Webinar summary: Using milk data to drive production and reproduction

This webinar explains how milk component data can be used to assess rumen stability, energy metabolism, protein use, and appetite, and how to turn that information into practical feeding decisions on pasture-based New Zealand farms. It outlines how fat, protein, protein-to-fat ratio, lactose, and milk urea interact with diet, breed and season, and how to use them together with cow sensors and herd test data to lift milk solids, cow health, and reproductive performance.

In this webinar:

1. Why kilos of milk solids per cow matter

- Component percentages are only meaningful when viewed alongside kilos of milk solids per cow; otherwise, trends can be misleading.
- Rising volume will usually dilute fat and protein percentages, so a lower percentage can still represent better performance if solids per cow are higher.
- Daily processor data, herd test results, and (in time) milk meter data all help build a clearer picture of production efficiency at cow and herd level.

2. Understanding core milk components

- Fat percentage reflects rumen stability, fibre adequacy, and the balance of volatile fatty acids (acetate, propionate, butyrate).
- Protein percentage reflects energy density, liver function, and amino acid supply, and is strongly linked to appetite and reproductive performance.
- Lactose percentage tracks closely with milk volume and indicates how “hot the fire is” in the rumen–liver system.
- Milk urea is the overflow of nitrogen that rumen microbes did not capture, influenced by non-protein nitrogen, soluble sugars, energy supply, and liver function.

3. Fat percentage and rumen stability

- The rumen prefers a pH of about 5.8–6.4; shifts outside this range upset microbial populations and can depress milk fat.
- Common stressors include low effective fibre, very fast-growing pasture, high levels of rapidly fermentable starch or sugar, excess unsaturated oil, and cow stress (social or weather-related).
- About half of milk fat is synthesised de novo in the udder from acetate and butyrate; disruptions to fibrolytic bugs or these fatty acids lower fat percentage.
- Milk fat depression is linked to rumen pH changes that alter CLA isomers and gene expression in the udder, reducing fat yield.

4. Protein percentage, appetite, and reproduction

- Protein percentage is a strong indicator of how much usable energy and amino acids reach the udder via the rumen and liver.

- Better diet balance drives gluconeogenesis in the liver, lifting glucose supply to the udder, increasing milk protein and supporting reproductive performance.
- When protein percentage rises while milk yield holds or increases, cows typically eat more, as the liver–brain feedback loop signals that the feed environment is improving.
- Poor protein balance, low soluble sugar, or high non-protein nitrogen can all limit microbial protein production and restrict protein percentage.

5. Protein-to-fat ratio – useful but easy to misread

- Protein-to-fat ratio helps flag diet imbalances: low ratios often point to energy shortfalls, while very high ratios can indicate rumen instability and depressed fat.
- Ratios can look "fine" even when both fat and protein have dropped together, masking an underlying problem with rumen function or energy delivery.
- As per-cow production increases, protein-to-fat ratio tends to rise; maintaining ratios around or above 0.8 through mating is a strong target, but can be challenging on fast spring pasture.
- Always cross-check the ratio against milk solids per cow, absolute fat and protein percentages, and recent changes in diet or pasture conditions.

6. Lactose percentage as a production and fertility signal

- Lactose percentage moves within a narrow band but tracks closely with milk volume; falling lactose usually predicts a drop in production if not corrected within one to two weeks.
- Higher lactose generally reflects better feed conversion, more consistent feed allocation, and well-managed herd competition.
- Low lactose can point to poorer diet quality, metabolic stress, udder inflammation, or ketosis, especially when supported by other indicators.
- Because lactose is driven by glucose supply, it links closely with protein percentage, energy balance, and, in turn, reproductive success.

7. Using milk urea in context

- Milk urea reflects nitrogen that was not captured by microbes and has moved through to milk and urine; it should not be read as a simple "too much protein" signal.
- High readings may result from high non-protein nitrogen, heavy nitrogen fertiliser use, or low soluble sugar limiting microbial capture of ammonia.
- Lower-producing cows (around 1.8–2.1 kg MS) should generally sit in the low- to mid-20s, while high-producing herds can tolerate slightly higher figures without true wastage or health compromise.
- Feed tests that include rumen degradable protein, undegradable protein, and amino acid profiles are becoming more available and improve diagnosis and response.

8. Practical tools and breed-specific targets

- Practical levers include rumen buffers and live yeast, effective fibre management, adjusting starch and soluble sugar sources, and improving protein quality, not just crude protein.

- Examples show that tweaking in-shed feeds (e.g. shifting the balance of wheat, DDG, and palm kernel) can lift energy density and propionate, drive appetite, and increase pasture intake.
- Jerseys, Kiwi cross, Friesian and Holstein cows have different "normal" ranges for fat, protein, protein-to-fat ratio, and milk urea at peak, so comparisons must account for liveweight and genetics.
- Future use of milk meters, AI-driven analytics, and integrated platforms such as myCOW will make it easier to pull processor data, herd tests, and sensor data together for day-to-day decisions.

For more details, watch the webinar or download the slide deck.