

25th Alltech Symposium focuses on sustainability

Alltech recently held its 25th International Animal Health and Nutrition Symposium in Lexington, Kentucky, USA and International Dairy Topics was in attendance.

Among the presentations given we felt that the ones covered in this article are of particular interest to our readers. In the general session, Declan Coyle from Ireland looked at building high performance teams. In this he stressed the importance in difficult times of having inspired leaders who had vision – people who ‘saw it and were it’.

Goals and values

These people must have high visions and be focused on them. He highlighted the importance of self-image, goals and values and, interestingly, highlighted how children aged four years old are 96% positive in their self-images, yet by the time they have reached 14 years old they have become 98% negative!

By 12 years of age the average child has received 100,000 NBRs (negative belittling remarks).

Another interesting study has shown that the 3% of Yale students who had clearly focused written career goals went on to be worth more than the remaining 97% of their college contemporaries.

Declan highlighted the importance for managers to ‘get things going’ and when staff have achieved things to celebrate their successes with them. The first three minutes with staff determines the outcome of the next five hours! Senior managers must prioritise and studies have shown that the two key traits in successful senior managers are the ability to prioritise and to positively

instil urgency into their teams. In times of difficulty the greatest danger is that we set goals too low and achieve them! The important thing is to understand the 80:20 rule and to focus on the 20% that brings 80% of the returns!

He compared management to a bus in that you have to get the right people on the bus and get them seated in the right seats and those who should not be on that bus should be removed from it.

The importance of making staff feel important, feel valued, feel appreciated and being told that what they do makes a real difference was stressed on several occasions.

It was intriguing that how management thought staff felt and how staff actually felt on key issues varied so much (see Table 1).

When it came to exit interviews 46% of departing staff felt that they were not appreciated, 61% felt they were unimportant and 88% felt that they had been undervalued.

Solution for salmonella

Anna Catharina Berge, a veterinarian from Belgium, asked the question ‘Do we have a solution for the salmonella problem in dairy cattle?’

The answer is ‘Yes’ and she cited statistics of 27-31% of US dairies being contaminated with salmonella and up to 20% of Californian dairies yielding salmonella from bulk tank milk samples.

In Europe she highlighted France where 8% of dairies in western France have salmonella in manure samples and 2% of dairies have multiple antibiotic resistant salmonella.

Most salmonella found on dairy farms do not cause clinical signs, but serotypes such as Salmonella

typhimurium and S. newport can cause clinical disease in adult animals and these two serotypes plus S. Dublin cause severe disease with deaths in calves.

Dr Berge highlighted the fact that closed herds have a lower risk for salmonella, there is an increased risk for salmonella in young calves and that antibiotic treatments of neonatal calves increase the risk of salmonella, whereas antibiotics in milk replacer decreases salmonella in calves.

As a general rule, larger dairy farms have more salmonella and contact between animals increases salmonella transmission, but social contacts are good for calf welfare.

On dairy farms water and warm weather are bad news because they create a bacterial soup that can contain salmonella. Also, the recycling of water to flush alleys is a key way of spreading salmonella in a milking herd, as is through the feed.

- Vaccination programmes
- Nutritional strategies and feed hygiene
- Only buy in salmonella free animals
- Focus on gut health
- Control rodents, birds and insects
- Reduce stress and isolate sick animals

Table 2. The salmonella control programme.

Dr Berge highlighted the 10 key components of a salmonella control programme (see Table 2).

She went on to highlight the importance of giving colostrum to calves, giving adult cattle Sel-Plex, optimising nutrition and minimising stress to improve systemic immunity and the use of Bio-Mos and optimising nutrition to improve gut immunity.

She strongly recommended giving two litres of colostrum twice within 24 hours of birth and monitoring calf serum samples in their first week to confirm that total proteins are >5.5.

For heifers she cited a commercial trial in which the use of Bio-Mos

dramatically reduced the faecal shedding of salmonella and another trial on a 1,100 cow farm in which the product reduced salmonella and diarrhoea and increased milk production.

Table 3 shows Dr Berge's five key points for reducing salmonella.

- Raise your own heifers
- Limit purchases of live animals
- Evaluate flows of animals, water and faeces
- Minimise stress and movement of animals
- Use Bio-Mos to optimise gut immunity

Table 3. Five points for salmonella reduction.

The nitrogen balance

Alejandro R. Castillo from California reflected on the relationship between feed efficiency and mineral balances in that if we can reduce nitrogen excretion there could be environmental benefits and, in this context, perhaps the efficiency with which cows utilise feed could be influenced by the mineral balance in the diet. The overall nitrogen balance is summarised in Fig. 1.

The utilisation efficiency of nitrogen is about 30% and you can get 1.6kg milk per kg dry matter intake.

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Table 4. The sustainability challenges.

- **GOVERNMENT**
Legislative, knowledge, trade constraints, site restrictions, local bias
- **ENVIRONMENT**
Expensive requirements will eliminate smaller operations
- **ACTION GROUPS**
Non-agricultural agendas and demands
- **CONSUMERS**
Humanising animal welfare and expectations

Table 1. Misperceptions by managers.

Managers' perceived ranking	Parameter	Staff's ranking
8	Being appreciated	1
10	Feeling 'in'	2
9	Understanding	3
1	Wages	5

	Today	Tomorrow
Average milk yield (kg)	9,195	11,363
Holstein average fat (%)	3.65	3.00
Average true protein (%)	3.00	3.50
Somatic cell count	250,000	<100,000
Feed efficiency (kg milk per kg DM intake)	1.4	1.8
Forage based rations (%)	50-55	70-75
Ration crude protein (%)	16.5	<15.0
Organic trace minerals (%)	25	100
Rumen additives	Buffers, yeasts	DFM, mycotoxin binders, yeasts, buffers, essential oils

Table 5. Comparing the cows of today and tomorrow.

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So, the question arises as to whether other nutrients, such as minerals, can affect feed efficiency.

It was concluded that feeding close to NRC requirements increases the Gross Utilisation Efficiency, that is the milk produced per kg of feed intake, and that there is a high correlation between the mineral content in the TMR and the mineral balance of the cow.

This then begged questions on how we can assess the satisfaction of protein and mineral requirements. Is the way forward to analyse the protein and mineral content of each component of the TMR? Should we check that the TMR mineral contents equates to the previously planned min-mix composition.

Biomarkers for mycotoxins

Johanna Fink-Gremmels from Utrecht University in the Netherlands considered the issue of finding biomarkers for mycotoxin damage.

It was highlighted how multiple mycotoxins affect multiple organs and metabolic pathways in the cow.

It was also highlighted that animal diets are frequently contaminated with mycotoxins and that very few of these are totally inactivated in the rumen. So, mycotoxins will enter the body and have their undesired effects.

The issue of health related biomarkers and their measurement was then discussed. For example, when Mycosorb is given to cows challenged by mycotoxins the GSH-Px levels double in just a couple of weeks. Thus, such parameters can be used to define the borderline between health and disease and gene signatures can be defined which are altered in specific disease entities. In fact, the real challenge is to accurately identify the gene signatures that are indicators of health and productivity.

Now various genes have been identified which can be taken as a group as an indicator of liver health and by using these we will be better able to understand health and disease and these impact key metabolic pathways and help us to assess intervention strategies.

Michael Hutjens from the University of Illinois discussed sustainable

dairy production. He defined sustainable dairy production as being economical/profitable, environmentally correct, consumer acceptable and capable of meeting consumer demand as well as being competitive at local, state, national and global levels.

He sees the major challenges to stability as being government, environment, action groups and consumers (see Table 4). In the USA there are 57,687 dairy managers who, on average, manage 159 cows (30-15,000 cow range) and produce some 500 tonnes of produce per FTE. There is a debt load of some \$US5,000 per cow and limited use of paid specialists.

By 2020 he sees there being just 19,000 dairy managers who will manage, on average, 450 cows.

These individuals will be college trained, managing people not cows, and resource specialists will be extensively used. These managers will follow business principles, tap into a network of resources personnel and they will understand immigration, employment and employee rights! They will probably speak Spanish. He then compared today's dairy cows and their feed with those of the future (Table 5).

In the future he sees an increase in cross breeding and the use of sexed semen to increase female selection. Recent data shows an increasing use of additives (Table 6).

Additive	2006	2007
Buffers	41	40
Yeasts	28	30
Rumensin	15	21
Niacin	9	11
Mycotoxin binders	11	14
Anionic products	3	5
Feed bunk stabiliser	2	3
Don't use	11	9
Mould inhibitor in baled hay	N/A	21

Table 6. Increasing use of rumen additives (% farms using).

Consumers will have a much better understanding of food production, will require food safety to be monitored and live in a world where the source of food impacts the consumer's purchase choice. The consumer of tomorrow will be even more 'quality focused'.

On the environmental front we will be striving to reduce methane production by continuing to increase milk yield per cow and American producers will continue to use rBST (bovine somatotrophin) and Rumensin and they will continue to optimise rumen fermentation and use additives such as yeasts, essential oils and buffers to enhance rumen performance.

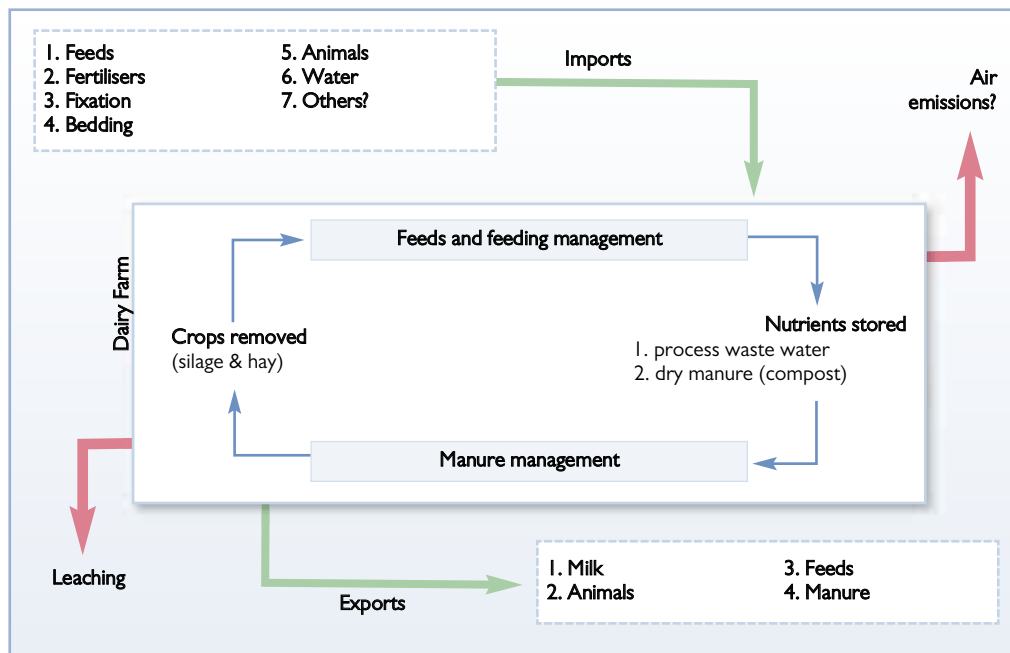
Efforts will be put into improving forage quality.

He also made an interesting aside

Parameter	Control	Yeast	Benefit
Dry matter intake (g per kg body weight)	34.6	35.0	+0.4
Milk fat (%)	3.80	3.85	+0.05
Milk protein (%)	3.20	3.19	-0.01
Milk yield (g per kg body weight)	46.5	47.7	+1.2

Table 7. Yeast effects on milk production.

Fig. 1. The nitrogen balance on the dairy farm. Whole or mass nitrogen balance equals imports minus exports.



on oestrogen levels in foods since many consumers link hormones to milk. Milk typically has 11 nanograms per 3oz portion compared to potatoes (22%), peas (340), wheat germ (1700) and cabbage (2000)!

Increasing milk yield

R. Shaver and colleagues from the University of Wisconsin, USA then reported on the responses and economics when Optigen is used in dairy diets. They showed that Optigen use increases milk yield per cow by 0.5kg and that its use decreases feed cost and increases IOFC by \$US0.21 per cow per day.

Overall the economics of Optigen usage are very much dependent on milk and feed ingredient prices.

In another presentation Alltech's Juan M. Tricarico considered how Yea-Sacc can support sustainable milk production. He cited a recent review that reported average yeast benefits from a multitude of trials (Table 7).