YEASTSOLUTIONS
ISSUE 43 - WINTER

FINE TUNING RUMEN FUNCTION = INCREASED FEED EFFICIENCY = HIGHER PROFITS

FEED EFFICIENCY AND THE RUMEN

Cereal and protein prices have continued to rise in 2021 after significant increases in 2020, which translates into higher purchased feed costs for herds this winter. Whilst farmers, feed mills and nutritionists alike have little influence over these markets, in an environment like this, optimising use of home-grown forage and maximizing feed efficiency in your herd will be crucial to ensuring that margins are maintained.

Feed efficiency is not a new term to the dairy industry – it's been around for a few decades - but it is not something commonly or routinely measured by dairy farmers. In simplest terms, it means the amount of milk produced per kg of feed or dry matter intake (DMI) and is typically standardized to 'Energy Corrected Milk'.

The feed efficiency of a herd has a large impact on whether a dairy operation is profitable or not and can also reflect environmental efficiency through reduced carbon footprint per kg of milk, as more efficient cows require less feed to produce the same volume of milk. Efficient cows will also utilise protein more effectively and convert more of it into milk, resulting in fewer losses through urine and faeces, reducing ammonia emissions as a result.

In recent years, the dairy industry has focused on genetics to improve herd efficiency, but there are many environmental, management and dietary factors that also play a pivotal role. These influencers include stage of lactation, whether the cow is grazing or housed, stocking rates in sheds, number of calvings, diet mix quality, feeding consistency, housing conditions and diet formulation, to name but a few.

Several critical nutrients such as protein, starch and sugars play a vital role in diet formulation, but forage digestibility is key in determining how much milk can be produced from home grown forages.

High quality forage is the cornerstone of any profitable dairy system, forming more than 50% of a cow's diet. Typically, the higher the quality of your forage, the more milk that can be produced from it and less concentrate required for a given level of yield. However, the inclusion level of silages in a winter-based diet is largely dictated by the digestibility of the forage and the neutral detergent fibre (NDF) content.

Silages of lower digestibility will limit performance as these forages typically have a higher stem-to-leaf ratio and take longer to be digested by the rumen bugs. This results in a slower passage rate of feed through the rumen of the cow, which in turn limits dry matter intakes and negatively impacts feed efficiency. This is wholly undesirable for high performing herds, especially during early and mid-lactation when feed intake is critical to support higher milk production.

Dairy diets are typically formulated to an overall NDF level of 32-35% NDF for both forage and concentrate, with 24-26% of this coming from forage. In simple terms, the lower the NDF level of a forage, the higher volume of that forage can be included in the diet without exceeding the overall diet threshold. As a guide, forages that have an NDF level of 42-44% or a digestibility value of greater than 72 allow for relatively high inclusions and will typically feed quite well.

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Phileo by Lesaffre

Significant variability is often seen when moving through clamps of silage, so it is essential to continue to regularly analyse silages over the winter to ensure formulated diets remain accurate. Significant changes to a forage nutrient profile can also impact animal performance as the rumen microbes, or rumen bugs, try to adapt - reducing feed efficiency and milk output in the process.

Measuring feed efficiency

While measuring feed efficiency precisely at farm level is difficult, monitoring forage dry matter and overall herd intake on a daily basis (including both from the diet feeder and parlour feeding) can give us a good idea of efficiency levels within the herd.

If a cow consumes 23 kg of DM per day and yields 41 litres of energy corrected milk, her feed efficiency is 1.8 kg ECM per kg of DMI. As a rule of thumb, this is a good level of feed efficiency during peak milk yield, while a feed efficiency of 1.5 is good for a herd at 180 -200 days in milk.

Feed efficiency should be measured alongside body condition score and conception rate to first service, particularly for cows in the first 100 days of lactation because we don't want high levels of milk yield to lead to bodyweight loss, as this will negatively impact on fertility. We ultimately want high levels of feed intake and digestibility to drive milk yield, thereby driving feed efficiency and actually minimizing bodyweight loss in early lactation.

Top Tips: Maximising feed efficiency with Cow Signals

1) Maximise cow comfort: For each cow, include 60cm feed space, 1 cubicle bed and 20cm of water trough space. Provide adequate lighting and ventilation and ensure head feed rails are adjusted to the appropriate height.

2) Ensure the diet is correctly balanced, properly mived and consistently fed. Don't overfill diet feeders, ensure feed passages are clean and remove mouldy, rotten or heating feed.

3) Make changes between forages over 2-3 weeks and introduce concentrate gradually to post-calving cows.

4) Analyse forages on a monthly basis. Significant variation in forage quality will challenge rumen microbes and rumen function, leading to performance setbacks and incorrect nutrient supply.

5) Monitor Cow Signals: Check dung for consistency and digestion of fibre. Look for cows to spend 12-14 hours per day lying in their bed and to ruminate for more than 8 hours per day.

Importance of Cow Comfort

As prey animals, cows naturally synchronise behaviours like eating, drinking and laying down with others in the herd. If head feed space, cubicle space or cow flow is limited, dominant animals in the group will access feed, beds and water first, often at the expense of others. This will cause more submissive animals, including heifers, to lie down less and consume larger meals at each visit, which can negatively affect rumen function, performance, health and ultimately feed efficiency.

"We have included Actisaf in the cows' diet for the last 6 years and it is in their feed year-round. By keeping the rumen functioning well, the cows can utilise the grass better and are able to manage diet changes more easily. It's worked brilliantly to drive performance from forage and keeps the cows happy in our system."

Jon Barber, Shropshire

Blood flow to the udder increases by 30% when cows are lying down, and cows should ideally spend 12 hours/day doing so. Research has shown that for every extra hour a cow spends resting and chewing the cud, an additional litre of milk is produced, demonstrating the importance of providing one comfortable cubicle per cow with ample access (e.g. no dead ends in buildings whereby dominant animals can block submissive animals from lying).

Research by Deming et al., 2013, showed that, daily lying time in robotic herds was positively associated with providing more feed space and increased frequency of feed push-ups. Additionally, they found that cows had greater milk yield when provided with greater head feed space.

The role of the rumen bugs

Feeding a balanced diet is essential to maximise rumen function and, by extension, optimise feed efficiency. The rumen is essentially the engine room of the cow, packed with billions of microbes that work together to extract nutrients from the diet, including up to 80% of the energy and 65% of the protein that is required for maintenance, milk production and fertility. Without a balanced diet, the rumen environment for these microbes is not optimised, which can cause digestion and cow performance to suffer hugely.

Recent research into the rumen microbiome has identified specific microbes that are linked with high levels of feed efficiency in dairy herds. One study found that early lactation cows with higher levels of key rumen bacteria, who utilise lactic acid and digest fibre, had up to 2.6 kg DM lower feed intake than in comparable cows of similar age and size, for the same level of milk production.

With other research confirming these findings, it is now thought that the population of microbes in the rumen has a significant effect - possibly more than 50% - on the feed efficiency of dairy herds.

MAKE THE MOST OF EVERY BITE

With the cost of bought-in feed rising, every bite counts when it comes to milk production and profitability.

Actisaf® Sc 47 live yeast is scientifically proven to support rumen function and drive feed efficiency in even the highest performing cows.

Research has shown that feeding Actisaf at 10 grams per cow per day delivers up to **5.9% more energy corrected milk** from the same amount of feed - without affecting cow health, fertility or body condition.

Adding **Actisaf® live yeast** to you dairy ration can **return up to 8x your investment**, and improving feed efficiency is key to delivering improved environmental sustainability. Can you afford not to use Actisaf this winter?

ActiSaf Sc 47

Learn more at
www.yeastsolutions.co.uk
or call us at 028 9334 3900.

"We added Actisaf to our milking cow diet to help with rumen function and deal with diet changes, and you could really see the difference in their behaviour, their manure and, more importantly, their yields. Since adding the Actisaf our butterfat levels have risen from 3.9% to 4.1%!""

Simon Davies, Camarthenshire

Improving efficiency with Actisaf® live yeast

Actisaf® Sc 47 live yeast creates a more favourable rumen environment and stimulates the key lactic acid utilising and fibre digesting bugs, the exact same categories that are highly correlated with feed efficiency in the study previously outlined. This mode of action also helps rumen microbes adapt during changes in forage composition – reducing setbacks and helping cows maintain milk production *(See Figure 1)*.

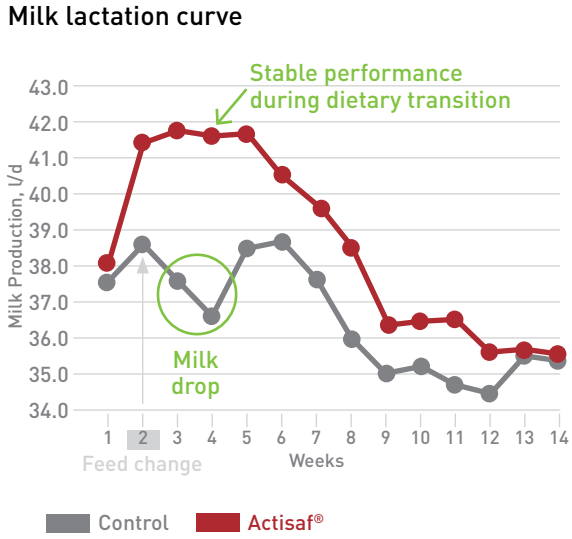

Figure 1: Effect of Actisaf® vs control during change in grass silage clamps

By supporting the growth of beneficial microbes, feeding Actisaf® also leads to increased digestion of fibre and more milk from forage. This was recently evidenced in a study from the University of Nottingham, which found that Actisaf® increased feed efficiency by 5.5% of a high performing (13,000 litres/cow/year), early lactation herd. This was achieved primarily through increased digestion of fibre, which yielded an extra 5.9% of energy corrected milk with no change in feed intakes. *(See Figures 2 & 3)*.

	Control	Actisaf	Diff.	p-Value
Milk yield, kg/d	47.5	50.1	+2.6	0.033
Energy-Corrected Milk, kg/d	47.7	50.5	+2.8	0.009
Fat-Corrected Milk, kg/d	46.3	49.2	+2.9	0.008
Fat, g/d	1823	1945	+122	0.022
Protein, g/d	1521	1593	+72	0.06
Lactose, g/d	2236	2342	+106	0.066

Figure 2: Effect of Actisaf® vs Control on Milk Production of high performing Holstein-Friesians

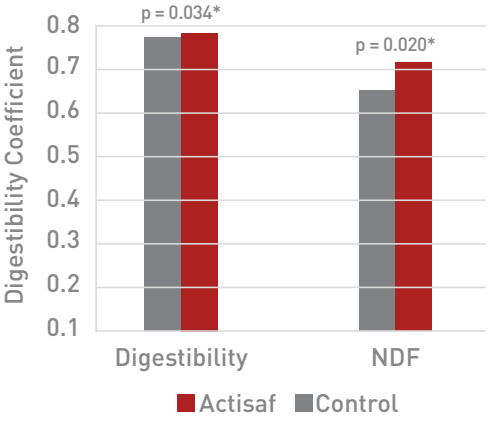

Figure 3: Effect of Actisaf® vs Control on Digestibility Coefficient of high performing Holstein-Friesians

Summary

- Feed efficiency is influenced by genetics, health, diet and cow comfort.
- As the organ responsible for digesting feed, optimising efficiency of the rumen is essential if we are to harness as much available nutrients in the diet as possible.
- Actisaf encourages a more efficient rumen environment, leading to more nutrients being unlocked from feed and in turn more milk from every bite.
- **By improving feed efficiency of even the highest performing herds, Actisaf can provide a return on investment of up to 8 times the cost of adding it to your herd's diet.**