International Dairy Topics

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Practical information for progressive dairy professionals

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Optimising longevity, performance and milk yield

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Choosing the best for optimal milking performance

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Preventative programme to protect the health of newborns

PHYTOGENIC FLAVONOIDS
Influencing gene expression in liver cells

MASTITIS AND TEAT CARE
We look at options from around the world

SILAGE
Practical hints and tips on what makes a good inoculant

Published by
Positive Action Publications Ltd

Publisher & Editor
NIGEL HORROX
neh@positiveaction.co.uk

Marketing Team
COLIN FOSTER
cf@positiveaction.co.uk

TIM BROWN
tb@positiveaction.co.uk

ALISON BURDASS
ab@positiveaction.co.uk

STEPH WEIGHTMAN
steph@positiveaction.co.uk

Production
SARAH DOVE
sarah@amneh.co.uk

Design & Digital
MATTHEW BAKER
bacca@amneh.co.uk

Subscriptions
SALLY WALKER
sw@positiveaction.co.uk

Accounts
ANNE SMITH
accounts@positiveaction.co.uk

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chewing the cud

Quality is a key aspect of any food producing operation and in this context we must regard the dairy farm as a food producing operation too. This is because it produces milk, which is a human food in its own right and also the precursor to a range of other foods, including cheese and yoghurt.

Quality has several facets. These include product safety; absence of abnormal colour, taints and odours; correct composition; and suitability for processing. A good example of the last point is whether there are chemicals in the milk that can interfere with cheese making.

Quality is ultimately defined by the consumer so it can also involve things like animal welfare, absence of zoonotic pathogens, antibiotic usage, GMO freedom, sustainability, carbon footprint and effluent management.

Nowadays, it is very important to have a quality-orientated philosophy on the dairy farm and to have all your staff buy into it.

The best way to get staff to buy into any philosophy or scheme is if they appreciate what is being done and why.

If it shows real benefits to the customer, the business and the staff then your staff are much more likely to buy into that scheme.

If it does not, you will have an uphill fight on your hands to make the scheme achieve its desired objectives.

So, how do you get your staff to buy into a scheme or philosophy?

It is critical that staff understand the reasoning behind the scheme and how it will help the business and ultimately benefit them.

In 2018 it is no good saying to staff 'because we have to' or 'it is the law'.

Another aspect is to involve staff at the outset, for example, in the definition of their farm's quality programme and its associated SOPs and then later on in audits of the dairy farm and the feedback from those audits.

Involved staff are informed staff! It is amazing how often, once they are involved, that staff can make a positive input into your farm's quality programme. They are the people in the larger operations who spend most time physically on the farm. At the end of the day, quality is a hands-on matter! ■

Cover Picture:

A new generation!
(Photo courtesy of Trouw Nutrition)

worldfocus

An executive summary of key international issues

Indonesia

Greenfields' greenfield success story!

PT Greenfields Indonesia has further strengthened its position as a major dairy products producer by opening a dairy farm in East Java. This farm houses 4,000 Dutch Holstein, British Jersey and Australian cows and its capacity will eventually increase to over 7,250 cows to boost production to more than 136,000 litres per day. PT Greenfields is a major dairy exporter in Southeast Asia with some 20% of its annual production exported to countries such as Singapore, Malaysia, Brunei and Cambodia. Indonesia's domestic dairy industry demands 3.7 million litres of fresh milk every year, of which PT Greenfields supplies just under a quarter. Their objective is for this figure to exceed 40% by 2022.

USA

Rising threat of soy and almond milks

Central Pennsylvania dairy farmers, many of whom are small, family-run operations, have endured bad prices for their milk for many months. Their plight got even worse recently when 24 or so of them were told that their milk was no longer required by a local processing facility. The background to this appears to be a glut, coupled to the rising consumption of soy and almond milk instead. As a results, farmers are quitting or finding additional jobs to source some income as their milking activities have given many of them serious debt problems. This is not just a problem in Pennsylvania as the processor concerned has had to cancel the contracts of a further 100 farms across eight States.

France

A story with more twists to come?

Baby formula products from food giant Lactalis have been involved in a Salmonella agona food poisoning episode since the middle of last year. It has involved 40 or so infants in France, Spain and Greece and, in France, approximately half of the infants were hospitalised. Initially, traces of S. agona were found in the company's main processing plant and 7,000 tonnes of product were recalled from almost 90 countries. Investigations suggest S. agona could have been at this facility for 11 years but not reported to the authorities. Why were earlier isolations of S. agona not reported and was it correct that there was no need to test for salmonella in product at point of production, as was claimed by some media sources?

The 30th World Buiatrics Congress 2018 Sapporo

Date 28 Aug.– 1 Sept., 2018

Venue Sapporo Convention Center (Sapporo, Japan)

President : Motoshi Tajima (Rakuno Gakuen University)

Registration Fees

Registration Category		Early ~30 Apr., 2018	Standard 1May~31 Jul., 2018	On-site
Participants from countries on List*	A	50,000 JPY	70,000 JPY	90,000 JPY
	B	37,500 JPY	52,500 JPY	67,500 JPY
	C	25,000 JPY	35,000 JPY	45,000 JPY
Students**		20,000 JPY	30,000 JPY	40,000 JPY
Accompanying persons		25,000 JPY	35,000 JPY	45,000 JPY
Daily Registration Fee		—	—	35,000 JPY
Congress Dinner		12,000 JPY		
Abstract book		8,000 JPY		

All Fees are quoted in Japanese Yen (JPY)

*For Country list A-C, please check WBD2018 Sapporo official website.

**To qualify for the student/post-doc registration fee, proof of full-time enrolment at a recognized university or college at both the time of registration and during the congress must be presented.

Keynote speakers

Antimicrobial resistance
Dr. Christophe Beloin

Group leader, Department of Microbiology, Institut Pasteur
France

Antimicrobial resistance
Prof. Dr. Theo J.G.M. Lam

Manager, R/D, GD Animal Health, Professor, Department of Farm Animal Health, Utrecht University
The Netherlands

Bovine welfare and cattle comfort
Dr. Ed. Pajor

Professor, Anderson-Chisholm Chair inAnimal Care and Welfare, Production Animal Health/Faculty of Veterinary Medicine, University of Calgary
Canada

Buffaloes, camelids and wild ruminants
Dr. Mohammed Shamsuddin

Technical Officer, Nuclear Sciences and Applications/Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, International Atomic Energy Agency
Austria

BVD
Prof. Joe Brownlie

Honorary Research Fellow, University of Bristol Veterinary School, Emeritus Professor of Veterinary Pathology, Royal Veterinary College
UK

Diagnostic imaging
Mr. Karl Nuss

Section Head, Farm Animal Surgery, Farm Animal Department, Vetsuisse Faculty, University of Zurich
Switzerland

E-learning and continuing education
Dr. Martin Fischer

Director, Assoc. Dean for Clinical Education, Institute for Medical Education University Hospital, LMU Munich
Germany

Epidemiology
Prof. Mark Stevenson

Professor, Veterinary Epidemiology, Faculty of Veterinary and Agricultural Sciences, The University of Melbourne
Australia

Herd health
Prof. Dr. Jos.P.T.M.Noordhuizen

Professor in dairy herd health & productivity management, Veterinary Science, Charles Sturt University, Wagga Wagga, NSW, Australia
France

Hoof health and lameness
Prof. Christer Bergsten

Professor, Biosystems and technology, Swedish University of Agricultural Sciences
Sweden

Immunology and vaccines
Dr. Geraldine Taylor

Honorary Fellow, The Pirbright Institute
UK

Infectious diseases: bacteriology
Dr. Richard J Whittington

Professor, Farm Animal Health, Sydney School of Veterinary Science, University of Sydney
Australia

Infectious diseases: virology
Dr. Paul M. Coussens

Professor and Director, Molecular Pathogenesis Laboratory, Department of Animal Science, Michigan State University
USA

Internal medicine
Dr. Walter Grünberg

Research associate,Clinic for Cattle, University of Veterinary Medicine Hannover
Germany

Nutrition and metabolic diseases
Prof. Garrett Oetzel

Professor, Food Animal Production Medicine Section, Department of Medical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison
USA

Parasitology
Dr. Massaro Ueti

Veterinary Medical officer, US Department of Agriculture, USDA-ARS
USA

Public health and food safety
Prof. Martin Blaser

Muriel & George Singer Professor of Translational Medicine, Medicine, New York University Langone Medical Center
USA

Reproduction
Dr. José Eduardo P. Santos

Research Foundation Professor, Department of Animal Sciences, University of Florida
USA

Surgery
Prof. Dr. Adrian Steiner

Clinic head, Farm Animal Clinic, Vetsuisse Faculty,University of Bern
Switzerland

Tropical animal diseases
Dr. Keith John Sumption

Executive Secretary, European Commission for the Control of Foot-and-Mouth Disease(EuFMD), Animal Health Service, Animal Production and Health Division, Food-and-Agriculture Organization of the United Nations
Italy

Udder health
Prof. Pamela Ruegg

Professor, Department of Dairy Science, University of Wisconsin-Madison
USA

Udder health
Mr. Peter Edmondson

Owner, Udderwise LTD
UK

Young stock
Dr. John Frederick Mee

Principal Veterinary Research Scientist, Animal and Bioscience, TEAGASC
Ireland

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Optimising cow longevity, reproductive performance and milk yield

There is no magic bullet that will keep cows healthy and optimise cow longevity, reproductive performance and milk yield. It comes down to the basics, starting with cow comfort and encompassing the quality of forages used, milking procedures, nutrition and more. These components are all important to keeping cows healthy, which is a key factor in dairy herd profitability.

by Maria Agovino,
Ruminant Manager, Europe, Alltech.
www.alltech.com

Healthy cows provide high-quality milk and have superior reproductive performance, but high-production cows are particularly susceptible to disease. Mastitis, lameness, ketosis, calving problems and other disorders can reduce production and increase the need for costly veterinary treatment. Improvements in overall health and feed efficiency can result in cost savings in production, veterinary fees, medical treatment and breeding. High pressure for increased milk production per lactation has led to increased health problems and decreased fertility, both of which compromise a cow's longevity.

Focus on peripartum

Health problems can appear at any time during lactation; however, pre and postpartum (the transition period) is the most important period affecting cows' longevity and herd profitability. In the last decade, the topic of dairy cows' transition period has been extensively reviewed and knowledge has improved significantly, but culling incidence due to transition period-related health problems still remains high.

During this phase, the complex interaction between the postpartum dry matter intake (DMI) depression, negative energy balance (NEB) and loss of body condition is associated with metabolic disorders and poor reproductive performance. To avoid NEB and loss of body condition, and to achieve dairy cows' milk yield potential, dairymen provide diets that are high in concentrates and low in roughage. Feeding such diets, however, can lead to impaired rumen fermentation and rumen acidosis, whereas low ruminal pH (less than 5.6) can further depress DMI and decrease milk yield. Feeding strategies that stimulate dry matter and energy intake, while stabilising rumen fermentation, are therefore vital for transition cows.

Numerous feed additives have been tested to improve postpartum DMI, stabilise rumen fermentation and decrease the incidence of postpartum metabolic problems. Dietary buffer supplementation (for example bicarbonate) could attenuate the decline in ruminal pH; however, results have not been consistent.

Several trials have been carried out to evaluate the effect of feeding live yeast cultures. Yeast is purported to stabilise the rumen environment, with effects including higher rumen pH, increased numbers of cellulolytic bacteria and reduced lactate concentration.

A study in dairy heifers by Lascano and Heinrichs (2009) also showed reductions in rumen ammonia concentration. In this experiment, dairy heifers supplemented with a live yeast culture exhibited increased volatile fatty acids production and a possible stimulation of N uptake by rumen bacteria.

Similarly, Al Ibrahim et al. (2010a) also noted a reduction in ammonia N concentration but with little effect on other rumen parameters. The lack of effect in the Al Ibrahim et al. (2010) study is likely to be related to the performance of the control group, making it more difficult to find a difference between supplemented and unsupplemented animals.

Increase in rumen pH

In contrast, Bach et al. (2007) noted an increase in average rumen pH over time in dairy cows when yeast was added to the diet. In a recent meta-analysis of the effects of live yeasts in ruminants, Desnoyers et al. (2009) noted that across 157 experiments, yeast inclusion increased ruminal pH, VFA production and organic matter digestibility (OMD), while reducing lactate concentration.

It was highlighted that dietary composition played an important role in the magnitude of the effects. This is in agreement with Robinson and Erasmus

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(2009), who noted that higher dietary neutral detergent fibre (NDF) and acid detergent fibre (ADF) resulted in a lesser response to yeast supplementation.

Commercially, there are numerous yeast products, such as Yea-Sacc (Alltech), available for use in ruminant livestock and other species. All are based on different strains.

Research has consistently shown that live yeast culture supplementation resulted in more stable rumen pH, increased DMI and milk production, and better feed efficiency, and more recent trial results have also shown decreased blood non-esterified fatty acids (NEFA) and better reproductive performance (Kaske, 2007).

Feeding the rumen

A basic understanding of animal nutrition as it applies to dairy cattle is essential to good herd management. The quality of the feed (levels of nutrients, palatability and digestibility) affects the rate of digestion in the rumen, uptake of nutrients and their utilisation by the animal.

Correct rumen development and maintenance is the key to promoting digestion. A suitable microbial flora must be established to ensure that forage is degraded at an optimum rate, releasing nutrients for the promotion of beneficial micro-organisms as well as supplying nutrients to the host cow.

Proper feeding of the dairy cow is complicated and requires a combination of scientific knowledge, creativity and good management skills to balance the needs of the rumen micro-organisms and the needs of the animal.

There are several elements that contribute to increased feed efficiency, but one of the most important is enabling the rumen of the dairy cow to reach its full potential, supporting the activity and growth of the rumen microflora and enabling dietary nutrients to be extracted from the diet as efficiently as possible.

Nutrients need to be provided to the rumen microflora that are well-balanced in terms of fermentable energy and protein supply. Fermentable protein nutrition has to be specifically adapted to maximise rumen microbial population activity and growth, as the different populations have different requirements in term of how nitrogen is supplied.

For instance, cellulolytic bacteria achieve optimal activity and growth when nitrogen is supplied as non-protein nitrogen or ammonia, while amylolytic bacteria require short peptides and amino acids to reach maximal growth and activity.

However, milk production is not simply connected to rumen degradable protein supply, as it is primarily a function of digestible protein supply in the intestine. Not only the quantity, but also the quality, of these digestible proteins is of tremendous importance.

In particular, amino acid profile and quantity have a direct impact on how efficiently they are used for milk production.

Poor efficiency

For years, dairy nutritionists have overfed crude protein in an attempt to meet the amino acid requirements for the desired milk yield. Beside the significant increase in input costs, this also results in poor nitrogen efficiency and, subsequently, higher nitrogen excretion, which is obviously detrimental to the environment.

The dairy cow inherently suffers from this poor nitrogen efficiency. Excessive nitrogen is converted first into ammonia and then into urea, which is partially recycled, but the vast majority is excreted. There is ultimately an energy loss associated with this process due to the detoxification of ammonia into urea.

This energy cost comes at the expense of milk production and other biological functions, such as reproductive performance. The energy required to excrete excess nitrogen is equivalent to up to 2kg of milk and can lead to body condition loss, increased blood and milk urea levels, and, subsequently, issues with reproductive performance.

The solution

The Alltech Protein Management programme provides a high-quality source of protein for your animals, giving them the nutrients they need to produce at their peak. This programme makes your feed work harder, so your animals do not have to. The Alltech Protein Management programme provides a source of consistent, high-quality protein for your animals, getting them off to the right start and keeping production on track to optimise performance.

It helps to meet the requirement of the rumen microbes for optimal growth and activity, while increasing the production of microbial proteins in the rumen and allowing maximal diet digestibility. Based on Alltech solutions that are included in the diet (Optigen, Optisync, Rumagen or DEMP), we can increase the fermentation rate in the rumen liquid phase.

Its bypass fraction contains a unique mix of essential amino acids that have a very similar profile to microbial protein, which is beneficial for efficient milk synthesis.

With the Alltech Protein Management programme, we are able to combine a slow-release nitrogen source with a high-nutritional-value protein source. The slow-release source ensures a steady supply to the rumen cellulolytic microflora, while the high-nutritional-value source is designed to provide protein for amylolytic bacteria. It also supplies the ideal protein to the liquid phase of the rumen.

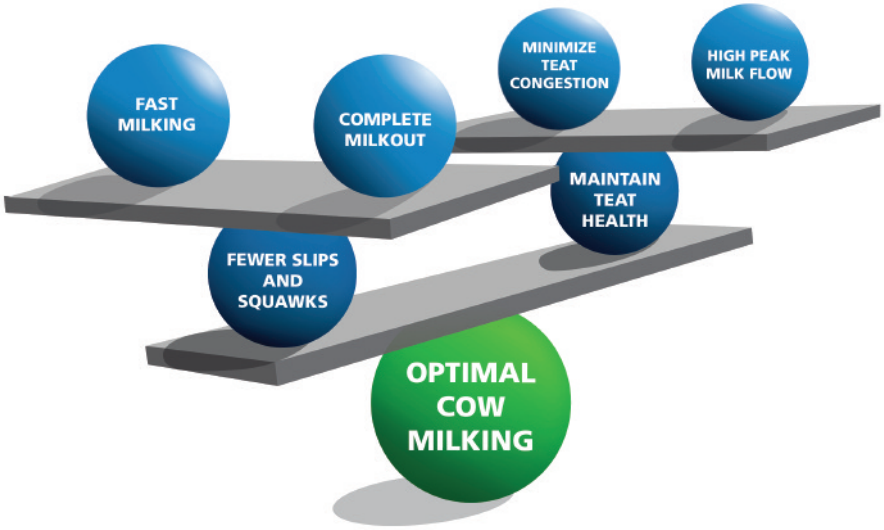
There are clear opportunities to improve diet performance by adopting innovative programmes. The uniqueness of this programme has provided nutritionists and dairy producers with a new arsenal when formulating dairy diets.

"We feed the bugs before we feed the cow" has always been a rule of thumb when feeding dairy cows. By using innovative technologies, the dairy industry can maximise profitability and maintain production costs. ■

Choosing the best teat cup liner for optimal milking performance

Teat cup liners come in a wide variety of designs to allow for optimal milking performance when matched to the teat, the shell and equipment settings, like vacuum and pulsation. Liners also differ to fit the varying lengths and diameters of teats among the breeds and genetic makeup of individual herds, along with individual preferences among dairy farmers.

by Mark Walker,
GEA North America.
www.gea.com



Optimal cow milking is a delicate balancing act of many factors.

In fact, teat cup liners are one of the most important pieces of the milking system – it is the only component in direct contact with live tissue.

Liners should milk cows quickly, completely and gently, and fit a wide range of teat sizes and shapes to promote healthy teat tissue and teat ends, milking after milking.

Choosing the right liner for your herd can be a difficult and confusing decision. When considering a new liner, keep your dairy's goals in mind.

Are you changing liners for udder health reasons? Faster milking? Better overall performance?

When udder health issues arise, liners are often the first component of the milking system to be changed. Since liners need to be changed regularly anyway, it is a change that almost always eliminates any additional costs.

The reality, however, is that changing liners is not always the silver bullet one hopes. Often there are milk quality issues other than the liner to consider.

Selecting the right liner for your herd can be an overwhelming decision and it should take into account many aspects of your farm, your herd and your management style. It is important to understand the various options available in today's market to make the best decision for your dairy.

The variety of liner designs allow for optimal milking performance.

Liner components

Liners have three basic components:

- Mouthpiece.
- Liner barrel or body.
- Short milk tubes.

Several design factors influence liner performance:

- Mouthpiece design.
- Barrel diameter and size.
- Shape.
- Wall thickness.
- Materials.

The teat cup is an assembly consisting of a shell and liner and may include a short pulse tube and short milk tube.

Liner shape

Liners come in many shapes – round, square, triangle, tri-circle, oval and

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variations of all of these. Tapering the barrel has also become popular.

While shaped liners often get credit for improving teat end condition, setting the liner up for optimal performance is often the deciding factor (i.e. setting proper vacuum levels and adhering to pulsation specifications).

Teat size

Consider the average teat size for the cows on your dairy. Using a narrow bore liner on large teats will result in poor milking performance.

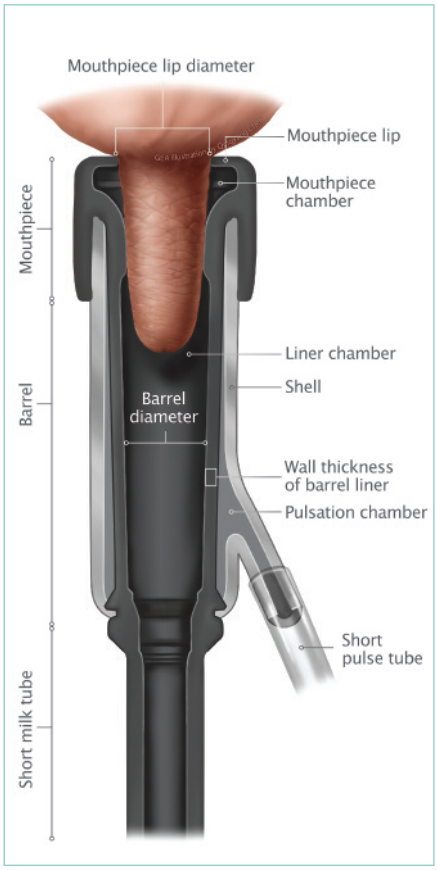
The use of a medium bore liner may offer the best all-around milkability for the majority of your herd.

Liner material

Choosing a liner material should depend on how long you want the liners to last and your dairy's desired performance properties. Liners can be made of rubber, blends of both natural rubber and synthetic rubber, and silicone among others.

- Synthetic rubber or mixtures of natural and synthetic are more resistant to breakdown from butterfat absorption and will tend to have a longer milking life than natural rubber liners.

- Silicone liners have a longer milking life, are resistant to butterfat absorption, and are more consistent in milking performance throughout the liner's life.



Liner and teat cup components.

Liner changes

Liners need to be changed out regularly due to use. They should be replaced after a specific number of cow milkings – which can vary from as few as 800 milkings to over 10,000 – depending on the liner material.

Cleaning cycles also impact liner wear. Standard rubber liners may begin to degrade after 80-100 cycles with material blends, while silicone liners last through more cleaning cycles.

Liner vents

A majority of today's liners are offered with vents to help keep milk movement away from the teat.

Placement of the vent can be in the mouthpiece or milk tube, with an additional vent in the milking claw.

Any combination of these vents can help aid faster milk flow from the teat to the milk hose.

While vents play a key role in helping

move milk, the diameter of the milk tube and milking unit inlet is also important.

Liner tension

When liners are inserted into the shell, the liner is stretched to apply tension to the liner body. Liner tension will vary between the type and style of liner.

Matching the liner to the shell is very important since it will provide the desired stretch of the liner and ensure proper opening and closing of the liner barrel during pulsation cycles.

One of the reasons the life cycle of a liner could change is because the liner was placed in an incorrect shell.

Once the liner is installed in the shell, the liner becomes more resistant to closure, which allows the teat end to be properly compressed during the liner-close phase.

The stretch of the liner barrel also ensures that the liner will seal around the top and bottom of the shell and provide an air-tight connection for the pulsation chamber.

Consider having a qualified milking technician or consultant perform milking time testing according to the National Mastitis Council (NMC) Procedures for Evaluating Vacuum Levels and Air Flow in Milking Systems. No liner will achieve peak performance or optimal milkability if your system is deficient. All liner manufacturers have recommendations for liner installation and setup.

Maximising liner performance

Maximising the overall milkability of a liner involves getting your milking system properly set up for the liner you are using.

Many of the liners on dairies today are underperforming – simply because they were never set up properly when installed.

Optimal performance of any liner is dependent on:

- Using proper average peak claw vacuum settings for your specific liner.
- Setting pulsation to optimise the average 'b' and 'd' phases of the pulsation system.
- Proper teat preparation to assure full milk letdown and flow from time of unit attachment to unit detach.
- Using detacher settings for unit detach without over milking.
- Unit alignment and support.
- The overall milk path from the milking unit to the receiver.

Make sure whoever installs your liners are aware of setup recommendations and are capable of doing the needed testing to verify a proper install.

The goal is to balance your desired goals on top of optimal cow milking. Once your system is properly set up for the liner you are using, then it is up to the cows to decide if the choice was a good one! ■

Preventative programme to protect the health of newborn calves

A recent ADAS study evidenced diarrhoea/scour as the most common disease in young unweaned calves accounting for 50% of all calf deaths. Diarrhoea may be caused by bacterial, viral and protozoal infections; and quite often it may be a result of mixed infections.

by George Shaw, MPharm MPSNI, Technical Adviser, Provita Animal Health, Northern Ireland. www.provita.co.uk

Other causative factors of calf scour can be inappropriate housing, feeding or stress which increases the animal's susceptibility to infection.

Antibiotic use and resistance

Antibiotic use for bacterial infectious diarrhoea can be very effective, provided a causative micro-organism has been identified and an appropriate antibiotic prescribed to treat it. Antibiotics should be reserved for treatment purposes and not for prophylactic or metaphylactic therapy. Due to the unwarranted and irresponsible use of antibiotics, the natural process of antibiotic resistance has been accelerated.

As a result, there has been a concerted effort to reduce the use of antibiotics and antimicrobials within the agricultural industry. Antibiotic use has positively reduced in recent years but greater reductions must be sought. Consequently, non-antibiotic alternatives and good management practices will be at the forefront of achieving such targets, whilst maintaining animal health.

Provita Protect

Provita Protect is the first probiotic in the UK to obtain Marketing Authorisation. To obtain this Veterinary Licence it has undergone many years of rigorous testing to guarantee efficacy, quality, safety and ease of application for the stockman.

Provita Protect should become part of the normal routine for the prevention of scours in young pre-ruminant calves. This preventative programme reduces the cost of subsequent rehydration and antibiotics treatment, time and setbacks to animal health and performance.

Why use a probiotic?

Animals are born with a sterile gut and digestive tract. Colonising the gut with beneficial bacteria as soon as possible after birth will automatically reduce the incidence of infection by pathogens common to farm animals. As animals develop, the digestive tract will naturally encounter populations of both beneficial lactic acid bacteria and potential disease-causing bacteria.

The key to maintaining the health of animals is to ensure a balance in favour of a healthy gut flora. Should a healthy animal suffer stress, the chemical balance of its digestive tract can change, resulting in conditions within the gut which favour pathogens. At this point, an animal becomes susceptible to nutritional and infectious scours and appetite loss, resulting in a rapid loss of body condition and animal performance.

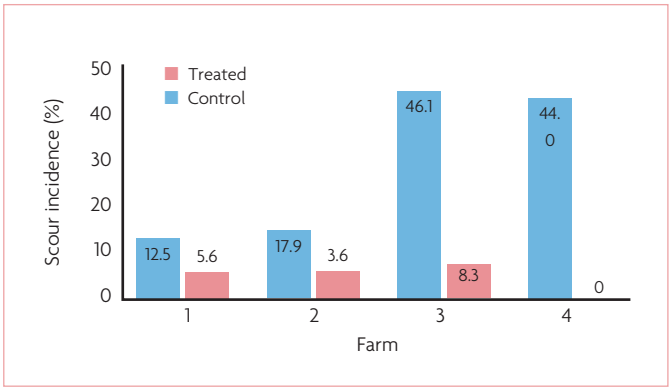


Fig. 1. Percentage of calves with scours.

Table 1. Effects of Provita Protect on scour incidence.

Farm	Calf source	Breed cross	Sex	Calves with scours (%)	
				Control	Protect
1	Market	Continental x Friesian Hereford x Friesian	Heifers Bull calves	12.5	5.6
2	Market	Limousin x Friesian Hereford x Friesian	Bull calves	17.9	3.6
3	Market	Aberdeen Angus x Holstein	Bull calves	46.1	8.3
4	Home bred	Holstein	Heifers	44.0	0.0

All improvements were significant at $p<0.05$

The benefits of using probiotics

Considerable independent trial work has been carried out on the benefits associated with probiotic use in recent years and the rationale behind using probiotics is summarised below:

- **Competitive exclusion in the digestive tract:**
Providing high levels of beneficial bacteria interferes with the attachment of enteric pathogens, such as E. coli, to the gut wall i.e. the objective is to crowd out the pathogens and prevent their establishment within the gut.

- **Antimicrobial effects:**
Probiotics are known to produce lactic acid and bacteriocins which have shown an inhibitory effect on some pathogens.

- **Lactic acid production:**
As the pH in the gut is reduced through the production of lactic acid, the environmental conditions within the intestine become unfavourable for some pathogens. The more acidic environment encourages increased enzymatic activity which improves digestion.

- **Immune stimulation:**
Probiotics may stimulate the body's immune response system against disease and although not yet fully proven, it is thought that anti-toxins are also produced by lactobacilli.

- A probiotic does not build up bacterial resistance or cause side effects.

When to use Provita Protect

- **At birth:**
Use as soon as possible after birth to establish a beneficial population of micro-organisms in the digestive tract.

- **Bought-in calves:**
Administer to bought-in calves on arrival at the farm. Bought-in calves are subjected to a great deal of stress, including separation from the dam, travel, encountering other calves from a variety of sources and changes in diet.

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- **Stress:**
Use at times of stress including dietary and housing changes, grouping calves and moving them into rearing accommodation, introduction of calves to milk substitute, before and after transportation and other potential causes of appetite loss.

Newborn calves

Provita Protect contains three specially selected lactic acid forming bacterial strains: Lactobacillus acidophilus strains and an Enterococcus faecium strain. These bacteria are able to survive and multiply within the intestine, providing protection for the animal against less desirable bacteria. By supplying high intakes of these beneficial bacteria, the intestinal well-being of the animal is established and maintained, thereby minimising the incidence of scours in growing calves.

Trial data

Provita Protect has been shown, in independent field trials, to help calves up to the age of 12 weeks resist pathogenic infection, thus avoiding the enteric upsets that cause diarrhoea.

Treatment with Provita Protect has shown a significant reduction in the incidence of scouring in calves, resulting in improved growth rates and body condition.

- Provita Protect provided substantial protection against nutritional scours under a variety of management systems, regardless of whether calves were bucket or teat fed.
- Both home-bred dairy replacements and bought-in calves benefited following treatment with Provita Protect.
- Body condition at five weeks of age showed significant improvement in calves treated with Provita Protect. Treated calves showed a 7.5% improvement in body condition (significant at $P<0.05$).

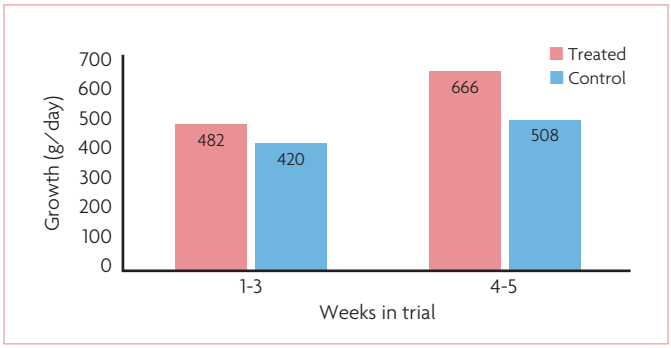


Fig. 2. Growth rates.

Incidence of scour

At three weeks of age, independent trials carried out by RDT Services Ltd, involving over 200 calves on four different farms, produced the results as shown in Table 1 and Fig. 1.

Growth rate

Provita Protect treated calves encountered a lower incidence of diarrhoea than the untreated calves. By maintaining the health status among these calves, the setbacks in growth and losses in weight common in scouring calves was prevented. Fig. 2 highlights the improved performance with measurement of growth rates in young calves.

Between weeks 1-3, when the calves were on a restricted milk based diet, the Provita Protect treated calves displayed a 14.8% higher growth rate than the untreated calves. During weeks 4-5 this advantage improved to 31.0% over the untreated animals when an ad-lib diet of concentrates and milk was available.

ADAS trial

In independent trials carried out by ADAS the three strains of lactic acid forming bacteria within Provita Protect were shown, in vitro, to be inhibitory to eight pathogens common to farm animals.

The pathogens tested were: E. coli strains K88 and K99; Salmonella types typhimurium, dublin and enteriditis; Staphylococcus aureus, Clostridium perfringens and Listeria monocytogenes ■

References are available from the author on request

Phytogenic flavonoids influence gene expression in liver cells

Reducing inflammatory processes in dairy cows is of high interest because the immune system activation is an energy-demanding process. That necessitates a reallocation of nutrients and energy from dispensable functions such as growth and production.

Dr Jaydip Sarkar, Dr Eckel Animal Nutrition (Thailand) Co. Ltd, India and Anne Möddel and Tilman Wilke, Dr Eckel Animal Nutrition GmbH & Co. KG, Germany. www.dr-eckel.de

Even subclinical inflammation requires extra energy and amino acids, for the production of acute phase proteins. It also has adverse effects on the metabolism, for example by an increase of plasma cortisol. It can safely be assumed that milk production is increased by an inhibition of inflammation. Dietary polyphenols, especially those of the flavonoid subgroup, are known for anti-inflammatory effects in cows.

According to scientific studies, metabolic pathways in the liver can be positively influenced by flavonoid-rich grape seed and grape marc meal extract (GSGME). Among others, supplementing dairy cow diets with GSGME can lead to increased milk yield. Recent studies show beneficial effects of a GSGME based feed additive on various hepatic genes related to inflammation and ER stress in the liver.

The underlying effects remained unclear. Hence, the goal of this study was to explore metabolic pathways in dairy cows receiving phytogenic flavonoids with their feed.

Material and methods

In order to gain insight into how a polyphenol-rich feed additive influences metabolic pathways, a genome-wide transcript profiling of liver tissue and lipid profiling in blood plasma was performed.

The experiment was conducted in dairy cows during the transition period. In total, the study duration was 12 weeks: three weeks before the expected calving until week nine post-partum.

The trial was carried out at the Educational and Research Centre 'Hofgut Neumühle' in the state of Rhineland-Palatinate, Germany.

In total, 28 Holstein cows with an average parity number of 2.8 were used in this experiment. Cows were assigned to two different experimental groups: A negative control group (n=14) and a treatment group (n=14).

During the study time the diet of the treatment group was supplemented with 1% of a GSGME based polyphenol product (Anta Ox by Dr Eckel Animal Nutrition) based on DM content.

The control group instead received 1% of wheat bran as an isoenergetic replacement.

Each experimental group contained 10 multiparous and four primiparous cows.

Average parity number was similar between groups (control group: 2.8, treatment group: 2.9).

Both groups received a total mixed ration (TMR) diet. In the period between week three antepartum and calving, the diet was calculated to meet the demand of a dry cow with a body weight of 650kg and an assumed dry matter intake (DMI) of 12kg per day.

After calving, the diet was calculated to meet the demand of net energy and crude protein requirement for 34kg daily milk yield, with an assumed daily DMI of 22kg.

The chemical composition was comparable (control vs. treatment, per kg DM: 6.5 and 6.8 MJ NEL, 140 and 166g CP, 383 and 356g neutral detergent fibre).

Critical phase in production

Samples were taken one week postpartum because this is the most critical phase in the production cycle concerning liver metabolism and related stress factors. Blood samples and liver biopsies were taken from every cow (n=28, day seven postpartum ± 2 days).

Blood was taken from the vena caudalis. Plasma was separated from blood cells by centrifugation, and the plasma samples were stored at -20°C until analysis.

Liver biopsies were taken after sampling of blood with a sterile 14-G biopsy needle. Approximately 50mg of liver tissue was immediately snap-frozen in liquid nitrogen and stored at -80°C until further analysis. Total RNA was isolated from liver samples.

Concentration and integrity of RNA was analysed using an Agilent 2100 Bioanalyser. The microarray analysis was taken randomly from six samples of each group (n=12, total), consisting of five samples from the multiparous cows and one sample from the primiparous cows.

The 12 RNA samples were selected, according to the GeneChip WT Plus Reagent Kit (Affymetrix, High Wycombe, UK). Samples were hybridised to the Affymetrix GeneChip Bovine Gene 1.0 Sense Target array representing approximately 23,000 bovine transcripts.

Afterwards, hybridisation arrays were washed and stained (Affymetrix GeneChip Fluidics station 450), scanned and computed from the image data (Affymetrix GeneChip Command Console Software) of every sample.

Bioinformatic prediction of mRNA targets for differentially regulated miRNAs was performed using TargetScan release version 7.1.

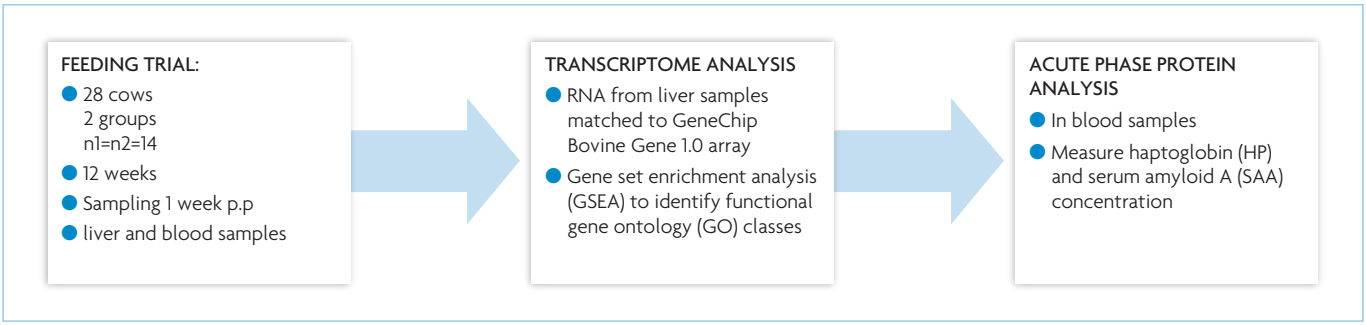
In order to extract biological meaning from the expressed transcripts and predicted mRNA targets, gene set enrichment analysis (GSEA) was performed to identify enriched Gene Ontology (GO).

GO was divided in three categories, biological process, molecular function and cellular component.

The interpretation on GO was mainly that biological processes or molecular functions and pathways identified as enriched within up-

Continued on page 17

Fig. 1. Overview about the methods used in the study.



Continued from page 15
regulated genes are probably activated, whereas down-regulated genes are likely inhibited.

For the qPCR analysis 25 different expressed mRNAs (microarray data) were randomly selected from most strongly up- (n=14) and down-regulated (n=11) mRNAs. The total RNA from all cows (n=14 per group) was for the transcription.

The qPCR protocol is described in Gessner et al. (2017). In blood plasma the acute phase proteins haptoglobin (HP) and serum amyloid A (SAA) were analysed using commercial ELISA kits (CSB-E08585b, CSB-E08592b, Hölzel Diagnostika, Cologne, Germany).

For statistical analysis, data was evaluated by student's t-test (Minitab 13, Minitab Inc, USA) with a multiple testing correction of microarray data.

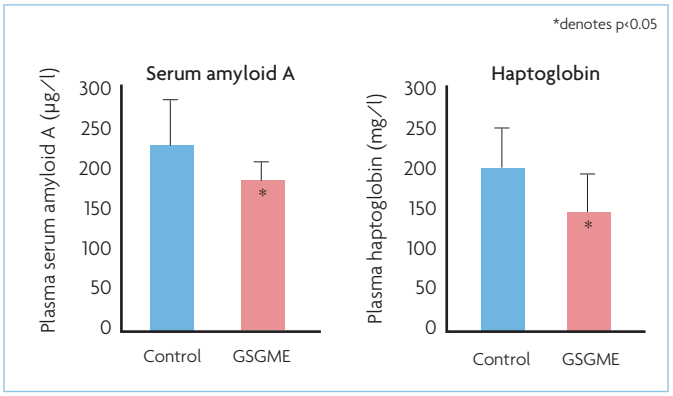


Fig. 2. Plasma concentration of serum amyloid A and haptoglobin in cows of control and treatment group one week post-partum. Mean (bar) and SD (whisker) (Gessner et al 2017).

Results

In total, 207 transcripts were expressed differently in the liver between the control and treatment group. The group with Anta Ox shows 156 up-regulated and 51 down-regulated transcripts.

The up-regulated transcripts were mostly mRNAs (n=155) and one non-protein coding miRNA.

The down-regulated transcripts include 43 mRNAs and eight miRNAs. A striking result was that within the down-regulated genes in the cows from the treatment group, a large number of genes are involved in unfolded protein response (UPR) related to endoplasmatic reticulum stress (ER stress).

For example, X-box binding protein 1 (XBP1) is a critical transcriptional regulator of ER stress. Therefore, the down-regulation of UPR target genes by Anta Ox shows less handling with ER stress factors. UPR target genes aim to restore ER homeostasis. Therefore, typical proteins encoded by UPR target genes, which were identified as down-regulated in the treatment group, are chaperones and co-chaperones. They are implicated in the refolding of proteins, and components of the ER-associated degradation (ERAD) machinery (for example MANF).

Another downregulated ER stress-inducible protein was PHLDA1/TDAG51. It encodes a protein promoting apoptotic cell death when ER stress-induced damage is overwhelming and homeostasis cannot be restored.

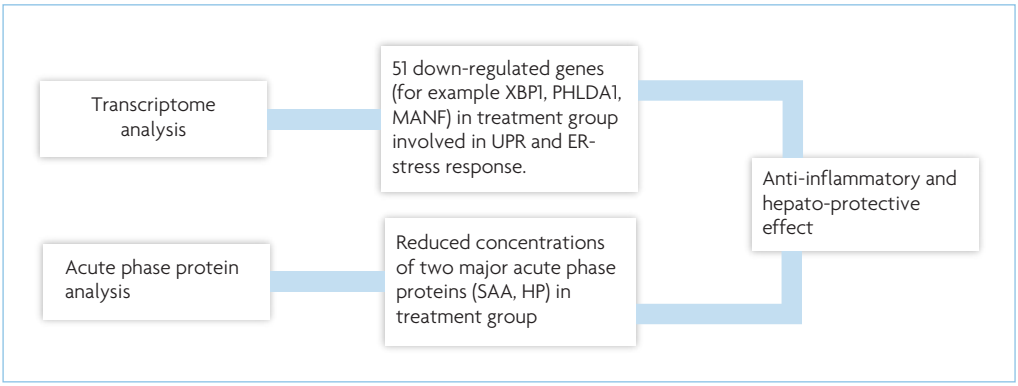
This is important, because other research shows that ER stress-induced UPR genes are up-regulated in the liver of dairy cows from late pregnancy to early lactation, for example XBP1 target genes. It can be assumed that ER stress in the liver of dairy cows has a decisive role in the development of liver diseases. This results in reduced metabolic functions of the liver, health and performance.

Fig. 2 shows the effect on the plasma concentration of the positive acute phase proteins SAA and HP. Acute phase proteins are important inflammation markers.

Concentrations of both acute phase proteins were decreased in the treatment group compared to the control group ($P<0.05$).

The inhibition of hepatic inflammation in the treatment group fits well together with the transcriptome analysis where APP SAA4 was one of the down-regulated genes. Hepatic synthesis of APPs is greatly induced during systemic inflammation triggered by pro-inflammatory cytokines. The acute phase response of the liver, which is determined by the concentrations of SAA and HP in plasma of cows, is inhibited.

Fig. 3. Effects demonstrated by transcriptome analysis and acute phase protein analysis.



Conclusion

Analysis of hepatic transcript profiles revealed important differences between cows receiving phytogenic flavonoids via their diet versus the untreated control group.

In the critical phase one week post-partum, supplementation with dietary polyphenols inhibited ER stress-induced unfolded protein response (UPR) and inflammatory processes on the hepatic cell level.

By inhibiting ER stress and inflammatory processes, Anta Ox reduces the risk of liver associated diseases. This promotes the animal's general health and leads to a better milk performance. ■

References are available from the author on request

Optionsfor

Extensive range of equipment for udder health

Ambic Equipment Ltd is a specialist in the design, production and international distribution of udder health systems and mastitis prevention technologies. Their product range includes an extensive array of teat dipping, teat spraying and teat foaming equipment suitable for both pre- and post-milking applications.

ambic.co.uk

The product range suits a variety of milking routines and levels of automation, ranging from simple manual application systems, such as a comprehensive range of dip cups, to fully automated systems, such as their automated teat spray system, Locate'n'Spray, which has been designed for rotary milking systems.

A wide range of chemicals are catered for across the product line – with customised products available to handle a range of chemical formulations as well as high viscosity and barrier chemicals. It is also able to handle two part formulations, such as chlorine dioxide.

Dosing and dilution products are also available to ensure accurate dilution on farm of concentrates, including a comprehensive range of peristaltic pumps and fully automated dosing systems in its new EasiDoser range.

The tool to manage the mastitis risk by ensuring a dry and clean litter

Mastitis is the first cause of pathology in dairy cows, responsible for 50% of the herd health costs, the second trait of variation of dairy income and the third cause of culling cows.

olmix.com

The most damaging mastitis are due to environmental pathogens. There is a high correlation between the occurrence of mastitis and the level of bacterial contamination of the litter. Pathogens grow in the litter as there is humidity, heat and oxygen. Thus, the quality of bedding is the first factor to prevent mastitis and has to be carefully managed.

Thanks to its unrivalled drying capacity, Mistral enables bacterial development in the litter to be reduced, thus controlling the occurrence of mastitis.

As it is a 100% natural desiccant, Mistral is non-aggressive to the skin and mucosa and can be safely and easily used in the udder area in a cubicle system. A field trial conducted in an experimental farm showed very interesting results. The herd was split into two homogenous groups in terms of days in milk, lactation number and milk production: control and Mistral group.

As Mistral contributed to limit bacterial development in the teat's environment, the somatic cell count in the Mistral group remained below 200,000/ml during the trial period and fewer fresh cows were infected in the Mistral group compared to the control group. On the contrary, the control group showed high levels of SCC (›250,000/ml) which involved milk price penalties.

Thus, Mistral is a management tool for the hygiene of the environment in the presence of animals.

Positively supporting the rapid reduction of the somatic cell count

Zinc is a basic chemical element for the proper maintenance of the health status of dairy cows, due to its intervention with several biochemical mechanisms concerning energy and protein synthesis, epithelium and claw formation, fertility and immunity.

tecnozoo.it

The use of a zinc complex has been demonstrated to be efficient in somatic cell reduction in animals with an evident state of leucocytosis.

Zincotris P is a dietetic mineral feedstuff containing a chelated zinc source with methionine, that facilitates its absorption and contributes, together with iodine and biotin, to stabilise and/or enhance the skin epithelium and the cutaneous annexes (hoof and udder).

A trial, conducted on 16 Italian farms, has shown Zincotris P (associated with all the good practices to avoid the occurrence of new mastitis) to be able to significantly decrease the average number of somatic cells (SCC).

It is therefore evident that the use of Zincotris P, within a somatic cells' control program, could positively support the aim of a general and rapid reduction of the somatic cell count.

Correct liner attachment for superior milking action

Teat health is a priority for both reducing mastitis and animal welfare. The milking machine is the animal to machine interface for milking a cow and therefore directly responsible for teat health and milking performance.

copulsation.com
youtube.com/copulsation

Proper liner attachment and liner action are critical to that performance. Failure to get full attachment with the teat properly aligned within the liner will result in harsh treatment of the teat, poor milking action with a risk of mastitis and injury.

Every milking system is constantly operating the liner by alternating between milking (open) and resting (closing) with 40% of the time resting. This results in a good chance that the liner will close as soon as the liner begins to engage the teat resulting in incorrect liner attachment.

Those typical cases of a liner partially attached can be fully avoided with the LinerMaid product integrated with the CoPulsation Milking System pulsator. These products guarantee every liner is correctly attached allowing for proper liner action for a superior gentle milking action. Achieve superior milking action with a focus on animal welfare as the liner is again held fully open for detachment.

Flexible, on demand chemical dispensing system

Globally, there is a wide variety of different approaches to proper teat care. When chemicals are used to treat teats, different combinations of chemicals are routinely mixed together in order to achieve optimal performance in both pre- and post-teat dip applications.

hydrosystemsco.com

Chemical examples include iodine and chlorine dioxide. Along with these chemicals, emollients are commonly added in order to keep dairy cow skin conditioned. To achieve optimal biological performance during different environmental situations, chemicals and additives are mixed at different ratios.

Once mixed, the shelf life of the chemicals are important. In order to optimise the teat dip mixture, Hydro Systems offers a flexible, on-demand dispensing system called ParlorMaster. The ParlorMaster is designed to provide the flexibility to dispense properly diluted chemical at the dilution rate that works best for your application. It contains a three-quarter gallon reservoir holding tank to provide on-demand dispensing without wasting product.

It features Hydro's Venturi technology to accurately dilute your concentrated chemicals. It is versatile enough to handle either one or two different chemicals and can be adjusted to handle multiple dilution rates.

Udder preparation is the start to healthy milking and quality milk

Sub-clinical mastitis is more and more often caused by infection with environmental bacteria, which originates from contact with areas such as bedding, pasture and manure, etc.

Cleaning and/or disinfecting teats prior to milking will reduce the number of bacteria on teats significantly, as wet and dirty teats can harbour high numbers of bacteria.

delaval.com

Different udder preparation routines will have a different impact on teat cleanliness, skin condition and milk let-down. Using a foaming teat cleaner is giving the best results on all aspects by far. The bubbles in the foam will burst, creating a surface tension that firmly holds the dirt until it is wiped off. Low consumption also makes this a very cost-effective routine.

Biofoam Plus has been proven to be a very effective foaming teat cleaner, covering the teats completely without spilling.

Farmers all over Europe have remarked that Biofoam Plus leaves teats perfectly clean and moisturised, by its smooth and airy foam which consumes a lot less than other products on the market.

To quote a French farmer "I think DeLaval managed to develop the perfect foaming teat cleaner, which leaves my cows with excellent teats".

State-of-the-art teat dilators and milking tubes

For many decades, teat dilators and other companion products have been used in veterinary medicine to treat mastitis, stenosis, injuries or for surgery on the teat canal.

Eco-type are now offering a new generation of products.

ecovet.de

Significant improvements have been made, such as safety for the user with regard to the raw materials used and guaranteed certified sterilisation of the products.

These innovative products offer safe application; they are break-proof, with newly designed handle pieces for a better insert.

They are packed individually into containers which means they can also be removed individually while still being enclosed.

Thanks to this generation of teat products, the product quality and innovation are now state-of-the-art and ensure an improved provision for the application.

Optionsfor

Hygienic prevention is the key in mastitis management

Worldwide, mastitis is one of the most expensive diseases for dairy herds. In discussion with farmers, it appears that the real cost of this disease is strongly under-estimated.

cidlines.com

Indeed, the costs of mastitis are considered in two categories:

- 'Direct or visible' costs are normally easy to quantify by farmers. It represents money they are directly losing: treatment costs, vet services costs, discarded milk.
- 'Indirect or invisible' costs are rarely taken into account by farmers because it is money they are not directly earning: decrease of milk yield, labour time, increase of the culling incidence.

Visible costs only impact for around 15% of the total cost of clinical mastitis. Moreover, clinical mastitis is only the tip of the iceberg: subclinical mastitis is much more frequent and more costly for the farmer. The decrease of milk yield due to clinical or subclinical mastitis is the main economical consequence for the farmer.

Once the disease is detected, the farmer has already lost a lot of money because of the milk production reduction. That is why hygienic prevention is the key in mastitis management. CID Lines' Mastitis Cost Calculator is a free tool to evaluate the losses on your farm. The app allows you to fill in your data and receive an overview of the economics of mastitis on your farm.

The round liner that folds like a square

The IQPro GQ is the first silicone liner for the IQ milking cluster from GEA that has a round barrel but folds like a square liner. The revolutionary four-way technology of the IQ milking cluster combined with the innovative silicone geometry of the IQPro GQ ensures efficient, fast and gentle milking.

gea.com

The name speaks for itself: Gentle and Quick! The new liner is especially designed for fast-growing and larger farms. Due to the small head a sufficient massaging effect is guaranteed throughout the entire milking process, even though the teats are short or narrow-standing. To achieve the best milking performance, the cluster and especially the liner must fit the udder and the teat as best as possible. Selecting the optimal liner for each specific application and herd is therefore very important. The IQPro GQ is able to adapt to a broad range of teat sizes and shapes and, hence, can milk herds efficiently.

Managing mastitis through on-farm testing

In this high-tech world, dairy producers are plagued by the age-old problem of mastitis and a large percentage of dairy cows still have udder infections during the course of their lactation cycle.

portacheck.com

Detecting mastitis in the sub-clinical stage is critical for saving time and increasing profits through reduced treatment costs and increased production. Modern on-farm tests provide producers with quick and accurate information that is essential for effective herd management.

PortaCheck is committed to providing high quality on-farm tests to address this worldwide problem. The PortaSCC milk test provides a semi-quantitative somatic cell count in less than 60 minutes.

UdderCheck is a two minute dipstick test that screens for LDH (lactate dehydrogenase), a proven measure of inflammation in the udder caused by infection. LDH is well correlated to somatic cell count and associated with the presence of mastitis. Using these two tests together provides farmers with tools to find infected quarters early and effectively.

Easy, affordable and reliable on-farm tests from PortaCheck.

Effective treatment of environmental mastitis

Mastitis control measures implemented in the early 1970s, known as the five-point control programme, are very effective against contagious mastitis but have little effect against environmental mastitis. The incidence of environmental mastitis has increased in recent years and it is key to control them to avoid chronification.

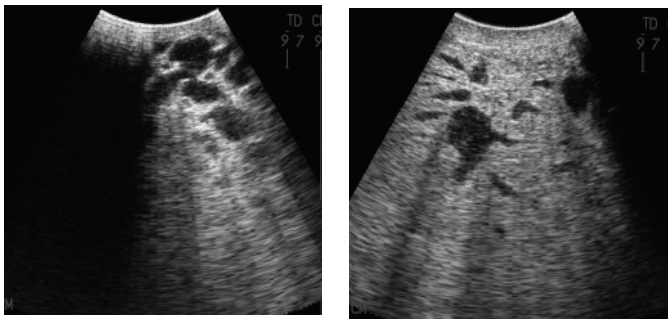
livisto.com

One of the most common causal agents for environmental mastitis in dairy cows is E. coli. This opportunistic agent usually colonises the mammary gland at dry-off, with the infection appearing at the beginning of lactation.

In cases of severe coliform mastitis, or in situations where the immune system is compromised – such as the transition period – it is important to fight these infections to avoid recurrence by treating the cows with systemic antimicrobial therapy.

Livisto's Boflox is a Marbofloxacin 10% injectable antibiotic solution. Marbofloxacin is a third generation fluoroquinolone with broad-spectrum against Gram-negative bacteria and high bioavailability by parenteral route. Its activity on bacterial DNA gyrase reduces the risk of septic shock due to the release of endotoxins when treating infections caused by Gram-negative bacteria such as E. coli.

Boflox can be administered to pregnant cows. The recommended dose for the treatment of mastitis is 1ml/50kg bw/24 hours for three days.



Highlighting the difference between a normal and a mastitis image.

Examining udders with the use of non-invasive ultrasonography

Ultrasonography is a non-invasive technique that can be used for examining the bovine udder and teats. For high milk production in cows, it is important to keep a well-structured udder and teats, as they are more resistant to the long-term impact of milking equipment.

bcftechnology.com

Different types of mastitis lead to loss and adverse changes in the quality of milk. Increased costs for treatment and early culling of the animals make up the negative economic effect. Udder ultrasound is a complementary tool to help diagnose the following:

- **In the gland parenchyma:** Mastitis; pathological changes in the udder, such as inflammation; without clinical signs of mastitis (haematoma, neoplasia, abscess,etc) and foreign bodies.
- **In the teat:** Stenosis, inflammation, mucosal lesions, tissue proliferation, milkstones, congenital changes and fused teats.
- **In the teat canal and Fürstemberg's rosette:** Inflammation and mucosal lesions.
- **In the teat cistern:** Inflammation, milkstones, tissue proliferation and congenital malformations.

Ultrasonography is increasingly used for examination and measurement of different anatomical structures (length and diameter of the teat canal, cistern, and the thickness of the teat wall).

Many authors have found a relation between mastitis in cows, the characteristics of the teat, the stage of lactation and the visualisation of the teat canal. The main indication of this technique is to appreciate milk flow disorders. Inadequate milking technique or teat handling are the most common causes of altered milk flow.

The BCF Easi-Scan:Go can be used for identifying mastitis in dairy cows.

Portfolio approach to mastitis control and milk quality

Driven by the wish to improve animal well-being as an integral part of a healthy future for mankind and their ongoing efforts in the area of mastitis control and milk quality, Boehringer Ingelheim Animal Health introduced their Ubrocare concept.

ubrocare.com

Ubrocare is a comprehensive range of products which provide mastitis control and treat the infection and inflammation effectively. The Ubrocare range includes:

- **Ubrolexin:** Treatment of clinical mastitis in lactating dairy cows for bacteria susceptible to the combination of cefalexin and kanamycin.

- **Ubrostar:** A unique combination of three targeted antibiotics (penethamate hydriodide, benethamine penicillin and framycetin) designed to deliver a triphasic approach to dry cow treatment.

- **Mamyzin:** Convenient and effective injectable treatment for mastitis caused by penicillin-sensitive organisms.

- **Metacam:** Leading NSAID offering long-lasting relief from pain and inflammation associated with mastitis. It has been demonstrated that routine use of Metacam with an antibiotic to treat mastitis significantly improved bacteriological cure rate and significantly reduces somatic cell counts and culling rates. It is also associated with a greater first-service conception rate, fewer inseminations and a higher probability of pregnancy by 120 days post-calving.

The Ubrocare range is available in Europe, South and Central America, Middle East, Turkey and North Africa.

Practical hints and tips on what makes a good silage inoculant

Silage inoculants are based on live bacteria which contribute to improving silage acidification and/or aerobic stability depending on the bacteria activities. The inoculant market is growing, with many different products on offer, claiming many benefits and various price ranges. This article offers hints and practical tips on how you can make an enlightened choice.

by Irène Joulié, Sylvie Roquefeuil, Luis Queiros, Lallemand Animal Nutrition. www.qualitysilage.com

There are two main types of bacteria used in an inoculant formulation, depending on the desired outcome:

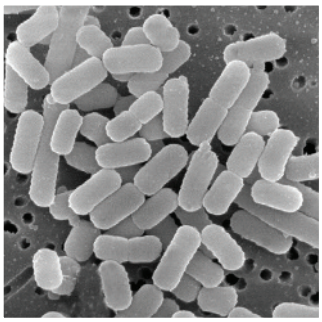
- Homofermentative lactic acid bacteria (LAB), which convert soluble sugars from the forage into lactic acid, for example, Lactobacillus plantarum or Pediococcus acidilactici. These bacteria are used to speed-up the initial fermentation, helping to quickly reach a safer pH.
- Heterofermentative bacteria such as Lactobacillus buchneri, which convert soluble plants sugars into lactic and other acids which have a documented antifungal activity (acetic acid or propionic acid). They are effective to improve silage aerobic stability and hence reduce the risks of aerobic spoilage after silo opening.

According to Professor Limin Kung, PhD, University of Delaware, "Of the heterolactic acid bacteria, only Lactobacillus buchneri has proven itself (with multiple research publications) to be an effective silage inoculant."

However, in the same bacteria species (for example L. buchneri), each strain has its own genetic identity and commercial strains are registered with unique strain numbers (for example L. buchneri NCIMB 40788 from Lallemand Animal Nutrition). In Europe, unique strains are authorised as silage additives and all documentation is linked to a particular-strain number. This means that, for example, what has been published for one L. buchneri strain cannot apply to another.

Always check the strain reference on the European Union register of feed additives before choosing an inoculant.

All inoculant formulations are specific. Inoculants can be based on a single strain or associate different strains with complementary activities. For example, homofermentative and heterofermentative bacteria can be combined to improve both acidification and aerobic stability of low sugar, high DM and high-nutrient content forages such as alfalfa.



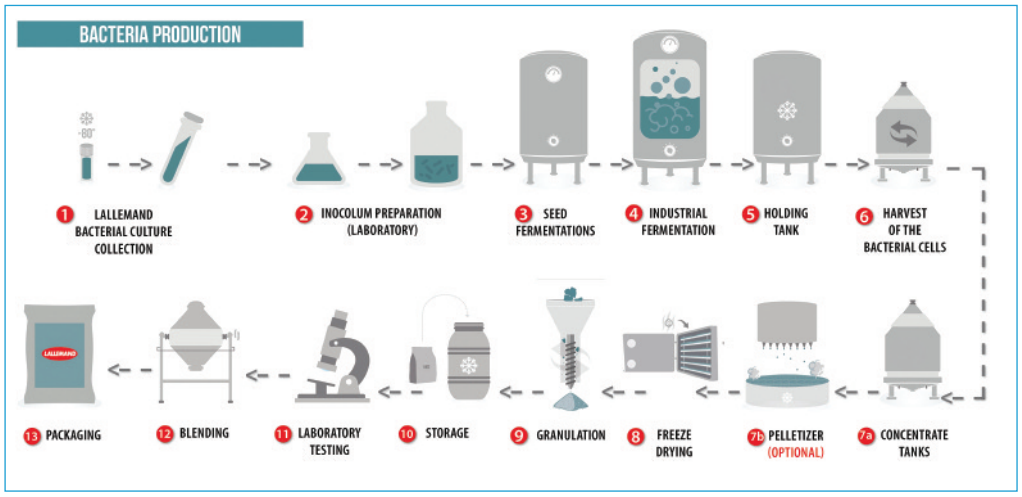
Lactobacillus buchneri (Electron micrograph courtesy of D. S. Smith, Dept. of Food Science, University of Guelph, Canada).

There is no rule as to what is the best combination, but the formulation should respond to specific issues related to each type of crop. For example, maize is prone to aerobic instability due to its high sugar and dry matter content. The best option for preservation is to use a proper strain of L. buchneri authorised to improve aerobic stability. On the contrary, grass silages and alfalfa have a lower sugar and dry matter content.

In this case, acidifying bacteria is necessary to achieve an ideal acidification. Some inoculants even associate these bacteria with enzymes that raise the fibre digestibility and release soluble sugars to enhance the lactic acid and antifungal bacteria metabolism.

Inoculant formulation should be specifically adapted to the target crop and ensiling challenge in order to ensure best silage preservation.

Fig. 1. From a few bacteria cells to tons of finished products, bacteria production is a succession of upscaling steps and tight quality controls, necessary at every step to ensure purity and quality of the final product. (Lallemand Animal Nutrition)



Research is key

Professor L. Kung wrote, "An effective silage inoculant will have independent, statistically analysed, and published data supporting its use. Of course, the more supporting

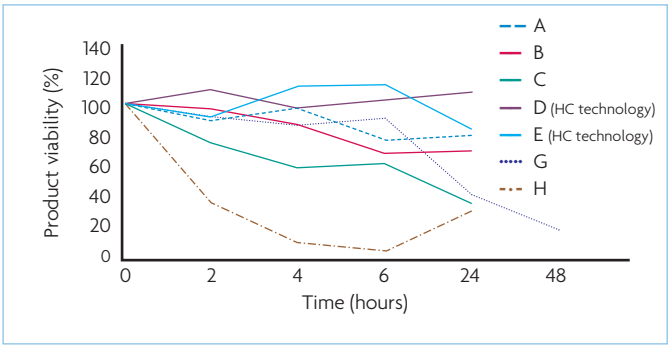


Fig. 2. Inoculant viability (%) over time in suspension in water: comparison of seven commercial products (Lallemand internal data, 2017).

On-farm services, such as Lallemand's silo audits can be a very important management tool.

data there is, the more credibility a product has. I will take an educated guess and say that no more than 10-15% of the silage inoculants in the marketplace have more than five publications showing that they work."

It is important to check that there is independent published research related to the inoculant formulation and/or strain(s). Not all companies invest in continuous research and development to document their products. Professor Kung explains, "Lactobacillus buchneri NCIMB 40788 has become the gold standard to improve aerobic stability, showing consistent results."

Always check that the scientific and technical references provided with a product refer to the specific strain.

Production is essential

An inoculant's efficacy relies on the biological activity of live bacteria. Thus, efficacy of the final product relies on the survival of the bacteria, from the plant all the way through to the silo.

Bacteria viability depends on the strain (its intrinsic quality), as well as the quality of the production process, formulation, and finally, storage conditions including packaging. The production of live bacteria requires expertise and stringent quality controls throughout the process.

Only a few companies possess the capability to produce bacteria and deliver pure, live, stable, and consistent blend of specific bacteria.

Companies that produce their own bacteria and control the whole chain from bacteria fermentation to final product packaging ensure optimal quality and traceability of the product (Fig. 1).

When choosing an inoculant, it is important to check the reputation of the primary producer, the product shelf life and the storage conditions.

Importance of formulation and dosage

Not only is the bacteria composition important, but also the dosage and product formulation technology. One can select the best possible bacteria strains, but if the farmer does not end up with the right number of live and active bacteria in the silo, it is useless for them.

Hence, the number and the viability of the bacteria, as well as solubility and ease of application at the harvester, are very important, too.

Once the product's scientific documentation and technology has been checked, it is important to check the dose.

All published data are related to a recommended dose of use, which is expressed as CFU (Colony Forming Units) per gram of fresh forage treated or per gram of product.

The CFU represents the number of live and active bacteria. When comparing two products, it is important to compare the final bacteria count, as sometimes this can help explain the price difference.

For example, L. buchneri is effective at 300,000 CFU/g of fresh forage. Certain products could be misleading as giving the overall bacterial count. It is important to check the number of each individual bacteria to make sure the optimal dose is used.

Always compare dose according to final bacteria count in forage.

Dead bacteria are useless

Number of bacteria or CFU in the sachet is one thing, but the number of live bacteria reaching each part of the silo is another. Lallemand's inoculants are stored as hydrodispersible powder in an aluminium foil sachet.

The bacteria are preserved in a freeze-dried form. When considering liquid applications, the bacteria are revived when mixed in water, surviving only a few hours in water outside the silo. For this reason, the remaining product should be discarded from the tank at the end of the working day or silo, within 24 hours.

However, bacteria viability after dilution is also dependent on the formulation and technology associated. For example, the High Concentration (HC) technology has been developed by Lallemand Animal Nutrition specifically for low volume applicators with three major features:

- High concentration of the product.
- Low sedimentation for homogenous application throughout the silo.
- High stability.

Fig. 2 shows the viability of bacteria in suspension in water over time, or stability, for different products available on the market. It shows that some products lose more than 25% viability during only the first two hours after dilution, and that at the end of six hours the viability had fallen to 60%.

The product using the HC technology offers up to 24 hours bacteria survival in suspension.

Formulation technology helps ensure viability over time.

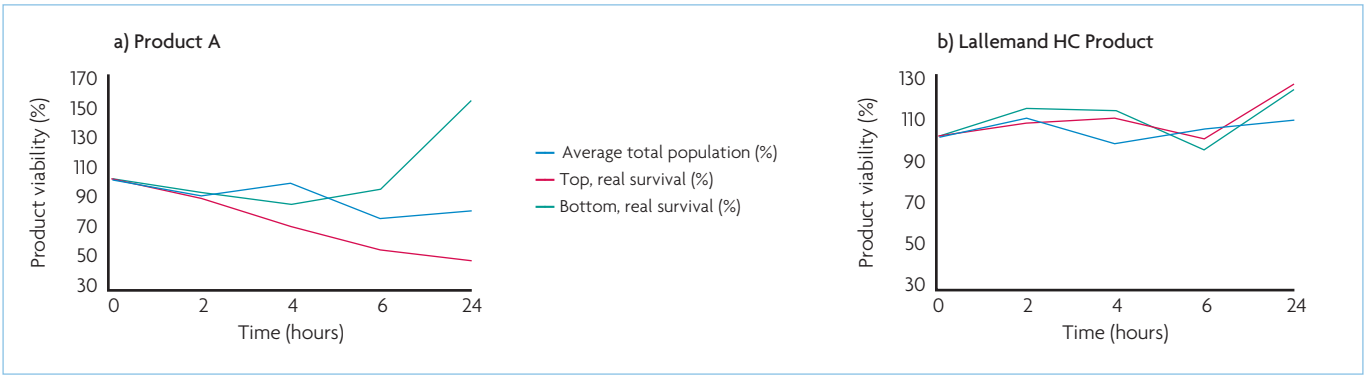
Does the product remain in suspension?

Inoculants are very concentrated; billions of bacteria are present in every drop of diluted product. To be effective, it is essential that their application is homogenous during ensiling.

One can have the best bacteria, but if it settles in the bottom of the tank, it is useless. As shown in Fig. 3, depending on the formulation,

Continued on page 24

Fig. 3. Sedimentation of a) commercial product (without HC technology) and b) Lallemand HC product in suspension over time (Lallemand internal data, 2017).



Continued from page 23
certain inoculants remain in suspension for hours, which ensures homogenous application within all the silo, while in other formulations, the bacteria, once mixed with water, tend to sink to the bottom of the tank after only a few hours.

As a result, the application can be far from optimal. Producers can risk overdosing the silage at the bottom of the silo while under-dosing the top part.

Silage at the top of the silo is where the aerobic challenge is often greater due to its higher porosity and where inoculant is most needed. With the HC technology, bacteria remain in suspension for up to 24 hours.

Product speed of sedimentation is important technical criteria.

Technical support

Successful silage making can meet many challenges and requires technical knowledge.

Silage inoculants are not commodity products and to make sure the investment pays-off, ideal practices should be implemented. Providers should accompany their users with strong technical support.

Professor L. Kung wrote on this matter, "Although technical service is not directly related to the effectiveness of a silage inoculant, this should be factored into your decision-making process. Certainly, companies that are willing to assist you in times of need should be highly considered."

On-farm services, such as the silo audits developed by Lallemand Animal Nutrition are very useful to achieve precise, objective and rapid assessment of the silage quality on-farm and represent invaluable tools to optimise the silage management at this level.

Check that your provider offers expert technical services on-farm.

Conclusion

There are many silage inoculants on the market with different claims and specifications. A better understanding of the makeup of a silage inoculant, its modes of action and specificities, help make the right decision.

The checklist shown in Table 1 (right) can help guide you to the right decision or at least address the preferred questions when choosing a product. ■

References are available from the author on request

Is the company reputable?	Yes	No
Do they manufacture their own products to international quality standards?	Yes	No
Is the product packaged properly to maintain product viability?	Yes	No
Is the product shipped in a way to maintain product viability?	Yes	No
Does the company have data to support the shelf-life of their product?	Yes	No
What do I need from my inoculant?		
Improve front-end fermentation and DM recovery	Yes	No
Improve stability at feedout and prevent spoilage	Yes	No
Does the company have third-party data to show the product can meet my needs?	Yes	No
What additional features and benefits would I like?		
Easy to use	Yes	No
Increased milk production	Yes	No
Other (write in)	Yes	No
Does the company have third-party data to show the product can deliver those extras?	Yes	No
Does the company offer help with sourcing applicators?	Yes	No
Does the product formulation include stabilisers to keep the product stable in the applicator tank?	Yes	No
Does the local rep provide additional services (for example, silage sampling and testing)?	Yes	No
Does the company have technical support services staff for any necessary follow-up?	Yes	No

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Liver abscesses

Introduction

Liver abscesses can occur in cattle at any age. In calves they are often a sequel to omphalophlebitis, whereas in older animals they are often secondary to reticulorumenitis or traumatic reticulitis.

The most common bacteria isolated from hepatic abscesses are Fusobacterium necrophorum and Arcanobacterium pyogenes, while Streptococci and Staphylococci spp. are often found in mixed cultures.

Clinical signs

Local, circumscribed liver abscesses typically show no clinical signs and are an incidental finding at post mortem examinations.

If abscess(es) are adjacent to the vena cava they can distort the vessel's wall causing phlebitis and thrombosis. Septic thromboembolism from the vena cava can cause a respiratory syndrome typified by cough, dyspnoea and/or pulmonary haemorrhage.

The percentage of adult slaughtered cows showing abscesses is relatively low (<5%), although in as many as a quarter of these, they are positioned such that they have the potential for causing vena caval thrombosis.

Liver abscesses can be associated with constitutional abnormalities including fever, anorexia, weight loss and reduced milk production. Abscessation in the region of the bile duct can result in obstruction to bile flow. Liver abscesses can cause vagal indigestion.

Hepatic abscesses can be as large as 20cm in diameter and, on rare occasions, such large abscesses can result in displacement of the diaphragm.

Treatment

Treatment consists of the use of antibiotics and/or surgical drainage. The use of the latter procedure depends upon the abscess size and location and the condition and value of the cow. On the antibiotic front, success is possible with penicillin but relapses are common unless treatment is for at least four weeks.

Prognosis is guarded.

Wild animals as disease sources

This Argentinian paper **(PLoS Neglect. Trop. Dis. 11 e0005722)** reports on the infection of small wild mammals with Leptospira spp., Brucella spp, Trichinella spp and Cysticercus fasciolaris.

A total of 10 pig farms and eight dairy farms were studied by removal trapping of small mammals over a three year period. Over a total of 14,359 trap nights, 505 small animals were caught including three species of introduced murine rodents, four of native rodents and two species of opossum. The results of testing for the four infections revealed that two or more pathogens occurred simultaneously on 89% of farms and each pathogen was found on half of the farms. Differences occurred due to season and rainfall. Interestingly, murine rodents appeared to be involved in keeping the pathogen on the farm, whereas other species were more likely to be involved in the dispersal of pathogens between farms.

Costa Rican parasite prevalence

This Costa Rican study **(Vet. Parasit.: Reg. Studs. and Reps. 9 115-121)** describes the distribution of Dictyocaulus viviparus (husk) and Fasciola hepatica in Costa Rican dairy herds and endeavours to determine the variables that affect the distribution of these two parasites.

Bulk milk samples from 526 dairy herds were screened by ELISA. Of these samples 20 (3.8%) and 19 (3.6%) were positive for D. viviparus and F. hepatica respectively.

Volatiles in dairy products

This Austrian work **(Euro. Food RES. and Tech. 243 1783-1797)** investigated volatiles in dairy products and taste and sensory properties of cheese after feeding essential oils to dairy cows.

The work concentrated on eucalyptol, camphor, menthol, menthone, pulegone and thymol. The results showed carryover into raw milk and accumulation in milk fat. Descriptive sensory testing of cheese made from the milk from treated cows showed a high variability of sensory properties. Preference tests by consumers showed a higher rating for cheeses made from cows receiving essential oils.

Respiratory disease complex

This Brazilian review **(Ciência Vet. nos Trópicos 19 43-48)** describes the predisposing conditions that facilitate the outcome of dairy cattle respiratory diseases caused by bacteria, viruses and worms, either acute or chronic with emphasis on the main clinical exploratory and laboratory methods used for its diagnosis. The review then goes on to consider treatments.

Citrus pulp for dairy calves

This Brazilian trial **(Arch. de Zootec. 66 351-356)** was undertaken to evaluate the effects of replacing corn by citrus pulp in calves up to 60 days of age. The intake of starter was higher in the corn group and calf weights were similar.

Concentrations of the three volatile fatty acids (acetic, propionic and butyric) and ruminal pH were similar in both groups, although percentage propionate was higher in corn fed calves and percentage butyrate was higher in animals fed citrus pulp. These results suggest that citrus pulp has the potential to be used as a replacement for corn in calves up to 60 days of age.

Virulence factors of staphylococci

This Turkish study **(Kafkas Univ. Vet. Fak. Dergisi 23 947-952)** had the objective of identifying the species of staphylococci that cause mastitis, to examine the virulence factors of these species and to determine the relationship of these factors to pathogenic and non-pathogenic staphylococci. The study included 37 isolates of Staphylococcus aureus, 13 of S. hyicus, nine of S. simulans, eight of S. chromogenes, five each of S. lentus and S. epidermidis, two each of of S. haemolyticus and S. hominis and one each of S. aurcularis, S. warneri and S. sciuri. Of these isolates 41.6% were coagulase positive.

The proportion of coagulase positive and negative staphylococci showing various virulence attributes are shown in the table below. The methicillin resistance rates in coagulase positive and negative strains were 2.9 and 16.3% respectively.

Virulence factor	Coagulase +ve (%)	Coagulase -ve (%)
Protein A	71.4	10.2
DNase	48.6	12.2
TNase	11.4	2.0
Capsul	40.0	8.2
Haemolyse	97.1	82.0
Staphylokinase	40.0	32.7
Slime in agar	28.0	12.2
Biofilm (microdilution)	37.1	12.2
Haemagglutination	17.1	10.2

White line disease and sole ulcers

This American paper **(Vet. Clins. of N. Am., Food An. Prac. 33 283-300)** considers some aspects of the two most common claw horn lesions in confined dairy cattle – white line disease and sole ulcers.

Predisposing factors include excess weight bearing and metabolic, enzymatic and hormonal changes. The white line effectively serves as a junction between the sole and the axial and abaxial walls of the hoof. It is at risk from trauma and separation and when this occurs the ensuing gap fills with soil and organic debris.

Colonisation contributes retrograde movement of infection to the solar and perioplic corium where an abscess forms resulting in pain and lameness.

Fat supplements

This Iranian trial **(J. of Dairy Sci. 100 5319-5328)** was undertaken to evaluate the effects of starter supplementation with different fat types which differed in their fatty acid profiles during the cold season.

The five diets used were:

- No fat or oil source (control).
- 3% palm oil.
- 3% soybean oil.
- 3% tallow.
- 3.2% mixture of palm oil, soybean oil and fish oil.

Overall, the addition of 3% palm oil or tallow to a diet for young calves failed to improve growth performance, whereas the addition of 3% soy bean oil or the oil mix increased the essential fatty acid concentration. It was found that calf performance was only improved by the soybean oil supplementation.

Bluetongue vaccination and ovine milk production

There is an on-going issue about blue tongue vaccination and its possible side effects in sheep, but these concerns have reduced since live attenuated vaccines have been replaced by inactivated ones. In this Italian study **(Summa, Animali da Reddito 12 55-60)** two Sardinian high yielding sheep flocks were compared – one group had been vaccinated and boosted and the other served as a control.

Both groups were evaluated in terms of daily milk yield per head and somatic cell counts.

This survey showed that correctly administered bluetongue inactivated vaccines do not significantly interfere with milk yield.

Virulence genes of Staphylococcus aureus

Staphylococcus aureus is a major cause of intramammary infections (mastitis) in dairy cows. Different prevalences of mastitis reported may be due to a combination of S. aureus virulence factors beyond host factors. This Italian study **(Toxins 9 195)** reviewed 169 S. aureus isolates from Italian dairy herds. These were classified into one of four groups based on the prevalence of S. aureus infection at the first testing. The aim was to correlate the presence of virulence genes with the presence of intramammary infections.

They found that, firstly, 24 genes were at a significant risk of being detected in all herds with infection prevalence of ›5%, including genes belonging to microbial surface components recognising adhesive matrix molecules MSCRAMMs, immune evasion and serine proteases. Secondly, there was a significant correlation coefficient between the genes interacting with the host immune response and High Prevalence group isolates against those of the Low Prevalence group. These results support the hypothesis that virulence factors, in addition to cow management, could be related to strain contagiousness.

Brazilian first

The first reported case of trypanosomiasis caused by Trypanosoma vivax in the Brazilian state of Goiás **(Braz. J. of Vet. Parasit. 26 366-371)** occurred after the importation of 18 auctioned cows from another state.

Some 56 cows in the herd were infected and 12 died. Diagnosis was confirmed by the examination of blood smears and ELISA. After this first case, five others were seen that could be linked to commercial movements of cattle or the iatrogenic practice of using a single needle many times over for oxytocin administration prior to milking.

Occurrence and impact of ovarian diseases

The objective of this Czech study **(Ind. J. of An. Scis. 87 8120-813)** was to assess the factors that determine ovarian disease and quantify the impact of ovarian disease on fertility rate and breeding costs.

High parity and summer season calving caused a higher prevalence of ovarian disease. Cows with ovarian disease had longer open days, longer calving to first service intervals and a higher number of services per conception.

Phytonutrients

Phytonutrients are organic compounds derived from the secondary metabolism of plants. They have a wide range of antimicrobial properties and some have also been considered as possible rumen modifiers. This American review **(J. of Dairy Sci. 100 5974-5983)** looks at phytonutrients and the ways in which they have potential to help the dairy industry.

It has been shown that some phytonutrients may inhibit the deamination of amino acids and methanogenesis in the rumen and shift fermentation towards propionate and butyrate.

However, many of the experiments supporting this have been done in vitro and have had highly variable and inconsistent results. Some reports have indicated positive results on production with rumen function. Other than antimicrobial effects in the gut, phytonutrients are known to bind onto specific receptors in neurones in the gut whose receptor mediated effects include immune responses, oxidative stress and insulin secretion and activity. Other phytonutrients, due to their phenolic nature, are less susceptible to microbial degradation in the rumen and may express activities post-ruminally.

Phytonutrients have also been reported as being able to regulate immune cells related to adaptive and innate immunity in challenged or unchallenged dairy cows.

They are also reported to reduce oxidative stress by decreasing lipoid peroxidation and increasing endogenous antioxidants in the cow. In addition, insulin secretion and sensitivity have reportedly been regulated by phytonutrients.

The regulatory effects of phytonutrients on immunity could potentially be harnessed to counter immunosuppression and inflammation as well as having a positive effect on energy partition for milk production through their effects on insulin. Obviously our understanding of phytonutrients is in its early days but it should yield interesting data for dairy scientists and, ultimately, farmers to use in the future.

Incomplete milking

This Canadian study **(Fronts. in Vet. Sci. 4 66)** was undertaken to investigate the effect of incomplete milking in the first five days postpartum on resting behaviour in dairy cows. The hypothesis was elevated intramammary pressure resulting from the milk being retained in the udders of incompletely milked cows could lead to a change in lying behaviour. The results suggest that incomplete milking might be a slight problem in second parity cows but in older animals it could be slightly beneficial.

House flies and E. coli

This American study **(J. of Med. Entom. 54 726-732)** was undertaken to assess the prevalence of seven non-O157 STECs (O26, O45, O145, O103, O121, O111 and O104). Out of 463 houseflies from nine beef feedlots and three dairy farms in six states, 34.3% of the flies carried one or more of the STEC groups. Interestingly, only 1.5% of flies from beef feedlots yielded STECs.

The Mervue Laboratory team were recently in Egypt to launch the Mervue Laboratories Ruminant, Poultry and Equine product ranges. Commercial Director William Twomey and Technical Director Martin Beirne were joined by Mervue's Head Nutritionist Des Cronin. The team undertook a series of farm visits and seminars in Cairo, Alexandria and Shakshuk covering topics of nutrition backed animal health and maximising animal health and production. The Mervue Laboratories product range, including their ruminant buffer product Rumbuff, were extremely well received.

mervuelab.com

SmartCow network

SmartCow – a research network of 3,500 cattle and 30 pan-European projects – is to be created by the French National Institute for Agricultural Research (INRA) to promote innovation in the European cattle sector. UK-based Agrimetrics is supporting the consortium with its expertise in big data for the agri-food industry.

"The SmartCow research network will generate a significant amount of valuable data and Agrimetrics brings its expertise in data management to the consortium," Professor Richard Tiffin, Chief Scientific Officer for Agrimetrics, told International Dairy Topics. "It will create integrated data sets, increasing significantly the range of analyses that can be conducted. For example, it will be possible to combine data from different methane emission sensors to improve our understanding of how diet affects the release of this greenhouse gas from dairy farms."

The INRA research infrastructure of 10 research institutes brings together scientific and technical skills in animal nutrition, genetics, health and welfare, data management and knowledge transfer. In the UK this includes SRUC's Beef & Sheep Research Centre, SRUC's Dairy Research Centre, and the University of Reading Centre for Dairy Research.

Rene Baumont, SmartCow project coordinator, comments: "SmartCow will increase access to the most advanced research facilities and equipment for the cattle sector across Europe. It aims to improve the quality and ethics of cattle research through identification and promotion of best practices, new measurements techniques, and smart technologies."

agrimetrics.co.uk

De Heus acquisition in Slovakia

De Heus recently acquired a grain silo and compound feed factory in Kendice in Slovakia in order to provide its customers with an optimal service. De Heus is keen to base its production locations as close as possible to its livestock farmers and with this acquisition are now in an even better position to respond to the need for high quality animal feed of its growing numbers of customers in Central and Eastern Slovakia and Northeast Hungary.

To fulfil the high quality standard set by De Heus, the production process in the acquired factory will be totally rebuilt and provided with the most advanced and modern production techniques.

These investments are expected to be completed in mid-2019. From that moment on, the factory will start production. In anticipation of this, the existing grain silos will be used to store grain harvested from July 2018 onwards. This grain will then be used as an ingredient for the animal feed produced at existing locations in the Czech Republic.

deheus.com

Information and trade exchange

Thai Feed Mill Association (TFMA) and Korea Feed Ingredients Association (KFIA) recently signed a memorandum of understanding (MoU) in Bangkok, Thailand during Victam Asia. The MoU is about trade and information exchange of feed and feed ingredients between Thailand and South Korea. This is a big step in the feed ingredients sector to start a new trade gateway and open new opportunities to link the two countries. They believe it will bring a massive benefit for both parties.

The livestock and animal feed exhibitions in Bangkok, Thailand are powerful places to make strong connections to create cooperation between two countries for upgrading the Asian livestock and animal feed industry.

vnuexhibitions.com

Scientific sharing in Asia

Nutriad recently participated with species and product application experts in the Pig, Poultry and Dairy Focus Asia 2018 (PP&DFA) in Bangkok, Thailand.

As one of the leading technical conferences for the Asian pig, poultry and dairy sectors, PP&DFA hosted more than 300 participants.

BK Chew, Regional Director Asia Pacific for Nutriad said "At PP&DFA we had the opportunity to share our latest scientific trials in the areas of mycotoxin management and gut health, with the aim to provide an alternative to AGP use, offering new insights to the ever challenging dairy production."

Dr Hassan Taweel's, Business Development Manager Ruminants presented 'Intake in dairy cows: the influence of palatability and fibre digestion." Dr Taweel emphasised that high producing dairy cows in early lactation fail to consume enough feed to fulfil their energy requirements and consequently suffer from nutritional and metabolic disorders. Combining palatability additives with rumen modifying additives could offer a great opportunity to modulate and improve DMI in dairy cows and other ruminants.

Palatability additives would provide improvement in the sensory characteristics of the ration, while rumen modifiers would improve and optimise rumen function and fibre digestion, sending positive post-ingestive signals and re-enforcing the positive effect on DMI.

Trial data on inclusion of Aroma Fruity or Gusti-Plus in the compound feed fed in the robot showed that the number of milking per cow increased from 2.4 to 2.8 times per day. This 15% increase led to 0.9kg increase in milk yield per cow per day and 6% improvement in feed efficiency.

Another study on the effect of adding Nutri-Ferm Prime (Nutriad's specialty DFM) to different rations based on alfalfa and grass hay or grass and maize silage led to a staggering 7-10% improvement in NDF and OM digestibility and a 6% improvement in feed efficiency.

nutriad.com

ILDEX Vietnam 2018 was recently held in Ho Chi Minh City and attracted 300 leading companies from 28 countries. With six international pavilions to showcase livestock technologies, ILDEX Vietnam has become the leading trade exhibition in the Asia region with strong attendance and plentiful business opportunities. "ILDEX Vietnam has seen tremendous growth this year. The exhibition space has grown by 40% and more than 87% was occupied by international companies," Nino Gruettke, the Managing Director of VNU Exhibitions Asia Pacific Co Ltd, told International Dairy Topics.

ildex.com

Reducing methane emissions on-farm

Harbro has developed a product that has been recognised by The Carbon Trust to reduce methane emissions and, consequently, carbon footprint for livestock farmers, without affecting productivity.

RumiTech is a feed additive which has been proven in trials and in practical on-farm situations to improve rumen function and feed use efficiency as well as to reduce methane emissions.

After independent review, the Carbon Trust has provided assurance that RumiTech is an effective tool for reducing cattle enteric methane emissions and that, within a predominantly forage-based diet, it reduces dairy or beef enteric methane emissions by 6% per day, and by 17.7% per litre of milk in dairy cow herds.

Recent data shows that 40% of greenhouse gas emissions come from methane produced predominantly by ruminants, with the wider agricultural supply chain also identified as being responsible for a further 8-11% of human-induced emissions.

harbro.co.uk

VIV Europe returns to Jaarbeurs Utrecht, The Netherlands, as the World Expo of animal protein businesses from feed to food!

From 20th-22nd June 2018, VIV Europe will be celebrating its 40th anniversary as a business platform.

Four events under one roof

VIV Europe 2018 is part of the first International Week for Smart Food Production, which will be a series of business events bringing together the global food and agriculture industries to address the challenges of today and tomorrow to achieve sustainable growth. The three other events will be GFIA Europe, the inaugural European Halal Expo and the new World Milk Expo.

Sharing Data = Better Poultry

A major focus at VIV Europe 2018 will be a special exhibition hall entitled 'Sharing Data = Better Poultry'. This will allow discussion about the benefits achievable by sharing data along the poultry supply chain. The section is under the spotlight for innovations from more than 30 exhibitors relating to Big Data poultry applications.

Companies interested in being part of this section have until 30th April to submit their request.

Convenient venue adds to visitor appeal

The site has been thoroughly modernised and the organisers are working on the basis of a 20% increase in visitor numbers for June 2018. There are many good reasons for visiting The Netherlands in June, starting with VIV Europe! The venue is very convenient and is easily reached from all parts of the world. We have also not forgotten about the FIFA 2018 World Cup!

VIV EUROPE IS PART OF SFP INTERNATIONAL WEEK SMART FOOD PRODUCTION

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vnu exhibitions europe

internationalnews

New cartridge system

Vettec, a leading manufacturer of hoof care products for more than 20 years, has launched a new cartridge system for its Bovi-Bond adhesive products.

The new, 160cc cartridge system includes a Push and Pull openings system, reinforced plungers and a triple-seal piston.

These enhanced features ensure leak-free dispensing and help hoof care professionals increase efficiency by mitigating the need for tools to open the cartridge.

"We designed this new cartridge system based on feedback from Vettec customers. We know that efficiency is key when hoof care professionals are working with their clients.

This new cartridge design will help save time and provide an advanced, reliable dispensing system for Bovi-Bond products," Anthony Woods, General Manager, Vettec, told International Dairy Topics.

The new push and pull cap design does not require tools to open the cartridge.

This minimises any potential damage to a cartridge, such as obliquely cutting off the tip or crushing the dual-dispensing channels.

In addition, reinforced plungers and triple-seal pistons create a redundant sealing system. The piston features a rubber o-ring with reinforced components to push adhesive forward at a consistent ratio. These features mitigate material from leaking out of the cartridges. The new cartridge works with the existing accessories including dispensing guns, mix tips and cartridge caps.

bovibond.com

Niacet re-enters the animal feed market

Niacet Corporation are to re-enter the animal feed markets in EMEA and APAC with its Calprona line of products for spoilage prevention, feed-safety and animal health.

Their portfolio includes calcium propionate, sodium propionate, calcium acetate, magnesium acetate and zinc acetate. They will also relaunch their activities in animal feed for the Americas.

niacet.com/calprona

New fund for animal health and nutrition

Seventure Partners, one of Europe's leaders in financing innovation and a world leader in life science microbiome investment, has launched AVF, an innovative venture capital fund, targeted at supporting companies in the field of animal health, feed and nutrition.

The first close of AVF at €24m is cornerstoned by Adisseo, an industry leader in the animal feed sector.

"This new fund was created to address a very specific and expanding need in the market: preserving animal health, gaining a better understanding of the entire food value chain as well as developing technologies to cultivate and produce food in a better way," Isabelle de Cremoux, CEO and Managing Partner at Seventure Partners, told International Dairy Topics.

Jean-Marc Dublanc, CEO of Adisseo, added "Adisseo is a unique company committed to strategic investments in new disruptive technologies, in order to enrich our portfolio of R&D innovations while respecting a mode of sustainable growth. Our ambition is to become one of the leaders in Feed Ingredient Specialties and the experienced partner of choice in animal nutrition. For this reason, we have been investing significantly for many years in our research programs and industrial development projects.

"With AVF, our goal is to invest in strategic collaborations combining the agility of start-ups with Adisseo's expertise. As such, Seventure was a natural partner of choice and we are pleased to become a strategic investor in AVF."

adisseo.com

Farm of the future network

Lallemand Animal Nutrition is joining Neovia's 'Farm of the Future' network as an 'Innovative Company'. The label recognises Lallemand Animal Nutrition's work in developing microbial-based solutions to improve animal environments.

The launch of Neovia's Farm of the Future Network.

The selected innovative solution, LALFILM PRO, is a protective biofilm for farm buildings that helps support the development of beneficial microflora – reducing the risk of contamination with undesirable bacteria.

A high level of hygiene and biosecurity can significantly improve production costs.

LALFILM PRO is a mix of selected and concentrated Bacilli and lactic acid bacteria that establishes a positive and protective biofilm after chemical disinfection. The biofilm helps create a safer microbial environment before the entry of the animals and contributes to improved hygiene conditions.

Neovia's Farm of the Future network aims to develop tomorrow's tools and models of R&D in animal nutrition and health by generating and valuing new data as well as testing the value of smart farming solutions under farming conditions.

lallemandanimalnutrition.com

Transforming feed analysis

Chr. Hansen has joined forces with Consumer Physics to use and distribute SCiO - a revolutionary feed analysis solution based on the smallest available pocket size NIR spectrometer.

The solution will be rolled out first in the US – with the intention to roll out globally over time – to Chr. Hansen's key account managers and distributors first and then to Chr. Hansen's customers.

SCiO offers instant feed and forage analysis with a click of a button, enabling nutritionists and consultants to troubleshoot variations and adjust rations during farm visits. It allows real time testing and it is more accurate and simpler to use than the cumbersome on-farm alternatives.

"Our partnership with Consumer Physics enables us to equip our key account managers and consultants with the latest technology available for animal feed analysis. With SCiO, we can now instantly fine-tune formulation, and proactively detect inconsistencies, in a matter of seconds. It is an important technology addition to our toolkit, in our continuous pursuit for service excellence, which we also plan to roll out to all our customer base," Steve Lerner, VP, North America Sales and Marketing at Chr. Hansen Animal Health and Nutrition, told International Dairy Topics.

SCiO is an innovative response to the dairy industry's need to constantly strive for a more productive and efficient operation. It allows farmers to:

- Track dry matter on a daily basis and optimise TMR rations.
- Control dry matter during the harvest season of corn, alfalfa and other forages.
- Enable the farm nutritionist and feed consultants to monitor trends remotely to avoid unexpected milk yield drop due to feed inconsistencies.

consumerphysics.com

Histidine – is it the third limiting amino acid?

by Fernando Diaz (DVM, PhD)

Fine-tuning and balancing diets for essential amino acids has become a common practice during recent years. In general, lysine and methionine are the main limiting amino acids in dairy cow diets. Histidine has been identified as the first limiting amino acid mainly in cows fed grass silage-based diets. However, new research shows histidine may be a limiting amino acid in corn silage-based diets as well.

In a series of studies conducted at The Pennsylvania State University's Dairy Teaching and Research Center, researchers evaluated the effects of histidine supplementation of low-protein diets on lactation performance of high-producing dairy cows. In the first work (2015), the authors supplemented a metabolisable protein (MP) deficient diet, already supplemented with rumen-protected methionine, with 50g of a rumen-protected histidine product (bioavailability = 54%).

The diet, based on corn silage (43.3% of DM), was formulated to contain 15.5% of protein in dry matter (DM) basis and provide 96% of the MP requirements (according to the dairy National Research Council; NRC, 2001). The results, published in the Journal of Dairy Science, showed that supplementing histidine:

- Increased DM intake (28.3 vs 26.6 of kg DM/day).
- Increased milk protein content (3.26 vs. 3.16%).
- Increased milk protein yield (1.46 vs. 1.37kg/day).
- Tended to increase glucose in blood (80.4 vs. 74.6mg/dL).

Similarly, in the second study (2016), the authors supplemented a protein-deficient diet (98% of the MP requirements) with 120g of an experimental rumen-protected histidine product (bioavailability = 18%). This diet contained 42% of corn silage and 14.5% of protein in DM basis. In summary, feeding protected histidine:

- Tended to increased DM intake (29.2 vs. 28.4 kg of DM/day).
- Increased milk protein content (3.11 vs 3.00%).
- Increased histidine concentration in blood (44.3 vs 26.3µM).

Finally, in the last study (2017), cows fed a MP deficient diet were supplemented with 400g of blood meal. Blood meal is an excellent source of histidine. The corn silage-base diet was formulated to contain 16.2% of protein in DM and to supply digestible histidine at 2.5% of MP requirements.

In this case, supplementing histidine by feeding blood meal:

- Increased DM intake (28.5 vs 25.4kg of DM/day).
- Increased milk yield (40.5 vs 37.57kg/day).
- Increased energy-corrected-milk yield (37.4 vs 34.4/day).
- Increased milk protein yield (1.18 vs 1.07kg/day).
- Increased histidine concentration in blood (90.9 vs 37.3µM).

These findings indicate that histidine may stimulate feed intake and milk protein production in dairy cows fed a diet based on corn silage.

Fernando Diaz works as a Dairy Nutrition and Management Consultant at Rosecrans Dairy Consulting, LLC. He provides consultation to dairies and feed companies including nutrition and feeding management, operational effectiveness, people capital management, and research and product development of new feedstuffs, additives and technologies for dairy cows. He can be reached at fernando@jration.com

internationalnews

Our new Conference Manager Jojo (right) and our Africa representative Nduta Mbuthia were both on hand to welcome the speakers to Dairy Focus Asia 2018. This leading dairy conference was recently held in Bangkok, Thailand alongside Poultry Focus Asia and Pig Focus Asia.

positiveaction.co.uk

New nutritional solution

Already sold in many different countries around the world (such as the USA, Brazil, China and Australia), Selsaf 3000 has now been launched in Europe thanks to its new registration.

This new Phileo nutritional solution enriched in selenomethionine and selenocysteine is a natural source of organic selenium for poultry. Selsaf 3000 is based on an evolution of the manufacturing process which allowed Phileo to increase the selenium concentration to 3000ppm. It is produced from a specific yeast strain CNCM I-3399 (the same as for Selsaf – 2200ppm), and through a mastered manufacturing process. Likewise, Selsaf 3000 offers a high stability with its long shelf life of three years.

A major characteristic of the product is its consistent composition in two active seleno-compounds: selenocysteine and selenomethionine.

"Our standardised production process and quality certifications guarantee a high concentration of organic selenium and a consistent active seleno-compound profile, with two thirds selenomethionine and one third selenocysteine and other active seleno-compounds," Aurore de Vienne, Phileo Global Product Manager, told International Dairy Topics.

Thanks to its excellent bioavailability, Selsaf 3000 allows better selenium assimilation via an active transport in the intestine and increases selenium levels in the blood compared to other mineral and organic selenium sources.

It helps the body against oxidative stress (which is detrimental to animal performance), both in the short term (thanks to the selenocysteine) and in the long-term (due to the selenomethionine) and boosts natural defences of animals.

This dual protection leads to dual benefits for farmers and consumers. For farmers, Selsaf 3000 supports animal health and increases animal performance. In reducing the oxidation, and therefore the rancidity of animal-derived end-products, Selsaf 3000 also brings a lot of benefits to consumers.

phileo-lesaffre.com

GEA secures new Indonesian contract

GEA has recently secured a contract with the Indonesian ABC Group to supply a EuroClass 800 RE milking system – the first that GEA has supplied in Indonesia. The milking system meets the company's needs today and has the potential to expand as the company's dairy herd grows to meet the demands of its developing market place. This is in addition to the supply of a complete UHT and aseptic tank including deaeration, separation and homogenisation as well as refrigeration equipment to the company.

Indonesia is experiencing a rapid rise in the demand for milk and milk products which is reflected in the growth of its dairy farming industry. According to the Indonesian Ministry of Agriculture, per capita consumption of milk is expected to rise to 20 litres in 2020 and again to 30 litres by 2025.

gea.com

Engaging the next generation

Dairy stakeholders from across the globe will meet in South Korea in October 2018 to ensure that the sector meets the challenge of engaging and inspiring the next generation of scientists, farmers and consumers.

Registration for this innovative and educational event, the 2018 International Dairy Federation (IDF) World Dairy Summit, which will be held in Daejeon, South Korea from 15-19th October , is now open.

Under the theme of 'Dairy for the Next Generation' the summit will explore emerging dairy issues and traditional aspects of the dairy sector while offering expert insight into the technical and scientific expertise that underpins the IDF's work programme.

The summit provides a dynamic and interactive platform for participants to exchange cutting-edge technologies and knowledge, identify a common agenda, develop shared solutions and encourages a holistic view of how to improve dairy farming.

"The IDF World Dairy Summit is the flagship global event in the dairy calendar. We are very excited to be hosting the summit in South Korea for the first time, in what should be an informative event with an abundance of scientific and technical expertise on display from dairy stakeholders across the globe and all levels of the value chain," Caroline Emond, Director-General of the IDF, told International Dairy Topics.

idfwds2018.com

APPOINTMENTS

DAVID FAULKNER
Global Nutrition International
Global Business Development Director
www.globalnutrition.com

DAVID MILLS
Biorigin
Technical Sales Manager, Animal Nutrition, Europe
www.biorigin.net

MILES HUFFAKER
Diamond V
Director, Market Access, Dairy
www.diamondv.com

Diary 2018

VIV Europe
20-22nd June
Utrecht, Netherlands
www.viveurope.nl

American Dairy Science Association Annual Meeting
24-27th June
Knoxville, Tennessee, USA
www.adsa.org

Indo Livestock 2018
4-6th July
Jakarta, Indonesia
www.indolivestock.com

30th World Buiatrics Congress 2018
28 August-1st September
Sapporo, Japan
www.wbc2018.com

SPACE
11-14th September
Rennes, France
www.space.fr

VIV China
17-19th September
Nanjing, China
www.vivchina.nl

Bangla Livestock
20-22nd September
Dhaka, Bangladesh
www.banglalivestock.com

World Dairy Expo
2-6th October
Madison, WI, USA
www.worlddairyexpo.com

IDF World Dairy Summit
15-19th October
Daejeon, South Korea
www.idfwds2018.com

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Reference 1. McDougall *et al.* Addition of meloxicam to the treatment of clinical mastitis improves subsequent reproductive performance. Submitted to Journal of Dairy Science.