



THE ROLE OF RUMEN MICROBES IN NET ZERO

Under pressure from all sides, the dairy industry is exploring ways to reduce its environmental impact, while also maintaining production and profitability. Kevin Doyle, technical manager for Phileo UK & Ireland, explains the role that rumen microbes can play...

The rumen microbiome plays a vital role in global food security

Ruminants are a vital asset to our society through their ability to convert non-human digestible fibre and protein into nutrient dense meat and milk to feed the global population. It is acknowledged that "the rumen microbiome is estimated to be responsible for digesting around ten thousand million tonnes of cellulosic material worldwide to provide milk and meat for 7.6 billion people"¹.

Cattle on average produce 1kg of human edible protein from every 600g edible protein they consume, which in turn is of a

higher nutrient content and can also contribute to the circular bioeconomy by utilising waste from non-animal agriculture (such as byproducts from plant based food production). This makes them vital to our future food security as the global population grows, however, it also comes at a cost.

The FAO urges for efficiency

The cattle industry (beef and dairy) has been highlighted as the largest source of agriculture's Co2 emissions (65%) globally, with feed production and processing (45%) and enteric fermentation (39%) as leading contributors. The remaining emissions attributed to cattle come from manure storage,

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processing, and transportation. The Food and Agriculture Organisation of the United Nations (FAO) has stated² there is a significant link between greenhouse gas emissions per kilogram of meat and milk, and the efficiency of production.

To make the biggest impact on emissions therefore, we need to look at efficiencies in both enteric fermentation and feed production and utilisation.

Feed efficiency has a significant impact on emissions intensities

Feed efficiency can support both a reduction in emissions from feed production and enteric fermentation. The concept is simple – if feed is digested more efficiently, less of it is needed, and animals can reach production or growth targets more easily. This allows us to produce more meat and milk using fewer inputs, reducing natural resource use, greenhouse gas emissions and nutrient use in the form of Nitrogen and Phosphorus, important for both air and water quality.

With feed and forage representing the largest costs on livestock farms, feed efficiency also has the potential to lower the cost of production significantly.

If feed efficiency has a significant impact on emissions, it's the rumen microbiome which has the biggest impact on feed efficiency – more than 50% of a cow's feed efficiency is governed by microbial community in her rumen. Thanks to recent research, we can now identify those groups of microbes associated with more efficient animals, and we can encourage their growth throughout the lactation cycle.

It can therefore pay to always consider the impact of diet and changes in diet on the microbes in your cow's rumen and not just focus on nutrient content. We can therefore add microbiologist to the many skills a farmer needs to do their job!

How do we harness the 'right' microbes in the rumen?

Actisaf[®] Sc47 live yeast supports growth of specific species of rumen microbes that are highly correlated with fibre digestion, acid utilisation and ultimately feed efficiency. These microbes extract more nutrients from the diet and buffer the rumen by converting lactic acid into propionic acid – a vital source of glucose in the rumen which is often wasted.

Through encouraging these beneficial microbes to thrive, Actisaf[®] is proven to process lactic acid more effectively than sodium bicarbonate which simply neutralises lactic acid and does not facilitate the conversion to propionate which means you miss out on a valuable glucose source. This better conversion of lactic acid also means the risk of acidosis or sick stomachs in herds is significantly reduced – which means less risk of drops in yield.

Actisaf[®] Sc47 also allows the rumen microbiome to adapt more readily to changes in diet by creating an environment that allows microbes to adapt to changes in feed, such as turning out to grass, changes in silages etc. which often upsets the microbiome and causes setbacks in performance.

A 2020 study from the University of Nottingham found that supplementing Actisaf[®] in a high performing herd in the first four months of lactation increased feed efficiency by 5.5%. This was achieved primarily through increased digestion of fibre in the rumen, which yielded an extra 5.9% (or 2.8kg) of energy corrected milk with no change in feed intakes or body condition loss – providing an 8:1 return on the cost of Actisaf[®].

Effectively, the cows reached higher peak yield, which translated to up to 580L of extra milk per 305-day lactation - lowering cost of production by more than 1 ppl. For a farm supplying one million litres a year, this equates to £10,000 per year.

A more efficient and profitable industry is a more sustainable one. If we harness the power of the ruminant digestive tract, we can minimise farming's impact on the natural environment and improve resource use efficiency.

1. Delgado et al., 2019

2. FAO, Tackling climate change through livestock: A global assessment of emissions and mitigation opportunities

MAKE THE MOST OF EVERY BITE



PERMITTED FOR USE IN ORGANIC FARMING SYSTEMS

Want to lower production costs per litre by increasing feed efficiency?

With record high costs for purchased feed, the efficiency with which cows convert feed to milk is more critical than ever. Every bite counts!

Actisaf[®] Sc 47 live yeast is scientifically proven to enhance rumen function and drive feed efficiency in even the highest performing cows. This means your herd can extract more energy from their diet, allowing them to produce more milk.

Trial work with the University of Nottingham's dairy herd showed that feeding 10g/day of Actisaf[®] resulted in a 2.8kg increase in energy corrected milk at peak lactation, using the same amount of feed without affecting cow health, fertility or body condition.

This increase in peak yield can translate to up to 580kg of extra milk per 305-day lactation - lowering cost of production by more than 1ppl.

For a farm supplying 1 million litres, this equates to £10,000 per year.

ActiSaf^{Sc 47}

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



MANAGING THE RUMEN ON SPRING GRASS

Turnout and lush spring grass can be a relief when silage stores are being challenged, but this also brings a sharp change in diet, which can negatively impact yields. And like all of us, rumen microbes need time to adjust to change.

Take it steady when transitioning to grass

Moisture content of grass varies drastically in spring, which will considerably affect intakes depending on weather, but also changes in grass nutrient profile as we move from covers carried over through the first and second rotations. This risks condition loss if grass is relied upon too early or too quickly. Ensure that cows are eased onto grazing, starting with 2-3 hours per day and increasing this steadily over a three-week period. Even a few hours of on/off grazing by day, when weather conditions allow, will mean that the rumen bugs can adapt to fresh grass. Cows should be able to consume 5kg DM in approximately 3 hours in suitable swards and weather conditions.

Monitor body condition score

A cow in early lactation will always prioritise milk production over her own health when it comes to energy and nutrient allocation. If spring grass nutrient content, availability and dry matter intake potential does not cover yield requirements, she will mobilise energy from elsewhere in her body to make up this deficit, and her body condition score will drop and potentially cause problems with fertility. She will also fail to fully realise peak milk supply, which in turn dictates the volume of milk and constituents produced through the whole lactation. Cows losing body condition can also point to a possible metabolic disorder, health issue or sub-optimal rumen function.

Listen to what the cows are telling you

Assess rumen fill 2-3 hours after milking to determine whether adequate grass has been allocated. Monitor cudging rate – you are looking for more than 65% of the herd to be lying down, chewing the cud 2-3 hours after milking. Check dung consistency – loose, bubbly dung with undigested fibre in it is indicative of poor rumen function, as is the presence of cud balls in collecting yards or cubicles.

Support the rumen

Adding Actisaf® live yeast to your cows' rations will reduce setbacks in performance at turnout by helping the rumen microbes adjust to grazed grass faster and more effectively, thereby improving rumen function. Actisaf® also reduces the risk of SARA, both at turnout and throughout the grazing period, and stabilises rumen function to promote milk solids and milk yield.

ACTISAF IN ACTION

Holebrook Farm, Shropshire

Tom and George Hanmer feed Actisaf to their dairy herd during peak lactation. "We're happy with the results. Our cows keep good condition, good cudging rates and production is where we want it. The muck looks well digested, there are no bubbles on the surface, so we feel confident the rumen is working well – plus we're achieving 76% of our milk from forage."

