fatty Acid | Megalac | Mega-Fat | Mega-Fat 88 | Mega-Fat Extra | Mega-Flax |
|--------------------|---------|----------|-------------|----------------|-----------|
| C16:0 | 48 | 71 | 88 | 97 | 26 |
| C18:0 | 5 | 2.5 | 8 | 2 | 3.7 |
| C18:1 | 36 | 20 | 0 | 0 | 26 |
| C18:2 | 9 | 5 | 0 | 0 | 12 |
| C18:3 (omega-3) | 0 | 0 | 0 | 0 | 32 |

Over one free litre of milk - per day, per cow

Farming is all about boosting the return on your initial investment. That's especially true in dairy farming where profit margins can be tight. Numerous studies have proven Megalac to increase milk production.

Take the following scenario. Feeding 500g per day of Megalac at a cost of £700 per tonne costs 35p per day. Yet on average each cow will produce an extra 2.3 litres of milk. Assuming at a milk price of 30ppl, the value of the extra milk is 69p - with a margin of 34p. Or - in other words - over one free litre of milk per day, per cow.





Want to know more?

Volac Wilmar are a leading voice in cow nutrition. If you would like to know more about how our range of fat supplements can improve both your profits as well as the health of your herd, please visit www.megalac.com.

Our website also has a free fat calculator that you can use to help gauge the optimum amount of fat to add to your dairy herd's diet.

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