

Healthier milk – FAQ's

There are numerous factors that affect the milk fat composition and therefore human health benefit of dairy products. This includes animal, environment and feed factors that can be managed to improve the fat profile. The answers below hope to answer some of the questions you may have about improving the fat profile of your milk...

What is a fatty acid?

Fatty acids are a structure of carbon and hydrogen atoms together in a chain of varying in lengths that have an acid attached to one end.

What's the difference between saturated and unsaturated fat?

Unsaturated fats have at least one double bond at some point along the chain of carbon atoms. This means that for every double bond, there is one less hydrogen atom, which reduces the melting temperature of the fat because hydrogen bonds require more energy to break. Unsaturated fats are liquid at room temperature because of this. Whereas saturated fats have no double bonds and are full of hydrogen atoms. This also means that saturated fats have a higher melting point and are therefore solid at room temperature.

Which type of fats do we want to increase in milk?

Generally speaking, it is the unsaturated fats that we want to increase in milk. These come in the form of MONO unsaturated or POLY unsaturated fat; the difference being that mono has only one double bond and poly has 2 or more double bonds.

What is the natural level of these fats in cow's milk?

On average, saturated fat accounts for between 65 – 70%, mono unsaturated 25 -30% and poly unsaturated fat is the smallest in proportion with less than 5%.

But does this change over the year?

Yes, there is a seasonal effect on the levels of different fats in the milk. During the spring and summer months when the cows are grazing, saturated fat tends to be lower. Whereas over the winter, while cows are on 'winter' diets containing more starch sources, the saturated fat level increases.

But my cows are housed all year round and I still see a seasonal effect?

This could be due to the change in silages. Fresher silages will have higher poly unsaturated levels so even housed cows will benefit from increased unsaturated fat levels when they're moved onto this year's silage. Wilting, drying and aerobic spoiling will reduce the level of poly unsaturates in silage.

What about differences between cows?

The genetics of a cow has an impact on the levels of different types of fat they produce. Therefore it is possible to breed cows to produce healthier milk. Lactation number also has an effect as first and second lactation cows produce milk with more unsaturated fat than older cows. There are also differences over a lactation; with SFA% being lower at the start of lactation, then peaking towards mid lactation before it plateaus towards the end of lactation.

How does milk yield effect fat production?

This is similar to how we calculate fat yield in kg – we need to take account of milk production as well. Applying the same method, we can calculate how much saturated or unsaturated fat has been produced in kgs. This then takes into account the dilution effect.

If I removed high saturated fat producing cows from the bulk tank, would it have an effect?

Yes it would but not enough to make it worthwhile. We looked at removing the top 5 SFA% cows for one herd and it only reducing the bulk tank SFA% by 1%. Therefore the cost of removing the milk wouldn't warrant the small benefit.

What could I feed to reduce saturated fat?

Possible feeds that will reduce SFA% include: fresh spring grass, lucerne, legumes, rapeseed, flaxseed, linseed and marine oils. C16 fat supplements can also reduce SFA% but to a lesser extent. These feedstuffs are either high in MONO unsaturates or POLY unsaturates and will therefore increase the level of oil in the diet, which reduces SFA% in milk.

But could these feeds have a toxic effect?

Potentially yes. POLY unsaturates fed at high inclusion rates can be toxic to rumen bugs and is compounded by the increasing oil% of the ration as well. Too much oil could cause a 'slick' in the rumen by coating fibre particles and preventing their digestion. Therefore, careful consideration needs to be given about how well protected the fat is from the rumen bugs and how digestible it is.

How quickly would you expect to see changes in the milk?

Milk fatty acid composition can alter within 2 days when moving from fresh grass diets to winter diets, with most changes taking place within 4 days. It is always advisable to make any feed changes gradually, rather than suddenly, to allow the rumen bugs time to adapt.

Are there other rumen effects?

Yes, the pH of the rumen has an effect on how well fats are broken down. An acidic rumen, e.g. one suffering from SARA, will not completely break down the fatty acids fed and instead produces substances that block milk fat synthesis in the udder.

Does cow health effect fat levels?

Cows that mobilise body fat, or 'milk off their backs', will release certain fatty acids into the milk, mainly mono unsaturates. This could explain why saturated fat is low at the start of lactation as most modern day dairy cows will experience negative energy balance during this period.

What should I ask my nutritionist about managing fatty acids?

Asking your feed supplier and/or nutritionist to provide a breakdown about the different type of fatty acids contained in your ration ingredients, whether they are rumen protected or not and their overall digestibility.

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There is unfortunately no simply way to improving the healthiness of your milk. However, by employing a combination of the above, greater cost benefits and improvements could be seen. For example, feeding certain cows based on their age or lactation stage a supplement to reduce SFA%, could be more cost effective to reduce the bulk tank SFA% than feeding the whole herd.

Here's a quick summary of the above:

- Fatty acids vary in chain length and number of double bonds. This is what differentiates the various fatty acids in milk into saturated, mono unsaturated and poly unsaturated fats.
- Primarily, interest lies in reducing saturated fats in milk by increasing levels of mono and poly unsaturates. Average levels for these are around 65-70%, 25-30% and 5% respectively.
- Seasonal differences occur in all systems, whereby saturated fat levels are lowest during the spring and summer months.
- Fatty acid profiles also vary during the lactation, with saturated fat at its lowest in early lactation. This could be because cow's are likely to be mobilising body fat, which in turn releases mono unsaturated fat into the milk.
- Genetics will influence individual cow fatty acid profiles and will also influence how they respond to changes in feeding.
- You can feed many different feedstuffs to alter the fatty acid profile but this is best discussed with your nutritionist. You will need to take into account the fatty acid profile of the ration to prevent any possible upsets to the rumen microbes.
- The milk fatty acid profile can alter as soon as 2 days after any feeding changes have been made.