Using Actisaf® Sc 47 at grass

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Phileo
LESAFFRE ANIMAL CARE

What is Actisaf®?

- Actisaf® is a **live yeast** of the species Saccharomyces cerevisiae.
- Yeast are **single cell organisms** which are classified as fungi.
- The most common use of live yeast is in the **making of bread**.
- Yeast ferments carbohydrates to **produce carbon dioxide** and it is this process that is so useful - by respiring oxygen, and producing carbon dioxide it causes the bread to rise.
- It is this same property of yeast - **the consumption of oxygen** - that makes it so useful when feeding ruminants such as dairy cows and beef animals.

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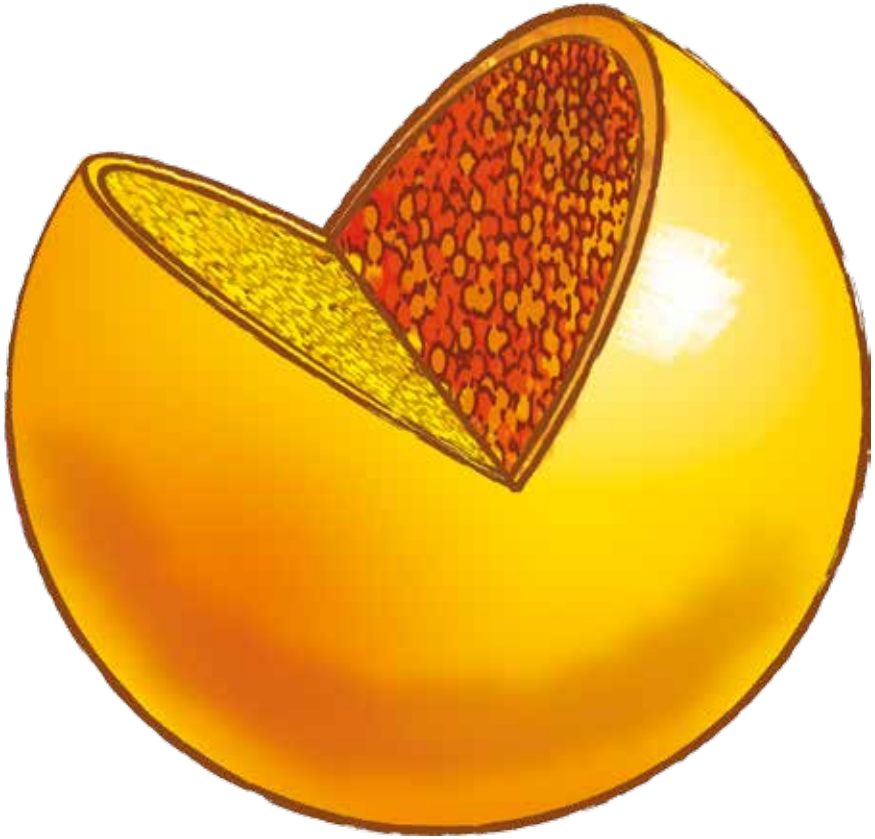
One gram of Actisaf contains **10 billion live cells**.

An Actisaf yeast prill is a bit like a Malteser - t**he unique drying process results in a layer of dead cells** around the edge of the prill (like the chocolate on the Malteser!) that **protect the live yeast cells within.**



The stability afforded by the coating of dead cells ensures that Actisaf is the **most heat stable live yeast** available, making it ideal for incorporation into pelleted feed through a mill.

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- Actisaf is produced by Phileo Lesaffre Animal Care, part of Lesaffre, the world's largest manufacturer of yeast. Around **40% of the world's yeast** is made by Lesaffre!

- Actisaf is produced by a **fermentation process** in the production plant in Lille.

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Why feed grass?

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The nutritional benefits of spring grass

Grass analysis - May

	Sample 1	Sample 2
Dry matter %	22.0	17.7
D-Value	76	74
ME-MJ/kg	11.8	11.5
NDF %	42.6	38.5
Sugar %	21.4	14.3

Taking the average digestibility of the above samples, for a cow consuming 17 kg DM of grazed grass she will consume sufficient energy to support maintenance plus a milk yield of 26 litres

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The digestion of spring grass in the rumen

- The rumen is a **large fermentation chamber** (similar to an anaerobic digester) that is packed **full of microbes.**
- These rumen microbes digest grass, forages and cereals **to make energy available to the cow**, as well as **synthesising microbial protein from ammonia**, which is essential for milk production, fertility and maintenance.
- The rumen microbes **require a low oxygen environment** and rumen pH to be kept between 6.0 - 7.0 so that they can **optimise feed digestion** and hence the production of energy and the creation of microbial protein.

The rumen is around 120 litres in size - about the same as a wheelie bin!

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The financial benefit of spring grass

Dietary cost to sustain maintenance plus 30 litres (spring 2016)

	Indoor	Grazing plus buffer and parlour feed	Grazing & parlour feed
Grass silage (11.0 Mj / kg DM)	12		
Blend (13.0 Mj / kg DM)	6		
Compound (13.3 Mj / kg DM)	1.7	5.2	5.7
Maize silage (11.5 Mj / kg DM)		4.5	
Grazed grass (11.5 Mj / kg DM)		10	14
Total DM intake	19.7	19.7	19.7
Diet cost / hd / £ / day	2.82 (€3.58)	2.47 (€3.14)	2.28 (€2.90)
Diet cost £ / day / 100 cow herd	282 (€358)	247 (€314)	228 (€290)

Each day spent grazing represents a dietary saving of £0.54 / cow / day or £54 / day for a 100 cow herd

Grazed grass @ £70/tonne DM (€89/t)
Grass silage @ £100/tonne DM (€127/t)
Maize silage @ £130/tonne DM (€165/t)
Blend @ £180/tonne fresh (€229/t)
Compound @ £200/tonne fresh (€254/t)

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But grazed grass has its limitations!

- **The dry matter and nutrient analysis of grass is highly unpredictable** and can fluctuate from morning to evening, let alone over the course of a week.
- This variability makes it **extremely difficult to predict dry matter intake** from grass and the intake of essential nutrients such as energy, protein, oil and fibre.
- **Lush spring grass can contain relatively high levels of crude protein (25%+).** Protein is degraded to ammonia in the rumen and the microbes use it to create microbial protein. **Excess ammonia breakdown in the rumen increases:**
    - Energy deficit in early lactation
    - Body condition loss
    - Ketosis
    - Embryo mortality

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But grazed grass has its limitations!

- **Grass swards can also contain a high sugar %**, which is beneficial for milk yield and solids.
- **Excess sugar in the grass, coupled with low effective fibre (stem) can adversely impact on rumen health and function.** Also, continuously grazing wet grass can pose problems for dairy cows.
- For example a cow consuming 15 kg DM of grass at 13% sugars would be consuming 1.95 kg of sugar which is the equivalent of feeding 17 kg fresh weight of fodder beet:

Amount of grass fed	% sugar	kg sugar/day	Equivalent fodder beet (kg) fresh
15kg DM	13.00	1.95	17

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- **Grass high in sugars is rapidly fermented by the rumen microbes**, which can contribute to a sharp decrease in rumen pH.
- **Low grass fibre levels limit rumen scratch factor leading to reduced rumination, saliva flow and ultimately rumen buffering**, which also contributes to a decline in rumen pH

Sub optimal rumen pH leads to the development of acidosis

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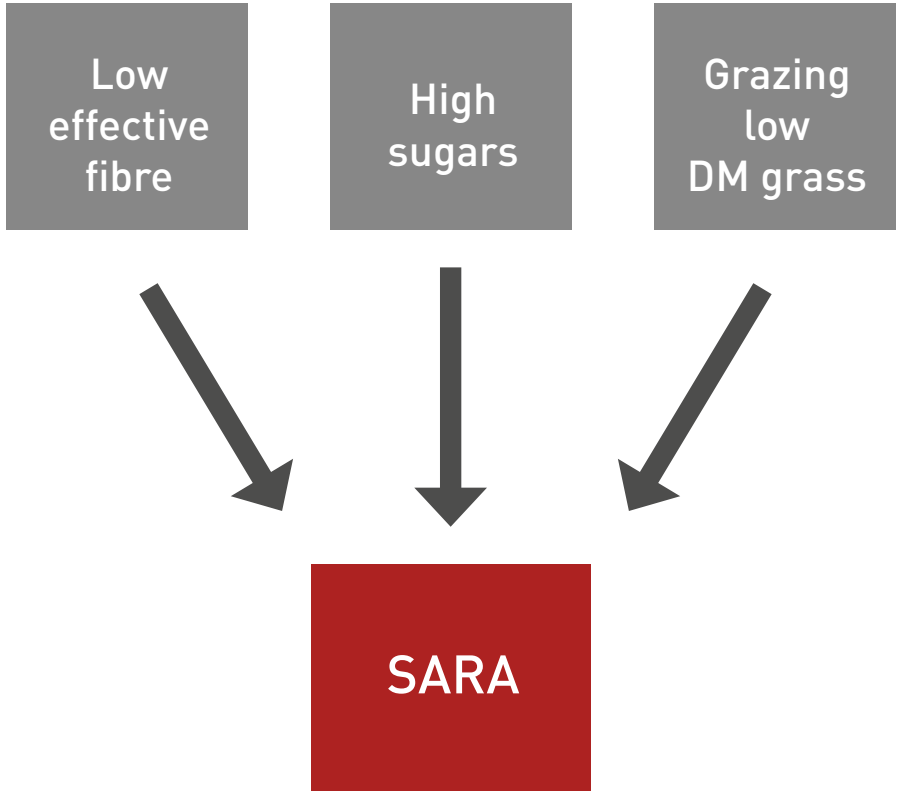
Sub-Acute Rumen Acidosis (SARA) at grass

- **The rapid fermentation of grass high in sugars, with low effective fibre content causes lactic acid to build up in the rumen.** This accumulation of lactic acid causes rumen pH to decrease and when it drops into the range of pH 6.0 down to 5.0 sub-acute rumen acidosis, more commonly termed SARA, develops.

- **SARA is a common occurrence at grass where rumen pH dips below pH 6.0** for a prolonged period of time after the ingestion of leafy grass, thereby killing fibre- and starch-digesting bacteria, which has the knock-on effect of reducing feed digestion and energy output from the rumen.



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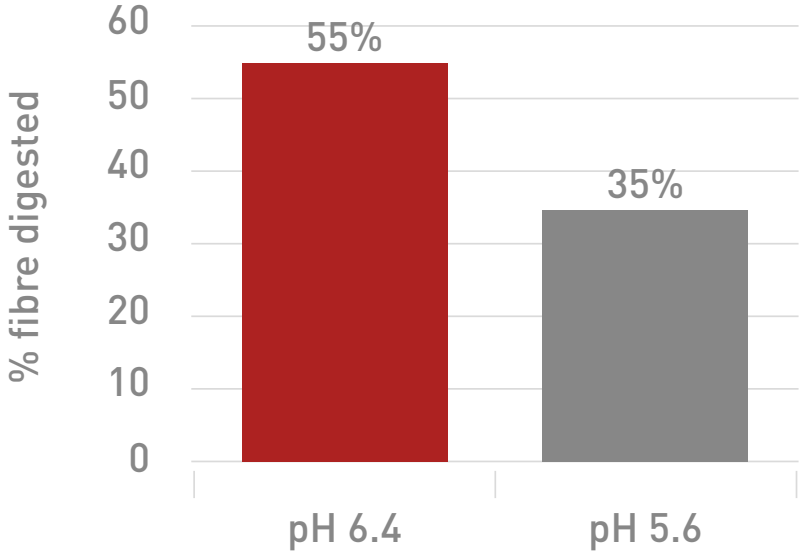
Supporting published trial work

Trial work carried out by Wales et al. 2001

- **Dairy cows** grazing 15.6kg DM of a ryegrass and clover sward were found to have a **mean rumen pH of 5.9**.
- **At a pH of 6.4 the rumen bacteria digest about 55% of the fibre**, whereas at a pH of 5.6 this falls to around 35%.



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Supporting published trial work

In a study conducted at UCD in 2006 on 12 spring calving herds at grass:

- **11% of cows had a rumen pH of less than 5.5 (SARA)**
- **53% of cows had a rumen pH less than 5.8** - too low for optimal feed digestion and intake

These cows were fed grazed grass, containing sugar levels in the range of 10.1-12.7% and cows fed less than 2kg of concentrate/cow/day.

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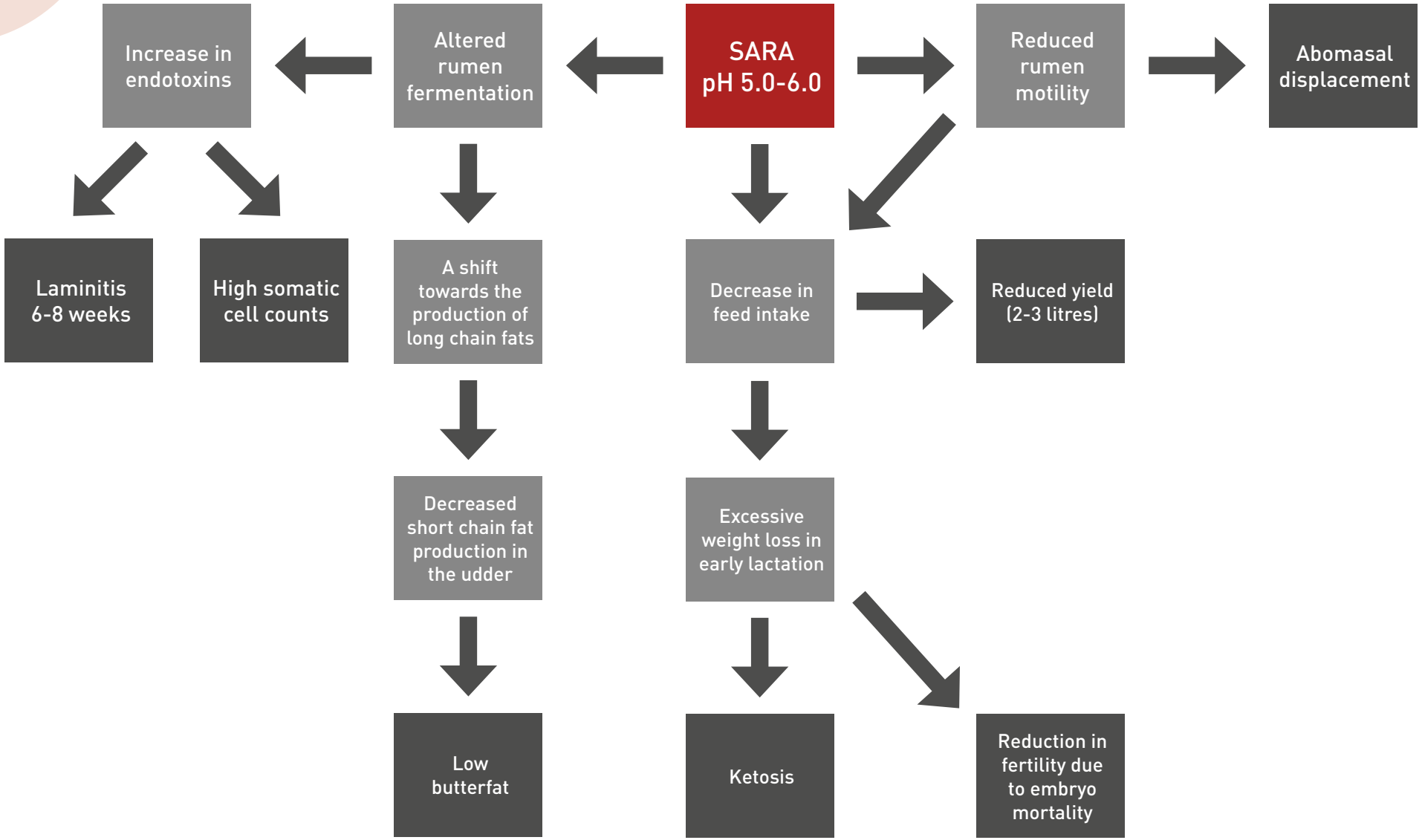
SARA and associated issues...



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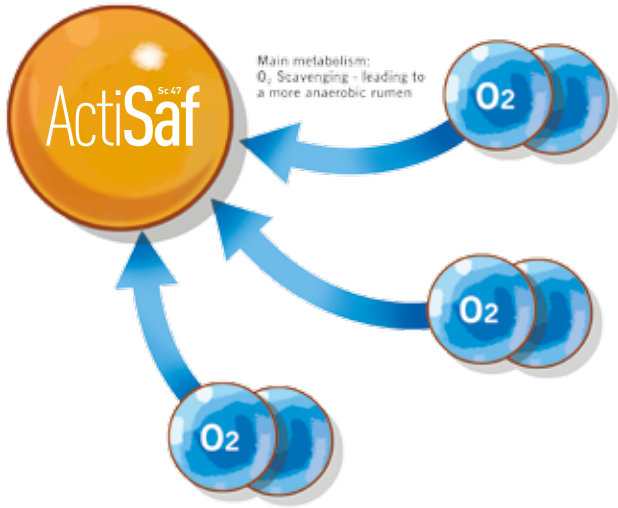
How does Actisaf work in the rumen?

- **The rumen is continually challenged by oxygen.** Oxygen, while it is there, is toxic to the bacteria in the rumen
- Actisaf is a live yeast that uses up oxygen, enhancing the rumen environment
    - **The removal of O2 from the rumen results in the growth of fibre-digesting bacteria and lactate-utilising bacteria,** increasing feed digestion and stabilising rumen pH, which prevents SARA from developing
    - **The removal of O2 increases the hydrogen concentration in the rumen,** which then reacts with lactate to produce propionate, a volatile fatty acid (VFA) that optimises milk yield and lean meat production
    - **Actisaf also increases ammonia utilisation by the rumen microbes,** which increases microbial protein production
    - **Five grams of Actisaf has been proven to have the equivalent buffering effect of 150 grams of sodium bicarbonate,** thereby stabilising rumen pH.



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Identifying SARA at grass...

- **Low butterfats at grass are indicative of sub-acute rumen acidosis.** Rule of thumb: if a Holstein has a butterfat percentage of less than 3.6 and a Jersey less than 5.0 it is worth investigating further.

Further indicators of SARA at grass:

- **If greater than 10% of the herd** have a higher milk protein than milk fat.
- **A rapid fall in fat percentage of 0.3%-0.5%** occurs in a week.
- **A sudden fall in milk protein of greater than 0.3%** occurs in a week.
- **A fat to protein ratio of less than or equal to 1.1 to 1**
- **Review average bulk milk samples with caution.** Individual milk records can highlight the range of butterfat percentages across the herd.

Individual milk recording can help to identify the range of butterfat levels in the herd

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Identifying SARA at grass - what is the cow telling you?

Observe rumen fill 3-4 hours after milking - SARA will reduce the digestive ability of the rumen microbes, reducing feed intakes

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Identifying SARA at grass - dung

Normal dung, indicative of normal rumen fermentation pattern

Gas bubbles and loose dung, indicative of excess lactic acid production in the rumen

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Identifying SARA at grass - ruminating

Aim for more than 65% of the herd to be ruminating at any one time. A content cow, chewing the cud, is indicative of good rumen health and function

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Summary

- **SARA is just as likely to occur when grazing high quality grass** as when feeding energy-dense winter rations
- **If butterfat levels fall, or butterfat falls below protein level** then this is a warning sign
- **Look our for other warning signs** such as loose, bubbly dung and poor rumination
- **Actisaf fed in conjunction with grazing swards** replicates the effect of including structural fibre in the diet.

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