Here comes the sun, and it is again the time of year to think about how temperature and humidity can affect livestock production. This year, we focus on swine, with a brand new survey indicating the reality of heat stress at the farm level, as well as on beef cattle, whose growth is also affected by heat.

Speaking of surveys, our silage experts discuss results of a large survey on silage quality and tips to optimize it. We are also pleased to share testimonials from a UK poultry farmer using BACTOCELL DRINK and insights from an innovative rumen health survey in Australia. Finally, we have met with a yeast production specialist in Denmark who shared his expertise on selenium-enriched yeast.

We wish you a great summer and maize campaign!

The Lallemand Animal Nutrition team

---

**EDITORIAL**

**LIVE YEAST ALLEVIATES HEAT STRESS EFFECTS IN SWINE**

A field survey was conducted by Lallemand Animal Nutrition during the summer of 2016 to evaluate the reality of heat stress on swine farms in Europe. This survey indicates that, even in countries considered as “temperate,” heat stress is a reality. This shows that heat stress is not only due to the climate, but housing conditions and ventilation management of the barns play an important part too. It also confirms the cost of heat stress in terms of feed intake loss: between 0.6 to 2.5 kg per day of reduced feed intake in lactating sows have been calculated! (To see the heat stress map visit: http://bit.ly/2rzeUX6).

The team of Etienne Labussière at INRA Pegase, in France, houses a state-of-the-art experimental facility to study energy balance and metabolism in swine under controlled conditions (ambient temperatures, etc.). These respiration chambers (picture) were used to conduct an in-depth study about the effects of live yeast _Saccharomyces cerevisiae var. boulardii_ CNCM I-1079 (LEVUCELL SB) supplementation on thermal heat acclimatization and energy balance in swine. In this experiment, finishing pigs were used as a model for sows, since, as Labussière presented it: “the bigger the animal, the more sensitive to heat stress.”

Results indicate that LEVUCELL SB had a positive effect on growth performance under both thermo-neutral and heat stress ambient temperatures. However, the supplementation had a greater impact under heat stress as it was able to “compensate” for the negative impact of heat on pig growth (Figure 1).

This could be linked to two effects of the supplement:

1. Improved feeding behavior: The number of meals per day was significantly improved under heat stress and the total daily feed intake was not affected by ambient temperature with LEVUCELL SB.

2. Positive effect on energy metabolism: Less energy is consumed for heat production, therefore more energy was made available for pig growth.

---

**LATEST NEWS**

- 8th International LEVUCELL SB Technical Meeting took place in Seoul, South Korea
- Lallemand Pilot Farms network now extended to swine: we are pleased to welcome a fattening and a collective maternity unit in France!
- Launch of www.ruminantdigestivesystem.com

Connect with us on [LinkedIn](https://www.linkedin.com)

---

**FEED UPDATE**

**JULY 2017 ISSUE 35**

---

**SCIENCE SUPPORTED**

**Figure 1 - T Evolution of pig live weight during the heat stress test for the control and live yeast diets**

This trial represents proof of concept that probiotic yeast helps pigs’ adaptation to heat stress. Farm trials conducted with sows in maternity pens confirm similar benefits in field conditions: improved sow feed intake, reduced body weight loss in lactation, translated into increased piglet pre-weaning average daily gain (ADG), and even reduction of piglet diarrhea.

In conclusion, LEVUCELL SB could represent a valuable tool to help alleviate the heavy toll of heat stress on pig production, in complement to relevant heat abatement strategies in the barn.
PRACTICAL BENEFITS

PRESERVING BEEF CATTLE PRODUCTION POTENTIAL DURING THE SUMMER

An underestimated issue in cattle
In dairy cows, the impact of heat stress can be easily measured. Lower milk production, less feed intake and many more variations from cows’ typical behaviors can be seen. However, in beef cattle, the signs of heat stress are much less visible. Although there is less visibility, fattening cattle suffer just as much as dairy cows in warm temperatures:

- Feed intake is decreased, leading to decreases in growth, which can even lead to negative growth (muscle loss due to low ingestion)
- Fertility is affected

In extreme situations, the quality of the meat may also deteriorate (higher pH at the slaughterhouse, which can impair meat ripening). Ultimately, if the animal fails to cool down, this may lead to sudden death (e.g. enterotoxemia and heart failure).

LEVUCELL SC benefits
A trial conducted in Texas (Texas A&M AgriLife Research Center, Lallemand Ruminant Center of Excellence) demonstrated that, in a situation of heat stress, the addition of a specific ruminant live yeast *Saccharomyces cerevisiae* CNCM I-1077 (LEVUCELL SC) to the diet allows to improve the cattle feed intake.

Feed intake was also more regular during the day, while animals not receiving LEVUCELL SC consumed more erratically during cooler periods.

As a result, the average daily gain (ADG) was improved by 50 g/day, and the carcass weight by 5 kg over the fattening period (70 days) with a poorly acidogenic diet.

A direct link with rumen pH
Another study conducted in Italy on a commercial farm (Consortio Agrario del Nordeste) on Charolais cattle showed similar results (+5% ADG with an average temperature humidity index, THI, around 70) and allowed a further understanding of the mechanisms involved. By supplementing the animals with a bolus system, which allows measurement of the ruminal pH in real time (SMAXTEC), this trial indicate that:

- Rumen pH decreases in conditions of heat stress, linked in particular to the strong variations of feed intake and loss of saliva buffering capacity (panting).

The live yeast stabilizes the rumen pH, especially as the animal is in a heat stress condition (Figure 1).

Thus, ruminal pH is indirectly affected by climate conditions and the use of a ruminant specific live yeast, known for its stabilizing effects on ruminal pH (rumen modifier), allows the consequences of heat stress on feed intake and growth performance to be minimized.


THE VALUE OF SILAGE QUALITY AUDITS AND GOOD PRACTICES

Silage practices, from harvest to bunker management, greatly influence the quality of the silage and, thus, the profitability of the farm. In 2010, silage experts at Lallemand Animal Nutrition developed a corn silage audit tool, the CSI (Corn Silage Investigation). This helped draw a picture of silage practices in the field — for example, showing that 64% of silos are insufficiently packed — and highlighted the good practices.

Silo density: The weak element
The multi-analysis compiled audit results from 149 dairy farms across France, Italy and Greece. Using the CSI diagnostic tools and protocol, silo parameters were measured: pH, temperature, and density at six different points spread across the silo face. In addition, samples were collected for analysis.

The survey indicates that not all farms are equal in terms of silo density. Heterogeneous results are shown from farm to farm, but, above all, 64% of the silos showed a density below the recommended value of 240 kg DM/m³.

Best practices pay-back
Looking at the relationships between silage practices and the density of the silo, several correlations could be found at different levels, at harvest but also at feedout (e.g. choice of defacing technique).

A second analysis was performed regarding aerobic stability. A correlation was found between some of the investigated parameters and aerobic stability: Density as well as silo design (bunker silos were significant cooler than drive over piles) and the use of silage inoculant (Figure 1). The use of a proven inoculant is a valuable tool for farmers to ensure their forage quality. Not all parameters are controllable during the ensiling process, the application of appropriate silage inoculant helps reduce spoilage. Its investment fits a strategy of maximizing the potential of production from the capital placed in the forage production area.

Table 1 summarizes the effect of various elements and recommendations.

In conclusion, on-farm silo audits are valuable tools. Monitoring forage quality at any moment during the preservation pro-
ADVANCING RUMINANT NUTRITION, AN AUSTRALIAN EXPERIENCE

With antibiotic reduction becoming a topical issue for livestock and human health worldwide, Lallemand Animal Nutrition together with microbiology experts recently took the opportunity to speak to farmers, producers, vets and nutritionists across Australia and New Zealand about ruminant nutrition. “By sharing experiences, we wanted to demonstrate that it is possible today to develop innovative programs, progressively reducing antibiotics in food producing animals without sacrificing performance,” commented Alex Tumey, Lallemand Animal Nutrition, Country Manager Australia and New Zealand.

Laurent Dussert, Global Category Manager for Ruminants focused market trends and a shift from “maximizing production” to “optimizing production”: “We’ve seen significant growth in production efficiency but we have to deliver more value for consumers, it’s about safe food, care for the environment, managing antimicrobial resistance and maintaining farm profitability.” Tools to assist producers in achieving these goals include precision feeding and proven rumen modifiers such as rumen specific yeast LEVUCELL SC (Fig. 1). Dr. Helen Golder from University of Sydney, explored acidosis and the impact on rumen bacteria. Addressing the early ruminant microbiome, Dr. Frédérique Chaucheyras-Durand explained that the successful establishment of gut microbiota in early life is key to ensuring optimum productivity later on. Trials have shown that 22% of the variation of a cow milk yield at first lactation is linked to growth conditions during the first weeks of life.

Rumen Health Survey
Sub-acute acidosis is still often underestimated and unpredictable while it is worth millions to the dairy industry. This in mind, the Oceania team conducted a Rumen Health Survey. It is an assessment of five rumen characteristics: scaring, atrophy, papillae quality, lesions and other observables which have been linked back to farm based performance data. The observations took place across five abattoirs and could be linked back to farm performance data. Two main conclusions could be drawn so far:

- Possible links exist between various rumen observations and performance
- Differences exist between beef and dairy

Such observation gives very interesting tips about the relationship between rumen health and rumen efficiency and should be linked to Lallemand’s commitment to develop the use of on-farm audits based on practical indicators of rumen function (e.g. rumination, rumen fill, cleanliness, locomotion, body condition, manure screening etc.).

Table 1: Overview of the key parameters affecting silage quality and tips for optimal preservation

<table>
<thead>
<tr>
<th>Key Parameter</th>
<th>Effect</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed of harvest</td>
<td>Directly correlated to silo density</td>
<td>Adjust the speed of the forager to the packing capacity at the silo</td>
</tr>
<tr>
<td>Silo type</td>
<td>Pile silos show the lowest average density, followed by semi-bunker and bunker</td>
<td>Bunker silos allow optimal packing</td>
</tr>
<tr>
<td>Packing</td>
<td>Key factor in minimizing the amount of air left in the silo</td>
<td>Pack with adapted weight, spread thin, even layers of forage (&gt;20cm); control traffic</td>
</tr>
<tr>
<td>Silo size</td>
<td>Correlated to density and “natural” compaction</td>
<td>Silos &gt;1.8m show higher average density</td>
</tr>
<tr>
<td>Chop length</td>
<td>Longer chop length is linked to lower density</td>
<td>Adapt the chop length to forage DM, find best compromise between efficient loss and optimal density</td>
</tr>
<tr>
<td>Use of an inoculant</td>
<td>L. buchneri 40788 at 300,000 CFU/g prevents molds and fungal growth and limits losses and heating at feed-out.</td>
<td>Dose and mode of application are keys to ensuring homogenous application and preventing sedimentation in the tank (e.g. HC formula for LVA).</td>
</tr>
<tr>
<td>Defacching equipment</td>
<td>Type of equipment is important to maintain good front face density.</td>
<td>Rotary cutter gives higher average density than loader.</td>
</tr>
<tr>
<td>Feed-out rate</td>
<td>Slow feed-out increases aerobic spoilage</td>
<td>Silo face should advance by 20 to 30 cm/day</td>
</tr>
</tbody>
</table>

**DID YOU KNOW?**

**CULTURING FLAVOR: MICROORGANISMS IN CHEESE-MAKING**

French General de Gaulle once wondered: “How can you govern a country with 258 types of cheese?” In fact, the number of cheeses was even understated! When it comes to cheese, like in wine, typicity and flavor are essential — so are microorganisms that play a key role in the transformation of milk into cheese.

A wide variety of carefully selected bacteria, molds and yeast are used every day by cheesemakers. Lallemand Specialty Cultures has an extensive cell bank with thousands of strains and about 60 available culture products for meat and cheese applications. While acidification by lactic bacteria is one of the first steps involved in cheese making, other microorganisms, including surface and ripening cultures, are also essential to the development of unique appearance, color, flavor and texture. For example, the beautiful white and velvety rind of the French Camembert. Finally, some microorganisms provide protection against pathogenic and spoilage organisms.
David Adsetts describes the challenges his poultry operation was facing: “Enteric problems could be seen on our farm at around 15-21 days old, possibly in part related to diet changes and increased growth rates, making it a stressful period. At the same time, we would be vaccinating against Gumboro, which could contribute to stress and enteric breakdowns. Although less than 50% of the flock would typically be affected, it still contributed to antibiotic use. We wanted to get ahead of the game and consider alternative approaches to help reduce antibiotic usage.”

This is what drove the farm to use BACTOCELL DRINK (Pediococcus acidilactici MA18/5M). The probiotic is initially supplied on day 4, in the water supply. “BACTOCELL DRINK inclusion rate is calculated using daily water consumption but applied in four to five hours to ensure the whole flock is dosed, then clear water will be supplied for 20 hours,” explains the producer. This process is repeated for five days with the aim of establishing a balanced gut microflora. We then carry out a follow-up dosing to coincide with the Gumboro vaccination.

Birds will also receive BACTOCELL DRINK if there has been a need for antibiotic intervention. As antibiotics can flush out the gut microflora, it is essential to get the gut recolonised quickly and to reduce the risk of undesired bacteria. BACTOCELL helps reconstitute the desired microflora quickly, usually within two days. “Alongside all the other actions taken to try and reduce enteric problems, BACTOCELL DRINK is proving a cost effective addition to our programme, reducing the incidence of antibiotic intervention for gut related issues at the mid-crop point.”

At a time when producers are challenged to judiciously use antimicrobials, alternative solutions to help manage the balance of the gut ecosystem can represent a promising strategy to help maintain poultry performance and health.

*UK authorities (DEFRA) has committed to a reduction in antibiotic usage in livestock to a multispecies average of 50mg/kg by 2018.

**FEED UPDATE**

- Feed Update is published 3 times a year by Lallemand Animal Nutrition
- To subscribe, visit http://lallemandanimalnutrition.com/en/europe/knowledge-center/newsletter/
- To receive hard copies of this newsletter contact animal@lallemand.com

**LALLEMAND ANIMAL NUTRITION • SPECIFIC FOR YOUR SUCCESS**

http://lallemandanimalnutrition.com

Not all products are available in all markets nor associated claims allowed in all regions.