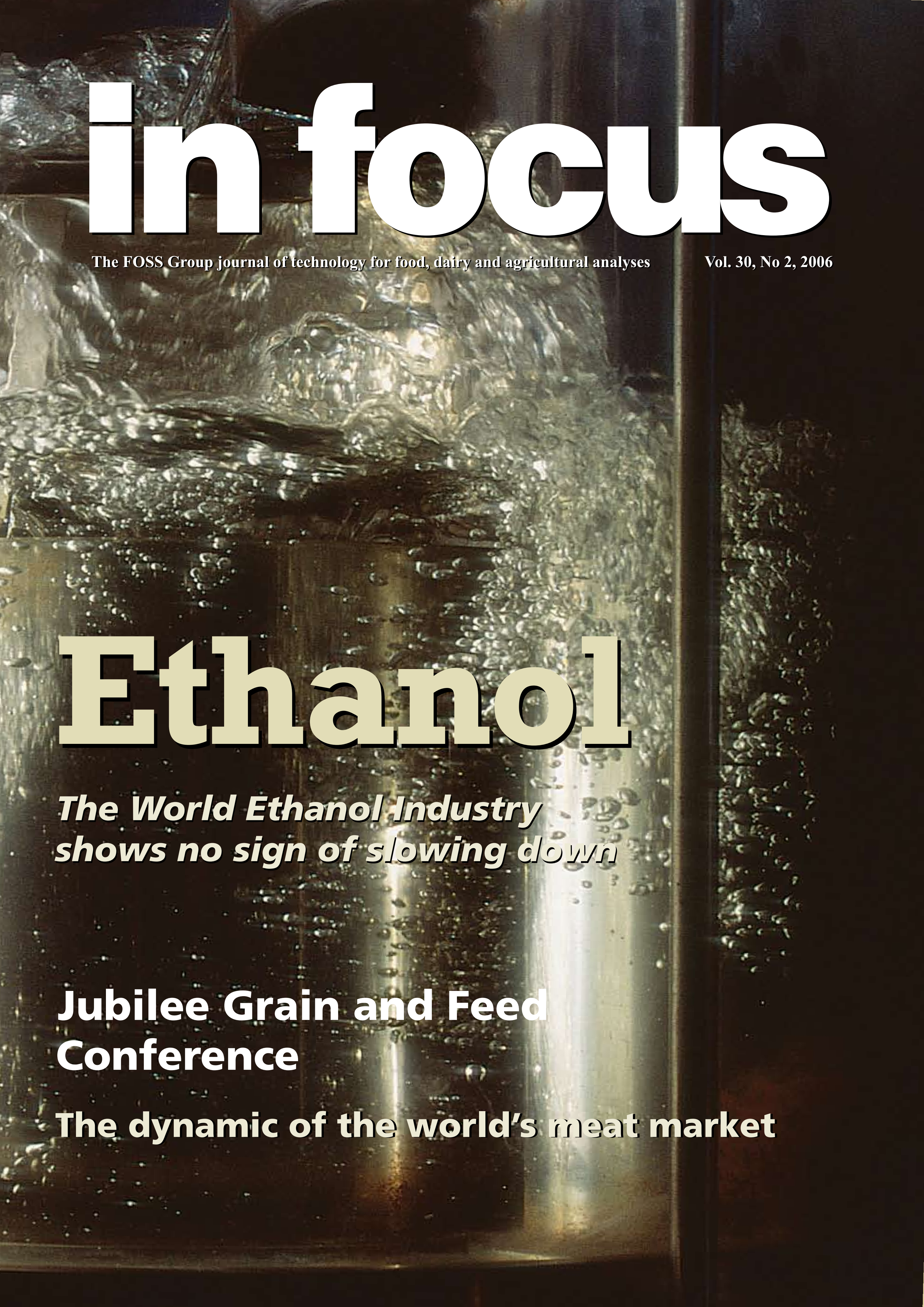

in focus

The FOSS Group journal of technology for food, dairy and agricultural analyses

Vol. 30, No 2, 2006

Ethanol

The World Ethanol Industry shows no sign of slowing down

Jubilee Grain and Feed Conference

The dynamic of the world's meat market

Something to be proud of

We have an expression in Danish which, roughly translated, means 'I can't keep my arms down.' The expression is great for capturing that proud feeling we get when something is really worth celebrating.

It is particularly apt as I think about the next major event in this exciting jubilee year. On Saturday 3rd June, around 1200 employees, customers, friends and associates will fill the new Copenhagen opera house for an evening celebrating the FOSS 50 year jubilee.

We have already held a number of successful events this year, including two highly successful conferences in Europe in the grain and feed sector and milk and dairy areas as well as a major conference for our customers in Australia/NZ. So far, several hundred customers and other stake-holders have attended these conferences. In all, there will be 17 FOSS customer conferences around the world this year. Besides listening to excellent key note speakers, what I have enjoyed most about the events I have attended so far is the sense of shared interest in tackling urgent issues that affect us all such as global market dynamics, the need for efficiency throughout the supply chain and growing demands for consistent product quality combined with top productivity.

Another aspect of the events we are running is that it helps to spread the word about FOSS as a company and the areas we are engaged in. A case in point was a recent event at the Danish Technical University called the 'Wine Challenge'. Talented students, armed with a calibration that they had developed for a WineScan analyser, competed against a panel of wine experts in deciding the price, quality and region of a number of wines. It was more about fun than anything, but it demonstrated the potential of just one of our solutions. It also attracted a lot of media attention in Denmark. Suddenly, familiar colleagues were on prime time evening news and the morning radio.

On the subject of media, around 10,000 readers have now signed up for the FOSS 50 newsletter and the associated FOSS 50 competition. Some lucky winners, drawn from the ever-growing list of subscribers, are already looking forward to the prize of a free trip for two to Greenland. A prize is awarded each month of this year, so there is still a good chance if you haven't yet joined in. At the same time, you can make sure that you get topical analysis-related news items from the world of FOSS.

Returning to the forthcoming celebration this weekend, I can feel my fingers naturally lifting from the keyboard. Not just because it will be a big event, but because it celebrates a number of aspects of FOSS: our history of innovation, our close partnerships with customers, our commitment to business areas that make a real difference to global issues and not least, our talented employees – things that are really something to be really proud of.

Fortunately, the celebrations are continuing throughout this special jubilee year. Wherever you are, please join us in celebrating 50 years of FOSS.

Yours sincerely,

Torben Ladegaard,
Managing Director, FOSS

In Focus

"In Focus" is the FOSS Groups' journal of instrumental and analytical techniques, produced for people concerned with nutritional analysis, quality control and research in the food and dairy, agricultural and related areas.

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*Front picture: Ethanol (C_2H_5OH) in its purest form.
Courtesy of Unica, São Paulo, Brazil*

Contents:

Who is best qualified to judge the price of a wine: a wine expert or a student armed with a wine analyzer? *See page 22*

Networked near infrared (NIR) analysis is enabling competitive production across borders and throughout the supply chain.

Proven: NIR analysis does pay

A feed mill can save in the range of two to five EUR/ton of feed per year through NIR-based advantages such as reduced wet chemistry analysis and more accurate feed formulation. Plus, advances in network technology are allowing such advantages to be realized on a global scale with minimal costs.

Some might say that they have heard that sort of claim made about NIR analysis before, only to be disappointed in realizing a return on investment. But, while lack of knowledge and adherence to traditional methods may remain as barriers to adoption of NIR analysis, advantages are now being exploited by some larger feed producers with significant financial benefits.

One such company is Provimi, an international supplier of nutritional solutions and technology with a share of seven per cent of animal feed worldwide. Provimi has over 100 plants in some 30 countries and is a world leader in animal nutrition and related know-how. The company is the world's largest producer of premixes. Other products include complete feed, speciality feeds, pet food and aqua feed.

A pro-active approach

Paul Gerardy, General Manager of Provimi Research and Technology centre in Belgium explains that margins are decreasing at the beginning of the feed and food chain for the grain producer, the feed producer and the livestock producer. "Costs and profit need to be monitored closely," says Paul. "NIR gives you power and security."

Paul says that, with wet chemistry analysis, a feed product can be eaten before the analysis results for raw materials arrive from the laboratory. "With NIR, suddenly you have a new dynamic," he says. "You have proactive decision making instead of archiving data that arrive too late to correct your feed formula. You do not formulate looking into the mirror, but in front of you."

Under Paul's guidance Provimi has taken advantage of advances in NIR analysis and complementary areas such as networking to set up a worldwide network of over ninety NIR instruments.

Of course, wet chemistry analysis is still the basis for the analysis operation. NIR calibrations are based on average results from eighteen validated laboratories. Typically, NIR is used to predict parameters such as: moisture, crude protein, crude fat and fibre, ash and starch. Provimi has 43 calibrations for raw materials, nine calibrations for complete feeds and two for silages.

For practical and economic purposes the network is managed from a central location. Calibration updates are sent from a central server to standardised instruments worldwide. Measurement results are then based on the same calibration, whether they come from India or Italy. Everyone can stay ahead. For instance, the calibration for the new soya harvest in Argentina is in the system before the ships reach port in Europe.

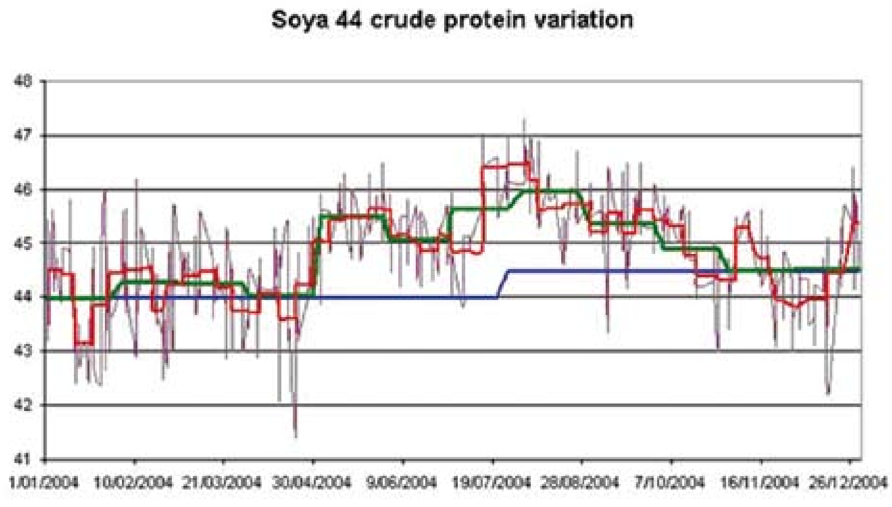


Fig. 1: NIR results for crude protein variation in soya samples. The blue line is the value used in feed formulation.

Every truck is tested

Just one example of the Provimi proactive approach in action is that all incoming raw materials are tested to ensure value for money and to stop anything outside the specifications. NIR analysis provides the right information in one to two minutes, that is, before the truck unloads the raw material. “If suppliers know we have NIR, we don’t have any problems,” says Paul.

The same can be applied to trucks leaving plants. None are allowed to leave without being tested. Out of specification feed will be retained in the plant.

There’s no need to be conservative

Paul explains that without NIR, the feed is produced before the raw materials have been analysed. Analysis is just for quality assurance purposes. But with regular NIR analysis, information is made real-time.

The decision process to update the feed matrix becomes easy and proactive. There is no need to be conservative, as illustrated by the graph of NIR results for crude protein variation in Soya samples, figure 1. In this example, each soya truck is analysed when entering the feed plant.

To those unfamiliar with NIR results, it may appear a little technical, but take a look at the blue line cutting through the middle of the other lines (figure 1). This is the value used in feed formulation. The monthly averages are indicated in green and the average per 300 tons in red (In this example, the feed plant uses two silos of 300 mtons to store soya).

Close monitoring of raw materials with NIR analysis ensures that the value used for the feed formulation is based on averages that are real and current. Feed formulation can therefore be more proactive without any in-built slack to allow for possible variations in protein content.

Fore instance, between 30 April and 10 October (dates on X axis), the feed producer could have formulated with protein values in the range of 45 to 46 % for soya instead of 44,0 and 44,5 % as indicated by the blue line in the graph.

The ability to produce feed with better monitoring of nutrient variation leads to significant savings.

To take an example, let’s assume a feed producer has two silos for storing soya, as shown in figure 2. and, as already mentioned, the raw material is checked at intake. One silo can be processed while the other one is being filled. The values used in the formulation system will then be the average values per 300 tons given by the NIR analysis of the incoming trucks, as indicated with the red line in figure 1.

Using the two silo example again, another approach could be to segregate the soya in the two silos: one for lower protein values and another one for higher protein values. The feed producer can then formulate more accurately to match expected content. And to keep everything on track he can monitor the feed formulation closely with NIR analysis.

From the experience at Provimi, conservative estimates indicate that savings of around two EUR per ton of soya can be made by matching protein targets more closely.

Better animal performances

Working our way down the supply chain, the effect of closer standardisation has an impact on animal performance.

Just as in the feed formulation example, getting closer to target values saves money. For instance, if chicken feed contains soya with 45% protein one day and 46% the next, the ideal amino acid profile will not be respected and it will have an impact on the performance of the bird eating that feed. What is more, proteins above the ideal profile will be wasted. By optimising the protein levels, more chickens can be fed for the same cost of feed production.

From Paul’s estimates, the gains to be made through optimal animal performance can be considerable: in the region of twelve EUR per ton of soya.

Beyond the laboratory

NIR analysis has also helped Provimi to save on wet chemistry analysis. NIR technology eases the load by taking the bulk of analysis work, leaving the laboratory to focus more on other pressing issues such as food safety.

According to Paul’s estimates, more than 95 per cent of samples can be predicted by NIR. Under normal conditions, the savings thanks to NIR on wet chemistry are around 0,20 - 0,25 EUR per ton of feed per year.

Cont. on page 6

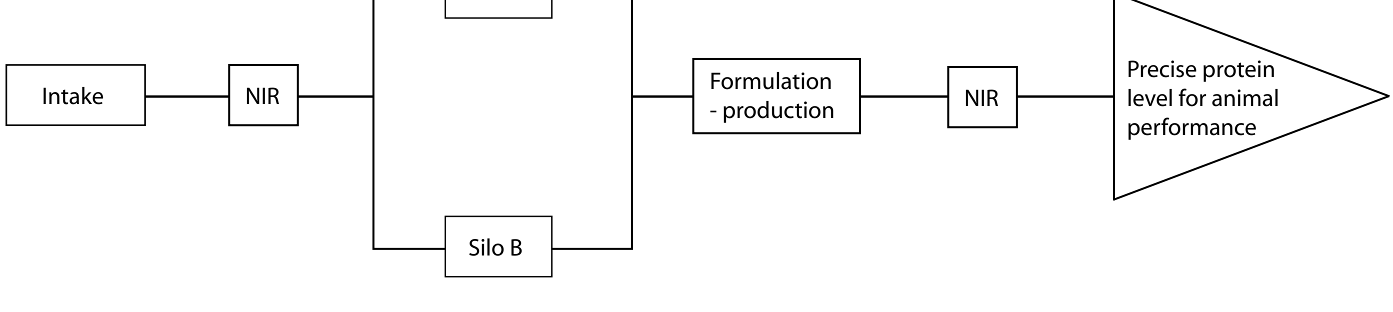


Fig. 2: Savings can be made at intake, in the flexible use of segregated material, in feed formulation and in optimizing animal performance.

How simple is it? With modern NIR technology, operators just need to load samples, either in ground or un-ground form and let the technology do the rest. Virtually instant results can be used for on-the-spot production control.

Cont. from page 5

However economy of scale is an important factor. “NIR in a feed mill is justified if the production is more than 50.000 mtons per year,” says Paul.

Making measurements is not an issue. Today, the simplicity of use provided by many NIR analysis instruments and associated software paves the way for analysis by non-laboratory staff. The latest NIR analysers allow samples to be measured in ground or unground form. Some analysers are also designed to be placed in the harsh production environment and require very little operator training to achieve valid measurements.

But is it reliable?

NIR analysis is based on reference analysis at accredited laboratories and NIR performance is regularly checked with wet chemistry. To date, the NIR analysis operation at Provimi is based on about 300.000 wet chemistry analyses on 69.000 samples of raw materials and complete feeds.

On the subject of NIR reliability, Paul is very clear. “NIR is just as accurate as wet chemistry, but more reliable because the human error is reduced to a minimum,” he says.

He is not so optimistic though about official approvals for NIR techniques, describing how, in Europe for example, each country has its own certification system.

The bottleneck is in the understanding

Effective NIR analysis requires good equipment, and reliable calibrations. The size of an operation is also important, for example, to realise savings against traditional wet chemistry.

And crucially, everyone in the organisation needs to understand what it is about if a NIR approach is to be accepted. With measurements taking less than a minute, NIR analysis generates a wealth of information. Everyone contributes and the information is used throughout the organisation. The Provimi approach shows that use of networking is important in this respect.

Using the network, experts based at a central location can organise information on the central server and manage the system remotely, for example, by making regular calibration updates. Staff at production sites need only think about making simple measurements as a straightforward part of their job while the information they receive provides a powerful tool for optimal feed formulation. Others such as business management can also use the wealth of information to make strategic decisions based, for instance, on the performance of suppliers.

The Provimi example highlights the savings to be made with NIR analysis. The feed mill pays the right price for raw material, costs associated with wet chemistry are reduced, there is less wastage in feed formulation, better information leads to better decisions throughout the organization and optimal feed formulation leads to optimal animal performance per kilo of feed.

All in all, the savings for a feed mill can be in the range of 2-5 EUR per ton, per year.

In the future, a pro-active approach to control demonstrated by the Provimi model could benefit everyone throughout the supply chain. To an extent, this is already starting with many of Provimi’s customers coming online as part of the NIR network. Provimi started to develop its NIR network in 1998. To date, there are 92 installations, 31 at Provimi sites and 61 at customer sites. Two to three installations have been added to the network every month in the last three years.

■

by Richard Mills, FOSS

It used to take three different time-consuming analysis methods to measure production control parameters. Now the same parameters can be measured simultaneously in less than a minute.

FoodScan™ Lab:
The all-in-one instrument

Based in the heart of rich pasture land at the foot of the Pyrenees, Spanish dairy producers CADÍ have built a reputation on the production of quality dairy products. Quality Control Manager Carme Flotats explains how using the FoodScan Lab has helped to protect product quality while speeding up analysis operations.

"We use our FoodScan™ Lab instrument to control production of cheese, butter and quark," she says. "Before we had the FoodScan, we had to use different analysis methods for each individual parameter, and this also included different sample preparation tasks for each analysis method. With FoodScan we only have to do one simple preparation and we get three parameters in less than a minute."

The FoodScan Lab has also helped to avoid the hazardous procedures involved in some analysis operations. "We reduce the use of chemicals and reagents, including those that carry a health risk," says Carme Flotats.

It all adds up to better control. "With FoodScan we can make more frequent measurements and therefore have much better control over production. The number of products falling out of specification has been dramatically reduced."

How it works

CADÍ are using the FoodScan in a laboratory to test both finished products and products in course of production. The parameters measured are fat, moisture and salt (other calibrations are also available for FoodScan, for example, protein for cheese).

The fast results available are proving valuable to CADÍ in terms of effective production control. Rapid results mean that deviations from target levels can be spotted quickly. Timely adjustments to production can then be made.

FoodScan is a highly flexible instrument allowing several different products or ingredients to be analyzed using just one instrument. Sample preparation is simple. Viscous samples like yoghourt or fresh cheese are simply poured into a Petri dish and analyzed immediately. Solid and semi-solid samples are ground prior to analysis.

Because FoodScan employs indirect Near Infrared Transmittance (NIT) analysis, costs for chemicals and reagents are avoided. Its manageable size makes it simple to accommodate in any laboratory.

Off-the-shelf ANN calibrations available with the FoodScan made the instrument virtually ready-to-use for CADÍ. Only minor adjustments were necessary for local considerations and the calibrations have proven highly stable over time.

New possibilities

The speed of results available with FoodScan also presents new business possibilities for CADÍ. Products that were previously difficult to control are now a viable option because FoodScan can deliver required control parameters in time to make any necessary adjustments in production. "FoodScan gives us potential production lines that we would have previously considered too difficult to control," says Carme Flotats.

More about CADÍ can be found at www.cadi.es

■

by Richard Mills, FOSS

The FoodScan™ analyzer is a highly popular instrument offering simplicity of use, little or no sample preparation and powerful calibrations that allow several product parameters to be analyzed in a single measurement.

BactoScan™ FC:

Beating bacteria in milk

A sample of raw milk today looks exactly as it did 30 or 40 years ago. But if you could analyse the contents, you would find that the one you just took contains far less bacteria. It has been a hard-fought fight, though and it still goes on. Dr Gertraud Suhren from the German Federal Research Centre for Nutrition and Food, in Kiel, talks about the role of rapid analysis in improving milk quality and the long road to approval for new analysis methods.

Bacteriological milk quality is an important parameter for the suitability of raw milk for processing products. It is of vital interest to the dairy industry, for instance, where bacteria levels can affect heat treatment procedures. It provides an indication of shelf life. It is also used to determine how much a dairy pays a farmer for milk. And it helps to determine the quality of end products made from milk. Finally, in an age where consumers are empowered, it provides a reference for the hygienic conditions of milk production.

Happily, average levels of bacteria in raw milk are falling. At least, that is the case if you live in a country like Germany where a combination of regulations, quality-based payment and emerging analysis technology has reduced average bacteria levels in a millilitre of milk from 1 000 000 Colony Forming Units (CFU) in 1975 to 20 000 CFU today. In Denmark, approximately 93 per cent of milk producers supply raw milk with less than 30 000 CFU per millilitre.

The importance of rapid analysis

On the subject of previous levels of bacteria in milk, Dr Suhren says: "When I started working in the area of milk quality, thirty years ago some milk samples were like a bacteria soup."

She explains that payment based on quality and government focus on hygiene management have played an important role in improving levels.

For example, according to EU legislation, milk from German dairy farms is tested for bacteria levels at least twice a month. Dr Suhren explains how, when the new rules came into force, they created a huge workload for milk testing laboratories, "It was important to find a way of automating and speeding up the analysis process," she says.

A number of solutions were available as alternatives to the traditional time-consuming and labour-intensive plate counting method. Among them, BactoScan™ is one that has withstood the test of time. The lower limit of detection of the flow cytometry technology used with BactoScan proved important as increasingly stringent regulations came into force. "Many of the other solutions fell by the wayside because they were not accurate enough to meet the new regulations," says Dr Suhren.

The ongoing approval process

One would think that something that could speed up analysis of bacteria would be quickly adopted. But acceptance and approval is a complicated process and has been going on for approximately 25 years. Referring to the various industry and government bodies involved, Dr Suhren says: "Many people need to be convinced of the complex nature of the parameter total bacterial count, and it takes a long time." In particular, the need to correlate the BactoScan method, based on counting individual bacteria cells, with the traditional method, based on counting colony forming units, has caused much discussion. Dr Suhren has been involved in two main areas of work: providing validation data for the new method; and converting data for comparison with traditional analysis based on CFU. The traditional CFU method gives an indication of quality based on colony forming units. The BactoScan method gives the same indication, but is based on the number of individual bacteria cells and is far quicker, see Figure 1.

Dr Suhren has been instrumental in informing EU lawmakers about the fact that

The BactoScan™ FC.

the two methods can be compared side-by-side rather than one being better than the other. "In effect they are two ways of looking at the same picture," says Dr Suhren. Her explanation of this to the relevant approval bodies has opened up the road to approval of the BactoScan solution.

The Federal Research Institute installed its first prototype of BactoScan in 1981, and has been involved in discussions about the validity of the method more or less continuously ever since. In 2004 a major milestone was passed with the introduction of the internationally accepted ISO 21187/IDF 196 – the conversion standard. This was an important step forward because the International Dairy Federation represents, according to its website, 74 per cent of total world milk production.

However, it wasn't long before new requirements in the form of EU and ISO standards for validation of alternative methods appeared on the horizon – an area that Dr Suhren is now actively engaged in. As ever, she is involved in explaining the validity of the method and how it can be incorporated into the approval requirements.

Amongst other method validation studies, Dr Suhren has also conducted three extensive ring trials in Germany that have been of enormous importance in gaining acceptance of the BactoScan as a reliable analysis method.

While official approval work goes on, today BactoScan can be said to be broadly accepted. "In the industry, BactoScan is no longer controversial, but there is always the need for an independent reference for proprietary methods," says Dr Suhren. "Now I think BactoScan is the most widespread rapid method for payment analysis and quality control, and makes milk the best examined foodstuff. Furthermore, Bactoscan has become the pacemaker for automated rapid analyses in quantitative food microbiology."

The same combination of compulsory measures, in the form of payment according to quality and government focus, has led to similar progress in reducing raw milk bacteria levels in other countries, for instance in the USA. New and aspiring EU member states are catching up fast, and the phase that Germany has already been through is applicable globally. "The same pressures to reduce levels of bacteria apply worldwide," says Dr Suhren. "We can look forward to further improvements in countries with developing milk production."

Such attention may be primarily driven by issues such as public health, but is also increasingly important in a global economy where milk quality is vital for processing, export and shelf life prediction.

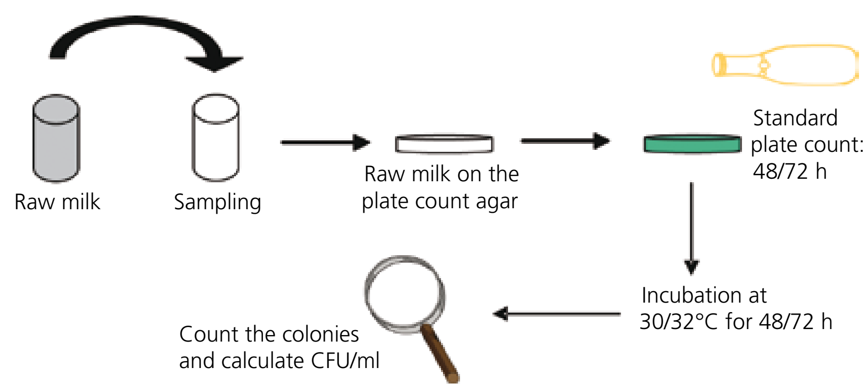
More information on the Federal Research Institute in Kiel can be found at www.bafm.de

by Richard Mills, FOSS

A Prototype instrument from 1981 in use at the Federal Research Institute in Kiel.

BactoScan™ today

- More than 90 per cent of all milk within the EU is paid for according to BactoScan results
- In use in over 50 countries
- Has become the industrial standard for counting raw milk bacteria in many countries worldwide
- Accords with numerous internationally accepted standards e.g. of the International Dairy Federation (IDF), and is approved by the Interstate Milk Shippers Association (IMS)
- Flow cytometry technology currently used in the BactoScan FC is a widely accepted analysis method that delivers results in less than nine minutes
- Recent updates include a semi-automatic version for laboratories with only a low throughput of samples.



BactoScan™ FC: Less than nine min

Fig. 1: Reducing Bacteria levels worldwide.

The Influence of reducing sugars in the determination of free and total sulphur dioxide (SO_2) using the FIAstar™ Wine Analyzer

When the FOSS FIAstar™ for wine was launched in 2004, it was with the recommendation that samples that were high in reducing sugars be diluted prior to analysis. This included sweet wines, late harvests and juices.

The aim of this study has been to evaluate the influence of reducing sugars, specifically glucose and fructose, on free and bound SO_2 equilibrium and recovery.

Free and TSO_2 equilibrium in wine

SO_2 in wine and juice exists in a natural balance of free and bound forms. This equilibrium is determined by a variety of constituents and their concentrations, as well as other properties such as temperature and pH. From both reference literature and laboratory investigations it is clear that reducing sugars will naturally bind with SO_2. Glucose demonstrates this effect to a greater extent than does fructose.

To demonstrate this effect, aqueous solutions of a 25 ppm SO_2 standard solution were spiked with combinations of glucose and fructose. The standards were analyzed by both aeration/oxidation (A/O) and FIAstar methods. As shown in Table 1, the recovery of free SO_2 decreases with increasing concentration of glucose. In natural samples, high sugar content is frequently associated with low free (unbound) SO_2 concentrations.

It should be noted that if a sample is altered by techniques such as spiking, dilution or a change in temperature, the equilibrium of free and bound SO_2 is also altered. In practical terms we found that diluting the sample generally results in a higher recovery of free SO_2. This decrease is not the result of any interference but only a reflection of the change in the SO_2 balance in the sample. There is no influence in total SO_2 recovery.

Sample comparison study

An investigation was carried out using high sugar wine samples. Samples were analyzed undiluted for free and total SO_2 using the aeration/oxidation method in parallel with the FIAstar wine method. In addition we measured the reducing sugar content, defined as the sum of glucose and fructose. Samples ranged in reducing sugar from 1,4 to 12 g/d (%). The results from these analyses are shown in Table 2.

Since FIAstar for wine was introduced, much data has been generated to com-

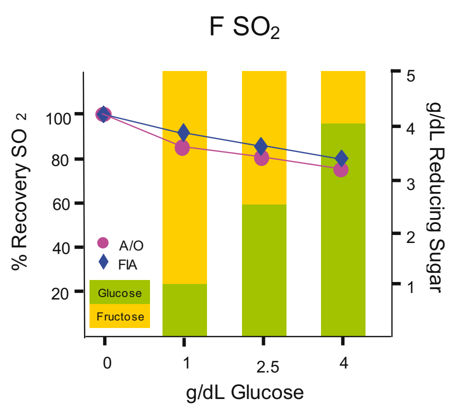


Table 1: 25 ppm F SO_2 recovery ppm in glucose / fructose solutions.

pare the results from FIAstar with those of various other reference methods. Samples that are high In reducing sugar have been specifically identified and presented in Figure 1. The sample types included Rosé, Muté[a] (several types), Zinfandel, White Zinfandel, Port, dessert wine, Muscat, Sangria (7% RS), French Columbard and red and white wines (3-5% RS). Reference methods included: aeration/oxidation, Ripper, Hitachi and Rebelein.

Conclusion

The FIAstar results agree well with reference methods for the analysis of free and total SO_2 in high sugar wines and juices, and such samples can be and should be analyzed without dilution. Any questionable samples should be evaluated against a reference method such as aeration/oxidation, Monier Williams etc. to determine if pretreatment is necessary.

[a] Muté - Completely unfermented or partially fermented grape juice whose fermentation was stopped. The resulting juice retains all or most of its natural grape sugars and is used to blend with other wines.

by Shirley Anderson, FOSS North America

Sample Type	Reducing Sugars, g/dL	F SO_2, mg/L A/O	F SO_2, mg/L FIA	T SO_2, mg/L A/O	T SO_2, mg/L FIA
Champagne	1,41	5	4	80	78
White Zinfandel	2,59	39	36	152	161
Rose	2,80	46	45	223	224
Rose	2,96	17	15	148	148
Blush	3,11	26	25	127	133
White Zinfandel	3,49	16	13	107	108
Champagne	3,80	5	< 2	150	149
Champagne	4,32	5	2	147	150
Red Wine	4,50	26	26	129	137
Sparkling Wine, Red	7,20	10	7	139	132
Malt Beverage	7,30	< 2	< 2	7	< 5
Sangria	7,50	47	40	100	100
Sparkling Wine, White	7,80	5	2	136	139
Port	9,50	< 2	<2	15	10
Port	10,50	< 2	< 2	29	23
White Port	12,00	< 2	< 2	8	< 5

Table 2. Comparison of FIAstar™ and A/O results.

Correlation of FIAstar™ to Reference Methods (high sugar samples)

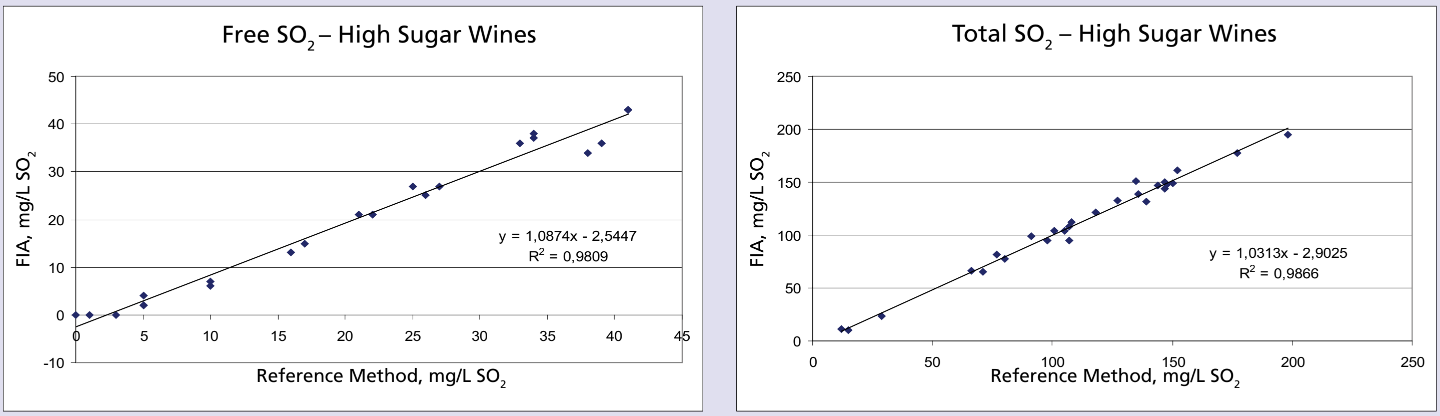


Fig. 1: Correlation of results from FIAstar™ to reference methods on high sugar wines.

The world's production of meat is constantly increasing. Annual average increase in volume is nearly 3 per cent.

World Meat Congress 2006, Brisbane, 27-29 April:

The dynamics of the world's meat market

The world's production of meat is constantly increasing. Annual average increase in volume is nearly 3 per cent.

To give some idea of what the global meat production represents, think about the cargo volumes that the world's largest container vessels carry by sea. The biggest of them will take about 10 000 twenty-foot containers, each holding 25 tonnes of meat. So we are talking in terms of, what 910 full loaded container vessels can carry. If you place the containers in one row, they would form a line about 56 000 km long, equivalent to 1,4 times the Earth's circumference at the Equator.

But the world's meat market is one that's changing. It comes as no surprise that production is increasing, so is the world's population, but traditional meat-producing nations in Europe and North America are beginning to loose market share to those of Asia and South America. And trade patterns are changing too. The traditional meat exporter, Europe, is now becoming a net importer.

Meat in production terms

Global production is dominated by meat from farm-reared animals – pigs, cattle and poultry – as indicated in Table 1. In terms of meat and processed meat products, and in terms of international trade, these are the most important sources. Mutton and lamb are important in certain countries, while meat from other animals such as emus, ostriches, horses, rabbits, game, alligators and so on plays an insignificant role when viewed in a global perspective.

Religious considerations

Poultry is produced and consumed all over the world. However, religious beliefs mean that beef and pork do not normally make an appearance in certain countries. Beef is not consumed in India as this would be contrary to the tenets of Hinduism. Likewise, pork has a very limited position in the Muslim world.

Pork: Increasing Chinese influence

Pork is the most widespread type of meat consumed, and represents 41 per cent of global meat production, a share that has remained stable over the past few decades. Table 2 indicates the largest producers.

Today China is producing more than half the pork consumed in the world. About 80 per cent of what the country produces is sold to traditional 'wet markets' and does not reach processing companies. However, the Chinese market is also in transition. More and more pork is being processed, and in recent years China has also begun to export pork products.

Another country that has a huge impact on the international pork market is Brazil. Increased production has now resulted in Brazil becoming the world's second largest exporter of pork products.

The EU is the world's second largest pork producing region, with Germany

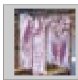
	1990 Tonnage	1995 Tonnage	2000 Tonnage	2005 Tonnage	*1990 %*	*1995 %*	*2000 %*	*2005 %*
Beef	48,7	49,3	51,5	55,2	*32*	*28*	*25*	*24*
Pork	59,9	71,2	83,5	93,8	*40*	*41*	*41*	*41*
Poultry	35,8	48,2	60,4	68,9	*24*	*27*	*30*	*31*
Mutton/ lamb	7,2	7,4	8,4	9,9	*4*	*4*	*4*	*4*
Total	**151.6**	**176.1**	**203.8**	**227.8**	**100**	**100**	**100**	**100**

Table 1: Global meat production 1990-2005 in millions of tonnes.

	**1995 %**	**2000 %**	**2005 %**
China	44,0	48,3	52,1
EU Of which - Germany - Spain - Denmark	22,5 (5,0) (3,0) (2,1)	21,1 (5,9) (3,4) (1,9)	22,5 (4,7) (3,4) (1,9)
USA	11,4	10,2	10,0
Brazil	2,4	3,1	3,0
Canada	1,8	1,9	2,0
Others	17,9	15,4	10,4
Total	**100**	**100**	**100**
Total (Mio tonnes)	**71,1**	**83,5**	**93,8**

Table 2: Global pork production 1995-2005.

as its largest producer. Denmark is well-known for its pork exports. Although Denmark produces only about 2 per cent of the world's pork, it accounts for about 15 per cent of global pork exports and is the largest pork exporter in the world.

Beef and veal: USA, Brazil and China

Beef used to be the second largest type of meat consumed. But, as indicated in Table 1, in recent years it has been losing market share to poultry, which has now overtaken it. The main reason for beef's decline has been BSE, which has resulted in many consumers reducing their beef and veal consumption.

The USA remains the world's largest beef producer. Over the last twenty years, however, Brazil and, in particular, China have increased their beef and veal production significantly. Today Brazil is the world's second largest producer of beef and veal, while China has moved up to fourth place.

However, China plays no role in the international beef trade – as yet. It is the traditional beef and veal producing countries such as Australia, Brazil, Argentina and New Zealand that continue to dominate the trade. The EU's largest beef exporters are Germany, Ireland and The Netherlands.

Poultry: Significant increases in production

Four regions – the USA, China, the EU and Brazil – between them account for about 75 per cent of the world's production of poultry, defined as meat from chickens, hens and turkeys, with chickens by far the most important of the three.

Generally speaking, meat from poultry is leaner than other types of meat. The tendency among many consumers to reduce fat intake has thus resulted in an increase in consumption of poultry. BSE has also helped to boost this sector.

To an increasing extent, meat from poultry is also seen as raw material for many processed meat products including sausages and delicatessen goods that used to be based exclusively on pork and beef. It remains to be seen what the effects of bird flu will have on consumption.

World Meat Congress

The World Meat Congress is held every two years, and is hosted by a leading meat-producing nation. This year's congress was held in Brisbane, Australia. There were more than 500 participants representing meat organizations, meat producing companies and suppliers to the meat industry. Topics presented included developments in global meat production; development of the meat market in selected countries; and future expectations in terms of meat production, consumption and trade.

FOSS was one of the participants, and exhibited solutions for at-line and in-line process control.

The above article is based on input during the congress.

■

by Poul Erik Simonsen, FOSS

Meat: what is it?

Meat, or lean muscle, is composed of approx 70 per cent water, 20 per cent protein and 9 per cent fat. The remaining 1 per cent is ash or mineral content. The protein can be divided into two categories: collagen (the connecting tissues) and BEFFE (the 'good' part of the protein).

Fat is the single most variable component, and in raw material is likely to range from as low as 1-2 per cent to as high as 80-90 per cent (or even higher). Protein and water in meat are closely related to each other, and are most often to be found in a 3,6-3,8:1 ratio of water to protein.

For most practical purposes, meat as a raw material is a three-component system of water, protein and fat as described above. Consequently, composition analysis focuses on these three components with a view to formulating targets in the manufacture of processed meat products.

Precise control of product composition is essential for optimum use of raw materials, achievement of product consistency, optimization of eating quality, shelf life and appearance, and for satisfying regulatory requirements.

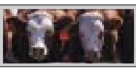
	**1995 %**	**2000 %**	**2005 %**
USA	23,2	23,7	20,5
Brazil	13,8	12,8	15,6
EU Of which - France - Germany - Italy	16,2 (3,4) (2,8) (2,4)	14,4 (2,9) (2,5) (2,1)	14,1 (2,9) (2,1) (2,0)
China	6,1	10,3	13,0
Argentina	5,5	5,2	5,6
Australia	3,4	3,9	3,8
Others	31,8	29,7	27,4
Total	**100**	**100**	**100**
Total (Mio tonnes)	**49,4**	**51,5**	**55,2**

Table 3: Global beef and veal production 1995-2005.

	**1995 %**	**2000 %**	**2005 %**
USA	28,9	27,4	27,2
China	18,0	21,3	19,5
EU	16,7	14,6	15,5
Brazil	9,3	10,5	14,1
Middle East/ North Africa	6,5	7,0	6,7
Mexico	3,2	3,1	3,4
Others	17,4	16,1	13,6
Total	**100**	**100**	**100**
Total (Mio tonnes)	**48,2**	**60,4**	**68,9**

Table 4: Global poultry production 1995-2005.

The World Ethanol Industry shows no sign of slowing down

Last year was the most successful year in the history of the world ethanol industry. The industry saw record production, promising new political initiatives, a very favourable economic environment and technology breakthroughs that will help bolster future demand.

There have, however, been challenges as well. Weather-related production shortfalls in key feedstocks for ethanol production, particularly in Southeast Asia, have highlighted the vulnerability of biofuel schemes.

Another area where problems need to be resolved is international trade. With the rise of fuel ethanol markets worldwide, incentives to stretch the existing rules have become greater. Today ethanol is traded in all kinds of forms, including blends and ETBE. This poses a problem for market transparency.

Moreover, there is still considerable resistance on the part of the oil industry to adopting ethanol, particularly in Europe where sales have remained below expectations. Finally, the rise of the fuel ethanol markets worldwide has resulted in a further reduction in the role played by traditional end uses, particularly in the industrial sector.

The data shown in graph 1 are what are fuelling the current debate over the pros and cons of renewable energy sources. Over the last ten years, prices for crude oil have risen by 300%, while values for the world's two major feedstocks for ethanol production, namely sugar and corn, have shown a remarkable stability. This widening gap has made biofuels from these resources increasingly competitive. In other words, the case for biofuels has become more compelling for economic reasons. This is a very new and important development.

The booming Brazilian market

One of the most astonishing turnarounds in the world fuel ethanol industry has been the resurrection of the Brazilian ethanol industry. A string of very good harvests, rising sugar prices and, last but not least, a significant breakthrough in engine technology have all contributed to the fantastic growth seen in the last two years.

Two major forces are currently driving the Brazilian market. The first is the superior economics of ethanol. Ethanol's discount against gasoline has been consistently between 40% and 60%, even when the lower energy content is taken into account. These favourable economics have been present in the Brazilian market for years but until recently had failed to translate into increased demand as consumers were not able to take full advantage of them.

This situation changed with the introduction of flex-fuel vehicles (FFVs) in 2003. This technological innovation is the second factor driving the market. Ever since the summer months of 2005, FFVs have boasted a larger market share than conventional gasoline powered vehicles. This new technology has provided consumers in Brazil with more choice and so far, ethanol has been the major beneficiary.

Combining the domestic demand driven by FFV's and Brazils future export opportunities there is a good chance that ethanol production in Brazil could double over the next couple of years.

Picture courtesy of Unica, São Paulo, Brazil.

The USA

As in the case of Brazil, ethanol producers are benefiting from very favourable economics in the US. After the slump earlier in the year, demand is growing very quickly, largely because of the huge price differential between ethanol and its competitor gasoline. Starting in May 2005, ethanol usage has broken records each successive month. Given the supply problems and record high prices in the gasoline market, ethanol values can be expected to remain high well into 2006.

Longer term, the Renewable Fuel Standard (RFS) which was approved by President Bush in August will define the industry's development path. This piece of legislation will put the ethanol business on a completely new footing, not only in the States but also overseas. Industry observers in the US agree that the figures set down in the program, 7,5 bln gallons (28,5 bln litres), should not be considered as a production ceiling but as a floor. Provided gasoline prices remain at high levels, ethanol will continue to find a market outside the RFS-program so that its volume is likely to rise well above the target.

The RFS will also show that it is quite feasible, even for an industrialized country with a highly developed transport infrastructure and sophisticated car technology, to set and implement very ambitious biofuel targets. This could give a signal to other G7 states such as the European Union which have so far been lagging behind in biofuel usage.

The EU

As graph 2 shows, the market share of biofuels in the EU-25 in 2005 is forecast to be less than 1.5% against the target of 2%. There are leaders such as Sweden, the Czech Republic and Austria but there also are laggards such as Denmark, Ireland and Finland. It has to be emphasized that the percentages presented in the graph are based on the plans put forward by the national governments. They are not mandatory, so the actual share of biofuels is likely somewhat lower than the 1.4%. In addition, most of the biofuels consist of biodiesel as the diesel market in Europe is still growing while the gasoline market is contracting. Taking a positive view, the EU market still has huge untapped growth potential and this could be exploited in the near future.

What are the obstacles to growth in the EU? Physical factors such as the available area which needs to be planted to energy crops are usually cited. However, various studies have shown that the EU, at least in theory, has enough land easily available to supply its fuel markets with 5 or even 10% biofuel blends.

Cheap imports are put forward as another reason for not investing in the sector. However, if we look at developments over the last 12 to 18 months and consider possible future trends, this argument must be less of concern right now. Currently, European producers can compete with imports, especially with the incentive programs put in place and this situation is unlikely to change anytime soon.

Finally, critics point to this variety of incentive systems and the ensuing lack of transparency as other drawbacks. True, there are a number of regimes - full tax exemptions as in Sweden and Germany,

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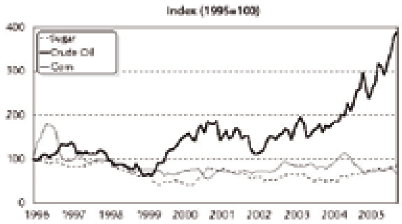
Graph 1 - Sugar/Corn vs. Oil

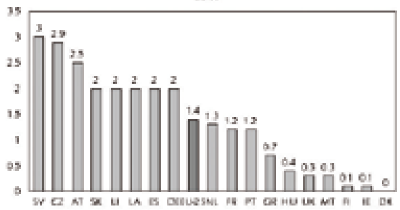
Index (1995=100)



F.O. Licht

Graph 2 - Biofuel Market Share in the EU

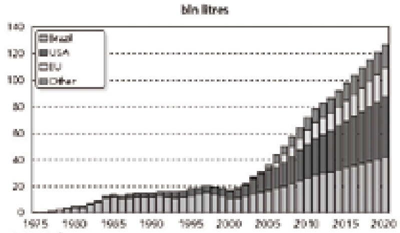
in %



F.O. Licht

Graph 3 - World Fuel Ethanol 2020

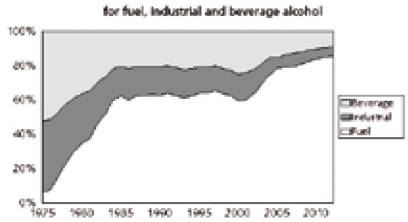
bln litres



F.O. Licht

Graph 4 - Market Shares

for fuel, industrial and beverage alcohol



F.O. Licht

Cont. from page 15

partial tax exemptions currently operating in the UK, limited tax exemptions for specific quotas such as in France and Italy and blending obligations which apply in Austria, Poland and the Netherlands.

However, this has also been the case in Brazil and the US. In the US, there are numerous state incentives beside the federal tax exemption. In Brazil, there used to be large number of different tax rates for ethanol. Therefore, it is difficult to understand why this should be a major problem as long as domestic producers make maximum use of their own national incentive schemes.

The rest of the world

Apart from these big three producers, there have been many other positive developments throughout the world, particularly in the Far East. In India, the fuel ethanol program is to set to make a comeback this season following an ample sugar and molasses crop. The industry has restarted its investment drive and will continue to install new distilling capacity over the next couple of months.

In Thailand, the amount of gasohol sold has risen during the past two months and this trend is expected to continue, particularly since the Thai government will be banning MTBE from 2006 onwards.

The new "kid on the block" in 2005 is the Philippines which has seen a number of promising legislative initiatives. As the first dedicated fuel ethanol plant in the country is not likely to go online before 2007, oil companies have started to import ethanol as a stopgap measure. This is a quite pragmatic approach as it puts economic and environmental advantages before the vested interest of the domestic agro-industry.

In China, the grain to alcohol facilities have continued to prosper with additional provinces offering E-10 blends. Moreover, there are plans to double the size of the Jilin plant to 600,000 tonnes from 300,000 tonnes at present. There are mixed signals from Japan with regard to ethanol. Brazil and Japan have agreed to cooperate closely on the development of the latter country's biofuel infrastructure but so far concrete steps have been lacking. Nevertheless, it would not be surprising if the Japanese started to use greater quantities of ethanol via the ETBE route very soon.

All these new programs and plans were worked into graph 3. By 2020, total fuel ethanol output worldwide on the basis of current programs could reach between 125 and 130 bln litres, which would be around 6% of world gasoline demand. This compares with 1.5% today. Over the next couple of years, the two ethanol giants, Brazil and the US, will be neck and neck in the race. The EU will become a large-scale producer of ethanol and programs in the rest of the world will also prosper.

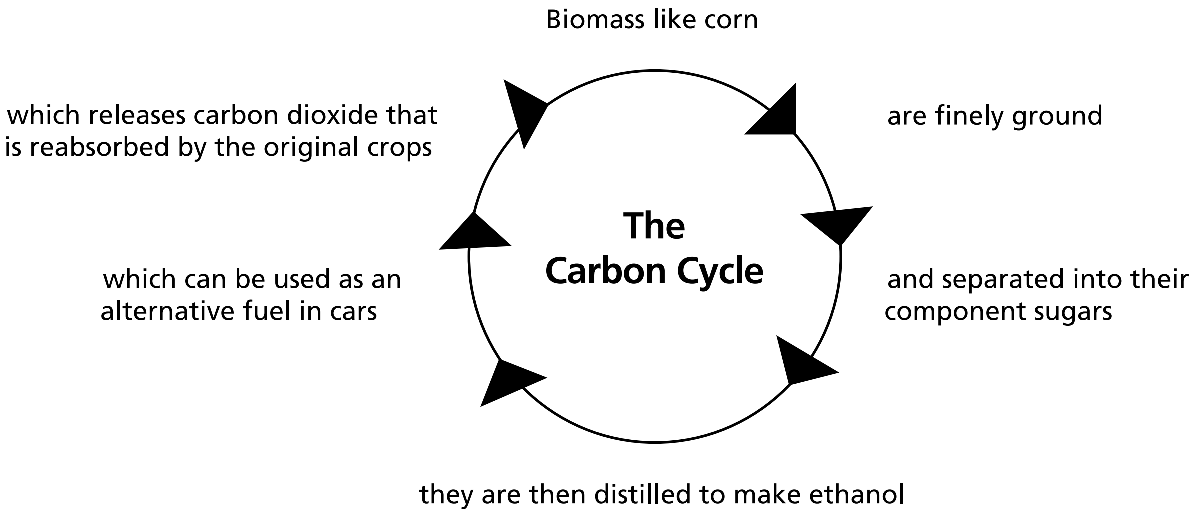
Basically, the market will split three ways. The US and Brazil will account for two thirds of world production while the rest of the world will make up the remaining third. Of course, we should not get carried away by these figures. Nevertheless, set against the background of high oil prices, such a scenario does not seem to be completely unrealistic.

Market structure

Graph 4 illustrates the phenomenal rise of fuel ethanol in recent years and the push that the industry is likely to see in the near future. While the fuel sector accounted for less than 10% of the world ethanol market in the mid-1970s, its share could rise to about 80% by the turn of the decade. Industrial markets will account for 7-8% by 2012 while the rest will be beverage alcohol.

The dominance of fuel alcohol will result in some fundamental changes. For example, we can assume that the ethanol market will increasingly be driven by crude oil and gasoline prices. The ethanol market will be an energy market and the non-fuel markets are being increasingly marginalised. Ultimately, they could even become completely separated from fuel

Ethanol Reduces Greenhouse Gases



Picture courtesy of Unica, São Paulo, Brazil.

ethanol markets and its determinants. This is because an ever-growing number of ethanol plants, whether in Brazil or the US and possible newcomers to alcohol production, will exclusively produce fuel ethanol. The only connection between the two markets will exist through those companies that have a diversified production portfolio, servicing both fuel and non-fuel markets. However, their number is quite small and has not grown in recent years.

These producers have the option to move in and out of non-fuel markets depending on the price for fuel ethanol. In times of high gasoline prices, this may reduce supplies to non-fuel markets and vice versa.

The fuel ethanol market will be a bulk market, governed by the rules of the commodity trade - large volumes of a standardised product where price rules supreme. In order to realise cost savings, production and distribution structures on the selling side will become increasingly concentrated.

The industrial market by contrast will remain the refuge of niche players who will increasingly try to establish ‘branded products’ with characteristic product and service profiles. The emphasis in this market will not be on price but more on reliability and meeting stringent specifications.

If these developments continue for the next couple of years, we may see higher prices and possibly higher volatility because of the swing factor in specific non-fuel grades. The structurally higher prices resulting from changed market economics for non-fuel alcohol may even result in synthetic ethanol producers finding their way back into the market because they are the only ones who can credibly claim that they will never divert quantities into the fuel market in times of higher prices. Being different from the rest may pay in some instances.

Conclusions

Record high oil prices have resulted in an unprecedented public relations drive on behalf of biofuels and ethanol in particular. This year, all major global newspapers and magazines have run cover stories on the end of the oil age and the rising star of biofuels. Among other factors, it was this publicity which paved the way for major biofuels programs such as the RFS in the US and the soon to be announced biomass action plan in the EU. These programs will provide the basis for strong growth and there is no doubt that the success seen so far will continue well beyond the year 2010.

■

This article is based on a presentation made by Dr. Christoph Berg, F.O. Lichts

Jubilee Grain and Feed Conference:

Bio-fuel and integrated NIR analysis in the spotlight

A variety of factors affecting bio-fuel developments are likely to absorb any impact on EU grain and feed prices. Meanwhile, networked NIR analysis is set to become increasingly important for competitive production across borders and throughout the supply chain.

Everything is connected. That is one conclusion that can be drawn from the recent FOSS Jubilee Grain and Feed Conference held in Bologna, Italy.

Franz Fischler, a former EU Commissioner for Agriculture, gave a macroeconomic view of influences affecting the grain sector, including the probability that imports from countries like Brazil will make up much of the expected shortfall in ethanol production. “It is cheaper to produce ethanol from sugar cane than grain,” he said.

Also on the subject of bio-fuel, Dr Alan Bullion of F.O. Licht/Agra Informa Ltd gave a global picture of rapidly growing production. Ethanol will soon consume 20 per cent of the US maize crop, and US ethanol output is set to reach six billion gallons by 2007. However, bio-fuels can come from many sources. In the EU, cuts in sugar quotas could mean that sugar refineries will switch from sugar to bio-fuel production. Potential production of ethanol from by-products, or so called secondary sources, is another likely source of bio-fuels.

Global economic dynamics will affect the European feed industry, according to Alexander Döring, Secretary General of the European Feed Manufacturers Federation. Increases in imports are likely to reduce Europe’s self-sufficiency in feed. In 2005 EU member states produced 143,6 million t of compound feed, most of it for consumption by pigs and poultry.

Interaction throughout grain and feed supply chains was a common theme during the conference, with a number of speakers touching on the importance of NIR analysis for production savings and food and feed quality.

A feed mill can save in the range of EUR 2-5 per tonne of feed annually through reductions in wet chemistry analysis and the improved production flexibility afforded by rapid NIR analysis results. Furthermore, advances in network technology are allowing such advantages to be realized on a global scale at minimum cost. Calibration updates can be distributed throughout a network, from a central server to standardized instruments worldwide. Results are then based on the same calibration, whether they come from India or Italy.

Peter Foss and the French Delegation at the Bologna meeting.

In the food industry, NIR analysis is adding value throughout the supply chain. In Australia payments are made on protein determined by NIR analysis. This promotes the cultivation of optimum varieties for different purposes, such as pasta or noodle production. And in Italy, 20 per cent of durum wheat production is linked to a national network that collects NIR information at different stages of the production process. The results provide key data for breeding programmes.

FOSS President, Peter Foss summed up by focusing on the future role of analysis in tackling issues such as consumers’ demands for not just information, but relevant information, as well as bigger issues such as CO_2 emissions and increasing pressure on already scarce global resources. “The use of analytical devices is just beginning,” he said.

by Richard Mills, FOSS

Australia: One supplier

Managing Infratec™ analyzers across a continent

Colin Tutt from CBH Neil Barker from Graincorp

Distance is no object, it seems, when it comes to running analytical instruments. Two major Australian grain producers, each running more than 300 FOSS Infratec™ grain analyzers, here describe how they tackle the challenge.

CBH Group in Western Australia

The CBH Group receives, handles, stores and outloads bulk grain at 197 points across Western Australia's grain belt – an area of 320 000 km². Each point has at least one FOSS Infratec. The man in charge is Colin Tutt, General Manager of Operations.

All instruments networked

"It's actually much easier than it sounds," says Colin.

"All 350 or so instruments are networked through the telephone cables and controlled remotely from Perth, so the calibrations are causing no trouble at all. As to maintenance, we have three service engineers covering the state, ready to troubleshoot at short notice. Not that the instruments break down often. The Infratec is an extremely reliable, consistent and accurate instrument that enjoys immense credibility among our growers.

Easy to use

"Obviously we have hundreds of staff operating the instruments. They go on a five-day sampling course with only a few hours dedicated to the FOSS Infratec. You don't really have to be a rocket scientist to operate an Infratec.

One supplier

"Using only one instrument supplier gives us some obvious advantages in calibration, training, maintenance, spare parts and so on. But equally important is the partnership we have developed with FOSS over the years. We were actually involved in the development of the Infratec and we were the first user in Australia – call us guinea-pigs if you like, but the bottom line is that FOSS listens to our needs and helps us constantly improve our technology."

Graincorp in the eastern states

At Graincorp they have a slightly different approach to managing a large number of instruments over huge distances.

Graincorp covers the eastern states of New South Wales, Victoria, Queensland and South Australia. The company has approximately 350 storage sites and runs 398 FOSS Infratecs, which cannot be networked due to poor telephone connections in the bush.

"Obviously, we have tried, but the network proved to be too unreliable so we have had to settle for second best," says Neil Barker, Graincorp's Technical Services Manager. "All sites have reference material and the instruments are tested daily. Maximum permissible error is ± 0,2%, well within the ± 0,4% specified by The National Measurement Institute.

Preventive maintenance

"Our maintenance programme is simple. FOSS carries out preventive maintenance service on each of our 398 Infratecs prior to each year's harvest. In case of an instrument breakdown, which happens very rarely, our technicians can be on-site anywhere within the hour. FOSS is exceptionally quick off the mark as well. If we have problems we can't solve ourselves, FOSS will be there within 2-3 hours. Downtime is practically unheard of as we have back-up instruments within easy reach of most sites.

1 000 users on training

"Prior to each harvest we hold training courses across the east coast. Over just a few weeks, more than 1 000 Infratec users get a basic operation and maintenance course. Training staff used to get one-on-one training from FOSS, but now they all go through FOSS Academy. The group training at FOSS Academy is great, our people love to go and the courses are extremely beneficial.

Consistent results

"There are pros and cons to dealing with only one instrument supplier. In our case the pros by far outweigh the cons. The FOSS Infratec is the most accurate instrument available, and it's much easier to get consistent results if all instruments are the same. Trust me, I speak from experience! On top of that, FOSS is very receptive to our needs and the service and maintenance network is second to none."

■

by Casper Reeslev, Ideas Unltd, on behalf of FOSS in the Pacific region

FOSS 50 Jubilee:

The Grain Market in Bologna

Part of the FOSS 50 jubilee programme was a visit to Borsa Merci di Bologna, the city's grain market. We were welcomed by the Market's President, Sr. Bruno Filetti, and Dr. Filippo Galli of the Italian National Cereal Association then gave a presentation about the grain trade in Italy.

Bologna's is the largest grain market in Italy, and a total of 1 277 different operators representing all segments of the grain business are involved. 12 per cent of them are engaged in milling or pasta production, and 35 per cent are merchants. In total about 35 million tons of crops are traded here each year, 42 per cent being imported cereals or oil seed and the rest produced in Italy.

The Market has three main activities:

1. It issues the official contracts that form the basis for all other contracts closed on the market. In total these cover 20 different types of contract, from wheat to oil seed. The contracts include quality requirements as well as penalties for failure to meet objectives.
2. It sets prices on a weekly basis. These will be the basic/reference prices for all grain trade for the following week.
3. It oversees the arbitration process, a mechanism for settling any conflicts that may arise. In the event of arbitration, settlement must be reached within 60 days.

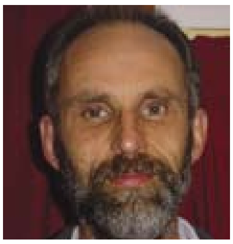
Laboratorio A.G.E.R., which has its facilities within the building, is involved in the arbitration process. The laboratory carries out qualified analytical work using a wide range of tests, from basic parameters through rheological parameters to GMO/Mycotoxine testing. The laboratory performs around 60 000 tests every year. Naturally, it has well proven performance through accreditation systems like ISO 9001, ISO 17025 and through GAFTA. This system works very well, and so far no cases have gone to court.

After an overview of the Market's operations by Dr. Andrea Villani, its Director, a guided tour of the facilities took place. On the trading floor we found that all the major companies had their own small offices that were used for trading. The atmosphere was very good, and both buyers and sellers had unique possibilities to perform their tasks. The tour ended with an interesting visit to the arbitration laboratory.

■

by Jan-Åke Persson, FOSS

New Zealand wins the first Greenland holiday!



Stephen Barrett from Fonterra in New Zealand is the first lucky winner of an adventure holiday to Greenland in the world-wide FOSS 50 competition! A FOSS Pacific customer for years, it will be Stephen's first trip outside New Zealand and Australia. We had a chat to the lucky winner…

Leaves in September

"My wife and I leave for Greenland in September. We thought the northern summer would be a good time to travel, avoiding the arctic winter. We are both very excited. My wife would love to get to know the Inuit culture a bit better and personally I look forward to exploring Greenland's natural beauty from a dog sled and sleeping in an igloo. On our way back we'll see a bit of Europe – Denmark, Germany and Ireland – but the first thing we'll have to do is organise our passports…".

Australia and New Zealand lead the world…again!

It was no coincidence that the first winner was a FOSS Pacific customer. A total of app. 3,500 FOSS customers world-wide have signed up for the competition since the launch – almost one in five (635) are from Australia and New Zealand!

We want more local winners!

Sign up for the competition on **www.foss.dk** for your chance of winning an adventure holiday to Greenland! Every month for the rest of the year will see one winner – so the sooner you sign up, the better your chances of winning.

Good to know...

Greenland is a Danish island so the official language is Danish. These few phrases may come in handy if you win the adventure holiday:

I'd like a beer, please.	Maa jeg bede om en oel?
It is freezing!	Her er hundekoldt!
Get that polar bear off me!	Faa den isbjoern vaek fra mig!
Are we there yet? *(it's a big island)*	Er vi der snart?
What's all that white stuff, ice?	Hvad er alt det hvide stads, is?

■

by Casper Reeslev, Ideas Unltd, on behalf of FOSS in the Pacific region

Sweden and Germany:

MilkoScan™ FT2:
Swedish field test demonstrates time-saving potential

The need for top quality and greater freedom of choice in a competitive dairy industry is making increasing demands on analysis operations. Innovative analysis solutions like the new FOSS MilkoScan™ FT2 are providing the answers.

Milko is a large Swedish dairy cooperative producing a wide variety of dairy products. Its production facility in Grådö, Dalecarlia has tested the new MilkoScan FT2 dairy analyzer as a faster and more flexible alternative to existing laboratory analysis equipment. The MilkoScan FT2 was on test for two weeks.

"We were happy with the instrument and it appears to be very reliable," says Jörgen Wåger, Milko's Laboratory Manager in Grådö. "It's just the type of product we've been looking for."

Jörgen Wåger explains how the field test of the MilkoScan FT2 helped reduce normal laboratory analysis workload, for example by eliminating time-consuming fat extraction procedures. And the laboratory staff particularly appreciated the fact that they could measure a variety of viscous and non-viscous samples quickly, with little or no sample preparation. "We were able to use the instrument for a number of products including higher-viscosity ones such as sour cream," he says. "We currently have a range of around 155 products, and that number is increasing all the time. So we can't afford time-consuming analyses."

The MilkoScan FT2 features a powerful pump system allowing a variety of dairy products such as milk, condensed milk, yoghurt and ice cream mixes to be measured directly without dilution. Measurements take less than a minute. An automatic 'backflush' function avoids the risk of carry-over from sample to sample. Other features include ready-to-use calibrations for a variety of products.

More about the Milko cooperative can be found at **www.milko.se**

■

by Richard Mills, FOSS

New payment scheme set to reduce analysis costs

FOSS Germany has entered into a new payment scheme with a major central milk testing laboratory, Milchprüfring Bayern e V. Instead of purchasing instruments, the laboratory will spread and ultimately reduce analysis costs by taking advantage of a new pay-per-sample scheme.

The scheme will be implemented over the next five years. It covers the renewal of several instruments for testing raw milk including Fossomatic™ FCs for somatic cell counting, BactoScan™ FCs for bacteria analysis and MilkoScan™ instruments for compositional analysis. The price structure is based on an agreed number of analyses per year. Instrument usage will be monitored during regular visits by FOSS technicians.

Thanks to the scheme the laboratory expects to stabilize and reduce the cost of raw milk analysis. It also expects to optimize maintenance by simplifying operational and business procedures. "Over the next few years we will achieve a substantial reduction in running costs," says Laboratory Director Dr. Christian Baumgartner.

Milchprüfung Bayern is a respected and well-established laboratory that performs around 15 million tests on raw milk every year. Demands made of automated analysis of raw milk are stringent, both in terms of quality and quantity. Growing requirements for advanced technology led the laboratory to consider investment in new instruments that could support business in the years to come.

The pay-per-sample scheme evolved out of discussions between the laboratory and FOSS Germany about meeting the laboratory's analysis requirements with financial benefits for both sides. "We see the pay-per-sample scheme as a milestone in raw milk analysis, and one that offers a win-win situation," says Dr. Baumgartner.

That FOSS had been working with the laboratory for over twenty years proved to be an important factor. "An agreement like this could only be reached with a reliable partner with in-depth technical know-how as to raw milk analysis," says Dr. Baumgartner.

The scheme may serve as a model for future business deals, and not only in Germany. "The pay-per-sample agreement with Milchprüfung Bayern is a business example with potential elsewhere in the world," says Trine Andersen, Manager of FOSS Analytical's Milk and Dairy business segment.

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Machine against man in wine tasting competition

Who is best qualified to judge the price of a wine: a wine expert or a student armed with a wine analyzer?

The result of a competition sponsored by FOSS at the Technical University of Denmark shows that analysis technology can prove a valuable supplement to a well-developed nose.

Around fifty students from seven European universities were invited to take part in the FOSS Challenge. They competed against each other to develop a calibration for a FOSS WineScan Flex analyzer so that it could be used to decide the price of wine. Normally, of course, WineScans are used at different stages in wine production to measure a number of parameters such as ethanol and organic acid content.

The winning team, Kim Houng Ngo and Martin Andersen from Aalborg University, then used their calibration and the wine analyzer to compete against a panel of wine experts in identifying the price levels, regions of origin and quality of a selection of wines.

The WineScan™ results came close to the experts' judgement, especially in terms of region and quality of wines at lower prices. But both the panel and the WineScan had problems in pricing the more expensive wines. The experts' ability to judge the finer points allowed them to get closer to the actual price.

"It is very interesting that it's the more expensive wines that are difficult to judge. All sorts of factors play a part," said wine writer Michael Poulsen, one of the experts.

One area in which the students and the WineScan were clear winners was in the speed of results. Their results for all the wines were delivered long before the experts had finished deliberating about terroir, complexity and bouquet. "For us it's all about mathematics and data," said Kim Houng Ngo from the winning student team. "It was fun taking part in the competition, to see how far we could get."

The winning team, Kim Houng Ngo and Martin Andersen from Aalborg University.

FOSS president, Peter Foss, says: "The aim of this competition has been to inspire students to make innovative use of technology. We'd rather see Kasparov play chess than a computer, so the risk of wine tasters and experts losing their jobs is minimal."

The fifty years of success that FOSS is celebrating in 2006 are thanks to innovative engineering, Peter Foss goes on to say. The result of the FOSS Challenge confirms that there are many areas in which analytical instruments can be developed even further to ensure food and drink quality. "We think it's fun to push technology to new highs with the help of some sharp minds," he adds.

by Richard Mills, FOSS

Notes for contributors

Manuscripts should be submitted to the Executive Editor. Submission of a manuscript is considered to be a representation that it has been neither copyrighted nor published, and that it is not being submitted for publication elsewhere.

Papers should be written in English, be headed by a concise but informative title, by the name(s) of the author(s), preferably with one forename in full for each author, and by the name and address of the establishment where the work was performed.

An honorarium of US$ 1000, will be paid for every published article.

Make sure the files are clearly and separately identified when shipping material by e-mail, diskette or on CD.

Images should be in TIFF format with high resolution 300 dpi, colours CMYK or B/W.

FOSS at Anuga FoodTec, April 2006

Anuga FoodTec is a red-letter event in the calendar for the food industry, and therefore for FOSS.

The exhibition provides an opportunity to catch up with the latest developments across the whole sector. It's the only process-oriented trade fair in the world to cover all types of raw material and all aspects of processing, packaging, hygiene, storage and distribution in food and drinks production.

For FOSS it's a stage on which new products can take a bow. This year saw the appearance at Anuga FoodTec of our recently released MilkoScan™ FT2, an instrument whose new levels of measurement accuracy promise significant advantages for dairy producers by saving them thousands of kilos of raw material every year.

In addition to the MilkoScan FT2, FOSS displayed the well-known FoodScan™ for rapid analysis of meat and dairy products, and the XDS Lab for versatile and highly accurate analysis of solid, semi-solid and liquid products. Many visitors to our stand were also interested in the MicroFoss™ system for simple microbiological testing, and in the InfraXact™ analyzer.

Enjoying the spotlights, too, was the MeatMaster™, our intelligent in-line solution for analyzing fat content in meat and trimmings. ProcesScan™ and ProcessAnalytics™ for automated production-line analysis and control were also on show.

Some 39 000 trade visitors from 146 countries attended Anuga FoodTec 2006, up 13 per cent on the previous event. The proportion of visitors from overseas also rose slightly, to 55 per cent. ■

by Sandra Strahl, FOSS Germany

FOSS at Victam Asia 2006, Bangkok, 8-10 March Dedicated analytical solutions for feed and grain

Feed analysis doesn't have to be complicated

FOSS offers analytical solutions that not only save time and money: they make quality more consistent.

This and many other aspects of feed and grain analysis were what FOSS discussed with customers over three hectic days at Victam Asia 2006.

With almost 4 000 visitors, there was a 30 per cent increase in attendance over Victam Asia 2002. And over 125 exhibitors participated in this year's trade show at the Queen Sirikit National Convention Center in Bangkok – twice the number in 2002.

FOSS exhibited the following solutions:

- The InfraXact™ Pro, a simple-to-use and robust near infrared (NIR) analyzer providing accurate results for key control parameters directly at the production line
- NIRSystems Feed & Forage Analyzer, a tried and tested workhorse in leading laboratories around the world.
- An unrivalled range of automated chemical analysis solutions that help to accelerate reference analysis operations and improve safety in the laboratory

Speed, user-friendliness and accuracy are axiomatic to all FOSS solutions. Our ongoing investment in areas such as NIR technology, result-traceability and calibration development ensures that FOSS can always match customers' analysis requirements. Victam Asia 2006 gave us the opportunity for direct discussions with many Asian feed and grain producers.

Besides the display at the trade show itself, several presentations and information sessions were held on aqua feed, feed safety, and food hygiene policy in the livestock industry. Technical seminars by other manufacturers highlighted other important aspects of feed analysis. For example, Brilliant Alternatives Inc talked about automatically moving NIR analysis data into a feed formulation database.

The next Victam Asia is to be held, again in Bangkok, during Spring 2008.

■

by Hans Strinsjö, FOSS

Somewhere new to explore

Sign up now and win an adventure holiday for two to Greenland

For 50 years, FOSS has explored ways to improve analysis through the innovative development of analysis technology – a principle that holds true more than ever today. How better then to celebrate 50 years of innovation than with a competition offering the chance to win a free holiday to a land rich in opportunity for discovery - Greenland.

A holiday for two will be awarded each month during the jubilee year, 2006. To enter the competition, simply sign up with your e-mail address on the FOSS 50 area on www.foss.dk. You will then receive our FOSS 50 newsletter twice a month throughout 2006. The newsletter will reveal the scope of dedicated analytical solutions inapplication areas that you may never have thought about, plus some interesting facts about your potential holiday destination.

Join us as we continue our journey during the next 50 years of FOSS. There's a lot more to discover!

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