LALLEMAND ANIMAL NUTRITION

SPECIFIC FOR YOUR SUCCESS

IN THE MIX

AUTUMN 2021

#54

See you at Beef Australia

BEEF 2021 | ROCKHAMPTON AUSTRALIA MAY 2-8

SPECIFIC FOR YOUR SUCCESS

IN THE MIX #54

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Honoured in the US by industry legend

A plaque honouring the late Trevor Schoorl takes pride of place at North Florida Holsteins. Pictured with the plaque is Don Bennink. Don described Trevor as "very talented, intelligent and personable individual who always thought about others." "The example he set showed us we really can make our world a better place."

Welcome

What an amazing time we find ourselves in! Are we coming to the end of the Pandemic with the arrival of vaccines? How long with the rain stick around? Did I grow and store enough forage (as silage) for my future proofed business? When will extensive travel reopen? There are still a number of uncertainties in our day to day lives. We should never stop looking for solutions to make our decision making process easier, whether its different bacterial strains to drive different silage outcomes that deliver more flexibility or novel biological solutions in poultry looking at Biofilms and housing hygiene, or perhaps intra-ruminal devices that give you precise and accurate data to make decisions on nutrition, health or reproduction. It's exciting to see the industry adopting new technology across all aspects of agriculture, from extensive, to intensive to domestic livestock.

Alex Turney - Country Manager

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S. boulardii is the most documented probiotic yeast in human medicine

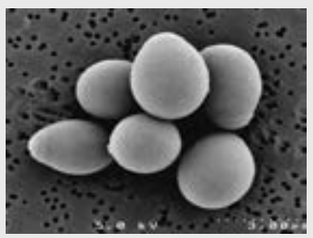
The benefits of the probiotic yeast *Saccharomyces cerevisiae boulardii* CNCM I-1079 (LEVUCELL SB) in monogastric animals are well known. Even before being used in feed, this live yeast proved itself in human medicine. Discovered 100 years ago, this unique yeast remains actively documented today as new areas of applications are still emerging.

The story started in 1920 in Vietnam. A traditional Asian medicine (an infusion of lychee hulls) was effective against infant diarrhea, which caught the interest of French physician Henri Boulard. Committed to identifying the active ingredient of this ancestral medicine, he discovered and isolated a particular type of yeast and named it "boulardii."

It was only in 1962 that the first form of boulardii active yeast was recognised and marketed as a probiotic in human medicine.

Since then, a huge amount of fundamental research has been generated on its mode of action and application in human medicine. Today, gut health remains the primary area of where the effects of boulardii are documented. However, research has also shown benefits to immunity, skin health and there are promising results on metabolism.

To learn more about *S. boulardii* in human medicine, visit the website: www.sboulardiibylallemand.com



Saccharomyces cerevisiae boulardii CNCM I-1079 .

3 questions to Caroline Achard on metagenomics

Caroline Achard is a research scientist at the Lallemand Monogastric Center of Excellence in Toulouse, and she is an expert in molecular biology and metagenomics.

How can we link metagenomics studies to microorganisms' functions?

Metagenomics is a great tool to predict the potential functions of the bacteria present in an ecosystem, based on the comparison of functional pathways database. It is important to keep in mind that these databases are generated and maintained thanks to what was observed for cultivable representative strains of bacteria. In order to confirm that these functions are really expressed, we are using other techniques such as metabolomics, which is the characterisation of an entire set of metabolites synthetized by the microbiota.

Can you share some of the most recent results you have been working on?

Using 16S rRNA sequencing analyses, we have demonstrated that feeding the probiotic yeast *Saccharomyces cerevisiae boulardii* CNCM I-1079 (LEVUCELL SB) to sows during gestation and lactation had a beneficial impact on the gut microbiota composition as reflected in sow performance. Interestingly, it also modulated the microbiota of the piglets. This so-called maternal imprinting on the piglet microbiota lasted even after weaning and is associated with improved piglet performance. Our team is currently conducting studies in all the applications we cover with our solutions, in various species of microbiota, but also in silage or animal environments.

Caroline, we see more and more metagenomics studies, what does it bring animal production in practice?

It is well accepted today that the gut microbiota interacts closely with its host and plays a crucial role in the maintenance of gut health. In humans, microbiota imbalance has been associated with multiple disorders and diseases. We believe that the establishment of a beneficial microbiota in young animals can improve robustness, health, and finally lead to better performance. It is thus important to have a better understanding of the microbiota dynamics. Metagenomics studies give us a better insight about the composition and the potential function of the microbiota. Most of the studies published today are using amplicon sequencing, also called barcoding or 16S rRNA sequencing. Such studies use only one marker gene, as some kind of bacteria ID cards. They give us access to the composition of the microbiota without the need for a complete sequencing of the metagenome. These studies help us better understand the impact of our solutions on the host microbiota and potentially discover the solutions of tomorrow.

Automatic heat detection makes life easy

The use of an innovative bolus-based heat detection and cow health monitoring system has boosted first and second round conception rates by up to 25% in one Gippsland dairy herd.

Rodney and Steph Goode, who milk about 380 registered Jersey and Holstein cows at Poowong North, VIC, adopted the smaXtec system about two years ago.

Developed in Europe, it utilises rumen boluses to monitor body temperature, animal activity and water/feed intake around-the-clock as a means of predicting heat, calving, heat stress and a range of illnesses, such as mastitis, lameness or pneumonia.

Data is collected by sensors mounted in the dairy or around the farm and then transferred to a base station via repeaters, and ultimately, to a 'cloud' database.

Individual cow and herd reports, including alerts and recommended actions, are then forwarded to authorised users instantly via smartphone, tablet or computer.

A second bolus can be administered to a smaller sample of cows to monitor rumen pH as an indicator of sub-clinical acidosis.

Rodney and Steph were quick to adopt the system once it became available in Australia.

Their split autumn-spring calving herd has an average production of 580 kg milk solids, achieved from an intensive grain-based ration and a silage-based PMR during summer and autumn.

Like many high production herds, achieving high levels of conception early in the lactation can be difficult.

"We were looking to improve our heat detection," Rodney says.

"We employ a lot of backpackers and it's not realistic to be relying on them for heat detection.

"Automation makes the process incredibly accurate and as easy as possible.

"The data for each cow is uploaded to our Easy Dairy herd management system as soon as it comes into the dairy.

"Any cow that is on heat is automatically drafted after milking so there is no chance of missing a heat.

"I'd say we've increased our 60-day pregnancy rates by 25%."

The smaXtec system also plays a major role in the Goode's mastitis program.

The Goodes' 'front-line' defence is an automatic teat dipping and flushing system installed in their 25-a-side swing-over Herringbone dairy.

"This system has had an obvious improvement in the health of our cows," Rodney says.

"Teat condition has improved, with very little cracking; there has been a significant reduction in somatic cell count; and we have nearly halved our clinical cases of mastitis.

"This has direct economic benefits – we have reduced our use of antibiotics, the need for veterinary intervention and our cows are staying in the herd longer.

"Plus, it saves time.

"There are only two of us working here full-time so having fewer cases of mastitis means we can get other things done.

"I reckon we save about 20 minutes each milking and that adds up to more than four hours every week.

"Like our heat detection system, it's fully automatic so we get the same result no matter who's working in the dairy each day."

smaXtec forms the second line of defence against mastitis by detecting any cows with an elevated temperature.

"Whenever we get a temperature alert, mastitis is the first thing we test for and that means we can treat before there are any clinical symptoms," he says.

"Overall, smaXtec has easily paid for itself several times over.

"We are about to install a second sensor down in the paddock so we can get a better handle on the heat status of our cows in real time rather than twice-daily.

"Sometimes the mating window can be only a matter of hours, so being able to detect heat earlier will allow us to get cows mated at the best time."

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Fall armyworm on the march

Fall armyworm descimates crop in the Northern Territority, rendering them a non-viable forage source.

The dreaded fall armyworm is making its presence felt across many states in Australia. Left unchecked, the larvae of this unwelcome pest can cause significant and rapid damage in a wide range of crops, including corn, sorghum, cane, rice, cotton and vegetables.

Lallemand Animal Nutrition Technical Services Manager, Jordan Minniecon, reports there is 'intense' insect pressure across areas of QLD, NT and NNSW.

"Producers are making multiple applications of insecticide to protect their crops but they are still scrambling to stay on top of this pest," he says.

"Sorghum and corn crops may well become non-viable forage sources. In some cases, producers are going to cut and wilt sorghum crops for silage because the insect pressure and the expense of spraying through to maturity are too great.

"The main thing is to check crops regularly to detect the early stages of infestation and then act as quickly as possible. Towards the end of the season, it is important to be vigilant with withholding periods."

Symptoms include leaf damage, such as pinholes, windowing, tattered leaf margins, skeletisation and defoliation, and chewing damage to fruits and vegetables.

Eggs are pale yellow in colour and 0.4 mm in diameter and 0.3 mm in height. They are laid in furry 'egg masses', each of 100 to 200 eggs, that stick to foliage.

Larvae are light green to brown in colour with a larger and darker head. As they develop, they become darker with white lengthwise stripes and dark spots with spines. Older larvae are 30–36 mm long and have a distinctive pattern of four spots on the second to last body segment and an inverted 'Y' pattern on their heads.

Pupae are red-brown in colour, 14 to 18 mm in length and approximately 4.5 mm wide. Pupation mostly occurs in soil under the host plant and occasionally in host vegetation. Fall armyworm do not hibernate during winter and cannot survive temperatures below 10°C.

Adult moths have a brown or grey forewing, a white hindwing and a wingspan of 32 to 40 mm. Male fall armyworms have more patterns and a distinct white spot on each forewing. Adults have been known to fly long distances and migrate quickly, particularly with strong wind.

Take a critical look at your open silage today

When you open up your new silage pit, it is a good time to assess both the silage and the management decisions that got it there. Deciding what went right, and what went wrong, is helpful to ensuring an even better 2021 spring silage season.

Most silage challenges fall into one of two categories: dry matter (DM) loss or aerobic instability.

DM loss, or "shrink," results in less available, and less high-quality, feedstuffs. This can occur due to many management factors but can be addressed by:

- Harvesting at the right moisture and stage of maturity
- Cutting at the correct length and with adequate processing (if necessary)
- Using a proven inoculant to fit your needs
- Packing tightly
- Sealing the storage structure

Aerobic instability — often seen as heating — contributes to silage losses by leaving producers with spoiled feed that must be discarded. In addition, heating normally reduces the forage's nutritive value. Aerobic spoilage is caused by yeast growth in the majority of the cases. Yeasts need oxygen to grow, making the above management missteps likely suspects when there is heating, especially inadequate packing and sealing. Silages with high population of yeasts have lower nutrient digestibility (fibre, DM), and this leads to reduced animal intakes and performance.

At feedout, when silage is again exposed to air, spoilage yeasts "wake-up" and can grow rapidly, causing heating and spoilage. At this stage, common management practices can help reduce losses, including:

- Keeping the silage surface tight and clean
- Not removing silage too far ahead of feeding and leaving it sitting in loose piles, and/or
- Feeding out at the correct rate
- Not removing too much plastic (enough to expose 2-3 days of feed)

Inoculant choices can help address both DM loss and aerobic spoilage. For example, elite lactic acid bacteria and enzymes, like those found in MAGNIVA Platinum forage inoculant can maximise dry matter, nutrient retention and improve aerobic stability to deliver stable, high quality and palatable feed.

MAGNIVA Platinum is a new generation forage inoculant that significantly improves 'front-end' fermentation and 'back-end' aerobic stability of silage after just 15 days, allowing it to be safely fed to livestock much sooner.

It combines a patented bacterium, Lactobacillus hilgardii CNCM I-4785, which is registered with the European Food Safety Authority (EFSA), with the industry's current 'gold standard', L. buchneri NCIMB 40788.

Independent scientific trials have confirmed MAGNIVA Platinum provides greater aerobic stability at 15 and 30 days than silage treated with L. buchneri alone after 100 days.

By taking a critical look at this year's silage, producers will be on their way to even better silage results next year.

See you at Beef Australia 2021!

Lallemand Animal Nutrition is delighted to announce that it will be a major partner of Beef Australia 2021, the country's premier beef exhibition. Held in Rockhampton every three years, this year's event is scheduled for 2–8 May 2021.

Country Director, Alex Turney, says the decision to participate in Beef Australia has been on the drawing board for several years. "The Australian beef industry is experiencing record livestock prices, massive shifts in market demand and a turn-around from one of the worst droughts in memory," he says.

"We think this is the perfect time to spark new conversations about nutrition. Silage is already a really big part of the intensive livestock industries, like dairy and grainfed beef – and now it's time to make it a mainstay practice in the extensive beef industry.

"Silage has never really taken off in the extensive grazing sector, which is really strange when you consider Australia is the driest continent on earth (apart from Antarctica). The grassfed livestock industry goes from boom to dust. Often we have more feed than we can use and then no feed when we need it most.

"Silage allows you to future proof your beef enterprise by preserving and storing processed crops and pastures for future use. You can then access that feed when you need it, allowing you to breed, grow and finish livestock, regardless of the season.

"Growing your own fodder – whether you do it on your own property or have it contract-grown down the road – allows you to take control of your future fodder requirements instead of being reliant on the season.

"Attempting to source feed when it's dry is never the best strategy because everyone is facing the same problem. Demand quickly outstrips supply, prices go through the roof and the quality of the remaining resource becomes variable and often geographically unfeasible to transport.

"The beauty of silage is that, produced and stored correctly, it can last indefinitely until you need it. Most silage is consumed within 12 months, but don't forget that silage can be successfully stored for 10, 20 or even 30 years."

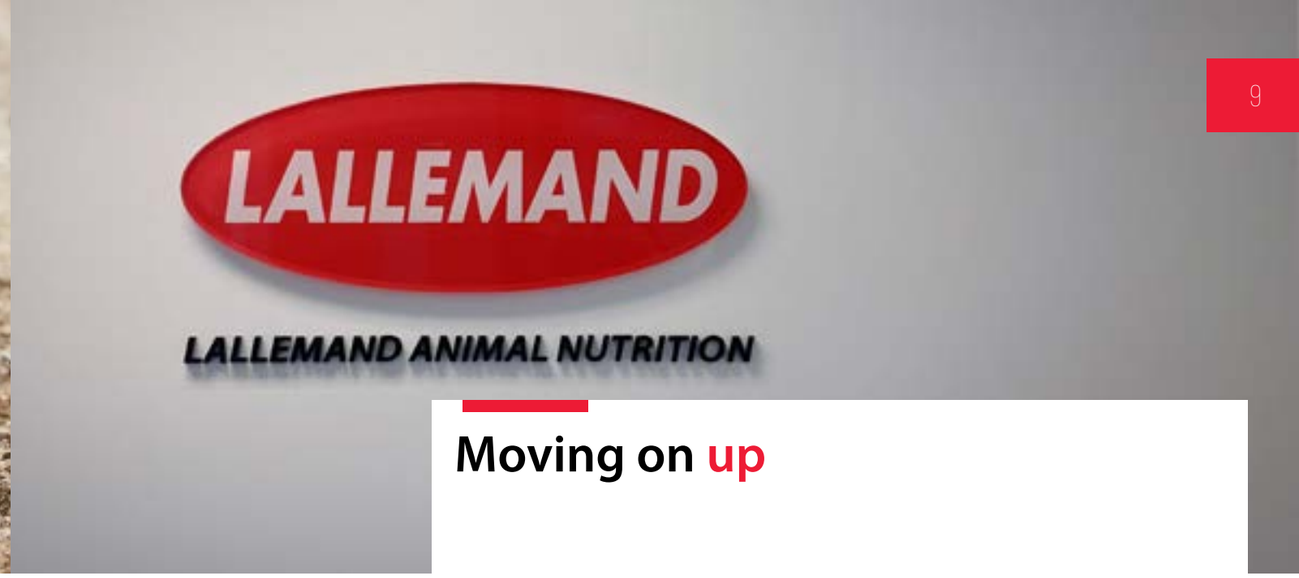
The Lallemand display will showcase modern silage technology to extensive beef producers. "We're going to show beef producers the modern silage roadmap – how to grow it, how to harvest it, how to store it and most importantly, how to feed it," Alex says.

"We'll have representatives from Pacific Seeds, Fodderlink, Eagle Direct, Rotomix and CLAAS. Plus, we've got half a dozen silage contractors who are going to be on hand to share their expertise directly with visitors.

"We're also going to run a short and punchy seminar program each day – four 20-minute presentations in the morning and four in the afternoon. We're going to start with the big picture – why grow silage? – and then drill down to each stage of the process: growing, harvesting, storage, feeding out and nutritional programs."

As an added incentive, anyone who visits the Lallemand Animal Nutrition site at Beef Australia will go in the draw to win $10,000 of seed, inoculant, sealing consumables and technical support to produce 1,000 tonnes of silage. "Obviously there's going to be contract growing and harvesting costs, but this is a great start to try silage for yourself," Alex says.

If you plan to attend Beef Australia, be sure to visit the Lallemand stand and say g'day.



Moving on up

Lallemand Animal Nutrition has moved to bigger and brighter premises at 7/72 Wises Road, Maroochydore – just around the corner from its longstanding location at 109 Maud Street.

Country Director, Alex Turney, says the move reflects the significant growth in the company over the past decade. "We've been at our former premises for more than two decades and put simply, we've outgrown our office," he says.

"We now employ six regionally-based Technical Service Managers throughout eastern Australia and six administrative staff here in Maroochydore. Our new office is larger and has an open plan design to allow for greater day-to-day cross-function collaboration, plus it will allow the entire company to meet in the same room."

Lallemand Animal Nutrition has been actively involved in the Australian livestock and forage industries for nearly 30 years. "Our inoculants were distributed by Quality Silage Systems for many years," Alex says.

"Ken and Trudy Rich made a huge contribution to the adoption of silage in the dairy and feedlot sectors. Lallemand acquired Quality Silage Systems in 2010 and we've continued to provide the integrated silage production service set up by Ken and Trudy.

"More recently, we've been working to increase the adoption of microbial technology to improve the health and well-being of livestock. We have already seen significant uptake in the poultry and swine industries and we anticipate similar adoption in the beef and dairy industries."

Improving performance in E. coli challenged broilers

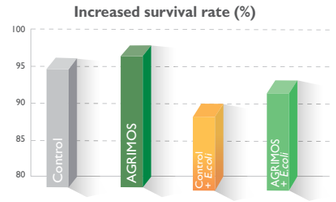


Figure 1

Agrimos improves liveability of broiler chickens under challenging conditions (E.coli).

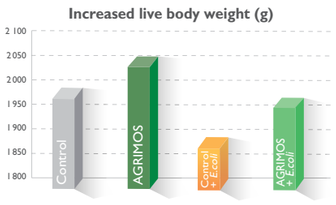


Figure 2

Agrimos improves body weight of broiler chickens under challenging conditions (E.coli).

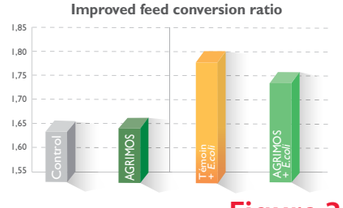


Figure 3

Agrimos improves FCR of broiler chickens under challenging conditions (E.coli).

***Escherihica coli* challenge in broilers causes a range of systemic disease ultimately producing septicaemia and early mortality. Infections with *E. coli* are common in poultry industries all around the world and result in poorer performance and higher mortality. Subclinical E. coli infections may not result in significant increases in mortality but can reduce nutrient digestibility and therefore increase feed conversion rations. Binding of pathogens like *E. coli* within the digestive system can reduce this effect.**

Controlling an *E. coli* challenge

Agrimos is a high-quality yeast cell wall derivative containing consistent levels of mannan oligosaccharide (MOS) and ß-glucans. Application with MOS has been shown to have specific effects on gut microbiota and morphology including: (i) reducing pathogenic bacteria in the gut, (ii) increases villi height to crypt depth ratio, and (iii) improving nutrient digestibility. The consistency of Agrimos comes from the specificity of the yeast it's derived from and the manufacturing process. This specificity allows Lallemand to guarantee the quantity of MOS in every batch of Agrimos.

MOS in action

A trial was conducted to investigate the effect Agrimos on *E. coli* challenged broilers performance and digestibility. The trial investigated a basal diet as a negative control (NC), the NC with Agrimos, the NC challenged with a medium virulent *E. coli* isolated from the farm (cNC) and this challenged diet with Agrimos.

As expected, the challenge with *E. coli* had negative impacts on performance indicators (liveability – Figure 1; body weight – Figure 2 and FCR – Figure 3) although only the body weight was significantly affected. Application with Agrimos had a positive influence on performance over both the NC and cNC. Additionally, the challenge with *E.coli* had a significantly negative impact on the digestibility of dry matter, crude protein and total energy, which was alleviated by application of Agrimos (Table 1).

E. coli challenges can be helped by application with MOS

Application of Agrimos in broilers challenged with *E. coli* brought performance back to the levels achieved by the control birds. The guaranteed concentration of MOS in Agrimos allows consistent binding of pathogenic bacteria along with improvements in gut morphology and an associated improvement in nutrient digestibility.

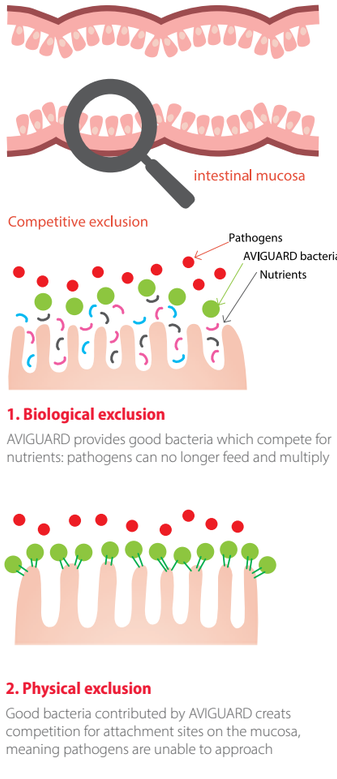
	Digestibility of nutrients			
Parameters	**Control**	**AGRIMOS**	**Control+ *E.coli***	**AGRIMOS + *E.coli***
Dry matter (%)	77,1 ±0,9	76,2 ±0,7	**73,8 ±1,0***	76,4 ±0,9
CP (%)	82,8 ±1,1	82,2 ±0,9	**77,4 ±1,1***	80,8 ±0,8
Crude fat (%)	79,2 ±0,5	79,5 ±1,1	80,0 ±0,6	79,1 ±0,7
Crude fiber (%)	22,6 ±0,4	24,1 ±0,8	20,5 ±1,1	22,7 ±0,6
Total energy (%)	67,6 ±0,6	67,0 ±0,9	**65,2 ±0,9***	67,0 ±1,0

** P < 0.05; compared to the control group*

Table 1

Effect of Agrimos on performance and digestibility in broiler chickens challenges by an enterotoxigenic E.coli strain.

Aviguard, a powerful tool to help maintain poultry health

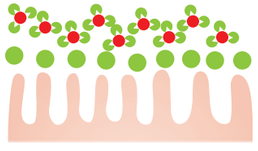


1. Biological exclusion

AVIGUARD provides good bacteria which compete for nutrients: pathogens can no longer feed and multiply

2. Physical exclusion

Good bacteria contributed by AVIGUARD creats competition for attachment sites on the mucosa, meaning pathogens are unable to approach



3. Chemical exclusion

AVIGUARD's good bacteria produce different substances, such as VFA and bacteriocins, which help fight pathogens

Health authorities are increasingly concerned about the contribution of animal production systems in clinical cases of human health contamination or antibiotic resistance. Poultry, the world's leading animal production system for meat and egg production, is therefore a key sector to be targeted for demedication approaches in animal husbandry. Reducing the prevalence of pathogens in animals by maintaining intestinal health and a balanced digestive microbiota is one of the most effective ways to address this issue.

In this context, the concept of Competitive Exclusion (CE) is of growing interest, not only from the poultry industry but also from the scientific community. Numerous articles on this topic have been published in peer-reviewed journals during the last five years.

AVIGUARD, composed of the normal gut flora from healthy adult birds, is a leading CE product allowing efficient installation or restoration of healthy gut flora to help protect poultry (e.g. broilers, turkeys, laying hens, breeding hens and game) against pathogens found in poultry production, such as:

- Salmonella
- Pathogenic avian *E. Coli*
- Clostridium perfringens, which is responsible for necrotic enteritis

AVIGUARD's microflora acts according to three modes of action corresponding to three levels of exclusion:

1. Competition for nutrients, which helps reduce the development of undesired microorganisms;
2. Competition for sites of attachment at the intestinal epithelium level, preventing undesired bacteria from attaching to the mucosa;
3. Production of antagonist substances.

The effectiveness of AVIGUARD, applied at an early age as close as possible to the hatch, has been known for decades and is widely documented in independent publications.

Key scientific articles have been compiled in a bibliographic review to contribute to the development of AVIGUARD and meet the expectations of our partners. This review can be used to explain the CE concept and product to current users or future customers of AVIGUARD. Trial results are also included to show AVIGUARD's high potential for maintaining poultry health, right from the start of the rearing phase, to allow animals to develop optimally and better resist rearing stress.

Aviguard research bibliography, available on request through your Lallemand Animal Nutrition contact.

Silage Safety:
A year-round job

https://www.youtube.com/

Silage piles and bunkers are common fixtures around livestock operations, but even the most experienced crews can become complacent. Simple safety reminders can help reduce the potential of injury for both farm employees and visitors.

"It's important for every visitor to clearly understand basic safety as soon as they enter the farm," says Bob Charley, Ph.D., Forage Products Manager, Lallemand Animal Nutrition, North America.

"The farm crew understands the rules, yet we all need reminders to keep safety top-of-mind. We must respect the equipment we're using and size of the structures we're creating."

Dr. Charley recommends producers follow seven basic tips:

1. Keep a safe distance. Never stand closer to the silage face than three times its height. Never park vehicles or equipment in front of the feedout face. Use signs to communicate safe distances.
2. Inspect cautiously. Do not take core samples if the feedout face is more than 2.5 metres tall. Always obtain samples and inspect using a loader bucket.
3. Feedout correctly. Never dig the bucket into the bottom of the silage. This can create an overhang. Never drive the unloader parallel to, and in close proximity of, the feedout face in an over-filled bunker or pile.
4. Bring a buddy. Work in pairs around silage structures.
5. Wear a safety vest for visibility.
6. Use caution when removing plastic, tyres, tyre sidewalls or gravel bags.
7. Do not fill higher than unloading equipment can reach.

Simple signage can help direct visitors and remind employees, Dr. Charley notes. Along with additional signage, it's important to have safety protocol meetings with employees throughout the year to talk about anything on the operation that has changed and also for reminders of protocols already in place.

"The best prevention is communication," he says. "Even well-constructed silage piles or bunkers can be dangerous. At the end of the day, we want everyone to go home to their families. We can't eliminate every risk, but we can try."

IN THE MIX

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