In co-operation with AEDIL, Dalum College of Food and Technology offers a practical and theoretical Training Course in Cheese Making by Ultrafiltration. The course will be held at the department of Dairy Training, at Dalum College of Food and Technology.

Programme

Monday, November 3rd
Information about Dalum and the UF Cheese Course.
Membrane-filtration, theory.

Tuesday, November 4th
Ingredients for cheese manufacturing.
Acidification and syneresis.
Preparation for Pilot Plant production.

Wednesday, November 5th
Ultra-filtration and Cheese production, Pilot Plant.

Thursday, November 6th
Ultra-filtration and Cheese production, Pilot Plant.

Friday, November 7th
Starter cultures for ultra-filtrated cheeses.
Exchange of experiences and evaluation.
Lunch and departure.

Daily meals
07.30 am: Breakfast
09.50 am - 10.10 am: Coffee break
11.40 am - 12.15 pm: Lunch
01.50 am - 02.10 pm: Coffee break
05.30 pm: Dinner

Participant
Participants should ideally have knowledge basis in microbiological and chemical aspects of cheese making. The course is for professionals with previous training in cheese technology, practice in cheese making and good knowledge of English language.

Cost and deadline
Course fee 1.100 Euros including meals and accommodation.
Course fee must be paid before October 15th 2008.
Deadline for registration is Monday 1st of October 2008.

Registration
For register and/or further information, please contact:
Dalum College of Food and Technology
Landbrugsvej 55 · DK-5260 Odense S · Denmark
Phone: + 45 63 13 20 43 · Fax: + 45 63 13 20 44
psj@dalumuc.dk - Dairy Teacher Mr. Paul Stein Jensen

60 years of experience

Primodan Food Machinery is a Danish manufacturing company incorporating more than 60 years of experience within the Dairy and Food processing industry. Primodan is an order producing company of filling and sealing machines as well as complete UF feta cheese and dairy plants for markets worldwide.
Continuous product development, high quality standards and customer support make Primodan a reliable business partner when looking for new equipment.
The major theme of Danish Dairy & Food Industry ... worldwide is: Expensive Raw Materials • Optimized Technologies. This year, we proudly announce that the Danish Minister of Food and Agriculture, Eva Kjer Hansen, and Peder Tuborgh CEO of the international dairy company; Arla Foods participate in Danish Dairy & Food Industry. Topics of their articles are increasing prices of milk, grain and other food raw materials - and what to do. Political as well as technological solutions are discussed.

Producers of dairy plants and equipment strive to develop new production technologies that maximize the utilization of milk and other food raw materials. Examples are optimized separation technology, which allows the dairies to refine and use all parts of the milk content. Also new types of ingredients help to optimize the production yield of e.g. cheese, yoghurt and ice cream. Efficient milk transportation and new sophisticated packaging that extend the lifespan of the food are other topics. Focus is also on optimized concepts within hygiene and quality analysis in order to minimize the risk of waste and failure in the dairy and food production.


The Danish Dairy Managers Association and the Danish Dairy Engineers Association own and publish Danish Dairy & Food Industry ... worldwide. We have published the magazine since 1976 and this issue is the 18th in succession informing you about Danish dairy and food industry.

Danish Dairy & Food Industry ... worldwide is distributed in more than 120 countries in 11.000 copies. Furthermore, the magazine is available at our homepage: www.maelkeritidende.dk. Our experience tells us that about 100.000 dairy, food and marketing specialist worldwide study this journal every year.

You are always welcome to contact us for further information.

K. Mark Christensen
Chief Editor

Anna Marie Thøgersen
Editor
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The right ingredients ...

With our complete sensor technology, including process instruments, analytics, and factory sensors, we leave no room for false assumptions. Intelligent sensors and RFID solutions deliver the decisive plus in accuracy and versatility for the F&B industry. They provide the firm foundation for flexible production, enabling high product availability, consistent food safety, and optimum supply chain management. More information: www.siemens.com/sensorsystems

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Answers for industry.
Surging food prices
Since the beginning of 2008, we have witnessed a rather sudden and steep upward movement in world agricultural prices. This price surge has affected several commodities at the same time but especially the cereal prices.

The reasons for the surging prices are among others the rise in oil prices, draught in key wheat producing countries and a global increase in demand for processed food and meat in China and India in particular.

We have witnessed the harsh consequences in some developing countries in terms of hunger, turmoil and social unrest. The effect for the man in the street is harsh when one spends most of owns income on food.

In recent weeks, the international prices on many agricultural commodities have started to fall, which could indicate that we have been at the peak for now. However, prices are most unlikely to return to the low level of previous years. They are rather likely to stabilise on a new and higher level.

Some countries react to this global phenomenon with export taxes and other restrictions in trade. As I see it, this is the wrong medicine. It might help in easing some of the problems but in the long run it is counter-productive.

Positive consequences
It is important to remember that higher prices may also have positive consequences. If the conditions are right they will stimulate the agricultural production in both the industrialised countries and in the developing countries. In the latter very large parts of the population live in rural areas and where they rely mostly on farming. Higher prices on agriculture products could improve their livelihood.

In Europe, we now have a rare opportunity to take advantage of the higher prices as an incentive to the much needed reform of the Common Agricultural Policy. We need a more market orientated CAP that gives the farmers the necessary incentives and possibilities to react to the signals from the market.

In my view, we need to further strengthen the market orientation of the CAP to the long term benefit of the farmer in the developing countries, the consumer and the European farmer.

The 2003-reform and ongoing Health Check of this reform is one step towards a CAP where the farmers do not rely on the support measures but increasingly react on the signals from the market.

Likewise, the Danish government strongly supports the aim of the Doha Development-agenda of freer trade within the framework of the WTO. The Doha Development-agenda offers a unique opportunity for growth and stability in developed countries and especially among developing countries. This must be one of the ways to cope with the higher food prices.

Danish Agriculture 2022
The future also includes other challenges for the Danish agro-food sector. And one of the most important challenges is the increasing trade and the increasing competition among countries and companies all over the world.

In order to prepare the sector for the challenges ahead the Danish government is preparing a public process. The process is called Danish Agriculture 2022 and the key emphasis is to ensure that the Danish agro-food business in 2022 is among the cutting edge agro-food centres in the world. It is very important for the Danish government that the agro-food business can sustain its dynamic structure and evolves in respect of the nature, the environment, the climate and animal welfare.

I will launch the 2022 agenda after the summer holidays and I will invite the Danish agro-food sector, NGOs and the public to participate.

We need all the help we can get to create the best possible business environment so the agro-food sector
can stay ahead in the global race for competitiveness.

**Innovation and R&D**

Innovation and R&D are some of the most important policy areas for the Danish and European agro-food sector in the future. The Danish government has given research and innovation a high priority in our visions for the future.

And I am looking forward to participate in the European Commission’s “High Level Group on the competitiveness of the European Agro-Food industry”. The High Level Group consists of nine ministers, European agro-food companies and non-governmental organizations.

The aim of the Group is to produce recommendations to the Commission around three themes: Supply of Commodities, The structure of the Food Chain and Regulation.

We are also only in the beginning of this process, but I am sure that several of the final recommendations will be focused on the need for investment in Innovation and R&D.

It is my hope for the future that by putting further emphasis on market orientation of the CAP and on Innovation and R&D, the Danish agro-food sector will strengthen its role as one of the world’s key agro-food production centres.

---

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Milk prices
What is your opinion of the current high prices on consumer milk - will the trend continue?
The long-term analysis on global milk prices is positive. Our prognoses show that consumer demands will exceed the international market supply in the years to come. However, the general conditions vary in geographic regions around the world, and the dairies operate and face different challenges. As Arla Foods will continue to focus on our long-standing strategy to enforce product development and innovation, we are less exposed to short-term fluctuations. Thus, our milk prices will be more stable on the global dairy market, which has experienced price turbulence during the recent year.

How will the rising retail food prices influence the agricultural structure?
The structural development within agricultural food productions will continue; the need for efficiency has not declined - on the contrary.

Climate changes
How will climate changes influence food prices?
Changes in the global climate are difficult to predict. During recent years, we have experienced climate problems especially in Oceania and South America, which has caused shortage of agricultural products in these regions with impact on the global market. However, the global climate situation is a long-term phenomenon, and we will experience years of food production surplus too.

It is extremely difficult to predict the future more than 3-6 month ahead. Mind you, monetary exchanges are also a major factor.

Supply and demand
How will Arla balance the issue of better prices to the milk farmers while retaining fair consumer prices on milk and dairy products?
As mentioned, we will continue to focus on product development and innovation. This means further investments within the entire milk value chain from cow to consumer. We are convinced that this is a long-term and sustainable approach - also for the farmer, our owner.

Regarding both our customers and consumers, we must successively document that we have focus on optimization, efficiency and innovation in order to be competitive. Competition does not vanish just because of inflation. The globalization will continue and strengthen the competition in ways that consumers never pay more than the actual value of a commodity. In my opinion, the globalization will bring more transparency into industrial production and pricing.

In the end, it is always a question of balance between supply and demand. No market and no sector can be unbalanced for long. Actually, last years inflation has made up the lack of inflation in previous years within the dairy world. In the future, consumers must be prepared to pay the actual prices for dairy products.

Global and local
Why is Arla more focused on local productions around the world?
As the world become more globalised, the need for trading across borders increase. As an international player, it is necessary for Arla Foods to be present and engaged on local markets. Furthermore, our presence on the markets gives us the opportunity to export high profile products from our dairy plants in Denmark and Sweden.

Because of the current monetary turbulence, it is wise to place both...
income and expenses in different countries and currencies. I am convinced that the relatively national dairy production around the world will decline. - The trans-boundary productions and co-operations will intensify in line with the globalization.

**Arla Foods**

The Danish Swedish dairy company Arla Foods has sales offices in 27 countries and production in 12: Denmark, Sweden, UK, Finland, USA, Canada, Argentina, Brazil, Poland, Germany, Saudi Arabia and China. The company export dairy products to more than 100 countries across the world and many of the products are sold under well-known brand names. A total of 8,500 Danish and Swedish cooperative members own the cooperative, Arla Foods amba. The annual turnover is 6.4 billion euro.

Arla Foods will continue to focus on the long-standing strategy to enforce product development and innovation. Thus, the company’s milk prices are more stable on the global dairy market. (Photo: Arla Foods).

---

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LACTADIAL was developed as a soft, flexible, crush-resistant rubber hose. Our engineers succeeded in reducing weight by 20% compared to the market standard: CITERDIAL. The ideal hose for daily manual handling.

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Comprehensive knowledge

The dairy industry, just like other industries, is faced with strengthening the competitive position on the global market by streamlining production. For the western markets, the biggest challenge is to reduce production costs, even though costs for wages, utilities etc. are rising. This leads to revisions of the production structure and comprehensive expansion projects.

Within the dairy industry, very specific requirements apply for the buildings in relation to functionality, hygiene and environment. This requires a specific building design to fulfil these requirements.

With ALECTIA Dairy’s comprehensive knowledge of the industry, we ensure our clients an optimised production prepared for the future.

Our consultancy within civil works includes building materials, construction processes and detailing adapted to the specific function of the building. Our technical process knowledge is brought in close interaction with the suppliers in order to achieve an optimal overall solution with focus on efficiency, operational safety, hygiene and environmental awareness.

Expansion of plant for white cheese

It is a big decision for every manufacturing company to carry out a modernisation and expansion of production. It requires both a large investment and precise planning of how the production plant is to be modernised without affecting daily operation in the construction period.

Arla Foods produces a Mediterra-
The high standard of Danish dairy and food technology is recognised and appreciated worldwide. Dalum College of Food and Technology has played an important part in developing and maintaining this excellence. Our international activities focus on the integration of food education and are based on our fundamental concept “from soil to table”.

Dalum College of Food and Technology offers tailor-made courses for the global dairy sector and food industry.

Dalum College of Food and Technology also houses the only dairy college in Scandinavia: The Dairy Training Centre of Denmark, which specialises in courses in dairy technology, laboratory techniques, maintenance of dairy equipment, environmental engineering, energy saving, quality control management, and the operation of dairy plants.

Our mission is to continue to expand our international courses and contacts.

Please contact us for more information.

ALECTIA Dairy

ALECTIA Dairy is one of the leading independent consultants in the global dairy industry. We cover the whole process from idea to master planning, design, construction and commissioning.

We have more than 60 years of expertise within the dairy industry. This experience makes it possible to create sustainable solutions for our clients that interlink function, design, finance and long-term expansion options.

We can draw upon the expertise of 750 people within the organisation. It is a clear advantage for our clients that we can combine a thorough knowledge of the dairy industry with a broad spectrum of skills within utilities, logistics, occupational health and safety etc.

We have applied our skills to several dairy projects including milk, cheese, butter, ice cream and milk powder for Arla Foods and other dairy plants. Examples of reference projects include a wet mixing and a spray tower for Arla Mengniu in China, a plant for liquid milk for Arla UK in Leeds, a dairy plant for Fan Milk in Ghana and master planning for Colun Ltda. in Chile.

About ALECTIA A/S

The companies Birch & Krogboe A/S, Danbrew Ltd. A/S, Watertech A/S and MA Project A/S are now all joined under the name ALECTIA A/S. With several acquisitions and strong growth in the international client portfolio, the changes have been so significant that there has been a need for a new name. The name ALECTIA comprises our wide range of skills, professionalism and values.

The 750 employees in ALECTIA offer consulting services to clients all over the world within construction, the global brewery and dairy industries, the hospital sector, occupational health and safety, the pharmaceutical industry and water and the environment.

nean style white cheese at Bov Dairy in Jutland. The market for white cheese is increasing in all Arla’s European markets, and sales are increasing more than expected. Arla therefore decided to expand their white cheese production by 50%. Arla chose to use ALECTIA Dairy as lead consultant on the project, because ALECTIA Dairy has a specialised knowledge of expansion of dairies.

The big challenge is that the daily operation in the dairy must not be interrupted by the expansion project. This requires particular planning and management of the process down to the last detail. The production at Bov dairy is only shut down two weeks a year. When Bov dairy shut down production in week 7, a public holiday week in Denmark, ALECTIA Dairy had planned all actions meticulously, so every second of the holiday week was used optimally.

Groundbreaking took place in May 2007, and the expansion is expected to be ready by April 2009.
Participating in International Courses

By Hans Skjerning, Principal,

Paul Stein Jensen, Head of Department
Dalum Education Centre, College of Food and Technology

Dalum Education Centre
All courses at Dalum Education Centre are connecting the concept “from soil to table”. We introduced the soil to table philosophy almost 30 years ago, when the dairy college was separated from Dalum Agricultural College. At that time, Dalum Education Centre got its own board and its own principal, and an objective of covering all courses from soil to table.

Today, Dalum Education Centre employs approx. 170 staff members, of which 110 are lecturers with vocational or academic backgrounds. We have approx. 1,100 full time equivalent students and course participants, and each year approx. 4,500 students attend an education or a course. Our buildings cover 38,000 square meters.

Areas of educations
At Dalum Education Centre, we offer the following areas of education:

• Agriculture, horticulture (greenhouse - and landscape gardener), animal keeper and forestry
• Food and catering (chef, waiter, butcher and baker)
• Dairy technology (dairyman and dairy operator)
• Technical gymnasium. (Three-year pre-university study course)
• Academy (Laboratory technologist and Process technologist; specializing in food, dairy or processing), and Service economist (specializing in hotel and restaurant, service management, event and tourism)
• In-service training and courses.

The international aspect
In the dairy training centre, the international aspect has played a major role for many years and is an integrated part of the daily work. Numerous courses and contacts worldwide bring inspiration to the college, but also a demand for flexibility and quality.

Each year Dalum Education Centre arranges a number of tailor-made courses for Danida and international companies. As an example, we have arranged the following courses:

• A 12-week course for participants from Nicaragua. Subject: Dairy technology in general.
• A 2-week course for participants from India: Subject: Milk powder.
• A 1-week course for participants from Japan. Subject: Danish Cheese College.
• A 4-week course for participants from Bangladesh. Subject: Production of drinking milk, UHT products and juice.

Through the years, Dalum Education Centre has participated in a number of international training activities for lecturers teaching dairymen, processing technologists and in-service courses. Lecturers have been stationed at educational institutions abroad for periods of a few days to several weeks.

International cooperation
To keep the teachers up to date, it is very important to give them possibilities to participate in international courses.

The first reason is to learn about new trends in the dairy industry. In this spring, one of the teachers from the dairy section joined into an AEDIL arranged course in Poligny in France together with dairy people from Austria, Germany, USA, Switzerland and Finland. The headlines in the course were “Production of Soft Cheeses, and topics like milk, chemistry and quality, fermentation, practical training in cheese making and packaging of soft cheeses was the most important content.

A similar course with the title “Cheese making by Ultra Filtration” is going to take place at Dalum Education Centre in the autumn 2008. The headlines will be: Filtration technology, Acidification and Syneresis, Starter cultures, practical training and a study tour.

The second reason for participating in international courses is the social aspect. In the evenings and in the time between the lessons the participants will have opportunity to talk more unofficial with each other about the dairy industry in the different countries and in this way to obtain knowledge about more international trends in the dairy industry.
Why risk working with several suppliers, when you can entrust your dairy factory to just one? Niro unites innovation with proven industry experience in dairy processing, including milk, whey, and formulated products.

We bring superior and reliable quality to every part of a successful processing line, from reception and storage over pasteurisation, evaporation, and spray drying, to powder handling, storage, and bag filling systems.

So stay away from unnecessary risks – choose one process supplier.
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**Verified accurate Sitrans F M flow meters**

Keeping up the Standards

**Sustained reliability**

Ole Tind Christensen from the service department of Siemens Denmark tells about his experiences in servicing Arla Foods, AKAFA, in Svenstrup in Denmark.

The cooperation with AKAFA has lasted several years and is described as a so-called ‘white’ service contract where Siemens has taken over all of the responsibility for servicing and maintaining AKAFA’s flowmeters. They have around 60 Sitrans FM Mag 1100F and Mag 3100 installed, 24 of which are part of the ‘white’ service contract. The service contract covers an annual service control, where the accuracy of every single flowmeter is verified. Furthermore, the service contract includes an off-site recalibration of the flowmeter after 6 years, and includes extra service checks, for instance, when there is a difference between the amount of milk metered by the tank truck delivering the milk and the amount metered by the flowmeters in the milk reception.

“I am happy with the close cooperation with the customer,” Ole Tind Christensen explains, “it gives me the possibility to follow our products over time, and I like the idea of Siemens being responsible for ensuring that the accuracy of our flowmeters is maintained.”

Also Arla Foods, AKAFA are happy with the service contract. Christian Andreasen, works manager on AKAFA, says: “Originally, we chose this service contract in order to be sure that the measurement results of our most crucial flowmeters are always precise. The recalibration after 6 years and the annual service check is an

By Maiken Thye Larsen,
Product Manager,
Siemens AG,
Siemens Flow Instruments
A/S Nordborg,
Denmark

With constantly increasing prices on commodities, the dairy industry requires process efficiency and continuous accuracy of their flow meters. Hence long term reliability and sustained quality of measurement values are of paramount importance. In general flow meters are becoming more and more stable and reliable. However, in the case of a malfunction effective and efficient maintenance and service tools are required in order to minimize losses. By sustaining the reliable measurement results through service contracts, costs can be reduced: Downtime on the installed instruments can successfully be reduced, and losses due to inaccurate measurement results can be significantly reduced.

**Service contracts ensure continuous measurement accuracy**

Ole Tind Christensen from Siemens ensures continuous accurate measurement results of installed flow meters through an annual on-site verification.

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NR. 18
option that gives us the needed measurement accuracy. Every year Siemens makes contact to us, so we do not need to remember when it’s time for the service check. The fact that we can just call them if there are any problems is another service, that we have made use of several times.”

On-site verification

The annual service check consists of a verification of the accuracy of the flowmeter. To this end, the well renowned Sitrans F M Verificator is used. The Verificator is a portable measurement device used to verify the performance and accuracy of the flow meter. The verification takes place while the meter is in operation, and thus temporary shut-downs become unnecessary. The test is performed in less than 15 minutes and the customer receives a verification certificate right after the test has been finalized. Furthermore, the Verificator complies with international verification standards: It is designed to ensure long-term stability and accuracy, it is sent for external verification once a year and each Verificator’s history is documented and traceable. With regards to accuracy, the Verificator can determine if a specific flow meter is performing as precisely as

The Sitrans F M MAG 1100F is an electro magnetic flow sensor especially suited for Food and Beverage facilities. With the Sitrans F M MAG 6000 custody transferred transmitter it provides a proven in use solution for dairies all over the world.
Integrating Control Systems
Opens for Better Performance

By Richard Franz, Automation Manager, Tetra Pak Processing North Europe

Cost-saving visibility
The trend is clear: Dairies worldwide require much more integration between their different control systems, as they continuously strive to decrease their production costs. Yet, in addition, there is a need to secure the trace of products in the dairy as well as ensuring optimal production run.

The suppliers of automation and other IT systems are working intensively with integrating diverse information and building bridges between real-time processes (production) and business systems (administrative databases), which among other things handle a company’s purchasing, sales and overarching production planning.

Examples from a number of different installed applications clearly indicate that problems can be avoided, and that visibility provides more opportunities for product development, increased production and cost-effectiveness. Bottlenecks, inefficient machines, rejects and parameter deviations can now be simply made visible via web browser in any office in a plant.

When investing in a new or upgrading an existing automation system, it is important to choose a modular system with tools that allow you to grow and integrate various control systems in the plant. Thus, it is important to build the automation strategy on international standards allowing the various applications in a dairy to communicate with each other.

Traceability
ISA S88 is an international modular standard, which enables strict replication and brings flexibility into communication between modules. Often, a lot of valuable information already lies in different automation systems and food producing machines. In addition, it is possible to access information from existing laboratory systems, logistics modules (from business or independent systems), planning modules (in business systems), identification data (from different identification systems) and link these together as elements of product/batch identity in a database.

In the end, this will give endless possibilities to reveal data in the form of production reports, key figures, tracking reports and information on production conditions to suppliers and customers.

This is what traceability is all about - to collect relevant information and use it to make visible, improved and optimised operational processes in a food processing plant.

New PlantMaster functionalities
Tetra Pak has developed a number of added-value functionality software modules to enhance the performance of its Tetra PlantMaster automation solutions. You can add one or more of the new value functionality modules to the core functionality to tailor your Tetra PlantMaster automation to meet market and regulatory demands.

Tetra Pak has used the Production Execution module to enable strict batch production runs, and to maintain tight control of recipe handling, tracing of production data and to contribute to production planning. The Production Execution module has interfaces to both ERP system and MES systems. It has the possibility to send data in both directions to superior systems. One common issue for batch oriented modules are to receive orders from ERP systems.

The Production Dispatching module has the additional advantage of being able to manually “simulate” the ERP system, enabling the production to continue even if the link to the EPR system is down. It has a built in scheduler and performance monitor, handling data, orders, stamps and identities. Sending production data - like received amount of milk or finished products - is easy to transfer to external databases, so that immediate invoicing can take place.

Since the core of the Tetra PlantMaster bases on S88, reporting and tracing becomes rather straightforward. Production data is collected in a very structural way thus allowing for the generation of all kind of reports, i.e. Production reports, Trace reports and CIP reports. As a natural addition, you can collect data to generate KPI reports for the management.

Enhancing the production even more, concepts like the Production Analysis tools is available. The KPI reports mentioned above is one way to ensure that the right amount of energy is used, or that the usage of the CIP station is optimal.

A modular design
We believe that the key behind all this is the modular design. This allows for adding of functionality as the need arises. Any dairy using Tetra PlantMaster shall feel that new requirements for integration of the different business programs they have can take place when they want it.
WE CAN HELP YOU SEE MORE

Tetra PlantMaster customised automation solutions enable you to see everything that’s invisible in your plant. Like bottlenecks that you can quickly identify and eliminate. Like how to use your plant more efficiently and simplify operation. Like how to minimise unplanned shutdowns, waste and energy consumption. Like how to use state-of-the-art knowledge to achieve profitable production solutions.

And you have full traceability at all times. Use information to avoid quality problems. Quickly identify the source of any problem and rectify it.

Is your plant a bit older? Not to worry. We can enable you to see what’s invisible there too.

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at www.tetrapak.com
– or get in touch directly:
info.processing@tetrapak.com

Tetra Pak, ▲. PROTECTS WHAT’S GOOD and Tetra PlantMaster are trademarks belonging to the Tetra Pak Group.
An increasing number of dairy processing companies separate and process their milk and whey until they end up with the most individually refined and often very valuable components of the milk and whey.

DSS has acquired great knowledge as a part or total supplier of these projects where both customer’s and supplier’s R&D people work closely together, from the time of development of the draft concept until the finished processing plant supplies a homogenous, usable, and saleable product.

Minimizing transportation costs
Despite the implementation of high technology into the process, many manufacturers need to think along traditional lines. The cost of transportation is still a strong motivation for choosing to concentrate the whey. Particularly, the current price increases in fuel make the economical benefits of a 60-75% reduction in the quantities of whey to be transported only too evident.

In areas where infrastructure and/or geography make it difficult to sell the whey for processing purposes, it is still used primarily as animal feed. Whey is a very valuable feed source with well-documented feed qualities. The feed qualities per dry-matter unit for concentrated whey are said to be better than for un-concentrated whey. At the same time, the price per feed unit compared to that of alternative feed types is very competitive. Irrespective of the possibilities of processing at hand, the whey is of value.

Optimizing income
One of the geographically challenged dairies is situated on the bank of one of the beautiful fjords in Rogaland, Norway. In the autumn of 2005, DSS received a call from Morten Svendsen, Dairy Manager at Ryfylkemejeriet in Sand, Norway. The dairy needed some basic information on the possibilities of membrane filtration. A few months later Ryfylkemejeriet had made their preparatory work, and again they contacted DSS.

M. Svendsen: “It became increasingly evident that the costs of transportation of our whey had a negative effect on our bottom line. Clearly, the aim was to optimise our income. Concentration of the whey before transportation was an obvious possibility of reducing our costs. Every day we transported the whey by truck up to 100 km away from the dairy.”

RO plant concentration
DSS suggested a solution including an RO plant that would concentrate all components of the whey before transportation.

M. Svendsen: “We use all components of the dry matter. Nothing is wasted, and we do not end up with a by-product that has to be dealt with or forms a major environmental problem. Our buyers of the whey gain advantages when buying the concentrate; their feed-whey tanks can simply hold more feed units this way, and therefore, they are willing to pay more for the concentrate.”

DSS is extremely flexible when it comes to working with local companies on the tasks of mounting the plants on site in order to achieve the best and most frictionless solution for the customer.

M. Svendsen: “We had a good dialogue with DSS concerning the technological aspects, and we were made aware of critical elements in the pre-
treatment. This sparring was very valuable to us in more than one way; in fact, it led to reduced costs of investment in equipment for pre-treatment. Further, we wished to use an external supplier for mounting the piping and pre-treatment equipment. We experienced the frictionless cooperation between the suppliers involved.”

“Everything considered it has been a great success for us. The savings in transportation and the increased income on the whey alone have contributed a margin of approx. 134,000 Euro the first year. This means that we get a payback time of less than 2 years on this plant.”

**Environmental advantage**

Apart from the profit gained, there is also the environmental advantage of concentrating the whey prior to transportation. The total environmental strain with Ryfylkemejeriet has also been reduced.

It is estimated that a truck emits 80 kg of CO2 per 100 km. Prior to the investment in the RO plant at Ryfylkemejeriet the quadruple amount of whey was transported on the roads, i.e. on transportation alone the CO2 emission was reduced by 75%. With more focus on CO2 emission, DSS still works intensively on reducing the energy consumption in our plants. A certain consumption of energy cannot be avoided, of course, but the total amount of CO2 from Ryfylkemejeriet today is approx. 35% below the level prior to the investment.

**DSS Silkeborg**

DSS Silkeborg is a world-leading supplier of membrane filtration technology for the dairy industry. With a turnover now exceeding EUR 20 millions and a staff of 40, the company has grown at a steady and controlled pace.

DSS has a clear strategy and focuses on one single technology for one industry. We are the market leader in maximising the use of all parts of the milk and have an in-depth knowledge of our customers’ products and processes. Our staff has extensive experience in dairy technology and is able to give advice about how the individual stages in the production process can influence product quality, yield, environmental impact, etc.
Visitors in 2006
The success of the event in 2006 has further strengthened Anuga FoodTec’s leading international role in food and drink technology. In 2006, approximately 39,000 visitors from 151 countries, a 13 per cent increase on the previous event, attended the trade fair. The proportion of visitors from abroad also rose slightly, up by two per cent to 55 per cent. The trade visitors’ decision-making responsibility was again especially high, as most of the attendees were managers or decision-makers from technical fields. Over 80 per cent of the trade visitors described themselves as the decision-makers or co-decision-makers with regard to procurement.

Exhibitors in 2006
In 2006, Anuga FoodTec once again showed slight growth in the number of exhibitors. A total of 1,172 suppliers from 43 countries participated on an expanded area measuring 113,000 m². The range of products and services was complemented by the specialist supporting programme, which focused on current issues important to the food and beverage processing sector such as robotics, dairy technology and ultramodern extruder technology.
Consumers are ready for more

But are you ready with the right packaging solutions?

Yes, consumers love milk. They always have! They love it with their tea & coffee, on their cereals, and to drink it with delicious flavours, or as it is.

But now consumers are ready for more — more natural taste, more convenience, and more environmental concern.

So when you choose your packaging partner, think like your consumers and choose a packaging solution with optimal light protection avoiding treatments that impair milk’s original fresh taste. Elopak’s innovative paper-based packaging solutions, now in more shapes and sizes and with more closure options.

Elopak – Offering You More Premium Possibilities!
VM Tarm is a family owned Danish company specialized in designing and building complete tankers tailored for the customers’ individual needs. For more than 30 years we have been among the leaders in constructing milk tankers to the dairy industry in Northern Europe. Now we are looking to the East.

**Tailored milk tankers**

Except from the truck-cab, we design and construct total transportation solutions to the customers need. The company’s owner, diploma engineer Knud Lauritsen is our expert within the milk tanker business, and he is in face-to-face contact with our dairy customers. The first meeting often takes place at the new customer's premises. Questions are answered and notes taken. Back home at the factory, specifications of the milk tanker are listed and drawn in 3D. This solution is then discussed between VM Tarm and our customer before final agreement.

The milk tank is made of high quality non-corrosive stainless steel, and constructed in the specific volume and divided into more than one room - if so wished. The shape of the tank is typically circular or elliptical/heart formed for optimum stability during transportation. Rooms and manholes are constructed for optimized CIP-cleaning. The stainless steel chassis frame is dimensioned and built to carry the specific tank. The chassis can be constructed with e.g. BPW or SAF mechanical or self-steering axles, and disc or drum brakes. Regarding the chassis we furthermore help our customers to minimize their costs, thus the chassis frames are made of stainless steel, and this means: Long lasting, easy cleaning and low (if any) maintenance costs.

At VM Tarm we have designed our own prototype of milk metering equipment. The equipment is robust and cleanable and is typically placed in a stainless steel rear-mounted cabinet enclosing pump with customer-defined capacities for litres/min., sanitary pipe and valve arrangement, flow meter or weighing equipment.

When we have finished the milk tanker, we invite the customer to come and inspect the solution. Moreover, we now accomplish the final adjustments of the tanker and the truck-cab connection - if needed!

**Environmental focus**

We offer different tank solutions within the milk and dairy sector such as rigid milk tankers and drag trailers, or solutions including both tanker and trailer for a more flexible milk collection and transportation. Furthermore,
we construct larger milk semi-trailers for inter-dairy transportation. VM Tarm also offers refurbish and repair of tankers as well as service.

Milk tankers more than 10 to 15 years old have been in operation on the roads for decades in the Nordic countries, as VM Tarm construct the tankers suitable for rough road conditions even in the Northern parts of Norway and in Iceland.

During the years, we have also focused on lighter weight design on the tankers to enable maximum payload. However, we never compromise on the high quality of the stainless steel or finish on our tankers. Remind you, high quality last longer.

Looking to the East
As the modern consumers increase demands on sustainable farm and food production, and also care about the food carbon footprint, they force the producers to focus on environmental awareness.

One of the parameters of the environmental issue is to strengthen local food production, including various regions in e.g. Europe. At VM Tarm we are ready to meet the challenges and offer our tanker solutions to new markets in the Baltic and Eastern European countries.

A look inside VM Tarm’s cabinet for milk tanker equipment: Pump, sanitary pipe and valve arrangement, flow meter/weighing equipment, air separator, and enclosed printer for farmers receipt. Hygienically built for easy cleaning.

Sensitive and “dirty” parts such as electrical- and hydraulically installations are not directly in contact with the milk area.

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Scan-Vibro is an expert and global partner within vibration technology. Customer designed sifters, conveyors, feeders and elevators are build and in operation at many dairies, milk powder plants and other food industries all over the world.

Ever since Scan-Vibro started producing high sanitary sifters for the dairy industry, the design of the sifters has been object to ongoing technical developments.

Re-designed sifters

New demands and regulations regarding the maximum loads, operators are allowed to handle have made it necessary to reduce the size (and weight) of the top hatches and instead increase the number of top hatches on the newly re-designed high sanitary sifters type SRS.

The re-designed version of these sifters, which have been on the market for approx. 1½ years, has caused a considerable number of enquiries - and orders - for upgrading of existing sifters with an old design.

In consequence of this Scan-Vibro has developed an upgrading kit, which can be mounted quite easily on older sifters. However, in some cases it might be necessary to make some minor modifications to the sifter body to enable the mounting of the upgrade kit.

The kit consists of a frame with 1 or 2 hatches (depending on the size of the sifter). The frame is to be either bolted or welded to the existing sifter - the design of the actual sifter determines which solution is chosen. The hatches are hinged and supplied with gas struts to keep them in open position, and they are very easy to open and close without use of any tool. When closed the hatches are secured by quick clamps.

It is not just the hatches that have been re-designed on the sifters type SRS: All sifters are now all welded externally, which means the design of the sifter is more or less the same no matter if the sifter is manufactured according to Scan-Vibro standard Grade 1, 2, 3 or NZCP 6 or USDA 3A. The finish of the internal surface varies from RA=1.3 µm to RA=0.2 µm, depending on which of the above standards is chosen.

The sifters are as standard manufactured of S.S. AISI 304, but can also be manufactured of S.S. AISI 316, or a mixture of both, e.g. product-contact surfaces of AISI 316 and the rest of AISI 304.

Capacities

With a few modifications to the design, the sifter can be made to stand a shock overpressure up to 0.3 bar, some sizes of sifters even up to 0.6 bar. The standard sizes of Scan-Vibro sifter range from 0.5 m² to 8 m² (screen area) with a single or two screen decks with mesh sizes 100 µ and 15 mm.

The screen deck can be equipped with a cleaning system, which ensures that the screen mesh stays open during operation, and even with this cleaning system the sifter remains CIP-able.

Change of screen mesh is not a big issue with a Scan-Vibro sifter, as it only takes a few minutes to dismount and remount the screen mesh, and it can be done without use of any tool.

Please visit www.scan-vibro.com for further information.
Dairy products mean healthy business

Health and Wellness is the strongest trend in the food industry today – and nowhere is it stronger than in dairy. From low fat to probiotics to heart health, the healthy dairy products lead the way. Consumers recognize yoghurt, milk drinks and cheese as safe and natural products, and they are hungry for more.

Chr. Hansen is the world’s leading supplier of healthy ingredients for the dairy industry. We believe that a close partnership with our customers is the natural forum for creating new and innovative solutions. Let’s meet, discuss recipes and inspire each other on how to create tasty, healthy and safe dairy products for today’s and tomorrow’s consumers.
GEA Liquid Processing Scandinavia A/S (GLPS) is well-known for the supply of complete process lines to the dairy industry. Over the years, GLPS has also gained great insight and experience with the rebuilding and extension of existing processing plants from a large number of successful rebuilding projects.

In 2005 Arla Foods Sweden was planning a radical structural change involving, among other things, the transfer of production volume from a number of small dairies to a few, big market milk dairies in Sweden, including Arla Foods’ dairy in Jönköping. As an experienced executer of rebuilding projects, GLPS was also asked to quote for the forthcoming rebuilding of Jönköping Dairy.

Thorough preparatory work
From the start of the project Arla Foods Sweden made the requirements to be met by the supplier absolutely clear: Full functional and capacity responsibility, full responsibility for the observance of the agreed time schedule, and a relatively long quotation phase involving a considerable number of working meetings in which the project would be successively adjusted up to the time of conclusion of the contract.

The conditions were difficult, but far from unknown to GLPS who took up the challenge and established a homogeneous project group with a 100% dedicated project manager and responsible project engineers from Day 1 on both the mechanical/process-technical side and on the electric/automation side.

Based on a feasibility study prepared by the client, GLPS forwarded its first quotation to Arla Foods in October 2004. A considerable number of clarification and coordination meetings were to be held before the final concept was in place and Arla was ready to entrust GLPS with the responsibility for the execution of the project in the early summer of 2005. However, the thorough preparatory work carried out in the initial phase turned out to be returned tenfold later on, in the form of meticulous process- and automation solutions - often with GLPS’ distinct fingerprint, detailed planning of all phases of the project and a clear common understanding of the project’s goal.

Optimum coordination
In order to ensure the required criss-cross coordination - with the client, sub-suppliers and all other parties involved at the dairy - intense meetings continued throughout the entire project. In total 39 ordinary project meetings were held with the participation of both the client and key-suppliers to the project - most of them in GLPS’ project office with full office-, meeting- and IT setup established on the site in Jönköping.

Since the rebuilding project included many sub-phases, the project also involved a large number of commissioning sessions - in total approx. 20 sessions, which were all carried out successfully within the ordi-
nary weekend standstill period of max. 24 hours without any disturbing impact on the operation of the dairy.

**Full flexibility**

Full flexibility was one of the main demands made on the rebuilt production plant, calling for not only an extension, but also a drastic change of all parts of the production plant and of its control system.

Today, each individual part in the rebuilt production plant can be completely flexibly connected based on GEA’s unique valve concept, allowing for optimum utilization of the equipment and quick shift from one product to another.

However, flexibility was also the key to the successful execution of the project. In the course of the project period the main time schedule was adapted 26 times, and about 50 supplementary orders/project changes were discussed in order to meet new requests from Arla Foods to match the given market situation.

In spite of the ongoing adjustments, a total overview and agreement on the scope of the project was maintained throughout the entire project. Prior to the start of the rebuilding work, all existing plant documentation available at Arla Foods was imported into GLPS’ Bentley CAE system. Thanks to the system, GLPS’ project group kept complete control of all new components and all successively removed/relocated/replaced components. To such an extent, that Jönköping Dairy has subsequently purchased a Bentley CAE system for its own future maintenance of the project documentation.

**Sweden as home market**

GLPS continually executes projects in Sweden and is today as much at home in Sweden as in Denmark. GLPS has established a close working relationship with many Swedish sub-suppliers and has its own staff living in Sweden.

GLPS has used several Swedish sub-suppliers for the rebuilding work at Jönköping Dairy, among them ÅF Benima who was entrusted with the entire automation supply, and Systemsvets who carried out all installation work. Commissioning was performed by both Swedish and Danish commissioning engineers.

**Customer and partner**

Rebuilding tasks are always a huge challenge due to many unpredictable factors and the demand for the continued operation of the production plant during the rebuilding period. A close and trustful working relationship with the client is absolute vital for success.

At Arla Foods’ dairy in Jönköping this process proceeded optimally, and GLPS’ project manager Michael Sørensen says with satisfaction: “There was this fundamental attitude from both the client's and the supplier's side that we were to work together like a team and not work against each other - to obtain a good result and to reach the goal on time”. And Arla Foods’ project manager Ola Allvin adds: "Rebuilding a dairy in operation is like carrying out a heart operation on a running marathoner. It is only possible with a small, compact team in which there is no doubt about who is doing what”.

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"Rebuilding a dairy in operation is like carrying out a heart operation on a running marathoner"

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**Key Figures of the Project**

GLPS’ extension and rebuilding of Arla Foods’ dairy in Jönköping involved, among other things:

- Installation of over 1,100 new GEA product valves and instruments
- Removal of over 500 valves, instruments or agitators/pumps with related programs
- Rebuilding of existing product tanks
- Replacement of existing product tanks
- Connection and integration of 22 filling machines from various suppliers
- New raw milk silo tanks
- Extension of 2 CIP plants by bigger tanks and new CIP lines

**Most Important Sub-suppliers**

Control System:
- ÅF Benima, Kalmar, Sweden
- KB EL-Teknik, Ry, Denmark

Mechanical Installation:
- Systemsvets, Norrköping, Sweden
- Tankki OY, Ahtari, Finland

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"Rebuilding a dairy in operation is like carrying out a heart operation on a running marathoner"
Cost Reducing and Energy-Saving Processing Lines

By Henrik Haraldsted, Team leader R&D and Pernille Gerstenberg Kirkeby, Manager of Technology and Marketing, Gerstenberg Schröder A/S

Process expertise
Gerstenberg Schröder A/S (GS) develop, manufacture and install modern, high-efficient and reliable processing lines for the food industry, especially for the production of crys-tallised fat products like margarine, butter, spreads and shortenings. GS also deliver process lines for emulsi-fied food products such as mayonnaise, sauces and dressings. We have been in business for more than 100 years and have installations in more than 120 countries around the world.

Naturally, GS employees travel all over the world to meet customers and potential customers, but we also participate in international expositions and conferences worldwide. The Interpack 2008 in Düsseldorf, Germany, was the latest show where we were exhibiting with a 100 m² stand showing the latest development within SSHEs, Nexus and Kombinator X250.

The main focus of GS is to be the preferred partner when the food industry demands scraped surface heat exchangers (SSHEs) for the manufacturing of food products, e.g. for the crystallisation process of margarine or for starch cooking of mayonnaise. The SSHEs manufactured by GS are known in the market under the names Consistator®, Kombinator and Perfector.

Process knowledge and process expertise exist in all departments in GS, even in the top management. By spreading expertise throughout the organisation concerning the business of GS customers, every enquiry will be met with an understanding of the customers’ business, needs and challenges. The process knowledge, the understanding for the needs of the food industry and the technical expertise are the major drives of the development work in GS.

Next generation of processing equipment
Increasing energy and raw material prices, increasing demand to the ef-ficiency of the machinery as well as intense competition among the food companies are challenges which in-
dustry is experiencing today. Therefore, the production is optimised, costs are reduced - the senses of the companies are sharpened. During recent years, most companies have started projects like LEAN to assist this efficiency process. The GS engineers have designed Nexus to meet these challenges of today and the ones of tomorrow.

Nexus means connection, link or tie, which is the reason why GS have chosen this name. During the development of Nexus, the GS engineers have monitored the requirements from the industry and have designed a compact SSHE which includes all the excellent features of the Kombinator and the Perfector. Thus, Nexus links the past to the future. Optimisation of process equipment, lowering environmental impact, and reducing energy consumption while keeping...
high product quality, have been the key words for the development of Nexus. Nexus is the next generation of high pressure scraped surface heat exchangers, a milestone within the industry.

Nexus can most of all be described as a machine with an evolutionary design and a revolutionary functionality. Low energy consumption, easy service and hygienic design have been in focus when designing Nexus. The patented scraper blade system has compared to traditional systems been optimised to secure efficient scraping off in addition to applying minimum wear on the chilling tube.

**Safe choice of refrigerant**

SSHEs have predominantly used cooling media such as various Freon types or Ammonia (NH3), and the use of these are from a health and environmental perspective not optimal even though the refrigerants are kept in closed and pressurised systems. The environmental issues and increasing legal restrictions especially for Freon have revived the use of CO2 as refrigerant. In addition, some food companies are reluctant to have NH3 in the production areas where foods are being produced.

The forecast for refrigerants in the future is generally a jungle of restrictions, legal requirements and high prices which is why GS have worked on developing SSHE using another efficient cooling medium. GS have at an early stage seen the numerous advantages that CO2 offers as refrigerant. The choice of CO2 as refrigerant for the Nexus is considered as an advantage economically, environmentally and legally. Refrigerant experts within the line consider CO2 as a clear winner of the near and distant future since CO2, just like NH3, is a natural refrigerant which under pressure is a very effective cooling medium. CO2, however, is considered as a cooling medium to be 20% more efficient compared to NH3.

**Flexibility**

Nexus can produce crystallised fat products like margarine, spreads and shortening at low cost but of high quality. GS customers all over the world cover multinational companies as well as smaller specialized manufactures and naturally, the requirements to the processing equipment differ. Some manufacturers see an increasing need of being able to vary the range of products. On the basis of considerably differentiated production wishes and conditions, Nexus has been designed to provide for and to permit changes, upgrading or simplifications. The Nexus user will experience a compact and flexible machine where choice of product and configuration is numerous.

GS have joined customers and manufacturers under a common roof with a common goal and created Nexus. Why not choose the most optimal and favourable solution for your production? Nexus offers flexibility and economical benefit many years to come. For detailed information, please contact Gerstenberg Schröder at www.gs-as.com.
Recently, the food industry has witnessed drastically rising prices. In addition to the ordinary trend of wages and salaries plus energy prices that hit the roof, a number of raw products such as raw milk, stabilizers and other ingredients have shown upward movements. Several industrial fruits and berries show the same movements. Take for example the price of strawberries, which today is at a price level unheard of since 2003, when the harvest of strawberries failed in several of the major producing countries. Poor growth conditions and lack of manpower to harvest the strawberries has resulted in a limited supply and thus higher prices.

**Demand for reduced costs**

The rising fruit prices have lead to an increasing demand from Dairy Fruit’s customers to optimize our recipes with the aim of maintaining the price level. Of course without having to compromise the taste. It is Dairy Fruit’s assessment that in certain cases, fruits are opted out or reduced in the development of new products, simply because of high raw product prices. Other considerations in terms of reducing costs may be transition to cheaper stabilizers, reduced or no use of aroma. However, this may prove to be a difficult if not impossible task, as the taste is strongly related with quantity, quality and contents of fruit and other ingredients.

**Optimizing**

The natural consequence of a general wish to reduce costs for ingredients will be to optimize individual processes. Since 2004, Dairy Fruit has sold aseptic liquid spice mixes in steel containers for use in different dairy products. It is a great alternative to dried spices, but not only in terms of taste, although Dairy Fruit’s spices mixes does allow: 1) a more efficient working process, as it is less labour-intensive compared to dried spices, 2) reduced spillage, 3) optimizing of storage, 4) reduced risk of incorrect mix as the number of additives is reduced, 5) simple alteration of recipe if required.

**New technologies**

Parallel with optimization of working processes at Dairy Fruit with the aim of streamlining our production, we are also introducing new technologies. As such, Dairy Fruit applies a technology that allows us to add ingredients such as colour and aroma “down stream” in the process of working up the fruit. This process allows us to optimize the use of colour and aroma as the gentle treatment preserves both taste and colour. In addition, Dairy Fruit delivers UHT products suitable for “down stream” addition at dairies during processing of products like milk drinks or dessert products.

**About Dairy Fruit**

Dairy Fruit is a state-of-the-art facility with 80 employees, who for more than 30 years have produced aseptic fruit mixes for the North European market. More than 50% of our products are exported. Since 2004, Dairy Fruit has produced aseptic liquid spice mixes as additives for dairy products.

At Dairy Fruit, the development of new ideas and products has our full attention. Over the last 3-4 years, Dairy Fruit has introduced more than 100 new products every year. Our attention to product development is an important part of our business, which we gladly share with our customers. Dairy Fruit wants to be the natural choice of the customers, who look for a supplier of fruit mixes for the dairy, ice cream, confectionary and dessert industries. Visit www.dairy-fruit.com for more information.
Going in the right direction isn’t enough. If you don’t go fast enough, you’ll inevitably be overtaken. That’s the strenuous challenge all businesses have to live with. Therefore it’s important that your R&D department always has the best testing facilities available.

At GS we have fully equipped pilot plants. They are available for you to do test runs at a reasonable cost. Alternatively, you can purchase a system for installation in-house. Whatever you choose, our highly qualified staff will assist you – regardless your project. So when it comes to pilot projects there’s only one question – your place or ours?

The consumer expects the same high quality in taste and consistency. Over and over.
Healthy cereals

A/S Crispy Food International is located in Goerlev at Zealand and is specialized in developing healthy and tasty cereal based products. These products are mainly sold to the industry- and retail markets in Europe and Asia. The design and development takes place in close collaboration with the customers.

Crispy Food offers products in different kinds of packaging, such as:

• Top Cups, i.e. plastic cups filled with muesli where a spoon can be included, for the dairy- and dessert industry.
• Bags and Pure Pak boxes for the retail market.
• Larger bags and big bags for the dairies (preferring the “Twin Pot-system”) - and the bakery industry.

Dairies

Crispy Food has become the obvious partner for dairies in their pursuit of transforming bulk products into more valuable product concepts.

The demand for convenience foods to eat “on the go” or “between meals” seems never to stop accelerating, and Crispy Food designs complementary solutions both in the Top Cup concept as well as for the Twin Pot concept, enabling dairies to develop their answer to how a clever convenience product should look like.

In both concepts the product may vary from dry, healthy cereals based fillings, over more candy like products to spicy powders for sour creams or even fluid fillings, as long as it is truly innovative and complementary to the existing substance.

Case story

In 2005 Arla Foods informed Crispy Food about a project where they wished to combine a fresh, tasty sauce concentrate with a cooking cream, which should make it easier for the consumer to prepare a tasty and delicious sauce for meat- and fish dishes. The solution should be contained in a pot with at Top Cup added. Both packaging parts were to be developed in a new unique design in order to stand out on the store shelve. Greiner Austria came up with a nice dome-shaped solution.

For Crispy Food it was a challenge to install a filling line for fluid fillings in an environment, where dust is not fully avoidable, and where a risk for cross contamination from one area to another cannot be ruled out.

The risk assessment of the whole concept made it obvious, that the filling of the pasteurized sauce compound, supplied in stainless steel containers, should take place in a separate room, specially designed for such an operation.

A room in-house was selected as “high hygiene room” and equipped with:

• A new filling machine Mk 2 installed by Primodan, covered by a laminar air flow (LAF) unit to flush the equipment and filling point with sterile air.
• Positive pressure in the filling room to avoid cross contamination from the surrounding production area.
A/S Crispy Food International

- A particle counter in order to validate the LAF-unit on a daily basis.
- A number of special cleaning utensils, disinfectants and heat-treatment equipment for machine parts.
- Operators who where selected among our staff and intensively trained in special hygiene instructions.

Arla Foods Cooking Division developed the sauce compounds themselves in cooperation with Dairy Fruit in Denmark and Frutarom in Germany.

According to the HACCP-study, a number of “hurdles” had to be built into the sauce compounds and the production facilities in order to achieve the desired shelf life: Salt level between 5-6%, pH-value below 4.5, addition of potassium sorbate as a preservative, cold storage, and high hygiene during filling.

An intensive shelf life test programme was performed before the products were ready to market.

A shelf life up to 75 days for the Top Cups containing the sauce compound was then achieved without compromising food safety and still fulfilling Arla’s demand for remaining shelf life at the dairy in order to have sufficient time for storing, manufacturing and distribution.

**The products**

The finished sales unit - consisting of the pot with cooking cream fitted with the sauce concentrate on top - carry a shelf life of 28 days.

After careful market testing of several flavours, the following compounds where chosen initially:

- “Skagen panna” meant for fish and shellfish dishes.
- “Pepparots panna” meant for white meat and chicken dishes.
- “Skogssvamp panna” meant for beef and pork dishes.

All recipes were made to be used either as they come or to be further refined by the “cook” at home.

This totally new product line was successfully launched on the Swedish market as scheduled in the autumn 2006. The launch was supported by i.e. TV commercials, Internet-blogs and intense presentations in major supermarkets. In the spring 2007, the concept was presented for the Danish consumers as well.

For Crispy Food it has been a great challenge to establish the fluid-filling-line in our current filling set-up. The future will show, and we are convinced, that the market for such novelties will grow and make Crispy Food an even more valuable partner for the dairy industry.

**Products available in**

- Top Cups, i.e. plastic cups filled with muesli where a spoon can be included, for the dairy- and dessert industry.
- Bags and Pure Pak Boxes for the retail market as well as larger bags and big bags for the dairies and the bakery industry.

This very new product line consisting of pots with cooking cream fitted with three different sauce concentrates on the top.

A/S Crispy Food International
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Introduction

Whey proteins, once described as a by-product of cheese-making, are now becoming increasingly popular in their ability to improve health whilst also being highly functional ingredients in dairy and food formulations. The benefits of consuming whey proteins are nothing new but now the science to support them is finally becoming available, as is the technology to isolate and purify the most functional and bio-available components of the milk.

Although Ultrafiltration has been used to separate out whey proteins from lactose for over 30 years, salts and water used in the production of higher protein concentrates and isolates in Microfiltration processes - such as APV ProFrac™ Process - are becoming of increasing interest to dairy processors as this means the range of whey proteins ingredients available on the market is wider.

Cost effective and advanced whey protein separations

ProFrac™ is one of APV’s most advanced membrane processes based on Microfiltration, for selectively removing whey protein from milk prior to cheese-making. This accomplished through sharp separations between the casein and whey proteins.

Depending upon the customers’ specific process needs and their business direction for their end products, the amount of whey proteins to be removed can vary from 45% to 75%. In terms of cheese-making, this translates from a casein standardisation step to a casein full concentration step. The benefit for a cheese manufacturing customer is significant growth in cheese yield and, the production of a higher - value stream of pure whey proteins. Current pay-backs are typically less than 24 months. A long term additional benefit of APV ProFrac™, as foreseen by our customers, is that extracted whey proteins are and stay native throughout the process. Several dairy research centres worldwide are indeed exploring the properties of native proteins and initial research shows these may offer improved solubility and heat stability. Further research is looking at whether isolating these proteins in their native state will minimize potential changes in their bio-actives properties.

Historically, ProFrac™ first generation APV Microfiltration for Fractionation entered the dairy industry 10 years ago via a number of innovative pioneer customers. However, it is only until recently real enthusiasm from dairy processors has started to build as the major roadblock to short returns on investment has been removed. The availability of more cost effective membrane configurations and materials, for example organic spiral membranes, has indeed made the technology much more affordable nowadays.

Boosting further the whey proteins concentrates functionality

In addition to ProFrac™ and to meet the rising demand from consumers for low fat, highly functional foods, APV has recently launched one of its most successful separation technologies ever.

The APV LeanCream™ process is based on the APV Shear Agglomerator (ASA), which is a groundbreaking technology associating simultaneous heat denaturation of the protein and the formation of micro particles of protein under controlled high shear. The synergy between heat and shear brings a new functional dimension to whey protein concentrates. The resulting product is a homogenous whitish solution of micro particles of whey proteins, with a very stable structure and a very sharp size distribution. It has the viscosity of coffee cream when produced from sweet whey and the mouth feeling of buttermilk when produced from acid whey. This product - named LeanCream™ after its process of preparation...
APV LeanCream™
– better flavour, less fat, higher earnings

APV LeanCream™ is a groundbreaking microparticulation process that gives you total control over whey protein particle size distribution.

APV’s new Shear Agglomerator (ASA) is designed to provide operating parameters for optimum particle quality and control.

APV LeanCream™ gives you:
• High, protein-based nutritional value
• Full flavour and mouth feel
• Bigger yield – reduced raw material costs
• Rapid pay-back and big ROI

Find out more at www.apv.com

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Conclusion
“The more we understand about taking milk apart and putting it back together again, the better prepared we will be to deliver solutions .. for specific consumer needs in any market segments of the world” says Dr. Phillip Tong, Director of the Dairy Products Technology Centre at California Polytechnic State University.

“With this new separation technology, whey protein manufacturers are sitting on a gold mine because they can now expand into new markets previously dominated by other food proteins.”

APV, considered to be a highly innovative technology supplier, has a commitment to help customers by offering the right combination of products, engineering, and system technologies, to embrace the ever changing dairy industry that has always been more consumer driven.

Value added milk ingredients are perfectly positioned to be star players in the beverages of the future, and this is just the beginning of the opportunities for our customers. With the right combination of innovative separation technologies, the future of whey protein is infinite.

For more information on APV separation technologies, please visit us at www.apv.com.
Possible sources of ignition
All flexible connections may create static electricity and thus a potential risk. The risk of sparks with sufficient energy for ignition is normally only likely to occur in connection with flexible connections that are longer than the diameter of the connection it is used for. Hot surfaces are also a risk. A hot surface is defined as product contact surfaces with temperatures above the ignition temperature of the products. For skim milk powder the ignition temperature is 400-460 °C.

It is well-known that milk powder may ignite spontaneously. Tests have shown that skim milk powder deposits of a thickness of 60 mm influenced by a temperature of 90 °C may ignite spontaneously after approx. 20 hours. Time is reduced at higher temperature and thicker layer. This is the most common ignition source of fires in spray drying plants.

A fire in the plant is the most common ignition source for an explosion. Welding, grinding or other heat generating work carried out directly on the plant or around the plant is a potential ignition source, specially when carried out during production.

Warning, prevention, protection
It is important to have sufficient warnings to prevent ignition of fire and explosion, as it must be possible to hear and clearly see all alarms. Alarms must always be taken seri-
ously. In a spray dryer, warnings could be temperature controls on main inlet and outlet temperatures with alarms and temperature controls on inlet air temperatures for internal and external fluid beds.

Frequent inspection of deposits in drying chamber, cyclones, bag filters and fluid beds are necessary. Frequent samples of powder can show if burnt particles are present in the powder produced. If burnt particles are found, the plant shall be shut down and inspected. When the reason for the burnt particles is found the production can be continued.

If the powder starts smouldering inside a drying plant, it is important that this is detected as soon as possible. Quick detection may prevent a fire and make a fast extinguishing possible. Lately detection of smouldering milk powder has been made available by measuring the difference of carbon monoxide concentration in the inlet air and the exhaust air.

Written instructions for operators concerning fire prevention must be available, including instructions of how to act in case of fire. Training in fire prevention and fire-extinguishing must be arranged regularly. If possible, one operator must always be present in the control room, and at least the operator must be within reach in case of emergency. A telephone must be available in the control room, so that information can be given to the relevant persons about an incident in progress.

Correct instructions must be available concerning the conditions, under which the personnel or assistance by persons employed by a third party must carry out maintenance or repair.

Modern spray drying plants used in the dairy sector can be protected against pressure increases caused by a dust explosion by means of pressure relief openings (covers or bursting discs). A fire or an explosion in the drying chamber may lead to another explosion outside the drying plant.

In order to prevent a fire or secondary explosions inside the building, the relief openings from the tower must lead to the atmosphere.

Personnel should not be present during normal operation in an area, where a flame may be expected in case of an explosion.

If you have further questions to above, please contact gej@niro.dk or other contacts at Niro. Why not use the knowledge that Niro has collected over the lifetime of 75 years?

GEA Niro

Niro is a world leader in industrial drying, with spray drying, spray cooling, flash drying, freeze drying, granulation and fluid bed processing as core technologies.

Plants are supplied to the dairy, food, coffee, chemical and pharmaceutical industries.

The Niro companies are part of the Process Engineering Division of the GEA Group.
Co-operation Resulted in Impressive Capacity Increase

By Jens Ole Jensen, Division Manager, ITW NOVADAN ApS

Close co-operation between Novadan, a Danish manufacturer of cleaning agents and disinfectants, and Sædager Dairy, a large Danish dairy, has lead to considerable capacity increase.

Short facts about Novadan
Established: 1980
Facility: 39,000 m²
Employees: 116
Production: 23,000 tons/year
Supplier for: Food processing industries

Introduction
Novadan is an innovative production and service company established in 1980. The company manufactures an exhaustive range of high-quality cleaning agents and disinfectants and is a leading player on the Danish cleaning market.

The company manufactures approx. 23,000 tons of cleaning agents and disinfectants every year, but Novadan does not only supply the right agents - the company considers it equally important to co-operate with their customers in a constant search for possible optimizations that may lead to increased productivity or savings.

The project
Manager Niels Elkjær of Sædager Dairy, Denmark, is one of the satisfied customers who have benefited from a fruitful co-operation with Novadan. Together they have succeeded in increasing the flow of the CIP procedure at the dairy’s GEA UF unit by impressive 30%.

The objective of the continuous dialogue between the dairy and Novadan is to create optimum conditions that will ensure the highest level of hygiene. The latest technology regarding high temperature filters delivered from DSS has also contributed to the success and combined with the know-how and the experience of Novadan, the good result was hardly a surprise to the persons involved.

By adding a booster to the cleaning agent, the dairy has achieved a considerably better production flow. The new solution is slightly more expensive, but the 30% flow increase abundantly compensates for this extra cost. As a result, the dairy is now able to process a significantly larger amount of milk per hour.

The new agent/booster solution has been applied since the beginning of February this year, and there is no doubt that it constitutes a major optimization for Sædager Dairy, and Manager Niels Elkjær is exceptionally pleased with the effective consultancy and back-up he has received from Novadan.

A task-focused attitude regardless of the size of the task, constant search for optimizations and cost reductions without compromising with regard to environmental requirement or quality are characteristic features of the approach of Novadan to the company’s co-operation with their customers.

Novadan is experiencing increasing growth in Denmark and on our export markets because of our forward-looking and environmentally conscious product development, our consistent service quality and our never failing credibility.
The Hygiene Solutions Preferred by Food Industries

Whether CIP or open plant cleaning is the issue - immaculate standards of hygiene are of vital importance to your production capability. Our comprehensive range of highly effective cleaning agents and disinfectants are developed at our own laboratory and designed to offer you the right solutions to improve your business. We continuously monitor your cleaning process and guarantee the highest levels of hygiene – that is our contribution to food safety.
High Quality Mixing for Low-Cost Products

By Per Kollerup Jensen, Regional Sales Manager, Scanima A/S

New complex ingredients

The increasing demand for low-cost products in today’s convenience food markets emphasizes the need for modern low-cost production. The days in which manufacturers sourced raw materials only from a limited group of trusted suppliers are over. Due to the highly competitive market today, they are forced to look for less expensive raw materials. At the same time, legislation has changed, regulation has become stricter and the general quality awareness has increased. The combination of these factors forces the manufacturers of modern convenience foods to look for replacements for traditional ingredients and has resulted in the introduction of new complex ingredients.

The special functional role of the new complex ingredients in the manufacture of high quality food and beverage products requires the latest mixing innovations. The increasingly widespread use of these ingredients in meeting demands for cost-effective manufacturing is the key driver behind the growing popularity of the Scanima mixing technology.

Process-enhancing techniques such as vacuum mixing with dry ingredient introduction and precise temperature control, are now widely recognized as essentials. Some reactions during the mixing cycle are becoming more complex. To gain a competitive advantage, the food producing industry today needs a mixing and control system that provides more versatility and greater control over the mixing process.

The key to all this is technology and experience - bringing together new developments in mixing technology and applying them creatively.

By following the trend in the market and combining new technologies in mixing and process control, Scanima can:

- Make new products possible
- Reduce the equipment (and the capital) necessary to mix the product
- Optimize the mixing process thus lowering operation costs
- Produce a superior end-product
- Shorten the processing time.

Manufacturers of modern convenience foods are forced to look for replacements for traditional ingredients. This has often resulted in the introduction of new complex ingredients. (Photo by Colourbox).
Scanima mixing solutions

For 25 years, Scanima A/S has manufactured efficient mixing solutions for industrial customers all over the world. Scanima has advanced the technology of mixing to become an “all-in-one process”, a factory within the factory.

The “all-in-one process” provides great flexibility and allows the production of many different types of products in the same mixer. Due to efficient mixing the use of some expensive ingredients can be reduced. A vacuum system allows automation of powder handling and de-aerates the products.

The Scanima systems technology provides optimal powder/liquid or liquid/liquid mixing with or without high-shear mixing. Ingredients can be homogenized, emulsified and dispersed in a matter of minutes - even products with a high content of dry matter or a high viscosity.

The recently patented “dynamic stator” gives an even more flexible mixing unit with the option of automatic change between high shear and no shear. This allows for an even wider range of products.

Applications: Convenience foods, dairy and beverages, such as:
- Cream cheese
- Processed cheese/analogue cheese
- Non-dairy creams
- Dairy deserts
- Sauces, soups, dips and dressings
- Mayonnaise, ketchup and mustard

Many of our customers in the food industry have found that the mixing process is a key strategic tool in their efforts to improve product quality, to take advantage of new ingredients and comply with environmental regulations.

Contact Scanima scanima@scanima.com - www.scanima.com to learn how we can design a mixing system for your application.
Reliable analytical methods
With about 7,000 staff in more than 150 lab facilities across 29 countries, Eurofins offers a portfolio of over 25,000 reliable analytical methods for characterising the safety, identity, purity, composition, authenticity and origin of products and biological substances.

Food testing has advanced considerably over the past decade and specialised areas require state-of-the-art equipment and experienced personnel. Challenges include technical, matrix complexity or industry specific and legal issues. For that reason Eurofins has created Competence Centres to concentrate expertise and samples across the Group in the areas of authenticity and origin control, pesticides, dioxins and persistent organic pollutants, organic and inorganic trace residues and contaminants, vitamins, mycotoxins, heavy metals and trace elements, veterinary residues, irradiation, foodcontact materials, allergene testing and GMOs - to name but a few areas of the expertise.

The global network of laboratories offers the best of both worlds. Customers have access to a laboratory close to them, yet can still take advantage of specialised expertise provided by laboratories dedicated to the specific analytical challenge at hand.

Food scares can be devastating for any food company. With the lowest detection limits offered by any commercial laboratory, Eurofins helps to ensure that the customers are not hit by the next food scare. The Group’s international presence and participation in many industrial and regulatory bodies allows Eurofins to advise customers in advance and to have the latest analytical methods available in time.

Analysing milk
Steins Laboratory (DK) joined the Eurofins Group in 2006. Eurofins Steins’ core competences are chemical, mi-

Eurofins Scientific is a leading international group of laboratories providing an unparalleled range of testing and support services to the food, pharmaceutical, environmental and consumer products industries and to governments.

Eurofins Steins performs more than 2 million analyses on more than 300,000 samples of raw milk every year.
crobiological, and sensoric analyses, consultancy, auditing, and certification within the fields of foodstuffs, dairy products, and agriculture.

Eurofins Steins has specialised in performing analysis of milk, cheese, and other dairy products for more than a hundred years. Eurofins Steins is Denmark’s oldest private laboratory founded in 1857 by S. Groth and A.N. Ørsted. The year 1888 saw the passing of the Margarine Act in Denmark. At that time, butter exports from Denmark were already considerable, and being able to distinguish between the new “synthetic butter” and genuine butter was crucial. According to agreement with the ministry, Eurofins Steins assumed this testing activity, which became a very extensive and essential part of the laboratory’s future activities.

Today Eurofins Steins performs more than 2 million analyses on more than 300,000 samples of raw milk per year. These impartial analyses help to ensure that 5,500 farmers in Denmark get their correct payment for milk delivered to the dairy industry - based on the composition and of the microbiological standard of the milk.

Another key competence is the Dairy Heard Improvement analysis - with around 6 million samples and 30 million analysis per year. The milk from each cow in Denmark is analysed on a regular basis in order to help the farmer to optimise his production. The results from these tests supply the farmer with detailed information on how to feed each of his cows, which animals to breed on, etc.

**Analysing dairy products**

Denmark markets some well-known dairy products all over the world - e.g. the famous butter Danish Lurpak and the cheeses Esrom and Danablue. Eurofins Steins performs sensory analyses and tests in order to document a persistent high quality of these products - and to ensure customers of the authenticity and Danish origin.

The laboratory produces calibration samples and offers proficiency tests - with a large number of different samples all relating to dairy products, and to the analyses performed in a dairy production laboratory. The calibration samples are used to improve and ensure the quality of the production laboratory - to help the laboratory with results that are in accordance with the true value.

Through the proficiency tests the production plant ensures that the production runs as close to set standards as possible - an important economical parameter for all dairy production plants.

**International partner**

Eurofins Steins is today a well-recognised, international partner when it comes to analyses of dairy products together with other laboratories in the Eurofins Group - Eurofins Steins (SE), Eurofins Wolverhampton (UK), Eurofins Analytico (NL), Eurofins Cervac Sud (FR), Eurofins ofi (A) - all of which have already proved to be ideal partners for the European dairy industry.
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The topics of Mælkeritidenede is scientific and technical issues within the dairy and related areas. Furthermore, subjects of dairy Research & Development, dairy product information, company profiles and exhibition information’s are accepted for the journal.

If you want further information about the Danish dairy industry, please contact the editorial staff: Chief Editor, M.Sc. in Dairy Technology, K. Mark Christensen or Editor M.A., Anna Marie Thøgersen.

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Sustainable Packaging Protects the Food too

By Annette Gøttsche, Corporate Communication Manager, Superfos

Sustainability is more than environmental concerns. Social sustainable packaging provides high barrier properties that extend the lifespan of the food inside.

As the focus CO₂ emissions and sustainability is increasing all over the world, the packaging industry must take its part of the responsibility. Therefore, sustainability is an integrated part of the everyday production and new developments at leading packaging manufacturer Superfos. But, the company also aims to use a broader view on sustainability.

We have to maintain the right barrier qualities that live up to the packaging purpose. A sustainable packaging solution considers both the environment and the shelf life of its content, thereby taking both environmental and social sustainability into account. And when it comes to food packaging, high barrier properties are just essential.

Therefore, we are constantly investigating product and packaging performances such as tightness, barriers, heat resistance etc. Previous-
ly, barrier properties in plastic packaging have limited the possibilities for products with minimum durability, but our latest product developments have shown new ways of extending the shelf life.

**Award winning tightness**

Superfos’ new and improved SuperSeal packaging solution brings high freshness and an increased shelf life to high quality spreadable products. As the new combined PP lid and hermetic PP seal makes the lid open and close easily and tightly every time, the oxygen transmission rates are below 0.01. These new features resulted in an IF Packaging Award on this year’s Interpack fair.

This packaging concept provides the food safety that consumers demand and keeps the products fresh. Moreover, it is a favourite among consumers as the lid provides an effective re-close function. This way, storage is easy and safe even long after the seal is broken. Altogether, the new SuperSeal features definitely secure the freshness of the products in production, in storage, at the store and at home.

**Easy recycling**

All Superfos’ products are made from PP and many of them include no other material. The single material equals easy recycling without compromising on the food quality and lifespan. As the improved SuperSeal container has eliminated the need for aluminium seal during packaging, the end-user appeal and low transmission rates are combined with great environmental advantages.

It is a fact that single material equals easy recycling and since the entire pack is made of polypropylene, it is very environmentally friendly. Furthermore, our calculations show a reduction of 4 grams CO₂ emissions for each container when the aluminium seal is replaced by the improved SuperSeal solution. This means that 1 million containers save CO₂ emissions equivalent to the emissions from an average car driving from Paris to Barcelona and back more than 10 times.

**Groundbreaking CO₂ calculator**

In Superfos, several years of product innovation have already resulted in weight reduction, optimised pallets and savings on raw material and energy consumption. This focus on sustainable solutions has led to several green packaging solutions and massive reductions of the carbon footprint.

The latest break-through is CO₂ calculator that takes Superfos’ aim to reach a smaller carbon footprint to a whole new level. The calculator includes emissions through the choice of raw material, energy consumption in production, transport and disposal. Furthermore, it can differentiate between the waste handling, energy systems and recovery systems in each country including whether there is a recycling system or not.

The CO₂ calculator is our respond to an increasing customer wish combined with a lack of market standards in this field. The precise and professional calculator enables us to pick out the best ways to take action on our own products. It is simply groundbreaking!

**About Superfos**

Superfos is one of Europe’s largest manufacturers of injection moulded plastic packaging, supplying high-quality packaging for food, non-food and health care markets. Superfos is headquartered in Denmark and has 1,500 employees at 10 production facilities across Europe and one in the United States with an annual turnover of Euro 360 million.

Superfos is owned by the investment fund Industri Kapital 1997 (67%) and Ratos AB (33%). Read more on www.superfos.com.
Increasing prices
Global shortage and increasing prices on milk and other primary agricultural products encourage efforts from the food and dairy industry towards a complete utilisation of raw materials by optimising the production. New process technologies are invented, machines and equipment are automated, alternative and new ingredients are applied, cheaper packaging developed, along with the improvement of hygienic and analytical concepts in order to find ways in which to carefully work up expensive raw materials without waste. In the academic world there is a strong focus on producing research of relevance to industry and not least of consumer interest, and in Denmark the development of new procedures and techniques is commonly based on joint research projects between industry and universities.

New technologies
Utilisation of new technologies in order to improve product quality is the focus of several research groups within the Centre for Advanced Food Studies (LMC). In particular the Milk and Egg Science Group at the Department of Food Science, University of Aarhus, and the Dairy Technology Section at the Department of Food Science, Faculty of Life Sciences, University of Copenhagen focuses on a new pasteurisation technique which is of importance for ensuring a safe food product along with, e.g., good maturation quality of blue cheese. The project is performed in cooperation with Arla Foods amba and supervised by senior scientist Marianne Hammershøj and professor Mogens Jakobsen, respectively.

Pasteurisation of milk ensures a microbiologically safe food product through elimination of heat labile microorganisms. The heat treatment also inactivates some milk enzymes and causes a certain degree of protein denaturation, which affects both functionality and sensory properties of the milk products. Lenient Steam Injection (LSI) is a new pasteurisation technology, where heat is transferred directly from steam to milk. Preliminary data suggests that LSI-pasteurisation causes a lower degree of protein denaturation. Whereas most bacteria are eliminated through traditional pasteurisation, spores and heat-resistant bacteria may survive. Also, heat stable bacterial enzymes may not be inactivated. However, LSI appears to be able to destroy or reduce Bacillus spores in milk.

The aim of this project is to investigate and describe the influence of LSI pasteurisation on milk and milk products. The main hypothesis of the project is that by using LSI bacterial...
elimination is efficient, spore-forming bacteria are reduced, a lower degree of protein denaturation of the whey proteins will take place and there will be a better preservation of the milk lipoprotein lipase activity. These parameters are important for the functional properties of whey protein concentrate and maturation and sensory properties of blue cheeses.

Milk ingredients

II: Gentle process technology for producing special ingredients based on milk protein
At the Department of Food Science and the Department of Natural Sciences at the University of Copenhagen, a study recently completed by post doc Jes Chr. Knudsen, associate professor Lars H. Øgendal and professor Leif H. Skibsted with support from the Danish Dairy Research Foundation and the Ministry of Food, Agriculture and Fisheries has brought forward results describing how temperature modifies the functional properties of the whey protein β-lactoglobulin with respect to stabilization of concentrated oil-in-water emulsions.

β-lactoglobulin may be used as an emulsifier in oil-in-water emulsions as it adsorbs to oil-droplet surfaces and acts to stabilize the emulsion by reducing the interactions between the individual oil-droplets thus keeping the emulsion in a steady state. An example of a similar liquid is milk, where milk proteins during homogenisation adsorb to fat globules and prevents the separation of fat and milk during storage. When small amounts of β-lactoglobulin is replaced with its heat-treated counterpart in relatively densely packed oil in water emulsions, a remarkable increase in viscosity, elastic modulus and yield stress is observed even though the heating is only performed at 69°C for 45 minutes or less. The reason for this is that heating promotes the formation of aggregates of proteins that adsorb to the oil-droplets causing increased interactions between the oil particles. This behaviour may be exploited in tailoring industrial products where a high viscosity is desired without increasing the content of oil or fat. A side effect is that the increased viscosity may be experienced as a creamier taste without actually increasing the fat content of a specific product.

Centre for Advanced Food Studies
The Centre for Advanced Food Studies (LMC) coordinates research and higher educations within the food area in Denmark, and it serves as a unique partner for the private and public food sector. The focus of scientific activities is on aspects of food technology, human nutrition and market relations. Four Danish universities participate in the centre, which was established in 1992, highly encouraged by the private food sector. It is possible for students to obtain university degrees in food science from the Faculty of Life Sciences, University of Copenhagen, the Technical University of Denmark and the Faculty of Agricultural Sciences at the University of Aarhus.

LMC runs the graduate research programme FOOD, where PhD students from all four universities may obtain scholarships and follow courses. This encourages network-forming activities across universities and subject areas whereby PhD students gain a broad perspective on science along with their specialized knowledge.
The global market for functional dairy drinks is on the rise and developing fast. According to food and drink consultancy Zenith International the combined markets of Western Europe, United States and Japan saw functional dairy drinks consumption rise 12% to 999 million litres in 2006. Western Europe alone accounts for more than 55% of the market.

Looking ahead the consumer thirst for functional dairy drinks seems to be increasing even more. Zenith estimates that consumption in Western Europe, US and Japan will reach 1.600 million litres by 2011. Western Europe alone accounts for more than 55% of the market.

The consumption and amount of new whey drinks developed and launched has increased dramatically and whey drinks have been called ‘the new generation of dairy beverages’. In Germany and Austria whey drinks currently account for an estimated 10% of the milk drink market, however more in the 0.5 litre format rather than the shot format. ‘My Whey™’ is the first concept developed for an easy to drink shot version of a whey drink.

“We have worked on combining the best of all worlds in ‘My Whey™’. The end product is high on nutritional value, has a naturally fresh yoghurt note and is a convenient probiotic shot you can bring with you and enjoy on the go. To our knowledge this is the first concept for small probiotic whey shots on the market,” says Christian Gilleladen, Application Manager, Fermented Milk, Chr. Hansen.

Challenge the taste
A challenge with whey is that nature provided it with a fairly salty taste. In the case of the ‘My Whey™’ shot the salty taste was overcome by using a specially treated whey protein and the exact right culture. The result is a fresh and easy-to-drink beverage.

In regards to appearance whey drinks are semi-transparent and can therefore be marketed as “soft drinks”. This makes it possible for dairies to launch new functional beverages without cannibalizing on their dairy beverage market. Furthermore, whey drinks can easily be carbonated due to their low viscosity.

High expectations
“We are sure that the global consumer will welcome ‘My Whey™’ with all its built-in benefits, and we are certain that it will be appealing to producers as well. In times of high prices of raw materials within the dairy industry, whey stands out as a very cost-attractive alternative”, concludes Christian Gilleladen.

The ‘My Whey™’ concept has been launched globally and industrial trials are soon to be turned into concrete production plans.

Whey to go
The consumption and amount of new whey drinks developed and launched has increased dramatically and whey drinks have been called ‘the new generation of dairy beverages’. According to food and drink consultancy Zenith International the combined markets of Western Europe, United States and Japan saw functional dairy drinks consumption rise 12% to 999 million litres in 2006. Western Europe alone accounts for more than 55% of the market.

The ‘My Whey™’ concept is a turn-key solution containing a mix of powerful Chr. Hansen ingredients: the probiotic strains BB-12™ and LA-5™ for documented health benefits, the enzyme Ha-Lactase™ for reduced sugar content in the final drink, and natural colors with phytonutrients properties. The concept comes in various flavor profiles - neutral, mango/orange, exotic, orange and raspberry - and more are scheduled to follow.

Probiotics are “friendly” bacteria that, when ingested in sufficient quantities, exert certain health benefits. The word probiotic literally means “for life” and is the opposite of the word antibiotic. Probiotics can help strengthen and maintain the natural intestinal balance - a balance that plays an important role for our overall health and immune system. BB-12™ and LA-5™ are two of the most well documented probiotic strains on the market today.

With the use of Ha-Lactase™, dairy products - in this case functional whey drinks - can be made available for consumers suffering from lactose intolerance and malabsorption. Another advantage of using Ha-Lactase is that the sweetness of the product increases without the use of sugars or artificial sweeteners.
Knowledge makes the difference

DSS is Europe's leading specialist in membrane filtration technology for the ultimate in high quality dairy processing.

Our experience in membrane filtration and dairy processes is unrivalled. Working closely with you, we integrate our systems seamlessly in your processing lines. More than 400 dairy companies have already optimised their plant with our technology.

Choose DSS for the best in membrane filtration technology. Innovative, flexible and reliable - we make the difference you need.
Sterile sampling is now part of everyday life in the food, brewing and pharmaceutical industries. More than 80,000 Keofitt valves are enabling manufacturers all over the world to check the physical and chemical properties of their products, and to test for microbial growth. It has not always been that way, though.

The sampling revolution
The Alexander Graham Bell of sterile sampling goes by the name of Kai Ottung. His 1980 invention remains fundamental to good sampling to this very day.

Kai Ottung’s contribution to global food production not only made it possible to take samples from tanks and systems, it also guaranteed reliable test results. Many years spent working as a head brewer and engineer for various breweries in Nairobi, Cairo, Scotland, Sweden and many other parts of the world had made Kai Ottung aware of the need for clean samples. And the vision became a reality in Kai’s small garage back in Denmark. Finally, food manufacturers all over the world could demand a new standard: the sterile sample.

A revolution was launched and, a few years later, Kai’s invention became the first sampling valve to receive FDA recommendation.

The next step
One of the new features of Kai Ottung’s sampling valve was that it could be sterilized repeatedly before and after use even when closed. Sterilization has therefore been a key element in Keofitt valves and ensures good, uncontaminated and undistorted results when used in production. Traditional Keofitt valves are dead leg free and fully drainable, making them completely safe.

But, with the ever higher standards required in food production, even a classic success needs to keep up with the times. Therefore, this year will see the launch of two new Keofitt products that take Kai Ottung’s design as their starting point and carry it forward into the new millennium: Simplex, a quality valve for non-sterile yet sanitary sampling, and Reflex, a double seat valve with combined sampling and steam control.

Simplex - why should sampling be complex?
This sanitary sampling valve is based on the well-known design of the existing W9 sterile sampling valve. The two valves also share most connection specifications and spare parts. However, Simplex cannot be steam sterilised, as it only has an outlet and no inlet.

The Simplex valve is intended for sampling for physical and chemical analysis only. It can be fitted where it is not essential to keep the product and sample completely free from the risk of contamination during sampling. So what makes the Simplex valve unique? The Simplex valve is CIPable and comes with EHEDG certification to prove it!
**Reflex - second generation sterile sampling**

The second-generation W9 valve, Reflex, is a combined sampling and steam valve. A double stem function sterilises the valve membrane differently depending on the action required: steaming or sampling. This pneumatic valve also allows sampling or steaming to be activated manually. The steam supply can be directly connected to the valve without a separate steam valve in between. This design is patented and eliminates the risk of product backflow into the steam line. It also allows the valve to be fully drainable when mounted upside down at the bottom of the tank. Furthermore, it minimises sample quantity waste and optimises steam and cleaning agent efficiency.

**Sampling classics and innovations**

The traditional, world-renowned Keofitt product range includes the M4, W9 and “I” valves, all of which are easily sterilised.

**Simplex, the non-sterile sampling valve, offers:**

- Body internals similar to the W9 valve
- A hose piece outlet with the same outside diameter as the W9 hose piece as standard
- 316L steel body with 3.1 certification
- W9 valve connection dimensions for the three versions
- A choice of manual or pneumatic operation

**Reflex, the double-feature sterile sampling valve, offers:**

- Standard fitting: inlet for welding to the steam connection and hose piece outlet for sampling
- 316L (1.4435) steel body with 3.1 certification
- No dead leg at steam inlet (can be installed at less than 30° angle)
- Pneumatic and manual
- Impossible to steam while sampling (by mistake)
- Immediate condensate rinse.

**Features shared by Simplex and Reflex:**

- No dead leg
- Completely drainable
- EHEDG certification
- FDA-approved membranes
- 3.1 certification
- Surface finish: $\text{Ra} \leq 0.5 \ \mu \text{m}$.

For more information visit www.Keofitt.dk, where you will also find your local Keofitt distributor.
New company name

Omy.dk (formerly Olssons Machinery) founded in 1955, focus on the latest technology and strives to establish the company as one of the world’s leading suppliers of machinery for the dairy and food industry. On info@omy.dk and www.omy.dk you can get in contact with our company and learn more about us.

Broad product line

Our major products are: Cheese cutting and waxing machinery, and non- and aseptic “Bag-in-Box” filling machines.

We also construct and manufacture: Heat exchangers and custom fitted pneumatic seat valves in stainless steel AISI 316, build in valve for tanks, and non-return valves for building into unions of DIN, DS, SMS.

Omy.dk products and solutions are based upon three characteristics: Quality, Flexibility and Efficiency. With more than 50 years of experience as supplier to a wide range of food industries, Omy.dk is well aware that fine craftsmanship added to the latest technology, and a high level of quality is essential to a modern and efficient company.

Innovation

Through constant awareness of new and emerging technology, Omy.dk provides innovative ideas to products and solutions. One example is the latest experiment conducted in the Omy.dk laboratory, where the process of cutting cheese was tested using various instruments: knives, wire, rotating blades, water, laser and ultrasonic cutting. The experiment was conducted in collaboration with leading food companies.

Cheese waxing machines

Our fully automated wax coating machines for cheese employs brand new technology that includes spraying, bottom waxing rollers, and brushes. The cheese is transported through the machine on a specially designed wire mesh belt, which allows spraying from below. Our machine facilitates the use of different wax colours by having interchangeable wax tanks. These wax tanks were designed to prevent overheating and scorching of both wax and product. The system is available in several sizes and the machine inlet and outlet can be tailor-made to meet the dairy’s requirements. As the latest news, we can wax cheeses as small as 125 mm in length.

Cheese cutting equipment

Omy.dk provides the widest range of cutting and portioning equipment for any type of cheese.

For hard cheese, our product range includes fully automated cutting as well as semi-automated machines with up to three cutting stations. These machines are also offered in several different sizes.

Large flexibility is achieved by including interchangeable cutting frames and blocks. Changing the cutting equipment to a different can be done in less than 60 seconds. Cutting is done either by using the latest technology, or by using just wires or knives. The inlet and outlet can be adapted to suit your set-up, and full automation can be supplied to ensure that our machines suit your existing equipment. Cheese cutting by ultrasonic sound is now available.

Aseptic“ Bag-in-Box”

Our aseptic “Bag-in-Box” machine is designed for sterile filling of bags. The machine is equipped with either a
Danfoss mass flow meter or a weighing unit, giving a system accuracy of 0.1% of the current flow. The filling amount and choice of program is performed on the front of the machine by a finger touch screen. As sterilization during the filling cycle, a barrier of sterile air and 4% hydrogen peroxide (H2O2) is sprayed over the filling head through stainless steel nozzles. A filter is installed to make the air sterile. As sterilization, only chlorine or hydrogen peroxide may be used. The filter can be sterilized by using saturated steam. The aseptic “Bag-in-Box” filling machine from Omy.dk has an adjustable roller table, and is constructed with a connection unit for CIP-cleaning, and water separator for steam sterilization.

The machine is semi automated. The operator manually places the bag in the machine and pushes the start button. The rest of the operation is automated - cork of, filling, and cork on. The filling is done either through a sterile pressure tank or through a mono pump, and eventually a by-pass valve.

The capacity varies according to bag size and product viscosity - from 1000-5000 l/h. When filling juice and milk products the capacity is approximately: 3 bags of 20 kg/min, 5 bags of 10 kg/min, and 7 bags of 5 kg/min. For delivery of aseptic bags, we are cooperating with several leading companies in Europe.

**Heat exchangers**
We have more than 25 years of experience in designing and constructing heat exchangers. To ensure the proper use of energy, it is exceedingly important to utilize a proper size heat exchanger - neither to large nor to small. We design and construct Pasteur plants as well as units for separating external and internal heat sources, whether these are 12 kW or 2000 kW.

**New solutions on demand**
Demands for higher capacity and requests for faster filling, has paved the way for yet another new product from omy.dk - a twin head filler. As a costumer in Vietnam needed a very fast and flexible filling machine, we constructed a machine for the filling of both 10-50 kg boxes and 200 l drums.

Furthermore, Omy.dk recently expanded its program through a non-aseptic “Bag-in-Box” filling machine line. This line range from the smallest manual filling station to fully automated lines with a high capacity. Omy.dk’s fully customised “tailor-made” solutions for the food industry are created as a result of a very close cooperation with food processing companies all over the world.

**Pneumatic seat valves**
Omy.dk has launched a new generation of customs fitted AISI 316 stainless steel pneumatic seat valves. The valve head is supplied with a heat resistant seal ring and close against a stainless steel seat. The valve stem is sealed with Viton rubber.

By choosing Omy.dk you can get the design “tailor-made”, in the exact configuration you want.

---

**Customized on Demand**
**Stainless Steel Machinery**
for the Food Industry

Aseptic Bag-in-Box.
Size of bags 1-1000 l.
Capacity: 1000-5000 l/h.
Filling: Mass flow or by weight.
Filling via 30 or 50 mm nozzles.

Automatic Cheese Waxing Equipment.
Manual or semi-automatic units.
We meet your requirements.

Advanced multifunction or small manual solutions for cheese cutting.
Fully automatic lines.
We meet your requirements.

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In today’s rapidly growing environment, a loyal consumer is an undeniable asset for every food producer, and a sustained ability to create a trust-based relationship with a customer is considered to be a core competence for every corporation. There cannot be a better tool to win loyalty than a safe product with a maintained quality level. The reputation of every food producer is especially sensitive within this area, not to mention the legal issues.

The dairy industry has received special attention, especially when it comes to product safety. Milk and the dairy products are ideal for development of micro-organisms and pathogens. The dairy production is also exposed to other hazards, including chemical and physical ones. Therefore, means and measures are undertaken to reduce or eliminate hazards and make the dairy products fully safe for the consumers.

**Adjusted Hygiene**

In this respect the packaging machinery remains one of the most important factors. The main task of the packaging process is to prevent the product from re-contamination. In order to provide solutions that correspond to the specific needs of the dairy industry Trepko has developed a concept of “Adjusted Hygiene”. In every filling & closing machine Trepko provides a selection of hygienic options best suited for a specific project.

Therefore, before a decision concerning application of different hygienic accessories is made, several factors must be analysed, including (but not limited to) to areas mentioned in Table 1.

Chemical and physical properties of a product are often considered a decisive factor to determine the level of microbiological hazard during the packaging process. Some products by definition are less sensitive to re-contamination due to higher acidity or high filling temperature. An underestimated hygienic hazard comes also from the packaging materials - especially from the way it is delivered and stored.

A thorough analysis of the above criteria will enable any food producer to determine the requirements in respect to four major fields of hygiene enhancement (Figure 1).

**Hygienic construction**
The concept of hygienic construction

---

**Table 1:** Before different hygienic accessories is made, several factors must be analysed.

<table>
<thead>
<tr>
<th>Product</th>
<th>• chemical properties (pH)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• physical properties (e.g. filling temperature)</td>
</tr>
<tr>
<td>Production</td>
<td>• hygienic standard of the processing line</td>
</tr>
<tr>
<td>conditions</td>
<td>• air quality in the packaging hall</td>
</tr>
<tr>
<td>Packaging material</td>
<td>• hygienic delivery &amp; storage</td>
</tr>
<tr>
<td>Distribution</td>
<td>• temperature of storage</td>
</tr>
</tbody>
</table>

**Figure 1:** Aspects of hygiene in packaging machinery.
is a standard solution offered in all the Trepko machines in its wide meaning which includes among others:
• mechanic design complying with the EU legislation
• high manufacturing quality (all mechanical parts are made at TREPKO’s companies, under our control)
• high quality materials - easily cleaned and resistant to cleaning agents
• a unique design of the filling systems
• automation that limits the operator’s interventions in the packaging zone
• automatically controlled lubrication.

Based on the construction compliant with these rules, the hygienic standard of every Trepko machine can be built-up according to the specific needs. In the first place it is accompanied by different cleaning and disinfecting facilities. Cleaning-In-Place of the contact parts has become the most popular. The advantage of the Trepko’s concept consist on the special design of the filling system (esp. rotating valves) as well as the possibility of individual adjustment of each phase. The CIP facility is accompanied by a Steam-In-Place solution, where the whole filling system can be sterilised with hot steam and cooled with sterile air. Apart from the contact parts, also the whole working zone of a machine can be provided with a possibility of CIP cleaning and disinfection. In such cases the machines are equipped with a working tunnel flooded with sterile air and cleaning installation, which is responsible for the CIP and sterilisation operation.

Another group of hygienic options is especially popular within the dairy sector. Closing the working zone of the machines in an environment with controlled atmosphere practically eliminates the risk of contamination by micro-organisms present in ambient air. When considering protection against contaminated air there are three important air quality factors: Air cleaning capability, laminar flow (0.4 m/s), and circulation in the proper direction.

The Trepko machines can be equipped with two alternative solutions ensuring packaging in a sterile atmosphere: 1) Sterile air cabin with HEPA filters, and 2) Filtration by sterilised filters based on a hydrophobic medium.

<table>
<thead>
<tr>
<th>Method</th>
<th>UVC radiation (wave length 254 nm)</th>
<th>Spraying with H2O2 solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phases</td>
<td>Radiation with blue light</td>
<td>Spraying Hot air drying Draining out fumes</td>
</tr>
<tr>
<td>Action</td>
<td>Affects the DNA of microorganisms</td>
<td>Oxidation</td>
</tr>
<tr>
<td>Application</td>
<td>Cups (not very tall)</td>
<td>Cups (all types)</td>
</tr>
<tr>
<td></td>
<td>Die-cut foils</td>
<td>Die-cut foils</td>
</tr>
<tr>
<td></td>
<td>Foil from reel</td>
<td></td>
</tr>
<tr>
<td>Effectiveness factors</td>
<td>Radiation time</td>
<td>Solution concentration Temperature Spraying accuracy</td>
</tr>
<tr>
<td></td>
<td>Distance and lamps’ position</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surface quality &amp; shape</td>
<td></td>
</tr>
<tr>
<td>Precautions</td>
<td>Design (reduction of reflections)</td>
<td>Removal of residues</td>
</tr>
<tr>
<td></td>
<td>Materials that absorb radiation</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: Packaging material treatment.**
To summarise, the Trepko machines represent the hygienic standard which corresponds to the customer’s specific needs. On the basis of a hygienic design, extra accessories and solutions can be installed both on the in-line (100 Series), rotary (200 Series) and carousel machines (500 Series) (Table 3).

Installation of different hygienic features should be considered as an investment with both technical and economic justification. Therefore a thorough analysis of the requirements is always recommended by Trepko. This is where we start - we listen to our customers.

<table>
<thead>
<tr>
<th></th>
<th>In-line machines 100 Series</th>
<th>Rotary machines 200 Series</th>
<th>Carousel machines 500 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygienic design</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CIP of the contact parts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SIP of the contact parts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CIP &amp; sterilisation of the working area</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sterile air cabins</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>UVC radiation of cups/foils</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Peroxide treatment of cups/foils</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Extra accessories and solutions can be installed both on the in-line (100 Series), rotary (200 Series) and carousel machines (500 Series).

Please help us to keep up a complete mailing list!

We continuously update our mailing list. In order to receive the journal on a regular basis, we kindly ask you to inform us if you have changed your address or it is incomplete.
In co-operation with AEDIL, Dalum College of Food and Technology offers a practical and theoretical Training Course in Cheese Making by Ultrafiltration. The course will be held at the department of Dairy Training, at Dalum College of Food and Technology.

Programme

**Monday, November 3rd**
Information about Dalum and the UF Cheese Course. Membrane-filtration, theory.

**Tuesday, November 4th**
Ingredients for cheese manufacturing. Acidification and syneresis. Preparation for Pilot Plant production.

**Wednesday, November 5th**
Ultra-filtration and Cheese production, Pilot Plant.

**Thursday, November 6th**
Ultra-filtration and Cheese production, Pilot Plant.

**Friday, November 7th**
Starter cultures for ultra-filtrated cheeses. Exchange of experiences and evaluation. Lunch and departure.

Daily meals
07.30 am: Breakfast
09.50 am - 10.10 am: Coffee break
11.40 am - 12.15 pm: Lunch
01.50 am - 02.10 pm: Coffee break
05.30 pm: Dinner

Participant
Participants should ideally have knowledge basis in microbiological and chemical aspects of cheese making. The course is for professionals with previous training in cheese technology, practice in cheese making and good knowledge of English language.

Cost and deadline
Course fee 1.100 Euros including meals and accommodation.
Course fee must be paid before October 15th 2008.
Deadline for registration is Monday 1st of October 2008.

Registration
For register and/or further information, please contact:
Dalum College of Food and Technology
Landbrugsvej 55 · DK-5260 Odense S · Denmark
Phone: +45 63 13 20 43 · Fax: +45 63 13 20 44
psj@dalumuc.dk - Dairy Teacher Mr. Paul Stein Jensen

| Name: ____________________________ | Company: ____________________________ |
| Position: __________________________ | Address: ____________________________ |
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World wide supplier of filling/closing machines