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Frontrunners

for a sustainable dairy industry

Dear reader.

Welcome to the 29th edition of Danish Dairy & Food Industry ... Worldwide with contributions from many large and small companies belonging to the Danish dairy and food industry. This magazine has a focus on a very central theme for all dairy companies: How to become frontrunners for a sustainable dairy industry.
Sustainability is crucial in all parts of the production and is getting more and more relevant in all markets all over the world

It is a pleasure to introduce Mogens Jensen, Minister for Food, Fisheries and Equal Opportunities, who emphasizes the need to develop Danish food production with low or no climate impact.

Arla Foods – the Danish/International based dairy giant (no. 7 in the world) - has been asked to explain their efforts to fulfill their ambitious plan for 30 pct. less CO2 in 2030 – and completely CO2-neutral in 2050. Chairman Jan Toft Nørgaard explains the effort at farmlevel – and Kristian Eriknauer, Vice President, Corporate Responsibility, go into details about the corporate activities.

Read also a comprehensive introduction to relevant, Danish research activities – financed by the Danish Dairy Research Foundation.

Finally a number of leading producers present their companies, products and services– all of them representing a very strong and proud Danish industry, which are market leading in many fields.

We hope you will enjoy the many contributions and that your horizon of dairy technology will be expanded.

Anne-Sofi Christiansen
Chief Editor

Lars Winther
Editor

Fronpage: Picture from Arla Foods.

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Editor Lars Winther
Journalist Lene Mikkelsen Walsh

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Danish Dairy & Food Industry ... worldwide
Munkehatten 28, 5220 Odense SØ, Denmark
Tel.: +45 66 12 40 25 – Fax: +45 66 14 40 26
www.maelkeritidende.dk – info@maelkeritidende.dk
www.ddfi.dk

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Frontrunners for a sustainable dairy industry

BY MOGENS JENSEN, MINISTER FOR FOOD, FISHERIES AND EQUAL OPPORTUNITIES, DENMARK

In August 2019, I had the pleasure of hosting the World Food Summit – Better Food for More People, with the aim to strengthen the orientation of food production and consumption of food towards the UN Sustainable Development Goals. It is important to support this work globally. Food production has a very big potential for contributing directly or indirectly to the UN's 17 global goals.

The Danish food industry has set a goal of becoming climate neutral in the year 2050. It is an ambitious goal that can inspire and show the way for the rest of the world. As Danish Minister for Food, I support this work and I am pleased to see the Danish food industry and the Danish Government work in the same direction, just as consumers are increasingly demanding sustainably produced food.

Food production with low or no climate impact

Danish agriculture must continue to be at the forefront of the green agenda. In Denmark, both Arla Foods and the Danish Dairy Board (Mejeriforeningen) have set net zero carbon goals by 2050 on behalf of their industries. Many farmers have voluntarily taken on the task of reducing CO2 emissions by using climate-friendly feed, new circulation pumps in the milking room, and – most importantly for the farm's climate accounts – wind turbines and biogas plants.

Last year I visited an organic farm with 130 milk-producing cows to get an insight into how different voluntary climate initiatives at the farm work in practice together with the milk-production, and I was very impressed with the initiatives and results. This sets a good example for the future agricultural production, and our aim is to develop Danish food production in a context with low or no climate impact across the whole value chain as a strong brand for our export markets.

Danish dairy products already enjoy great confidence and recognition globally. Last year I visited China for purposes of export promotion and Danish dairy companies established in the Chinese market confirmed to me that Chinese consumers are increasingly demanding sustainable and safe food products. Our goal is to further increase the export of sustainable dairy products to the Chinese market.

Animal welfare as part of a sustainable production

Animal welfare in Denmark is high and remains a priority. In 2017 and 2018, a voluntary label "Better Animal Welfare" was introduced first on pork and later on chicken meat in the supermarkets. The label clarifies the level of animal welfare in the products in an easy and clear way and makes it possible for consumers doing their everyday grocery shopping to influence producers and retailers towards better choices for animal welfare. The label contains three levels of animal welfare. Already at the first level, animal welfare is significantly higher than non-labeled products, and the label is well known by the Danish consumers. Early in 2020, the label will be expanded to veal, beef, milk and dairy products. The label fosters market driven animal welfare, and contributes to a more sustainable production.

Frontrunner for the use of sustainable technology

The Danish dairy industry is a global frontrunner in using sustainable technology. The means are new innovative technologies, digitalization and public-private partnerships on water-efficient measures. I welcome and support further sustainable transformation of the food sector. The Government has in 2020 allocated 272 million DKK (36 million EUR) to the Danish Green Development and Demonstration Program (GUDP), which promotes green innovation in the Danish Agriculture and Food Industry, part of which provides support to sustainable development projects in the Danish dairy industry. ●

Arla farmers will use big data to accelerate journey towards carbon net zero

The 9,900 farmer owners behind the European dairy cooperative, Arla Foods, are accelerating their efforts to reduce their carbon footprint. Arla Foods is the first dairy company in Europe to introduce an initiative across seven countries that will triple the speed of CO2e reductions on farm and accumulate one of the world's largest sets of externally verified climate data from dairy farming.

One of the most challenging areas for the sustainability effort in Arla Foods, is the emission of methane gase from the cows. Arla Foods farmer owners are already among the most climate friendly dairy farmers in the world, producing milk with less than half the average of emissions per litre compared to global dairy production. Now Arla Foods is introducing a new Climate Check programme and comprehensive support to all its 9,900 farmer owners in Northern Europe to fight climate impact. This will pave the way for the company to reach its ambition to reduce carbon emission by 30 per cent by 2030 and have a neutral climate impact by 2050.

Jan Toft Nørgaard, farmer and chairman of Arla Foods.

- Dairy is an excellent natural source of nutrients compared to its carbon cost, but we have a strong desire to make the balance between nutrients and CO2 even better. Arla farmers have already cut emissions by 24 per cent since 1990, but we also recognise that it's not enough. As in any other industry, we need to do more and we need to do it faster, says chairman Jan Toft Nørgaard.

Data set will help develop next moves on the farm

The new global standardized tool for Climate Checks on farms in seven European countries builds on the successful climate check model that was introduced to Arla farmers in Denmark in 2013. The Climate Check will help the farmer identify emissions on farm and provides a clear picture of the actions farmers can take to reduce emissions further. Each Arla farmer will provide input information covering everything from herd size to housing, milk volumes, feed usage and feed production, energy and fuel usage and renewable energy production.

The Climate Check programme will include a digital reporting tool, in which all farmers will submit their climate data. The data is verified by an external advisor who will visit the farm to provide advice on action plans.

As data from potentially 9,900 European dairy farms and an annual production of 14 billion litres of milk is submitted during 2020, Arla is building one of the world's largest sets of externally verified climate data from dairy farming. This will be the solid foundation for benchmarking, knowledge sharing across the dairy industry and correlation analysis.

- We will be able to benchmark against our farmer colleagues on carbon footprint. But equally important, the data can be used to gain more knowledge and science-based solutions in collaboration with the agricultural sector and academic institutions. This will be important as we decide on which science-based solutions will take us to the next level in the fight against climate change, says Jan Toft Nørgaard.

Incentive to motivate farmers

The data captured will enable each farmer owner to see what level of carbon emissions they produce per litre of milk and identify where there is room for improvement. Arla will support its farmer owners to deliver reductions of 3 per cent per year on average which would see Arla on track to reach its ambition to reduce carbon emission by 30 per cent by 2030 and have a neutral climate impact by 2050. However, farmer owners who have used the earlier model have shown that it can help reduce carbon emission by up to 4 per cent per year.

To support the farmer owners in using the new Climate Checks, Arla's Board of Directors has decided that farmers who sign up to the Climate Check in 2020 will be paid a financial incentive of one eurocent per kilo of milk. Based on earlier initiatives, a financial incen-

tive has proven to be effective in supporting programme roll-outs. Arla Foods Chairman Jan Toft Nørgaard expects the vast majority of Arla farmers to sign up to the Climate Check, thereby accelerating work to reduce carbon emissions.

- Within our cooperative, we have some of the most climate-efficient farmers in the global dairy farming sector. But not all farmers have had the possibility to do the Climate Check yet. So this decision by our Board releases that potential in addition to the ongoing knowledge and learning that we will all benefit from, says Jan Toft Nørgaard.

Arla's sustainability journey

This announcement marks the latest in a series of sustainability measures taken by Arla and its farmer owners in the last few years. These include participating in the development of a global and scientifically approved way to measure carbon sequestration, Arla's own research to evaluate ways methane emissions might be reduced through feed choices and experimenting with ways to increase biodiversity on farm. Furthermore Arla supports a professorship at University of Aarhus, which examines the connection between fodder and methan gas emission. ●

ARLA FOODS

Emission of carbon must be reduced to fulfill the sustainability goals in Arla Foods.

Arla has a climate plan for all stages of production

All climate actions are broken down into annual targets, so that the first milestones can be met by 2025, Kristian Eriknauer, Vice President, Corporate Responsibility explains.

At Arla Foods, many suppliers and employees focus on the climate impact in their daily lives. However, few can probably match Kristian Eriknauer, who is the Vice President with responsibility for Corporate Responsibility. His primary activity is therefore to ensure that all parts of the group optimize activities in relation to sustainability – a big challenge, which he is quite confident about.

Active sustainability board

- Arla has had a focus on sustainable production for many years, but has in recent years increased a number of programs where methods and documentation work is intensified as well, Kristian Eriknauer says and refers, among other, to the establishment of the Sustainability Board, which was established in March 2019 with overall responsibility for implementing the sustainability strategy. Among the board's first activities was the formulation of a number of work streams for all parts of the strategy, which contains both ambitions for what it produces (health and transparency), and how the company manufactures its production in a sustainable way.

- In this way, the Sustainability Board has operationalized all our goals, the sustainability manager says. He believes fully and completely that the group will succeed in meeting the ambitious goal of, among other things, 30 per cent less CO2 in 2030 – and a completely CO2-neutral production by 2050.

Short- and longterm goals

- It is of course difficult to assess goals this far into the future. Therefore, we have also decided to break down the goals into shorter sub-goals for each goal. It is measured in the same way as our economic KPIs, so that we for example can monitor the development of our climate efforts every month. It has a strong focus in all management teams, Kristian Eriknauer explains, who adds that all departments have their own roadmaps that are continuously being concretized towards 2025 and 2030 respectively.

- It is also encouraging that farmers have already reduced CO2 emissions by 24 pct. in the period 1990-2017, which indicates that we can actually put action behind the words. And with the new program for Climate Check, we're speeding up this process - while gaining incredible knowledge with the new database, Kristian Eriknauer says and adds:

- We operate with a responsibility for what we produce, where the quality and nutritional content of the products are central parameters. And then we are responsible for how we produce our products, where the climate targets have become central turning points, he concludes. ●

Arla's 8 primary focus areas and workstreams

All company functions has set goals for 2030 – which has been broken down into annual targets and with milestones in 2025.

KRISTIAN ØSTERLING ERIKNAUER
VICE PRESIDENT,
CORPORATE RESPONSIBILITY
AT ARLA FOODS

Farming

- Climate Checks are offered to all Arla dairy producers in 2020, giving specific suggestions for activities that can reduce greenhouse gas emissions.
Feed optimization and slurry management.
- In addition to biogas projects, a number of farmers have also erected wind turbines, which together produce green energy equivalent to 61 pct. of the total energy consumption of Arla's farmers.
- see also a separate article on Climate Checks.

Supply Chain (supply of raw materials)

Switching to green energy is central. One of the primary initiatives is support for several large biogas plants, where biogas replaces natural gas in the production of electricity and heat, which is used both at the large production plants, on the farms and among other consumers. The degassed slurry is returned to farmers as effective manure. Thereby you have a circular process and a green loop.
Arla had a target of 50 pct. green energy at the industrial plants in 2020 and is currently at 27 pct. - primarily through biogas and wood chip-fired plants.

Transportation

Conversion varies from country to country – among other as a result of various national aid schemes. The heavy trucks are converting to biodiesel - and as an experiment to biogas - just as light transport is heading for new electric vehicles or biogas.

Packaging

New packaging types significantly reduce CO2 emissions. For example, more than 1 billion milk cartons have been converted to bio-based materials in 2019. Recirculation and recycling are primary focus areas, which is done in collaboration with municipalities and renovation companies.

Distribution & Dairy Development

Energy for distribution is converted to green sources. Distribution in third world countries is linked to aid programs for local milk products, which includes the sales in Nigeria and Bangladesh among others.
In Bangladesh, Arla is embarking on an ambassador's corps among 5,000 women in vulnerable areas who are being educated in nutrition. Thus, women can help others with their knowledge together with a selection of Arla's milk powder products – all while the women get an income basis.
Sustainable food production is perceived broadly and is closely linked to the United Nations 17 Sustainable Development Goals which takes poverty and women's rights into consideration.

Food Waste

Arla has a goal of reducing food waste by 50 pct. in the period 2015-2030 and is working on identifying and reducing sources of waste in production, as well as working with customers on better planning and to inspire consumers to reduce their food waste.

Health

All products must meet a number of nutritional criteria on the minimum protein and calcium content, as well as a maximum limit of sugar, salt and fat in the products. Furthermore, naturalness criteria are used in order to minimize the amount of artificial additives.
Climate impact in food production must be seen in the context of the nutritional effect of a given food. Here calculations show that milk products contain a very high nutrient content in relation to the climate imprint.

BY LARS WINTHER

The Danish Dairy Research Foundation strengthens the focus on sustainability

Arla Foods and the smaller Danish dairies are very satisfied with a common effort to improve sustainable dairy production through the Danish Dairy Research Foundation.

A sustainable production will be critical for the continued "license to produce" of the dairy industry and its many suppliers. If you don't meet, or even exceed, the expectations and demands from consumers and authorities, there is no future for your food company. Two persons, who can confirm these statements, are Lars Dalsgaard from Arla Foods and Poul J. Pedersen from Thise Dairy. Representing the multinational dairy company (Arla is processing 14 billion kg. milk) and a smaller, organic and dairy company (Thise is processing 110 mio. kg organic milk). Both are members of the board of directors of the Danish Dairy Research Foundation (DDRF).

Tradition for cooperation

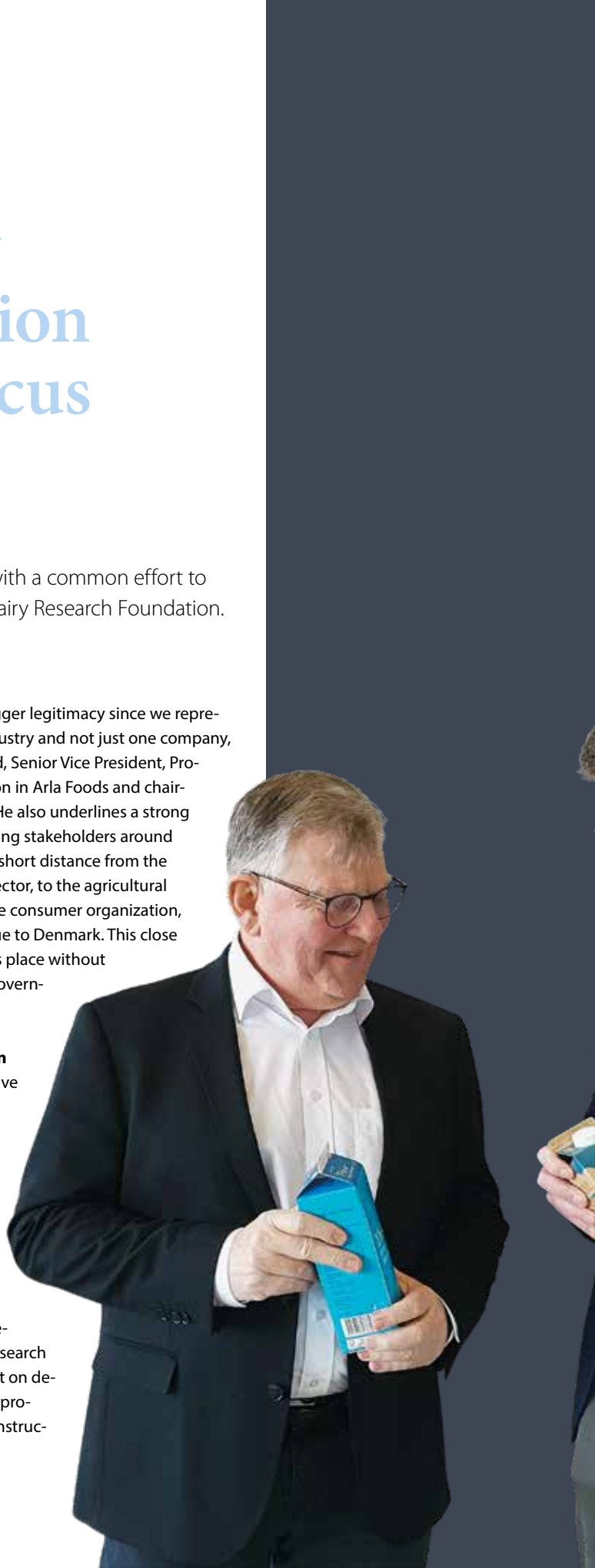
Although they compete on the Danish home market, they also cooperate when it comes to dairy research related to the DDRF, a Foundation that initiates research projects at primarily the universities and hospitals amounting to around 2 million EUR annually. A construction that is quite unique, where the bigger companies and the smaller dairies share some of their resources spent on research in joint projects. From the perspective of Arla, the cooperation is partly due to a strong tradition, when it comes to public-private research. And partly an important premise in the negotiations with the authorities. The cooperation with others simply gives a stronger credibility.

- It gives us a bigger legitimacy since we represent a national industry and not just one company, says Lars Dalsgaard, Senior Vice President, Product and Innovation in Arla Foods and chairman of the DDRF. He also underlines a strong tradition of gathering stakeholders around the table having a short distance from the minister to the director, to the agricultural organization, to the consumer organization, etc., which is unique to Denmark. This close collaboration takes place without jeopardizing the governmental authority.

Win-win-situation

From the perspective of the smaller dairies, this is a win-win-situation.

- For the smaller dairies, it is the only way to influence more basic and strategic research, since our resources used for research obviously are spent on development of new products. With this construc-



Danish Dairy Research Foundation in a nutshell

- The Danish Dairy Research Foundation (DDRF) initiates and coordinates strategic research interacting closely with the dairy industry and universities, hospitals and the suppliers. The projects are typically carried out by the universities – sometimes in close collaboration with industry.
- The projects are pre-competitive in nature and underpin research-based innovation at the dairies.
- Since the foundation of DDRF in 1990, the dairy sector has invested a DKK amount totaling three-digit millions into research at the universities through DDRF.
- DDRF annually initiates research projects supported by funding totaling DKK 12-14 million or 1.6-1.9 million Euro (50 % financing). Members (the dairies) are sponsoring according to their milk intake.
- The vision of DDRF: The Danish dairy industry has a leading edge within sustainable production of differentiated, safe and healthy milk-based products.
- DDRF consists of representatives from Arla Foods, the smaller dairies, the universities and Danish Dairy Board.
- Read more at: www.mejeri.dk/forskning (unfortunately only in Danish).

tion we get an exceptional influence on channeling the resources to fields, where several are relevant for our product development as well, says Poul J. Pedersen, CEO at Thise and chairman for the Foundation's Technology and Safety-group. He points towards projects about whey as an example, where all Danish cheese dairies have a common interest in optimizing the knowledge and value, since the smaller dairies are delivering their whey for further processing at Arla plants, that again are interested in optimizing the whey for further processing. He also mentions new research on reuse of water at the dairies as a hot topic, where the small dairies depend on common research results.

- When it comes to reuse of water, I also think that Denmark has a big advantage from a close cooperation with the suppliers to the dairy industry, where several Danish companies are global leaders, Poul J. Pedersen says.

Sustainability research

Sustainability issues tend to receive a bigger and bigger share of the research resources of both the dairies and the Danish Dairy Research Foundation.

- Sustainable production has a long track record in the Danish dairy industry. As a natural consequence, research on sustainable production has a long history at the Danish Dairy Research Foundation, the universities, Advanced Technology Groups, the dairies and the suppliers to the dairies. The close cooperation at all levels is a competitive advantage that should be treasured and safeguarded as basis for the continued success of the cluster, Lars Dalsgaard says and continues:

- When looking at the value chain, undoubtedly the primary sector and improving logistics and food waste at the consumers are key levers when it comes to improving the environmental foot-print. The dairy plants on the other hand have been working on improving their foot print for a long time and many of the low hanging fruits have already been picked. However, further optimization is still possible at the dairies. ●

Poul J. Pedersen (left), Thise Dairy and Lars Dalsgaard, Arla Foods, with milk from their companies – in a modern, sustainable milk carton.

Six relevant research projects focusing on sustainability

- under the auspices of the Danish Dairy Research Foundation.

CAVI: Improved functional properties of dairy products by new process technologies – understanding the molecular mechanisms caused by hydrodynamic and acoustic cavitation

Project leader: Marianne Hammershøj, Department of Food Science, Aarhus University.
Participants: University of Southern Denmark, SPX Flow Technology A/S, Arla Foods Ingredients Group P/S, and Arla Foods amba.
Aim: To examine the effect of cavitation-based technologies on proteins and fat in dairy products. Acoustic cavitation (ultrasound) and hydrodynamic cavitation (kavitator) is compared with existing technologies such as homogenization and pasteurization.
Results so far:

- Acoustic cavitation treatment of milk improved the texture of yoghurt – the same effect was not seen when applying hydrodynamic cavitation.
- Acoustic cavitation can provide homogenization of the milk fat globules (< 1 µm), whereas by hydrodynamic cavitation a reduction in the MFG size to 1.5 µm can be obtained. This could potentially be used to stabilize organic milk by avoiding fat separation.
- Hydrodynamic cavitation, heat and shear effects, may reduce the bacterial count in milk.
- Cavitation may be used to reduce the viscosity of protein concentrates enabling drying of concentrates with higher dry matter content, which again will be more energy efficient.
- Initial results suggest that hydrodynamic cavitation can provide a faster milk powder rehydration, but this needs further research.
- The effect of cavitation on product characteristics is temperature dependent, and the process must be tailored accordingly.

Sustainability benefits: Reduced energy consumption in case of cavitation technology replacing other processes; e.g. homogenization and pasteurization, extended shelf life and less food waste.

Big cheese Data: Fully automated on-line 3D NIRS measurements, modeling and control of cheese production quality

Project leader: Klavs Martin Sørensen, Department of Food Science, University of Copenhagen.
Participants: University of Copenhagen and Arla Foods (Høgelund and Taulov Dairy).
Aim: To develop a fully automated method that enables measurements on all cheeses in a production line, as well as measurements of the variation/heterogenicity of the individual cheeses. The output is an on-line, real-time, non-destructive mapping of the production quality.
Results so far:

- A prototype robotics platform has been developed to be used for the 3D automated measurements on cheeses in a production line. Proof-of-concept tests have been performed.
- A software platform has been developed including collection and storage of data and subsequent handling of spectral data.
- Pilot tests have been performed monitoring the degree of maturation over time. Standard analyses (e.g. chemical parameters in addition to sensory quality assessments) are merged with the spectroscopic measurements.
- The spectroscopic and standard analyses data have been collected in a database, and analysis of the data is in progress. An artificial intelligence-based system is under development for prediction of product quality.
- The project is looking into maturing the technology for large scale on-line production testing.

Sustainability benefits: Reduced energy consumption, extended shelf life and less food waste.

Reward: REuse of WAteR in the Dairy industry

Project leader: Søren Balling Engelsen, Department of Food Science, University of Copenhagen.
Participants: University of Copenhagen, Technical University of Denmark, Wageningen University & Research, Technische Universität München, Arla Foods, Novozymes, NIRAS, DHI, Tetrapak, and LiqTech.
Aim: To establish a research community that provides the knowledge to bring Danish industry closer to self-sustainability – the closed factory principle – where water intake is diminished by re-using production streams.
Results so far:

- Use of reverse osmosis (RO) to separate water (permeate) from the whey production (retentate) has been successfully implemented.
- Established a unique data set and insight into the RO process and its related cleaning in place.

The Danish Dairy Research Foundation is together with the universities, dairies and suppliers working on making the dairy production even more sustainable. The main focus is on utilization of resources, extension of shelf life, and consequently, reduction of food waste.

Point of contact:

Grith Mortensen, Chief Consultant, DDRF.
Mail: gmo@lf.dk Phone: +45 4096 4114

- A database system to extract and align process data including on-line spectroscopic data has been developed.
- A state-of-the-art process NIR spectrometer have been constructed with five fiber connected transflectance probe heads attached to a multiplexer. The probeheads and entire spectrometer have proven to be extraordinary stable and are already taken is use for a new application in cheese production at Arla Foods Taulov Dairy.
- Treated whey water contain variations in the order of several log 10 colony forming units after ultrafiltration (UF), but consistently lower after RO filtration and at levels below drinking water standards after a second RO.
- Prolonged storage of RO water result in considerable microbial growth – especially at elevated storage temperatures.
- Biofouling of RO membranes with non-dairy associated yeast was noted. Some yeast strains were very tolerant towards the cleaning regimes used.
- The data challenge of an untargeted approach has been underestimated. University of Copenhagen joins DIKU and FOSS to create a Center for Deep Process Learning.

Sustainability benefits: Reduced water consumption.

Infant Brain: New infant formulas to promote optimal brain development

Project leader: Anette Müllertz, Department of Pharmacy, University of Copenhagen.
Participants: University of Copenhagen, Technical University of Denmark, Aarhus University, Bioneer A/S, Arla Foods AMBA, Arla Foods Ingredients Group A/S, and Semper AB.

Aim: To develop infant formulas that are better digested by infants, and lead to a higher incorporation of omega-3 fatty acids into brain tissue, which should result in an improved cognitive development in infants fed infant formulas.
Results so far:

- Methods for isolation of phospholipid-rich dairy ingredients from different raw materials have been established.
- An *in vitro* digestion model mimicking the digestion in the stomach and the small intestine of newborn infants has been developed.
- The synergistic lipolytic activity in the infant gut has been improved by optimizing the fat globule surface layer.
- The process steps of supplementing phospholipid-rich ingredients to infant formula may narrow the gap in cognitive development between breastfed and formula-fed infants. This is now being evaluated.

Sustainability benefits: Improved used of dairy raw materials.

AFunDay – Antifungal Dairy Product Bioprotection

Project leader: Susanne Knøchel, Department of Food Science, University of Copenhagen.
Participants: University of Copenhagen and Arla Foods.
Aim: To evaluate the use of bioprotective cultures to inhibit the growth of unwanted yeast and mold in fermented dairy products. The goal is to extend shelf life and prevent food waste.
Results so far:

- Based on strains from various sources in Denmark and abroad, a representative panel of molds and fungi from fresh fermented dairy products, such as yogurt and skyr, has been collected and characterized.

Sustainability benefits: Extended shelf life and less food waste.

Dairy Predict: Prediction tool for risk assessment and documentation of food safety

Project leader: Paw Dalgaard, National Food Institute, Technical University of Denmark.
Participants: Arla Foods, Danish Veterinary and Food Administration.
Aim: To develop tools for prediction of the growth potential of *Listeria monocytogenes* in different types of dairy products. The tools may be used for risk assessments, in product development and in the documentation of food safety in relation to dairy products.
Results so far:

- Data on growth of *Listeria monocytogenes* included in the Food Spoilage and Safety Predictor Software: Detailed characteristics have been determined regarding pH, NaCl, dry matter, food preservatives (including nisin and naturally occurring lactate) and phosphate melting salts as relevant.
- Smear and brined cheeses, cottage cheese, processed cheese, chemically acidified cheeses have been included in the open access tool.
- A new project (Cbot-Predictor) has been initiated focusing on *Clostridium botulinum* and spreadable cheeses.

Sustainability benefits: Extended shelf life and less food waste. ●

Dairy training at Kold College in Denmark

The European dairy industry needs more workforce with more skills

A 3-years research in 14 countries shows a dairy industry asking for more skills in several fields - among these a better understanding of green production and digital skills.

Representatives of international dairy companies and national education institutions gathered in November at the Van Hall Larenstein University in Leeuwarden, the Netherlands, to discuss the outcome of the EU Erasmus+ project „Mapping Skills Needs and Supply in Dairy Sector".

The results

Statistician and dairy engineer Prof. Morten Arendt Rasmussen, Copenhagen University, confirmed at the Leeuwarden gathering that the database is really solid and provides a very good insight into dairy skills required. AEDIL was able to identify the following skills categories that are most important to the dairy industry:

- Dairy skills
- Digital skills
- Green skills
- Management skills.

Recommendations to dairy skills

AEDIL Project Coordinator Isabel Sande Frandsen (Denmark), described some of the most important findings. Employees in the dairy industry must definitely have dairy-specific skills. These can only be brought across if professional education is at a level that can fulfill industry demand.

- Do not level down on specific dairy skills training but rather scale it up, Frandsen quoted on of the key

BY LARS WINTHER

Isabel Sande Frandsen, AEDIL Project Coordinator.

findings of the AEDIL project. Adjustment of dairy training requires a close collaboration of industry and schools. AEDIL recommends that teachers and trainers have regular internships in dairy companies to have an insight into the state-of-the-art of industrial milk processing.

Recommendations to green skills
When it comes to green skills, dairy workers must be able to assess risks associated with milk processing, they must have an insight in reuse and reduction of energy and resources and be able to understand business plans with a green focus. This is an area that is only taught very scarcely at most educational institutions and hence needs quite urgent attention. Frandsen explained that many topics that are already taught at the dairy schools can quite easily get a green twist.

Recommendations to digital skills
Digital skills rank very high in the requirements of workers' qualifications brought forward by the dairy industry. This includes the ability to understand fundamentals of automation and to use business software. Pilot plants in dairy schools should be upgraded to state-of-the-art automation to make students familiar with existing technology. Part of the required digital skills is also that workers need to be aware of IT security. Furthermore, it was recommended that students should be exposed to automation during their internships in the dairy manufacturing industry.

Recommendations to management skills
As the dairy industry also needs qualified managers, workers' education must convey special qualification. The AEDIL project identified that business and supply chain understanding as well as LEAN as a tool for controlling unit operations stand at the core. In higher level education, future dairy company managers need to understand milk markets and consumer trends and their impacts on the industry.

Work-based learning
All these skills must be developed in a work-based (life-long) learning process. Trainers and teachers alike need continuous up-skilling in dairy plants to stay on top of newest developments. This means that a greater alignment between educational institutions and the industry is required. Dairy companies may also make use of external specialists in the supplying industry to cover special and plant-related knowledge transfer requirements.

Recruitment
The AEDIL event made one thing quite clear: if the dairy industry wants to attract and employ well-skilled workers, it must invest into necessary resources. This in turn requires money. The industry and, given the importance of milk production in rural economy, governments should be prepared for investment into qualified staff. ●

Further information:

Isabel Sande Frandsen,
AEDIL Project Coordinator.
Mail: isf@maelkeritidende.dk
https://dairysectorskills.com

AEDIL

Facts - AEDIL

The results and recommendations of a 3-year pan-Euorpean project were presented. The recommendations are based on a very comprehensive research and analysis of the future requirements for professional education in the European dairy sector.
The project started back in 2016 born out of the realisation that the development in the dairy industry is running much faster than the teaching at dairy schools across Europe – hence, creating serious skill gaps.
The results were presented at a conference on 26 November 2019 in Leeuwarden, The Netherlands

Initiator of the project:
AEDIL (Association for European Dairy Industry Learning).

Duration: 3-years

Research:
- 117 dairy companies in 14 European countries were interviewed to identify the most important skill requirements today and in the future, specific for the milk processing industry.
- 56 educational institutions (vocational and university levels) were interviewed to identify which topics are taught and at what level.
- 65 ex-students were interviewed to verify the taught lessons with perceived teaching.

Downloads from AEDIL's project site: dairysectorskills.com
- Report with Recommendations (available in English, German, French, Polish and Turkish).
- Analysis Report with country specific data.
- Report with Best Practices on Work Based Learning.
- Report with Best Practices from global front-runners on Green and Digital skills.
- Detailed data from the research.

Sustainable solutions through process automation

Plant optimisation in the dairy industry for increased sustainability

Since the 2016 release of the UN Sustainable Development Goals, the focus on corporate sustainability has increased dramatically.

Demands from the dairy industry are ever increasing and sustainability in the solutions from suppliers is a focus-point getting more and more attention in the requirements. Process solutions today are strictly validated against KPI's when it comes to consumption per SKU on water, electricity, chemicals for cleaning etc.

This focus is, by coincidence, happening in the same period as new technologies and smart solutions are merging as part of the Industry 4.0 / Digitalisation wave. These new technologies offer a toolbox to help the efficiency of optimisation, operation and maintenance, all supporting sustainability targets in the solution. Objectives derived from this are e.g.:

- Big data analysis tools for trimming and optimisation of processes
- Data analysis tools for OEE calculations help to improve line efficiency
- Smart sensors and predictive maintenance tools, securing more production uptime
- Smart in-line analytical instruments for optimising on product tolerances
- CIP analysis "auto-tune" tools and applications, securing minimum usage of chemicals, water, cleaning time.
- Smart application software enabling e.g. hibernate functionality in the process equipment.

Au2mate has been involved in numerous projects taking advantage of the new technology and smart tools. Below are a few examples on solutions supporting the sustainability targets in today's process automation systems:

Data analytic / Artificial Intelligence tools (AI)
As part of centralised automation systems today a large amount of data is per default collected in databases holding historical information on everything from sequence behaviour, alarms, process values etc. This vast amount of data can now via new software tools/algorithms be analysed and used for both optimisation and troubleshooting purposes all leading to improvements of processes.

OEE tool
Applying OEE on process and filling line equipment is today almost mandatory in new installations. The OEE tools provide a unique insight on plant performance and utilisation enabling the production management to trim and increase efficiency and production throughput.

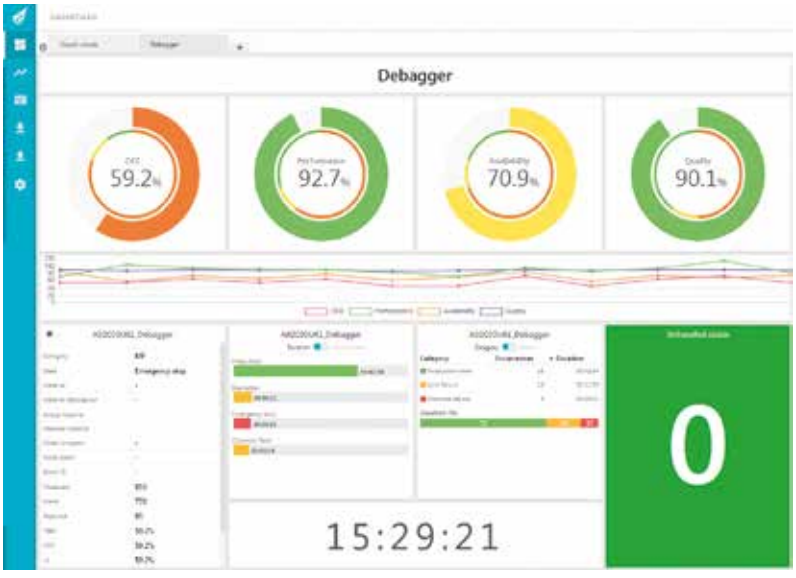
At the same time track and trace and material consumption reporting back to the ERP system, saves a lot of manual labour time documenting the same in traditional log sheets.

Smart sensors and actuators
New generation of self-calibrating and self-monitoring sensors allow continuous/-uninterrupted operation i.e. no need for production downtime for calibration purposes and sensor will automatically notify in case of malfunction.

New generation of actuators/valves with build in monitoring and self-diagnostic tools providing pre-warnings in case tolerances on travel time/movement is exceeded.

Proactive partner
Moving forward, Au2mate strive to be a proactive partner in the constant optimisation of the dairies. In case more information on applications or methods mentioned above is desired, please do not hesitate to contact us at www.au2mate.dk or by telephone +45 8720 5050. ●

AU2MATE



OEE tool from Au2mate

Bigadan, a pioneer in providing renewable energy to the industry

The production of biogas is rapidly increasing in Denmark. Bigadan was one of the first companies to use the technology, and is — with more than 30 years of experience — still one of the leading companies in the field.

BY LENE MIKKELSEN WALSH
FOTOS: BIGADAN

The Company name 'Bigadan' is a contraction of the words Biogas Danmark. And that is exactly, what the business is about – from engineering and construction of biogas plants to ownership and operation. Bigadan has been involved in more than 40 large scale biogas plants in 17 different countries where manure and industrial waste co-digest – with Arla Foods as one of its clients through almost a decade.

So the company has helped Arla in its green conversion — and the dairy still belives in biogas as a future source of energy. Both are good reasons to visit Bigadan and hear more about the benefits of biogas and the company's skills.

From pioneers to an experienced partner

Bigadan has its headquarters in East Jutland, outside Skanderborg on a country estate, where stables and barns are turned into offices. Here we meet COO Henrik Vestergaard Laursen, who guides us through the company history, makes status and names the visions.

He begins the story in the 1980's where the interest in finding alternative sources of energy was in its infancy. In Funen, foresighted entrepreneurs started Bigadan, in order to develop and sell biogas plants. During the first years Bigadan had different ownerships until 2000, where the company was established in its present form.

But some of the employees— including the CEO Karsten Buchhave — have been on-board almost since the start. So clients can benefit on the experience and knowledge, that the company has build, Henrik Vestergaard Laursen notes.

Bigadan started out selling plants – and still provide engineering and construction services to large-scale co-digestion biogas plants, but since 2001, ownership and operation of large scale biogas facilities are two other main business fields.

The Arla-case in Herning

The cooperation with Arla Foods in Herning is an example on, how to solve a clients' challenges.Around 2009 Arla had set some aims for the use of renewable energy. One of these where to use more biogas.

At the same time Bigadan had bought two biogas plants — north and south, of Herning, respectively Studsgård and Sinding. The plants, that run under the common name Herning Bioenergy, receive manure from local farmers and industrial organic waste from local food processing companies to produce biogas.

In 2014 Bigadan was to decide, whether they should renew a contract with the energy company, that provided energy to the households of Herning – or produce biogas for the natural gas network – or seek cooperation with Arla. The the choice fell on Arla.

COO Henrik Vestergaard Laursen

Facts: The benefits of biogas

Biogas is a renewable energy that can replace natural gas. It is produced by anaerobic digestion of organic material. Biogas production is thus a combined energy production and a waste treatment technology. When manure is used for biogas production, the emission of greenhouse gasses from handling and storage of slurry is reduced. And by-product is high quality natural fertilizer. The CO2 emission is almost as low as that of electricity.

Source: Danish Energy Agency

Studsgård biogas plant is one of two plants near Herning owned by Bigadan. The plants deliver raw gas for Arla's power plant, which uses the energy at its dairies in the area.

Therefore, in 2015, an 8.000 m^3 digester was constructed at Studsgård. Both Herning plants were connected with Arla´s facilities around Videbæk through a more than 40 km gas pipeline, so the plants are able to deliver gas to Arla's energy plant which produces energy for Arla's nearby dairies. Furthermore substiantial expansion on both plants were initiated.

Bigadan delivers the raw gas, and Arla has converted some of their boilers, so that they can use biogas in steam production, as well as they have invested in gas engines, that can generate electricity and heat.

The cooperation between Bigadan and Arla in the Herning area now runs in its fifth year. Arla has since set up different solutions with biogas all over Denmark with different companies. At the moment Arla use 27 pct. green energy in its industrial plants —primarily through biogas and woodchips plants.

Bigadan looks across boarders

Bigadan is on the top-tree list of the biggest players on the Danish marked for biogas, owning ten plants and with a solid history cooperating with industrial clients such as Arla and other energy-intensive companies.

COO Henrik Vestergaard Laursen describes the Danish marked for biogas as both open for green conversion through biogas, but also saturated at the moment. Therefore, Bigadan also looks for export opportunities

Most of all the COO would like to see biogas being used for heavy transport, but that is another story — hopefully to bee continued, according to Henrik Vestergaard Laursen. ●

Facts: Biogas production in Denmark

The total production of biogas in Denmark is expected to more than triple from 2012 to 2020, reaching a total annual production of 15 PJ. The measuring unit petajoule (PJ) is equal to one quadrillion (1015) joules. The total energy consumption in Denmark was 645 petajoules in 2018. According to The University of Southern Denmark today has a potential for producing biogas to 94 petajoules.

Source: Danish Energy Agency

Further information

Bigadan A/S
Vroldvej 168
8660 Skanderborg

Tlf: +45 86 57 90 90
mail@bigadan.dk
www.bigadan.dk

BIGADAN

FH SCANDINOX – your partner in food process engineering

FH Scandinox A/S is combining skilled project engineering with new and secondhand processing equipment. Now also with the grand opening of new margarine technology center in own facilities.

The dairy, and other food manufacturers are under increasing pressure to provide a constant stream of new and imaginative top-quality products. At the same time, they must comply with heavy demands on sanitary solutions. FH SCANDINOX design, engineer and supply complete processing plants, and equipment,

But also development and sale of small scale pilot plants are increasing world wide.

Our Expertise covers project management, plant installation, commissioning and after sales service, and dairy- and food processing technology is designed and engineered to meet strict hygiene, food safety and quality standards, while operating efficiently and sustainably.

Efficient organization

- With total 55 employees we are still a small actor in the food industry, but this means we have a very efficient and flexible organization, and most important we are very close to our customers. Thanks to our experience and know-how we are a serious and competent partner, who in close co-operation with our customers, develops optimum solutions fully meeting the consumers' stringent requirements, says Torben From, Sales Director at FH SCANDINOX. The company has a broad cooperation with several suppliers of dairy equipment, so the customers can be assured, that the technical level is at top.

Torben From

CIP and mix-poof valve matrixes

One of the growing activity fields are installation of CIP systems and also pre-manufactured mix-proof valve matrixes for any purpose in the process, which do have high attention.

- Our CIP systems are designed in such a way that optimal cleaning is ensured. Depending on the customers' requirements, we install central or decentralized systems or a combination of both. We are also able to pre-manufacture complete CIP units in our workshop, says the Sales Director.

- Our mix-proof valve matrixes are the optimal state-of-the-art solution for the liquid media flow in fully-automatic dairy and food processing plants. Manifold flow can thus be realized in a clearly arranged form in a relative small space. Our valve matrixes are individually developed by our engineering team, suitable for the respective processes and meet the customers exact requirements, says Torben From.

Pilot plants

FH SCANDINOX A/S supplies pilot plants to a wide variety of food industries.

For safety reasons more and more producers choose to develop and test the products on their own before large-scale production is initiated.

This small-scale process facility enables you to focus on research, development and

About FH SCANDINOX

40 years of experience and know-how within sale, engineering, manufacture, erection and running-in of complete processing plants and equipment worldwide.

3 divisions in Denmark, 2 placed in Jutland and 1 placed in Copenhagen. Plus subsidiary in Norway and China.

Engineering department with skilled technicians endeavor, who always provide a satisfactory solution in terms of quality, hygiene, function and economy.

Own erection department and a workforce of committed and highly experienced and flexible fitters, all experts in stainless steel.

All field engineers have certificates in stainless steel TIG welding.

Contact: FH Scandinox A/S
Tarm – Head office
Kærhusvej 4, Hoven
6880 Tarm
Phone: +45 7534 3434
E-mail: fhs@fhscandinox.com

Second-hand Equipment

With one of Scandinavia's largest stocks of used processing equipment for the dairy and food industries, FH SCANDINOX A/S can supply a wide range of:

- Stainless steel storage and processing tanks
- Homogenizers
- Separators
- Plate heat exchangers
- Butter processing equipment
- Margarine processing equipment
- Packing and filling machines
- Pumps
- Valves, etc.

We can rebuild and meticulously test used processing equipment in our workshop prior to delivery.

testing without disrupting the current production.

All our pilot plants are naturally characterised by flexibility and high quality.

Growing in margarine

The dairy industry is a main work area for FH SCANDINOX, but also margarine production is an very important work area. In 2018, the company acquired 75 pct. of the shares in Gerstenberg, who has more than 100 years of know-how in equipment and services within the margarine industry.

- We are convinced that this new initiative will not only be of great benefit to our existing customers on the international market but also make new potential customers enthusiastic. Our common vision is to be the preferred supplier to the margarine industry with new technology, and we believe there will be a positive synergy to our dairy activities as well, says Torben From.

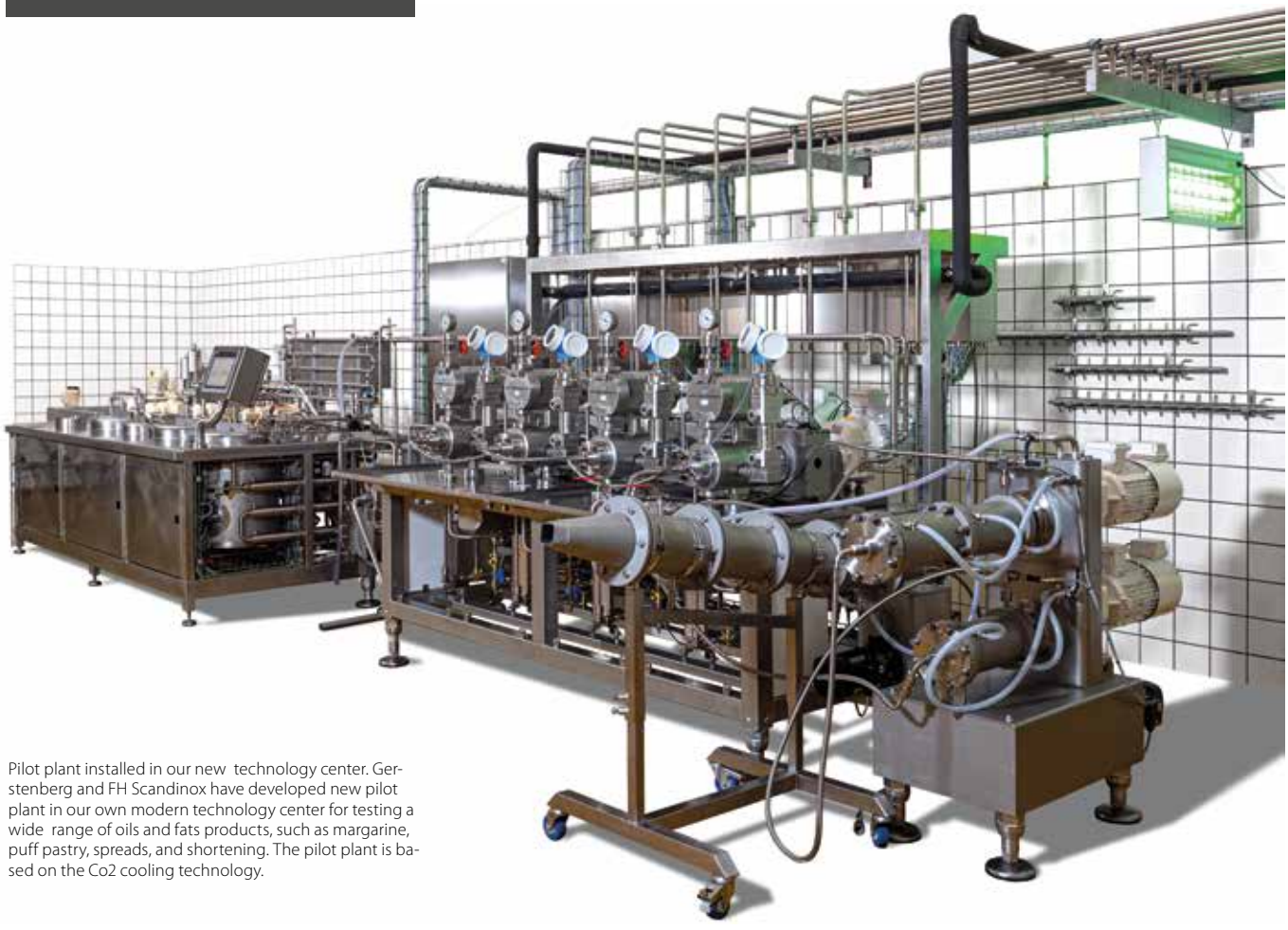
Dismantling and used

Another important area is dismantling and sale of used dairy- and food processing equipment.

- We have lot of experience working for the biggest companies in Europe. This includes dismantling of complete plants or smaller production lines, which often is re-installed at a new customer with different upgrades of the involved technology, says Torben From.

Among the customers are Arla Foods, TINE Dairy Norway, MILLS Norway, Puratos Belgium, who make use of the FH Scandinox experience in dismantling and selling used equipment. ●

FH SCANDINOX



Pilot plant installed in our new technology center. Gerstenberg and FH Scandinox have developed new pilot plant in our own modern technology center for testing a wide range of oils and fats products, such as margarine, puff pastry, spreads, and shortening. The pilot plant is based on the Co2 cooling technology.

Compact GEA test mixer improves hygiene, flexibility and efficiency

GEA has redesigned its market leading BATCH FORMULA® Test Mixer to meet customer demand for the highest levels of efficiency, flexibility and hygiene. The machine's footprint has also been reduced by at least 25% compared with previous models allowing equipment to be located easily within a plant, through normal door apertures, without dismantling.

The food and dairy industry has trusted the BATCH FORMULA® Test Mixer from GEA to create exciting products such as nutritional formula, ingredients, cream cheese, drinks and sauces, for many years. Being able to test products and processes at pilot scale helps customers to prepare recipes and establish process parameters before investing in full-scale plant, thereby bringing new products to market more quickly and profitably. The equipment can also be used for long-term, small-scale production or test group evaluation.

High flexibility

The modern design has addressed four key areas: hygiene, flexibility, efficiency and footprint. The design meets the strictest hygiene requirements of the food and dairy industry. This has been achieved through a series of detail changes, for example reducing the number of dirt traps in the system, helping to prevent cross contamination. The BATCH FORMULA® Test Mixer now features direct steam injection that allows the equipment to be used for making soft cheeses and sauces. This increased flexibility helps users to produce an even greater range of products on the same machine; also, integrated vacuum flash cooling allows fast, gentle product temperature reduction.

Efficient cleaning

Easy, efficient cleaning prevents cross contamination or product carry-over when switching batches.

GEA has used Computer Fluid Dynamics (CFD) techniques, usually reserved for full-scale equipment, on the BATCH FORMULA® Test Mixer. This allows the machine to be refined for maximum efficiency and to more closely harmonize with the results achievable on larger equipment.

A key feature of the BATCH FORMULA® Test Mixer is its integral CIP system (Cleaning in Place) which reduces the machine footprint, makes product changeover faster and reduces both water and chemical consumption.

The BATCH FORMULA® Test Mixer from GEA (Pic. GEA)

Core functions the same

For many years the BATCH FORMULA® Test Mixer has been the benchmark technology for processors requiring the flexibility of small batch production with easy scale up and trusted GEA technology. While the redesign has improved some key features, the core functions of the mixer remain the same. These include: high-shear operation to limit exposure to air thereby improving product quality and shelf life; and lowest point drainage for maximum product recovery. The BATCH FORMULA® Test Mixer also introduces powders below the surface so they are wetted more efficiently for fast processing and better mixing. These features reduce batch cycle times, improve product homogeneity, increase shelf life and reduce time to market for new products.

GEA test facilities at Ahaus, Germany

Customers may test products on the BATCH FORMULA® Test Mixer at the GEA factory at Ahaus in Germany before putting them into full-scale production. This also provides the opportunity to test down-stream processes (such as UHT or CIP) to establish the performance of the whole production line. The results obtained can be faithfully reproduced at production level.

GEA

Contact:
Jens Blach Andersen, Product Manager
Phone +45 2875 8096
jens.BlachAndersen@gea.com

BATCH FORMULA® Test Mixer

– designed for hygiene, flexibility, efficiency and easy installation

The state-of-the-art BATCH FORMULA® Test Mixer from GEA – the ultimate in hygiene, efficiency and flexibility. Combining trusted technology with innovation, the BATCH FORMULA® Test Mixer now features steam injection, integrated CIP and is 25% smaller for easy installation, even in confined spaces.

- Trusted technology for the effective mixing of food, dairy and beverage products;
- Ideal for testing recipes and processes ahead of full-scale production with seamless scale-up;
- Fewer dirt traps to prevent cross contamination;
- Optional direct steam injection for making soft cheeses and sauces;
- Integral clean in place (CIP) for fast product changeover, ultimate hygiene and minimal use of water and chemicals.

GEA engineering for a better world

gea.com

UNIVERSITY OF COPENHAGEN
FACULTY OF SCIENCE

A 2-year MSc program in Dairy Science and Technology

- with Internship and a Global Outlook

The University of Copenhagen offers a 2-year MSc program in Dairy Science and Technology as part of our Food Science program. Before the program, you will have the unrivalled opportunity of 6 months organised industrial internship within the dairy industry in Denmark or elsewhere.

The program focuses on providing in-depth insight into the formulation and production of dairy products, including the use of ingredients to achieve the right quality.

About 50% of the students in the program have an international background, and the teaching maintains a global outlook on dairy science and technology.

You will:

- Learn about process technologies that convert raw milk into nutritious products
- Understand how the individual processes affect the product
- Become knowledgeable about the whole production chain
- Achieve an in-depth understanding of the effect of the processes on quality.
- Gain insight into the underlying dairy chemistry
- Obtain a deep understanding of microbiology, starter cultures and enzymes

Structure

The structure of the program is shown in figure 1.

Requirements?

The program will fit students with a background equivalent to a BSc in Food Science.

All teaching is conducted in English.

Teaching

The teachers are all experienced researchers with a comprehensive knowledge of the science and practice of dairy technology. In addition, numerous guest lectures will be given by representatives from the industry.

Lectures and laboratory work are supplemented by pilot-scale practical experiments and visits to production sites.

Your MSc thesis will invariably involve close collaboration with a company.

Your future

After ending your education, the Dairy- and Food Industry sees the candidates as very attractive labour which means:

- Very low unemployment
- Good opportunities to work in an international environment
- Skills to become a manager
- Attractive salary conditions

Besides this, you also have the opportunity to become a researcher and teacher within your field.

About the Department of Food Science

Department of Food Science, Faculty of Science, University of Copenhagen performs research and conducts teaching at the highest academic level in the area of food science. Common to all of our research is that it contributes to growth, employment and solutions to global challenges such as sustainable food production, secure food supply, food and health, and the challenges within energy and the environment.

More at http://food.ku.dk/english/

Schedule

The program begins in September each year.

How to attend?

For more information on the program: http://studies.ku.dk/masters/food-science-and-technology/programme-structure/specialisations/dairy_technology/

Please also take a look on the faculty homepage under education:
http:// www.science.ku.dk/english/
Other questions, please contact, Associate Professor Anni Bygvrå Hougaard
abhg@food.ku.dk ●

A 2-year MSc program in Dairy Science and Technology – with internship and a global outlook

Year 1	Block 1	Internship	
	Block 2		
	Block 3	Molecular and Functional Properties of Milk	Food Processing
	Block 4	Dairy Processes and Equipment	Innovation and Entrepreneurship in Food
Year 2	Block 1	Microbiology of Fermented Food and Beverages	Food Quality Management and Control
	Block 2	Elective	Elective
	Block 3	Dairy Product Technology 1	Elective
	Block 4	Dairy Product Technology 2	Dairy Microbiology
Year 3	Block 1	MSc thesis	
	Block 2		

	Compulsory courser and thesis
	Elective courses

Fresh New Landia Mixer was the natural choice for Hollandia Dairy

A Landia AirJet mixer that solved an odor problem at one of California's oldest independent dairies, is close to completing a full five years of uninterrupted service.

At the Hollandia Dairy (established 1950) in north San Diego County, a side-entry mixer (from a different manufacturer) was failing to prevent build-up of odorous septic sludge in a 35,000-gallon bolted steel equalization tank (18.5 ft. in diameter x 18.75 ft. in height).

- Our old side-entry mixer just wasn't mixing the tank anywhere near enough, so odors were building up. Since the humble beginnings of the Hollandia Dairy, which was created by Mr & Mrs Arie de Jong shortly after they arrived in the U S from the Netherlands, we have always endeavoured to be good neighbors, so investing in a much better mixer was a must. On several occasions we had to drain the tank to empty out the sludge, which was no fun at all – and very, very time-consuming, said Hank Van Nieuwenhuyzen, Chief Operations Officer at Hollandia Dairy

Care for environment

ES Engineering were called in to see what solution could be found. Carbon filters were introduced, but as Project Manager Christian Tasser* explains, this was only a temporary measure.

- At Hollandia's milk processing plant in San Marcos, it was clear to us immediately that this family-owned business cared about the environment and took the situation with its equalization tank very seriously. We looked at how we could best prevent the tank's contents from going septic, taking measures to reduce pH levels and see what would be best, especially for peak production times. The wastewater, including effluent from Hollandia's fruit juice manufacture didn't pose a big problem with solids content, but the existing mixing system wasn't up to the job, he said.

Looking for an instant, yet long-term solution, Christian Tasser sought to maximize the effect of the newly purchased Landia AirJet (chopper pump model MPTK-I 80) by recirculating the foul air (from the top of the tank) down through the wastewater, thereby effectively scrubbing the sulfur out of the air to eliminate the odor issues. This set-up works along similar lines to the Landia GasMix sys-

BY THORKILD MAAGAARD,
SALES DIRECTOR, LANDIA

*Christian Tasser now works in the wastewater treatment and renewable energy sector for Carollo Engineers and together with Khalil Kairouz, PhD a leader in Odor Control Management, they are offering engineering solutions for wastewater clients nationwide.

Hank Van Nieuwenhuyzen, Chief Operations, Officer at Hollandia Dairy with Landia AirJet.

tem that is increasingly being installed for mixing of Anaerobic Digesters in wastewater treatment facilities and industrial biogas plants. The Landia AirJet at Hollandia dairy was sourced through World Water Works, Inc – an innovator in the wastewater treatment industry, who also provided installation of the AirJet.

No need for chemicals

- The Landia AirJet is reliable and very effective. The capital cost isn't high, and you no longer need to add chemicals to the tank – plus there's the very big advantage of not needing blowers, which are very energy intensive, Christian Tasser said.

And Hollandia Dairy's Hank Van Nieuwenhuyzen added:

- Installation was easy, through an existing manway, so no additional holes were needed in the wall of our tank. And in nearly five years of operation we've not had any problems at all with the Landia AirJet - and haven't had to clean out the tank once! Our odor problems have been solved. It's been an excellent investment". ●

LANDIA
- a global company with roots in Denmark

Landia supplies pumping and mixing solutions for agriculture, wastewater, biogas plants and food industry applications.

We are not part of the throwaway culture. As a Danish company, we are subject to very strict national regulations on energy consumption, waste handling, and wastewater – and rightly so. Throughout our production process and beyond, we work to minimize environmental impact.

Many Landia products have been in operation for 20-25 years even though the operating conditions may be extreme. In that way, Landia customers achieve the lowest lifespan costs, while resource consumption is minimized, which further results in a positive impact on the environment.

We have been manufacturing pumps since 1933, but we are keener than ever to produce the very best solutions – and match that with unrivalled aftersales support.

As well as Denmark, we have long-established business units in the UK, the US, China, Norway, and Germany and solid representation all over the world. In order to provide the very best technical solutions, everyone involved with sale of Landia equipment has an engineering background.

We have been ISO 9001 certified since 1994.

Contact:
Landia a/s, Industrivej 2, DK-6940 Lem St., Denmark
Find local sales office at www.landiaworld.com – info@landia.dk - +45 9734 1244

FoodTech building bridges

In Herning the team behind FoodTech 2020 believes that they can continue the growth from the recent exhibitions, as the latest in 2018 set several records, when it comes to visitors and exhibitors. This year builds on top of this.

- Basically the concept is the same, but I think we have succeeded with some exciting adjustments, which give even more opportunities, says John Jensen, Project Manager in MCH and a part of the project team behind IFC. He points at the new DiaLabXpo (Expo for laboratory technology and equipment), closer cooperation with DTU (Technical University of Denmark) to assist the bridgebuilding between students and the industry as a few examples of the innovation.

- FoodTech is a unique meeting place for the whole food sector. It is a place, where professionals learn from each other and a great option for product innovation, but also a possibility to recognize the work of colleagues and competitors. And as a part of Food Tech you have even more advantages, since the many integrated fairs give synergy opportunities, John Jensen says. ●

John Jensen.

FOODTECH

FoodTech takes place the 29 Sept. to the 1. Oct. 2020 and is the most important meeting place for the food industry and its customers in Northern Europe. More than 300 exhibits are offering 9,000 guests the latest food technology with equipment for all industries. In addition to the many exhibitors and stands, FoodTech allows participants to experience more special events:

- FoodTech Award for most innovative product news.
- Tech City - competitions, expert sessions, conferences, exhibitions with the latest technological trends.
- DiaLabXpo - expo for laboratory technology and equipment
- FoodTech Challenge - 50 ambitious students with highly specialized knowledge will compete to develop new business models, ideas and concepts that can successfully be implemented by participating businesses.
- IFC Water Congress - water in the Food Industry (see page 44)

See more at www.uk.foodtech.dk

FOODTECH
PROCESSING & PACKAGING | 29 SEPT. - 1 OCT. 2020

International Food Contest (IFC) - the dairy peoples meeting point

International Food Contest is a part of FoodTech. More than 1,200 dairy products will be rated by professionals with grades and public taste samples for each product. Dairy is the core of the exhibition, but it is continuously expanded with new food categories, which also includes plant based food. Products can be submitted for evaluation after registration until the end of August.

IFC also offers a wide range of events with food at its center, as well as attendees can participate in various lectures and short courses.

A wide range of suppliers with special ties to the dairy industry are part of the IFC.

See more at www.foodcontest.dk

Welcome to the future

Join the food industry's meeting place
29 September - 1 October 2020

Join FoodTech 2020 and strengthen your relations

FoodTech gathers the entire food industry in one place and provides a platform for inspiration, knowlegde sharing and developing new relations that will set your business up for the future.

Book stand and read more at uk.foodtech.dk

FOODTECH
MCH Messecenter Herning / 29 Sept. - 1 Oct. 2020

Primodan offices:

- Headoffice: Skimmedevej 10, DK-4390 Vipperoed
- Hagemannsvej 18, DK-8600 Silkeborg
- Turkey: 23 Nisan Mh, Mithatpasa Cd, No:22, Ofis Gökçadir Is Merkezi, K:4 Ofis:19, Nilüfer, Bursa.

Further on agencies in Egypt, Jordan, Norway, Serbia, Lithuania.

Se more at www.primodan.dk

New Yellow Cheese Skills in Primodan

PRIMODAN has recently acquired the yellow cheese-making activities from SPX® FLOW, which complements the qualifications in cheeseproduction

Primodan is a Danish-owned company which designs, manufactures and supplies filling plants and equipment for the dairy and food processing industry. It excels in the design and supply of turnkey white cheese plants, as well as cup, jar and bucket filling and packaging machines for markets worldwide. Last year Primodan acquired the SPX FLOW yellow cheese-making technology, which presents new opportunities and expansion of Primodan's current cheese-making plant business.

Over the years we have supplied more than 90 white cheese plants to markets primarily in the Middle East – by this new acquisition we look forward to spreading our presence by also covering the semi hard and hard yellow cheese market.

The yellow cheese technology

The specific technology and equipment included in the acquisition includes the CurdMaster, used to produce cheese curd from cheese milk; the OPD PrePress System, for batch draining, pre-pressing and cutting of cheese curd; the SaniPress system, for final pressing and handling of hard and semi-hard cheeses and a complete brining system. These machines have been proven to offer excellence in performance and efficiency across a range of cheese types.

As a part of the acquisition Primodan will also take over the aftersales activities for the equipment already installed around the world.

Primodan opens new office in Silkeborg – Denmark

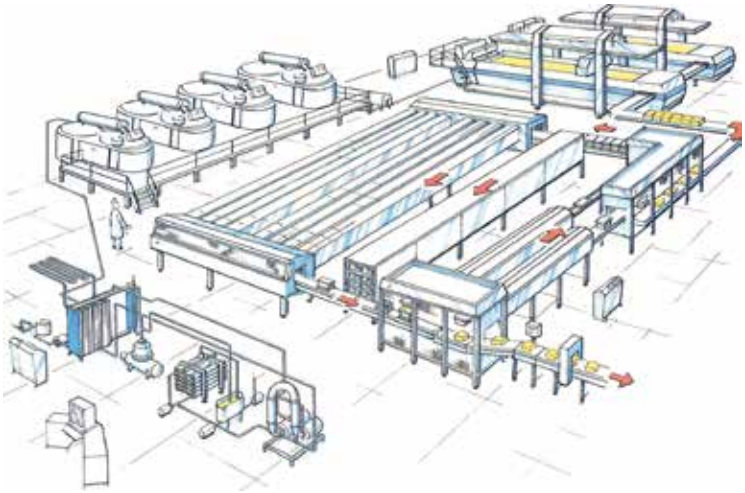
Primodan's strategy is to be a competent and reliable supplier for the yellow cheese segment – which is why Primodan has opened an office in Silkeborg- Denmark in order to be present in the area of Denmark where the know-how and knowledge is to be found for yellow cheese making. The first dedicated and competent colleagues have already joined the Primodan team and started in the new premises from where we will handle the yellow cheese projects and aftersales activities.

The office in Silkeborg is Primodan's second office outside our main office and factory in Vipperoed – Denmark. In 2018 we opened an office in Bursa- Turkey which today acts as an aftersales / service center for the Turkish and Middle Eastern markets. ●

BY LARS HENRIKSEN,
SALES DIRECTOR

Visit us at interpack
PROCESSING & PACKAGING
7-13 May 2020 Düsseldorf
Stand 6E76

Primodan - When flexibility is your priority



NEW

SEMIHARD/HARD CHEESE PLANTS

Primodan has acquired the cheese technology and equipment from APV/SPX.

Today we offer the well known range of equipment formerly sold under the ***APV/SPX*** and ***Pasilac*** brands. Equipment like the ***OPD Pre-press,*** the final pressing system known as the ***Sani Press,*** the ***Curd Master*** Chesse vats and the brining systems. This technology makes us capable of offering state of the art turn-key cheese plants for our valued costumers.

CUP- AND BOTTLE FILLING AND SEALING MACHINES

Capacities from 500 - 20.000/hour

UF (FETA TYPE) WHITE CHEESE PLANTS

Primodan is a world leading Danish Manufacturer of UF (FETA) white cheese filling lines and filling machines for use in highly efficient productions. Our solutions are custom-made with strong focus on hygiene, ergonomics and flexibility.

www.primodan.dk

Primodan A/S • Skimmedevej 10 • DK-4390 • Vipperoed • Denmark • Phone +45 59 43 14 79

With DairyQuant GO and InSight Pro solutions from Q-Interline you can rest assure that your analytical solution will provide trustworthy results and high value throughout the lifetime of the analyzers

Value through Insight since more than 20 years

Q-Interline has been supplying analytical solutions for the dairy industry since 1996. Experience earned from many projects and close cooperation with leading dairy groups, has resulted in our portfolio of analytical solutions covering the value chain from raw milk to finished products. Our solutions enables the dairies to monitor and control the quality of their production.

Effective implementation

Investing in an analyzer solution is an investment into a long relationship not only comprising an instrument delivery. Our new project concept covers a technical and an organizational project, which secures an efficient installation and implementation and at the same time prepares the organization to own and operate the analyzer solution. The project concept will enable the customer to operate the analyzer concept to its full potential as fast as possible and secure short return on the investment.

High value throughout analyzer lifetime

All DairyQuant and InSight Pro solutions from Q-Interline are ready for automatic instrument control that continuously monitors hardware, application and calibrations. Release resources for important tasks since automatic instrument control will alert you if your attention is required. When utilizing automatic instrument control, you can rest assure that your analytical solution will provide trustworthy results and high value throughout the lifetime of the analyzer. ●

BY PER SAND, BU MANAGER NORDIC, Q-INTERLINE.

DairyQuant GO – developed for analysis of key components such as fat, protein, dry matter and lactose in all kinds of liquid dairy products.

Contact information:
Q-Interline A/S
Phone: +45 4675 7046
Mail: info@q-interline.com
Web: www.q-interline.com

Q interline
Value through insight

InSight Pro online for analysis of butter.

InSight Pro

– for online process control

InSight Pro is a new concept of online analyzers from Q-Interline. InSight Pro will analyze powder, butter and spreads, cheeses and liquid dairy products, for important parameters such as protein, fat and dry matter. In addition to standard parameters, low signal components such as salt can also be analyzed.

Production sites in the dairy industry face constant demands to optimize the production and increase raw material utilization to remain competitive. They must minimize off-spec production and rework while producing within specifications and regulatory limits. InSight Pro delivers important intelligence of the process stability and enables operators and the production management to make solid decisions based on this. We call this value through InSight.

Results of the analysis is presented on a touch screen monitor at the production line where the results are to be used. The results are displayed with the InSight View user interface and ensure that status of the process is continuously provided to the operator.

InSight Pro can be equipped with various cells and probes that are optimized for the dairy products to be analyzed. Up to two measuring points can be connected to the same InSight Pro analyzer, providing greater flexibility and more attractive economy over one-point analyzer systems.

DairyQuant GO

- analysis of all liquid dairy products

DairyQuant GO is the first major innovation for analysis of liquid dairy products in the industry for several decades. It has been developed for analysis of key components such as fat, protein, dry matter and lactose in all kinds of liquid dairy products. DairyQuant GO is used for analysis of WPC and other types of concentrates, ice cream mix, cocoa milk, samples with additives and added sugar and much more as well as standard products such as whey, milk and cream.

Simple sample handling for the laboratory and the process

The unique feature of DairyQuant GO is that the sample is not pumped into the instrument. No liquid at all is pumped into the instrument! Instead, the sample is analyzed using the patented disposable Pivette™. You can analyze a concentrate sample followed by a low-fat milk sample, or any other combination of samples without compromising analytical results. After each analysis, the Pivette™ is disposed, and the DairyQuant GO is ready for the next analysis – without any cleaning, zeroing and waiting time.

Focus your resources on important things, since DairyQuant GO does not require your attention on a daily basis. Traditional systems require annual service, chemical for zero, cleaning and standardization and in general high level of maintenance to operate at optimal performance. This is completely eliminated with DairyQuant GO.

DairyQuant GO is the newest addition to the powerful DairyQuant family of FT-NIR analyzers from Q-Interline. It also comprises DairyQuant solutions for analysis of powders, butter and spreads, cheeses and much more.

Move Down the Line to Improve the Bottom-Line

Signode is offering state of art Transit Packaging Solutions for the Dairy Industry

The dairy industry is only as good as its supply chain. The safe, speedy, and efficient transport of milk, yogurt, cheese, butter, ice cream and other dairy products is essential for this ever-growing market sector. That's not including the multi-billion dollar rise of dairy alternatives like almond, soy and wheat milk

Regardless of its lactose levels, dairy and/or dairy-alternative product manufacturers face an array of material handling challenges. When it comes to shipping, not everything is as predictable as macaroni and cheese, and not everything is as volatile as ice cream. Everything moving through a processing plant and a distribution center does have a unique set of requirements. Some products are temperature sensitive and require cold-storage from fill-to-shelf, others may be highly perishable and need to be shipped quickly- pushing manufacturers throughput requirements to the limit.

Many packaging demands

As if ensuring these sensitive products arrive on-time and in-tact isn't enough, new global regulations and sustainability standards are making matters more challenging. As a result, manufacturers are being forced to look for novel ways to meet demands without sacrificing quality. Cutting down on packaging material or 'light-weighting' containers is one method for reducing waste and cost. Other manufactures are exploring packaging alternatives such as moving from plastic/poly-based materials to rigid cartons.

In either scenario, these efforts can be thwarted if pallet loads are not properly contained. For example, when stretch wrapping pallet loads, high film tensions can crush products that have been 'light weighted.' It's important to understand how product moves throughout its supply chain journey and to double-check if any changes have been made to the packaging or its handling. Some of the smallest adjustments can yield the biggest returns or failures.

Signodes variety of solutions

Fortunately, industry suppliers, like Signode, offer a wide variety of solutions to ensure the manufacturers' end-of-line also protects its bottom-line. From automated storage and retrieval systems (AS/RS) to FDA-approved water-based adhesives for product palletization to stretch wrap/hood equipment and protective packaging solutions, Signode works closely with manufacturers to identify ideal transit packaging solutions for the application. In fact, Signode can also test any solution before it's applied. From temperature-controlled rooms to drop-test equipment and vibration tables, Signode's ISTA certified lab provides customers peace-of-mind on a pallet. Following the norms and standards for load stability worldwide, Signode's commitment is further evident in its membership with EUMOS. The non-profit

Octopus Stretch Wrapper

BY ALICE HOLM KRISTENSEN, MARKETING MANAGER, SIGNODE INDUSTRIAL GROUP

About Signode

With more than 80+ manufacturing facilities and more than 7,000 employees worldwide, Signode is a leading manufacturer of a broad spectrum of packaging consumables, tools, software, and equipment that optimize end-of line packaging operations and protect products in transit.

organization in Europe was founded to develop the safety on cargo transport and set the standard to test load unit rigidity. With a diverse portfolio and a lab to back it up, that also means Signode is unbiased in its recommendations.

Lachenmeier and Octopus equipment

For example, heavy loads with sharp corners, boxed product or temperature sensitive applications work well with Signode's popular Lachenmeier stretch hood equipment.

The stretch hood equipment is further ideal at handling commissioned loads, especially low layer loads/one layers loads, where a stretch wrap solution is not preferred. However, for those looking for stretch wrap solutions, Signode offers its popular Octopus™ line of automatic rotary ring stretch wrappers. While it's not ideal for low/single-layer loads, it does provide maximum load containment for most all others. The classic ring-type method of wrapping invented by Signode ensures a well-balanced design which maximizes efficiency and reliability. It also allows for unlimited wrap patterns due to its ability to begin and end film cycles at any vertical point on the load. This inherent feature increases flexibility and reduces film usage up to 25%. The ring-wrappers can operate in environments down to -25 degrees Celsius.

Lachenmeier stretch hood wrapped load

When compared to traditional wrap systems, the "s" style pre-stretch of film improves performance, better handles a variety of films, and significantly lowers the overall cost of ownership.

Complex dairy packaging

Given the diversity of dairy products, it's no surprise that the way products are packaged is equally complex. From rigid milk cartons and plastic yogurt containers to resealable flexible cheese bags, pallet loads are as varied as the industry itself. To that effect, so is Signode. The company strives to provide its global customer base with the tools, expertise and solutions to meet even the most challenging transit packaging applications. So rather than crying over spilled milk, as the saying goes, keep your investment protected and work with your vendor to make sure the entire supply chain is optimized. ●

Plug-and-play water treatment
ensures quality and reduces installation time

When installation time and product quality have top priority, a factory-built solution offers many advantages. A Romanian manufacturer of spirits can attest to this with their newly installed water treatment plant from EUROWATER.

A water treatment solution consists of several treatment steps - filtration, softening, membrane filtration, booster pumps – all controlled from a central control cabinet. Basically, two approaches can be used when installing such a solution.

1. The water treatment units and components are delivered individually and assembled on site.
2. A factory-built system where all units and components are installed on a frame or skid; the "plug-and-play" approach.

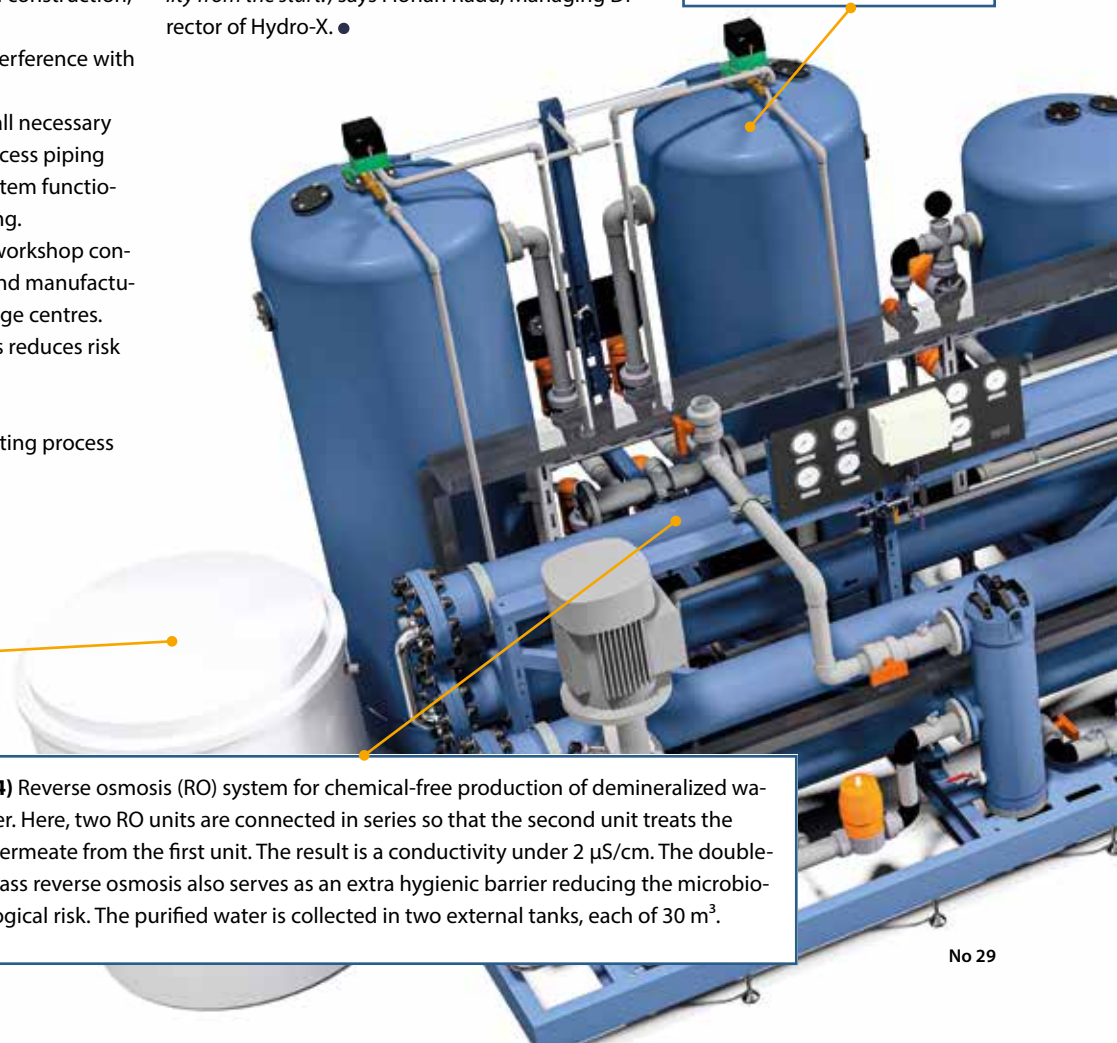
The plug-and-play approach offers several advantages:

- Factory-built systems allow parallel construction, reducing installation time on site.
- Off-site construction eliminates interference with facility production.
- A single-source design comprises all necessary system components, including process piping and wiring, and ensures proper system functionality and component dimensioning.
- Assembly takes place under ideal workshop conditions with full access to testing and manufacturing equipment as well as knowledge centres.
- Fewer on-site contractor manhours reduces risk of safety incidents.
- Testing is done before shipment.
- Straightforward connection to existing process equipment.

Customer case

Alexandrion, a Romanian brandy manufacturer, chose a plug-and-play solution. The complete water treatment system was assembled at the EUROWATER production facility in Denmark. Upon completion and testing, the entire solution was shipped to the customer location, where it was installed. This was managed by the local EUROWATER distributor in Romania, Hydro-X. *"The installation time was very short. From placing the two frames on site, it only took two days to make piping and electrical connections between the frames and tying it into the existing process. The plant produced high water quality from the start."*, says Florian Radu, Managing Director of Hydro-X. ●

(3) Softening unit for reducing the hardness in the water and preventing calcium deposits in the subsequent membrane filtration unit. Softened water is collected in an external water tank of 19 m^3.



Brine tank for regenerating the ion exchange softeners.

(4) Reverse osmosis (RO) system for chemical-free production of demineralized water. Here, two RO units are connected in series so that the second unit treats the permeate from the first unit. The result is a conductivity under 2 µS/cm. The double-pass reverse osmosis also serves as an extra hygienic barrier reducing the microbiological risk. The purified water is collected in two external tanks, each of 30 m^3.

Pure water treatment since 1936

SILHORKO-EUROWATER has more than 80 years of experience within the fields of developing, manufacturing, selling and servicing complete water treatment plants for the food and beverage industry, heat and power plants, waterworks, hospitals and other industries. The main applications are product water, boiler water, process water, cooling water, rinse water and drinking water. The company has more than 410 highly qualified employees at 23 sales and service offices around Europe. For more information, please visit www.eurowater.com

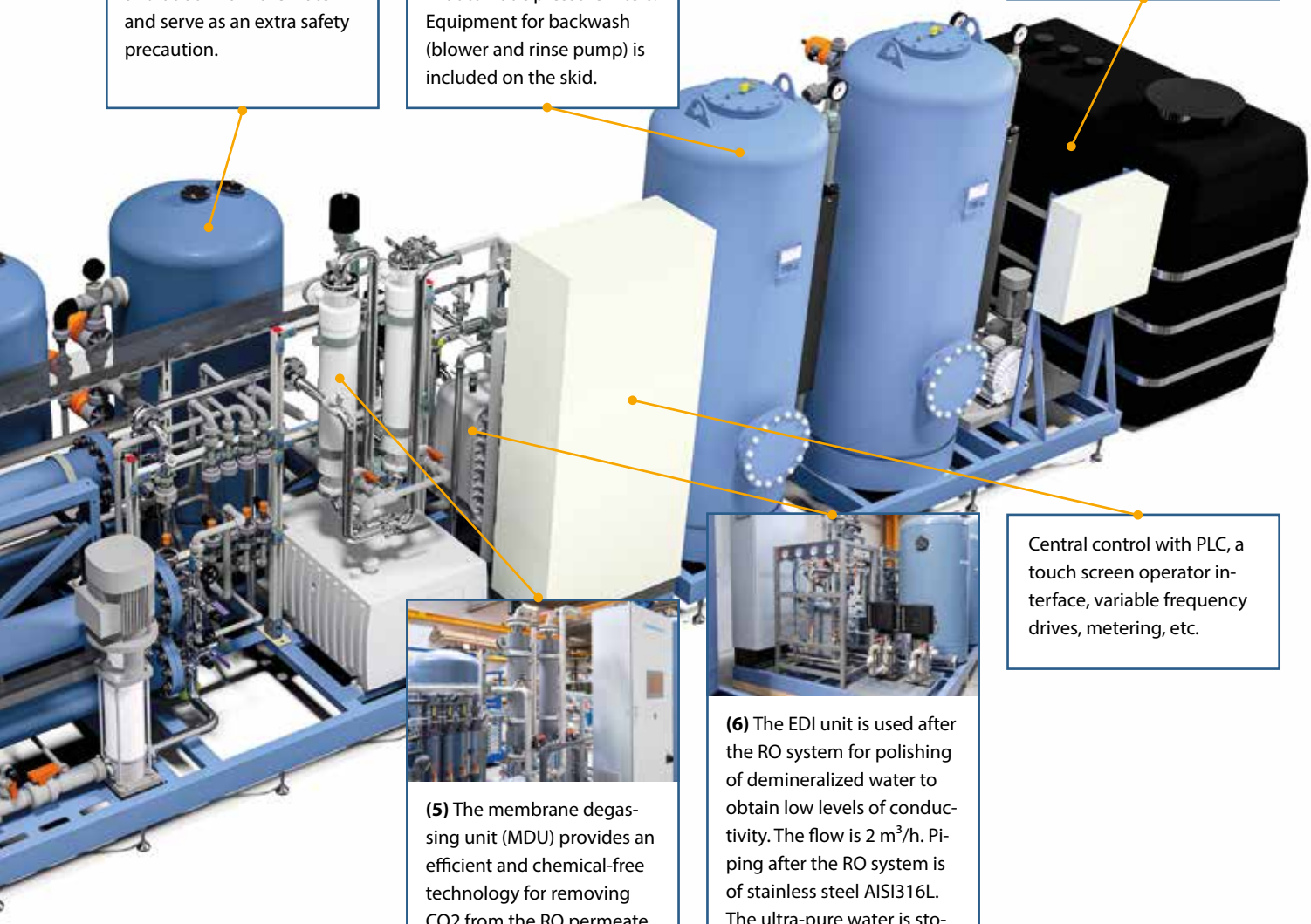
BY JENS O. GJERLØFF, MARKETING MANAGER, SILHORKO-EUROWATER A/S

EUROWATER
PURE WATER TREATMENT

(2) Activated carbon filters remove colour, taste and odour from the water and serve as an extra safety precaution.

(1) Removal of iron and manganese from groundwater in automatic pressure filters. Equipment for backwash (blower and rinse pump) is included on the skid.

2,500 L storage of backwash water for pressure filters.



(5) The membrane degassing unit (MDU) provides an efficient and chemical-free technology for removing CO2 from the RO permeate, thus improving EDI performance considerably.

(6) The EDI unit is used after the RO system for polishing of demineralized water to obtain low levels of conductivity. The flow is 2 m^3/h. Piping after the RO system is of stainless steel AISI316L. The ultra-pure water is stored in two external tanks, each of 15 m^3.

Central control with PLC, a touch screen operator interface, variable frequency drives, metering, etc.

Food packaging from 100% recycled plastic

Food-approved packaging made from 100% recycled plastic – is this possible? YES - Danish company SKY-LIGHT are specialized in plastic packaging and sheet made from up to 100% recycled PET.

Plastic packaging – and especially single-use plastic packing – is a much debated topic these years. Newspapers, TV and the social medias are overflowing with pictures of disposed plastic waste in nature and animals that have been negatively affected by plastic waste in oceans or on land. The comprehensive debate about plastic puts pressure on the plastic industry – but this debate is welcomed by the Danish manufacturer of plastic packaging – SKY-LIGHT A/S:

- Some may frown at plastic manufacturers, because they associate them with the world's current problems with plastics. We consider ourselves part of the solution, not part of the problem, explains Søren Kjær Larsen, CEO and co-owner of SKY-LIGHT A/S.

Plastic – a material with unique capabilities

- People tend to believe, that the problems with the large volumes of disposed of plastic in nature could be solved by minimizing or even banning the use of plastics. While we share the goal of minimizing use of all the world's resources, we would like to point out, that the essence of the world's problems with plastics are not plastic itself, but the way we humans dispose plastic products after use, highlights Søren Kjær Larsen and continues:

- The world's problems with waste in nature are not to be blamed on waste itself. All waste – no matter the material – is harmful to nature – and should be recycled. We are facing a behavioral problem – not a material problem.

Plastic is a unique material – a material with considerable advantages to our climate, especially when talking about food packaging. It is important to emphasize that a shift away from plastic to alternative materials could result in other negative consequences. We need to be aware of the unique mix of advantages, which plastic brings as cheap price, light weight, extended food shelf life, recyclability and durability (see figure 1). Therefore, plastic is by far the most climate-friendly material there is.

- We have loved plastic throughout many years because of its strength and durability – great qualities which paradoxically are turned into catastrophic disadvantages, when the material ends up in nature, notes Søren Kjær Larsen and continues:

- Plastic is disposed of in nature, probably because it is so cheap and therefore often considered as worthless waste. But once we dispose of plastic in nature, it seizes to be an asset, and instead becomes a liability – to the environment. This is what we humans overlook. The only solution to this problem is to ensure that the plastic is recycled and thus maintained as a valuable resource. If we recycle, we not only maintain the value of the plastic, we also prevent the negative value which will otherwise impact the environment.

SKY-LIGHT manufacture rPET food packaging with up to 100% recycled plastic. One of the sources are shredded and recycled plastic bottles.

rPET packaging: From plastic bottles to food packaging

SKY-LIGHT is specialized in optimizing the amount of recycled plastic in especially food packaging – without compromising food safety.

- For more than 30 years we have worked with recycling plastic into new packaging products. Today, we have reached a goal,

SKY-LIGHT

Contact - Inge Nielsen, Head of Sales
Tel: 0045 7676 7575
E-mail: ini@sky-light.dk

where we are able to produce food packaging and sheet with up to 100% recycled plastic, states Søren Kjær Larsen.

SKY-LIGHT were one of the very first companies to achieve the pre-approvement from EFSA (the European Food Safety Authority) to recycle post-consumer-waste from plastic bottles into new products approved for food contact – and since then they have not looked back.

- Plastic packaging of rPET is a sustainable choice – and we make rPET even more sustainable by increasing the amount of recycled plastic in our packaging products. By using recycled plastic, we decrease the use of virgin plastic and hereby the consumption of fossil resources like oil. The result is a significant reduction in the CO2 impact, explains Søren Kjær Larsen.

Making food approved packaging from recycled plastic is the essence of what SKY-LIGHT do. Today, between 85-90% of the company's total consumption of raw materials consist of recycled plastic – about half of this is post-consumer-waste from bottles.

Plastic is a unique material with a strong mix of advantages – especially when talking about food packaging.

Circular recycling of customers production waste

Besides recycled plastic bottles, SKY-LIGHT also use post-industrial-waste in their production of packaging and sheet. A vision to have a production facility, with the most sustainable resource consumption, has led to efficient circular recycling of all plastic waste from SKY-LIGHT's own production, as well as plastic waste from other parts of the value chain – including customers and other industrial partners. In most cases, SKY-LIGHT have established circular collaborations with their customers.

- Recycling is here to stay – and we see circular recycling collaborations as something that will grow in the coming years. We are the best in using recycled PET for food packaging, we aspire to become even better, and we will lead the development of maximizing recycled content in food packaging, ends Søren Kjær Larsen. ●

Join the plant-based fermented revolution

SPX FLOW offers process equipment for each step in the manufacture of both plant-based and dairy products.

BY: PRANAV SHAH, PROCESS CATEGORY DIRECTOR, FRESH DAIRY

Demand for plant-based products – which offer a healthy, more sustainable and more eco-friendly alternative to dairy – has risen over the last few years, resulting in a commensurate growth in sales.

But it's important to understand that this doesn't mark an end to dairy products; it just means more opportunities for producers/manufacturers and more options from which consumers can choose.

Health and simplicity

The most common plant sources for dairy alternatives are soya, almonds, oats, rice and coconut, but other plant-based milks are also gaining popularity, such as cashew, peas, hemp and flaxseeds.

Current food trends focus mostly around health and simplicity. People are becoming more aware of ingredients and the origin of what they eat and drink, and are looking for simple, clear labelling and nutritious food.

As a result of this, more plant-based products are being incorporated into consumer diets as they look for animal-free alternatives to their usual sustenance. Plant-based milks (and fermented products) fit this requirement perfectly and will offer a significant global market opportunity in the coming years, across all the regions, including Asia Pacific, Americas and Europe.

The factors affecting these trends include:

1. Demand for 'free-from' foods and vegetarian diets
2. Increasing incomes and increasing expenditure on food/beverages
3. Awareness among consumer about nutrition and well-being
4. Outlook towards sustainability, being socially acceptable, feel good factor and being 'cool' about new trend
5. Religion/cultural preference combined with animal welfare considerations

SPX FLOW is a brand

with extensive expertise in plant-based products and 30 years of experience in the market. It offers state-of-the-art production equipment and process line solutions for manufacturing different types of plant-based ferment-ed products and milk. Contact us if you are ready to ride the plant-based revolution.

Huge processing flexibility

The process for making plant based fermented products depends on the raw material selected. Soya beans for example need blanching and then grinding. While the processes for rice and oat that involve enzymatic reactions prior to grinding. For grinding, SPX FLOW offers a wide range of mixtures to select from, depending on the duty and function required. The slurry created by the grinding process is then subjected to fibre separation and heat treatment.

Heat treatment is a critical step for various reasons. Apart from very important bacteriological critical control points, this step also contributes to stopping enzymatic activities. SPX FLOW has in its portfolio a comprehensive portfolio of thermal processing solutions, backed by 1,000+ references and more than 50 years of experience. The technologies include direct heating, such as infusion or injection, or indirect heating including tubular, plate or scraped surface heat exchangers, any of which can be deployed to get the desired process advantages.

Expert help with testing

The heat-treated plant-based juice obtained by the various processes above can be used for a variety of fermented products. As this field is still emerging and offers potential to

many producers, SPX FLOW offers a testing facilities at its two innovation centres in Silkeborg, Denmark and at ENIL University, Mamirolle France.

In addition to its significant research and development and test-lab-based operations in the test centres, SPX FLOW already has significant real-world experience in the processing of plant-based products. Indeed, it is currently installing plant based lines with a number of leading food manufacturer known for its dairy products, but expanding operations into plant-based alternatives.

Traceability and up-to-mark CIP protocol is another primary requirement and forms another area of expertise within SPX FLOW. The two areas where cross contamination can occur are mixing and CIP stations. As a result, separation of those areas is critical! Dairy & non-dairy in the same plant.

Some process equipment, including heat treatment, can be used by both dairy and plant-based lines. This gives manufacturers the opportunity to run both dairy and non-dairy products in the same plant. The major equipment elements remain the same, with just the temperature parameters and bacteria culture differing.

As each different plant-based raw material possesses different compositions – in terms of carbohydrates, proteins, lipid profile etc. – the culture or enzyme chosen requires specific know-how and the testing of recipes, collecting samples and checking market adaptability might be needed. This can be done by performing a test at one of the SPX FLOW test centers or on a pilot/small-scale plant. Both alternatives have their own advantages. Performing tests at an SPX FLOW test center gives the manufacturer access to know-how and industry best-practices from SPX FLOW, while doing it in their own premises keeps intellectual property in-house.

SPX FLOW can offer a small scale, plug and play skid-based plant with capacities of around 150-200 kg/hr at a very affordable market price. These small-scale plants, along with larger commercial plants, are optimized in terms of their sustainable energy footprint and layout, and offer the flexibility, MES compatibility and traceability required by many customers. Each design prioritizes taste, mouthfeel, nutrition, digestibility, visual appearance, yield and economy. ●

Optimizing fractionation of milk proteins

Separating milk proteins in pure fractions containing casein and whey protein respectively is a dream scenario. It enables production of commercial interesting products but is also a technically challenging task to fulfill. Based on our research, Tetra Pak can optimize membrane filtration performance targeted towards the individual customer desire – and provide dairies with line solutions that are very cost effective and with high purity of retentate and permeate.

BY HANNE SØRENSEN, PRODUCT MANAGER FOOD AND BEVERAGE BASED APPLICATIONS, PHD (RIGHT), AND ANITHA RASMUSSEN, APPLICATION TECHNOLOGIST, TETRA PAK FILTRATION SOLUTIONS

Fractionation of skim milk is synonymous with microfiltration, and for this task both ceramic and polymeric membranes can be used. There is a significant price difference between the two types with ceramic membranes being more expensive. Research shows that ceramic membranes are superior in respect of passing whey proteins through the membrane and retaining casein compared to polymeric membranes. Therefore, both membranes have benefits and are useful depending on which requirements are of primary importance.

Common for both ceramic and polymeric membranes is that there is a pore size distribution rather than a defined cut-off value, which would be the optimal design for separating proteins. The pore size distribution may be of variable width, and therefore performance of the membranes is often interlinked with building of a secondary fouling layer.

Membrane performance tests

Tetra Pak has completed a range of tests investigating membrane performance at different processing conditions and thereby different fouling layer compositions. Combining performance of membranes from various suppliers with a building of a secondary fouling layer is crucial as it will define the final performance.

Trials have shown that good performance of a polymeric membrane filtration system can be obtained by different processing conditions depending on the membrane used. A relatively open membrane could be used together with a dense fouling layer created from low baseline and low crossflow pressure resulting in high flux, low retention of whey proteins, and high retention of casein.

Another membrane with a smaller and more narrow pore size distribution could be combined with low baseline and high crossflow pressure. This reduces the secondary fouling layer, and the fractionation process relies on the membrane properties themselves rather than the fouling layer.

Another well-documented aspect is on temperature during filtration. β-casein will partly solubilize from the casein micelle when stored cold and follow whey proteins through the membrane. Polymeric membranes are often operated at cold conditions enabling a long production time, but unfortunately also allowing a high transmission of β-casein. This could be overcome by increasing temperature and thus minimizing the performance difference between polymeric and ceramic filtration systems.

Pretreatment of milk often neglected

Milk is assumed to be fresh and undisturbed when arriving to the dairy. But it can have been traded between dairies resulting in multiple pasteurization processes. This will result in partly damaged whey proteins that are difficult or impossible to pass through the membrane, initiating a range of undesired effects such as decreased whey protein yield, buildup of protein in retentate, and/or decreased flux all resulting in decreased system capacity.

Another pretreatment is ultrafiltration/reverse osmosis concentration of milk for transportation purposes or for optimizing design of the production line. Tetra Pak has found that the possible degree and type of preconcentration will affect the subsequent microfiltration performance in respect of flux and retentions. Therefore, there is an often-unforeseen possibility to optimize a full line design. Focus is often targeted at the individual process – in this case microfiltration, but our work has proved that focus should rather be targeted at fully optimized line solutions to meet requirements needed at each dairy. ●

MEMBRANE FILTRATION: THE NATURAL WAY TO CREATE CUSTOMIZED DELICACIES

LET INDULGENCE MEET HEALTH

Consumers around the world are increasingly aware of concentrated yoghurt as a tasty source of protein – and look for recipes with yoghurt as an ingredient.

Concentrated yoghurt needs to be treated with care to ensure maximum yield as well as delicious taste and mouthfeel.

Tetra Pak has vast experience in fermentation technology, which is built into our processing solutions. Key step of the concentrated yoghurt line is the membrane filtration technology.

Want to know more? +45 8720 0840, tetrapak.com/membrane-filtration/

From the water congress in 2018

Are you updated upon the water use in your food company?

Water reduction, reuse and recycling is a central part of the sustainability programs in many food industries. In the fall 2020 experts will meet in Herning at Water in the Food Industry - as a part of FoodTech/IFC.

30 September and 1. October 2020 the 2th IFC – Water Congress will be held in MCH Messecenter Herning together with FoodTech and International Food Contest. The theme of the congress is "Water in the Food Industry" and covers the sustainability agenda that the food industry as well as the rest of the world is facing today. The Committee behind is dedicated to create a program, that will equip the audience to reflect upon the water use in their company. Since water becomes a more and more scarce resource, many food companies try to find smart water systems with a limited water use, which is closely connected to reuse and recycling.

John Jensen was project manager two years ago, where the first water congress specific for the food industry was held in Herning. Together with Maelkeritidende, he is also in charge this year.

- We got a real good feedback from the 100 participants, who was satisfied with the sharp focus upon the specific challenges for the food industry. We know, that water usage becomes more significant as a competitive parameter in the future and that authorities are tightening laws and guidelines every year. Therefore it is very important to be updated on the latest development, John Jensen explains. At the deadline of DDFI the program was not ready yet, but one opening keynote speaker will kick off the congress with a broad overview of the UN Sustainable Development Goals in relation to water in the food industry.

Denmark obvious host

- We also think, that Denmark is an obvious host for a conference of this type, since we have several leading suppliers of water equipment and technology, and I expect these to be a part of the congress as well. Furtheron we have invited academia experts to contribute with their latest research and applied aspects on the congress theme, John Jensen says.

The congress will be divided into 3 sessions - water reduction, reuse and recycling – each issue with new water technology aspects for the food industry and applied technology and case studies.

-The ambition is to convert the newest knowledge in these areas into applicable solutions for the food industry. The congress will end with a panel debate to discuss the water challenges in Food industry, John Jensen says. ●

WATER CONGRESS

Water in the Food Industry

The sessions will focus on 3 thematic areas:

Session 1: Water Reduction in the Food industry - in relation to Sustainability, Food safety and Rethink

Session 2: Water Reuse in the Food industry – in relation to Sustainability, Food safety and Rethink

Session 3: Water Recycle in the Food industry Sustainability, Food safety and Rethink

Follow the program at www.ifc-watercongress.dk

John Jensen, project manager, MCH.

For more information:
John Jensen, jj@mch.dk.
Phone: +45 2321 6088
Birgitte Glad,
bg@maelkeritidende.dk.
Phone: +45 2237 4025

Vision

IFC Water Congress should be the preferred meeting point for the Northern European food industry in terms of sustainable water solution and wastewater management.

Mission

To create a meeting place where knowledge about water and wastewater are in focus starting with the food industry in Northern Europe.

- professional speaks from the best experts in the industry.
- networking across boundaries and industry.

A part of FoodTech
www.ifc-watercongress.dk

FOODTECH
MCH Messecenter Herning / 29 Sept. - 1 Oct. 2020

MCH | +45 9926 9926 | mch.dk

MCH

Dairy production is a part of the solution

More than 200 dairy people meet at Nordic Dairy Congress in Malmö to discuss the UN sustainability goals. They strongly believe, that milk and dairy production can contribute to solve malnutrition in a sustainable food model. The congress is open for dairy people from all over the world.

BY BENGT PALMQVIST
PRESIDENT OF THE NORDIC DAIRY TECHNOLOGY COUNCIL

Delivering on the UN Sustainable Development Goals and fixing the climate crisis is the center of attention around the world and the debate is challenging the dairy industry to perform even better. However, the dairy sector remains part of the solution if we are to feed a growing world population – making sure that people around the world get the valuable and essential nutrients that dairy products and dairy ingredients provide.

The 45th Nordic Dairy Congress brings together prominent speakers from around the world to present a programme designed with an international outlook and the ambition to appeal to participants with different competences, positions and challenges. The speakers will present solutions and views that should serve as inspiration for the dairies and related industries to improve their financial bottom line as well as their bottom line supporting the UN Sustainable Development Goals. Furthermore, we hope the presentations will spark the smart brains of the scientists at universities and other knowledge institutions to help the industry come up with sustainable solutions of tomorrow.

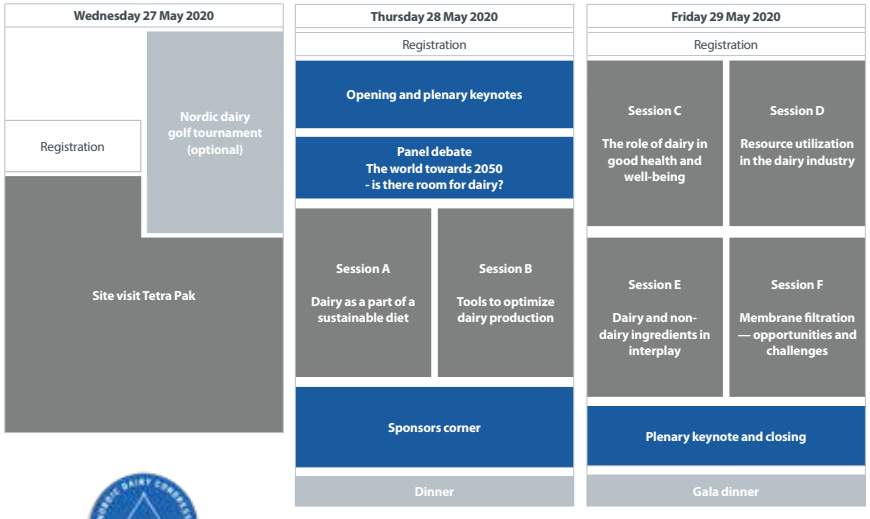
The Congress is international, and the entire program will be in English. The Nordic Dairy Technology Council has been extended with active participation from Society of Dairy Technology, UK. On this background we are welcoming dairy specialist, scientists, enthusiasts and stakeholders from all over the world to a congress with a cutting-edge programme.

The Congress will take place in the center of the beautiful Swedish city, Malmö. Malmö is very close to Copenhagen and transfer works easily upon arrival at Copenhagen Airport.

Last but not least, we are proud to announce, that the Nordic Dairy Congress 2020 also marks the celebration of 100 years of Nordic collaboration around dairy congresses. The anniversary will be celebrated at the congress gala dinner, which will be held in the old and beautiful Town Hall of Malmö, Knutssalen. The celebration will be hosted by the Mayor of Malmö on behalf of Malmö City.

I am looking forward to welcoming you to the 45th Nordic Dairy Congress in Malmö. ●

Programme overview



NORDIC DAIRY CONGRESS

100 YEARS
2020

Nordic Dairy Congress

DAIRY OPPORTUNITIES OF TOMORROW

Malmö, Sweden 27-29 May 2020

SUSTAINABLE DEVELOPMENT GOALS

The theme is 'Dairy opportunities of tomorrow' and the programme will dive into specific goals that are crucial for the dairy industry. About 300 participants from the Nordic region as well as the rest of the world are expected to register.

The language of the congress is English. Early bird registration with reduced price until 15 March 2020: EUR 715 ex. 25% Swedish VAT.

Visit the website for further information.

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www.nordicdairycongress.com