

I N T E R N A T I O N A L

# DAIRY

IDM 8

August 2017

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PROCESSING | INGREDIENTS | PACKAGING | IT | LOGISTICS

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Explore the ideas of tomorrow, today! Latest market trends, production and service concepts, technical innovations and a broad range of sustainable packaging solutions. Discover how cutting-edge software, automation and digitalization can revolutionize your operation. As your partner for end-to-end solutions for the food industry Tetra Pak and Miteco – our Centre of Expertise for Carbonated Soft Drinks – showcase at drinktec how to secure the growth of your business: today and in the future!

Visit us at our booth in hall A6.303.

Get more information and your free entrance ticket at [www.tetrapak.com/drinktec](http://www.tetrapak.com/drinktec)



#### Editorial:

4 It's a new market situation

#### drinktec 2017:

6 A hotspot for the dairy industry

#### Site report:

14 Lactoprot: Expansion ahead

35 The world's highest performance milk drying plant

#### Interview:

45 Fermented dairy products – market development

#### Market analysis:

26 The World Dairy Industry and the changing World Agenda 2017-2025

32 Rabobank: Global Dairy Top 20

#### QC:

13 Lactic acid bacteria test gained independent validation

#### Technology/IT:

16 Heidebrecht/Reitmaier/Kulozik: Milk protein fractionation by means of microfiltration

20 Raw milk without bacteria from the stalls

30 Donaldson sets standards with LifeTec and the (P) series

33 Fruit juice 4.0

38 Innovations in automation to deliver efficiency, quality and confidence

42 Hygienic, versatile and powerful double-screw pumps

#### New book:

23 Achieving sustainable production of milk, Volume 2: Safety, quality and sustainability

28 IDF Bulletin – Global Marketing Trends

#### Ingredients:

24 Powders with impeccable handling properties

40 Oestergaard: Nutritional beverages

#### Packaging:

29 World first aseptic pack 100% linked to plant-based renewable material

37 Standardizing labeling and marking printing

44 Oxygen and undesired reactions

#### EDA Column:

48 The future of Dairy in the Post-2020 Common Agricultural Policy of the EU

#### COLUMNS:

13, 23, 28, 29, 37

News

29

People

50

Suppliers guide

51

Imprint

51

Preview IDM 9 2017



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# It's a new market situation

Milk fat is no more a problem, but protein is

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Roland Sossna  
Editor IDM  
International Dairy Magazine  
sossna@blmedien.de  
international-dairy.com

In a somewhat historical view, the markets for milk fat and milk protein have come into a complete imbalance. The prices quoted for protein are about what they have been a year ago while the prices for fat have skyrocketed by an unbelievable 150% or so. As it looks like, this tendency is here to stay for somewhat longer, although there are first indicators in the markets that fat prices won't increase much anymore.

Nobody in the industry who has a heart for dairy farmers would say that milk fat prices need an imminent correction as milk prices have recovered to a much more sustainable level over the past months. One should remember that a relatively large number of farmers has quit, at least in Europe, in reaction to the severe market crisis we have seen. This cannot go on without significant repercussions for processors.

What we see is in fact a totally new market situation. Consumers eat more cheese – the EU exports are destined to reach an all-time high this year – and cheese absorbs a lot of milk fat. There are also less alternatives to milk fat available, just look at the long-going negative discussion on palm oil. Vegetable fats have reached a relative high price level and they are no longer available in as much quantity as one who wants to save costs would possibly like to source. Butterfat also benefits from the declining consumption of margarine and, generally speaking, milk fat has now the image of being the very best nutritional fat on the planet, even in the US. And, breeding has led to lower amounts of fat in milk.

Therefore one needn't be preoccupied with the fat side of the market. But the market situation for protein is worrying. EU stocks above 350,000 tons of SMP have put a heavy burden on the market and what has once disappeared into intervention must return sooner or later to the market. No-one seems to have developed the right means how to cope with the SMP stocks. And this is likely to stay that way.

It is to hope that the looming correction on the milk fat side will not shake the market in a way that will produce the next milk market crisis before farmers have recovered from the past one, thinks Roland Sossna.

A handwritten signature in black ink, appearing to read 'R. Sossna'. The signature is fluid and cursive, with a long horizontal stroke at the end.



# Together we make the world's best dairy processing equipment

As the world's milk production has increased over the last few decades, GEA has been at the forefront of dairy processing technology. Our expertise in plant design and development has grown with the global demand for pure, healthy food, and by listening to and supporting our customers.

GEA draws its expertise from all corners of the globe to bring together the very best in dairy processing technology,

to deliver everything from individual solutions to entire processing plants. By listening to our customers and responding to their needs, we can ensure that the solutions we develop meet the world's highest production standards.

Ongoing service and support ensures your plant continues to operate with maximum output and minimum downtime, waste and energy consumption, and is why partnering with GEA makes perfect sense.



photo: Messe München

# drinktec: Hotspot for the dairy industry

11 – 15 September, Munich: Every second exhibitor will address the dairy industry

**M**ilk-based drinks are generating an annual turnover of around € 100 billion on the global market, which is about the same as the international market for standard milk products. Especially outside Europe, the market for milk mixes is growing rapidly. At drinktec, the world's leading trade fair for the beverage and liquid food industry, which will be held in Munich from 11 to 15 September 2017, the exhibitors will also deal with this issue.

55% of the exhibitors announced in the run-up to the fair to offer solutions for the dairy industry. At drinktec 2013, more than 12,000 visitors were from the milk and liquid dairy products sector (an increase by 58 percent compared to the previous trade fair). At drinktec 2017, the exhibitors will present the whole range of the treatment of milk and whey as well as liquid foods. In addition, suppliers of raw materials and additives will also show their products.

## Program for dairy processors

With hall B1, drinktec 2017 alone has 11,000 square meters of floor space for raw materials, ingredients, additives and treatment agents. In this appropriate environment, the Special Area New Beverage Concepts will be an excellent place where visitors from the dairy sector can get ideas for future innovations. An ideal place for product developers, brand and innovation managers as well as marketing managers and buyers, to test

new beverage concepts and to search for new ideas. The Innovation Flow Lounge is being continued to the drinktec 2017 with a new concept as a source of inspiration for marketing, packaging and product innovation. The last day of the drinktec forum is devoted exclusively to milk. The topics range from microwave processes in pasteurization to preservation methods to milk protein fractionation by means of microfiltration.

IDM has compiled a show pre-view for you on the following pages.

**Danish Food Tech Group**

Danish Food Tech Group is organising a national Pavilion of Denmark at drinktec 2017. At the Pavilion of Denmark, five Danish companies will showcase their solutions and services to the international beverage and liquid food industry: Admix Europe ApS, BLÜCHER METAL A/S, Expanite A/S, KM Rustfri A/S, System Cleaners A/S.



**KM Rustfri is launching a new valve increasing output in beverage production by 300 percent (photo: KM Rustfri)**

Expanite is introducing a new process to increase surface hardening of stainless steel by a factor of 10. KM Rustfri is launching a new valve increasing output in beverage production by 300 percent. System Cleaners A/S is presenting a new solution enabling beverage manufactures to reduce cleaning time by half and increase production. [dk-export.dk](http://dk-export.dk)

**Domino: Coding 4.0**

Domino presents state-of-the-art coding solutions that beverage and liquid food manufacturers need for finishing their products at high throughput, reliable productivity and low operating costs:

The newly launched Ax-Series Continuous Ink Jet printers use an array of integrated sensors to automate system monitoring, allowing for proactive and predictive diagnos-



**Caption: Domino can provide all the building blocks of Industry 4.0 in coding and marking (photo: Domino)**

tics and remote service support through IIoT and connection to the Domino Cloud. The company can provide the building blocks of Industry 4.0 in coding and marking.

Domino has also developed two new inks which have been designed for coding substrates where a layer of moisture is present. As the dried ink can be removed through caustic wash processes, these inks are particularly suitable for use on returnable glass bottles. The i-Pulse yellow ink (2YL855), with its high contrast on dark substrates, is designed for marking coloured returnable glass bottles, while the i-Pulse black ink (2BK156), a fast dry black ink, has been developed for coding onto both PET and clear returnable glass bottles.



Worldwide supplier of filling/packaging machines

# Techology for your ideas

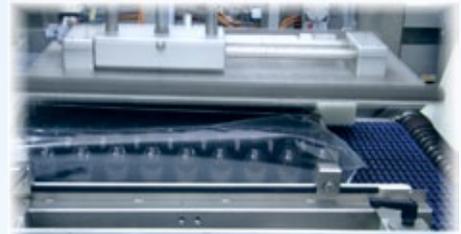
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**Hall B5  
Stand 535**

**MUNICH  
GERMANY  
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The new F720i high-speed fiber laser has been designed for coding cans at speeds up to 90,000 beverage cans per hour and is suitable for demanding production environments thanks to its high IP rating. [domino-printing.com](http://domino-printing.com)

### **Flottweg: Small separator, immense potential**

Flottweg will present its brand-new AC1200 separator. It is starting a new product line of high-performance separators for small and mid-sized companies. This separator is characterized by its excellent clarification performance, outstanding product yield, and a compact, user-friendly design. Its core applications are in the juice, beer, and olive oil industries. The system is specifically configured and adapted for each of these applications.



**The AC1200 offers optimum product yield due to quiet, high-precision Soft Shot discharge system, has a user-friendly handling and simple maintenance, incorporates individual process integration and parameterization for customer needs or requirements on site, offers high flexibility with minimal space requirements (floor area of the skid is about 2 m<sup>2</sup>) (photo: Flottweg)**

The skid solution makes the AC1200 extremely flexible, with very little space required. The separator is also equipped with the patented Flottweg Soft Shot discharge system for product-friendly, quiet discharge.

Flottweg is also starting a new era in terms of product design. The design of the AC1200 communicates the Flottweg core competences of robustness, quality, and maintenance friendliness. The goal of the product designer is to direct the focus more specifically onto the point of know-how, the separator bowl. [flottweg.com](http://flottweg.com)



**The GEA Homogenizer Ariete 5400 offers the greatest versatility achieved so far in the industry (photo: GEA)**

### **GEA: The widest capacity homogeniser**

GEA's new Ariete Homogenizer 5400 offers the widest capacity ever achieved (80,000 l/h@120 bar) and the greatest versatility; from dairy to beverage, but also in pharmaceutical and chemical sectors while maximum efficiency and safe operations are guaranteed.

The growing demand for high efficiency and safe operations in the dairy industry has prompted GEA to develop the only homogenizer in the world able to ensure increasing quality standards for continuous production, using less power and fewer resources compared to the other 5 pistons homogenizers on the market. The high pressure Ariete pump means 7% higher efficiency in its class, this coupled with the possibility to install GEA high efficiency options such as NiSoPURE, NanoVALVE and OPS allows further savings in production costs (power, water, oil).

The new strengthened design confers greater steadiness and stability to the machine in any working condition prevented vibrations and allowing smooth operation and reduced pulsation also for viscous and difficult products. Thanks to GEA's expert aseptic capabilities in the pharma sector:

- Inside and outside design allows extreme hygiene and safety
- Straight pipes for inlet and outlet connection to manifold
- Easy cleaning due to no water stagnation areas
- Slope on external case for discharging
- Motor position allows safe and easy access for the operator.

Entirely built around customer's needs, Ariete Homogenizer 5400 allows easy and safe accessibility to the inside minimizing service time. The motor position allows safe access to the operator and easy belt tensioning. [gea.com](http://gea.com)

### **GEA: Aseptic Blow Fill**

GEA's Aseptic Blow Fill (ABF) is the world's first rotary aseptic blow moulding machine with an integrated aseptic filler and

capper. The principle is to sterilize the preform with hydrogen peroxide at the exit of the oven, then blow the preforms with sterile air in a sterile environment and maintain this sterility throughout the filling and capping process.

The system reduces the use of chemicals and doesn't need any water in production. Energy usage is kept to a minimum by the elimination of air conveyors, sterilization and rinsing carousels, and water UHT sterilization. The whole system is more compact than traditional technology and requires fewer operators.

ABF is an extremely flexible system that can blow and fill up to 48,000 bottles per hour on 500 ml bottles, and can operate for up to 165 hours without any need for intermediate SOP during production. It operates at different levels of decontamination appropriate for each product: this allows products with different shelf lives – low acid and high acid aseptic beverages – to be filled on the same system.

GEA's revolutionary ABF technology, that uniquely sterilizes preforms before they are blown into their final shape, has enabled a reduction in the weight of the bottle to be filled. As the preform is made of thicker material than the bottle itself, it's possible to work with higher temperatures during sterilization without any risk of shrinkage that would affect the shape of the bottle.



**GEA's Aseptic Blow Fill (ABF) is the world's first rotary aseptic blow moulding machine with an integrated aseptic filler and capper (photo: GEA)**

This allows the weight of the bottle to be reduced compared with traditional aseptic systems. For example GEA designed a new type of lightweight PET bottle that was 25% lighter than previously used: just 12 g compared with 16 g for a standard 500 ml bottle for aseptic filling. Further innovation to the bottle shape was possible, thanks to the cooperation with Bericap, by the 33/15 neck, double-thread finish.

The perfect cap sterilization system for the GEA Procomac ABF is the Sterilcap VHP, based on the DRY sterilizing effect of H<sub>2</sub>O<sub>2</sub> in vapor form at the correct concentration and temperature. The design of the chutes inside the machine ensures that all the cap surfaces are exposed to prevent any shadowed area.

Sterilcap VHP is very compact and is located on top of the filler to feed the capper by gravity. It is able to treat both sport and flat caps on the same machine. Changeover can be performed quickly, without any mechanical intervention and without losing sterility. [gea.com](http://gea.com)

**Gebo Cermex: Robotics**

Gebo Cermex, part of the Sidel Group, will showcase the latest developments:

- AQ Flex – a breakthrough universal all-in-one conveying solution which delivers unprecedented packaging line performance, unrivalled output speed and unique agility.
- EvoFilm – a robust, high speed, flexible modular shrink-wrapping solution. It meets today’s sustainability and energy-saving challenges, while ensuring product integrity and finished pack quality.
- The cobotic version of FlexiLoad – a magazine loading solution that ensures automatic, flexible and safe corrugated magazine feeding on any case packer and erector, to reduce the source of musculoskeletal disorders while allowing natural interactions between the fenceless machine and the operators.
- Cobots on Automatic Guided Vehicles (AGVs) – cobots add high precision and cost-effectiveness to simple and repetitive tasks, thus increasing the added value operators can bring. By making them "mobile" – implementing them on AGVs – their efficiency will be spread across the line.



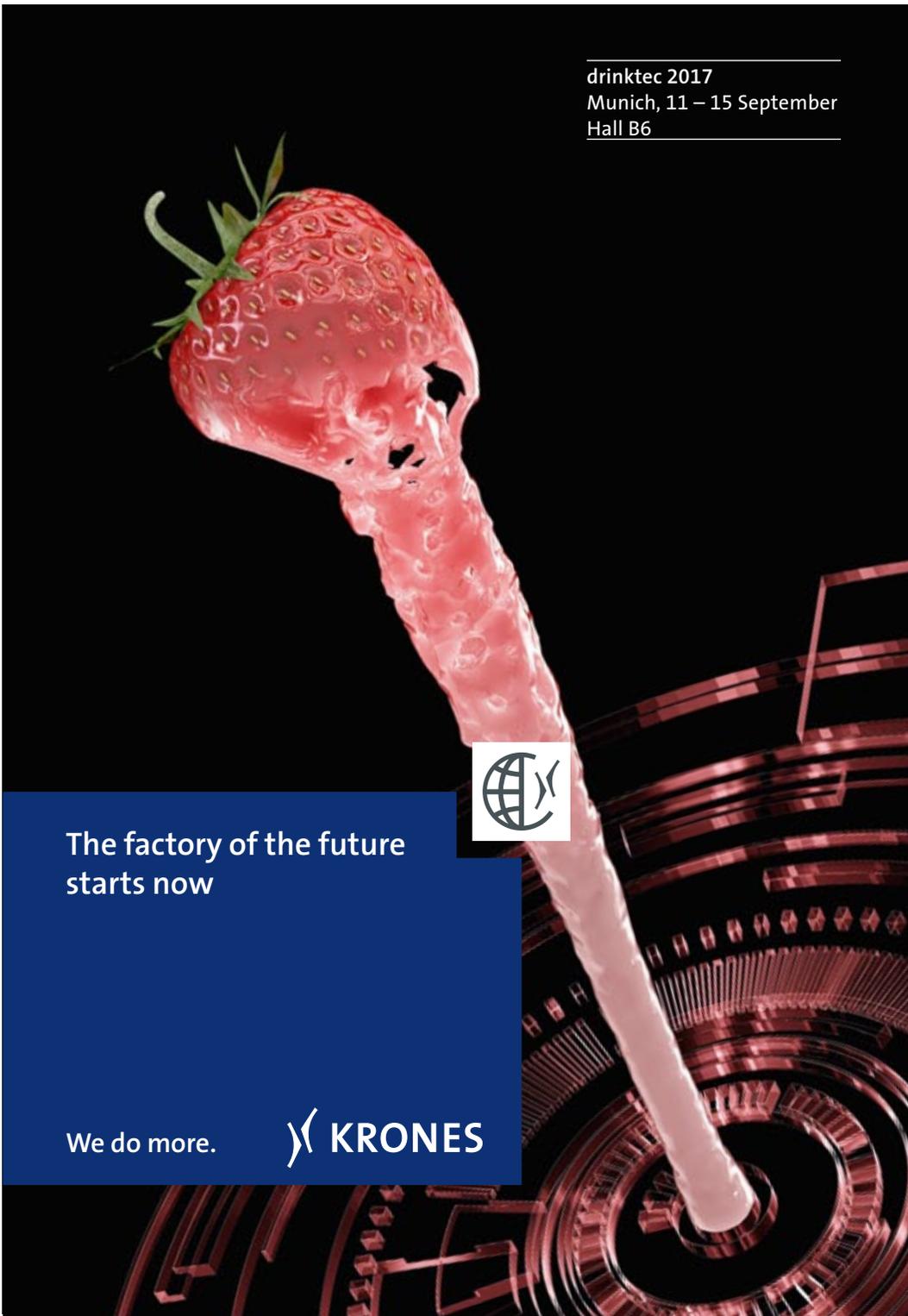
The cobotic version of FlexiLoad ensures automatic, flexible and safe corrugated magazine feeding on any case packer and erector (photo: Gebo Cermex)

- EIT – the Efficiency Improvement Tool that uses comprehensive line monitoring to accurately detect the causes of unplanned stoppages and help increase operators’ responsiveness.
- OptiFeed – a new crown and cap feeder which optimizes cap/crown availability at the capper through its unrivalled efficiency, in addition to ensuring the quality of the caps and their compliance with the relevant specifications. [geboacermex.com/drinktec](http://geboacermex.com/drinktec)

**INOXMIM: Mixers, blenders and emulsifiers**

InoxMIMGrup develops and manufactures mixing, agitation and emulsification applications. The wide range of mixers, blenders and emulsifiers including vertical, bottom, in-line, bottom with recirculation, solid-liquid emulsifiers, etc. allows to provide solutions for solid-liquid and liquid-liquid mixtures. Innoxmim cooperates with client’s technical department and laboratory to customize the standard products

drinktec 2017  
Munich, 11 – 15 September  
Hall B6



The factory of the future starts now

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for accomplishing each application needs.  
[inoxmim.com](http://inoxmim.com)



**20 years of Innoxmim-experience: Complete reactors with agitators and mixer (photo: Innoxmim)**

**Kaeser: Foundation for Industry 4.0**

Kaeser Kompressoren will highlight solutions for a compressed air supply that's reliable, efficient and most importantly, completely ready for integration into the Industrie 4.0 environments of the future. The company is extending Industry 4.0 capabilities to its smaller rotary screw compressor models.

New DSD and FSD-series rotary screw compressors offer significantly enhanced efficiency and higher flow rates – which translate into energy cost savings. The frequency-controlled ASD compressor series is now equipped with a synchronous reluctance motor. [kaeser.com](http://kaeser.com)



(fig.: Kaeser Kompressoren)

**KHS: Technology 4.0**

KHS Group will be exhibiting the future of filling and packaging systems under the motto "Technology 4.0". The systems supplier will be presenting its new systems for all container segments. All branches of industry will find innovative ideas for sustainable and effective processes.

Technology 4.0 enables KHS to optimize the total cost of ownership (TCO) of its customers and ensure greater sustainability in all processes. The exhibits to be presented in Munich include world innovations in virtually all areas of application.

**Growing systems for small quantities**

KHS also offers small- and medium-sized bottlers technology and know-how that have proven effective at the highest level. The systems supplier has integrated established technology of can and keg fillers, for example, into new systems for smaller quantities. KHS will also be presenting a compact solution for labeling that is likewise tailor-made to meet the requirements of the lower capacity segment. Common to all developments is the capability of enabling the machines to grow in size in accordance with increasing quantities with simple upgrades.



**KHS Chairman Prof. Dr.-Ing. Matthias Niemeyer: Technology 4.0 means that innovative strength and future viability continue to characterize KHS' systems and services. The focus of attention here is on the innovative use of digitization as well as new concepts throughout the entire production process (photo: KHS)**

**Benefits from digitization**

In view of increasing digitization, Technology 4.0 also focuses on the benefit for users. Effective control instruments become IT systems that are decisive for managing the entire system. Users realize more economical and more reliable processes thanks to further automated and precise control of all processes. Systems previously tried-and-tested in practical operation pave the manufacturers' way to the digitized smart factory. [khs.com](http://khs.com)

**Krones: We do more**

Krones will, as in all the previous years, be showcasing its corporate capabilities in Hall B6. The principal focus this time is on innovations primarily designed to improve line performance still further, to ensure even higher individualisation and flexibility, and to impart additional sustainability to the production operation. Digitalisation plays a



**Digitalisation plays a key role and a unifying theme for the entire Krones stand (photo: Krones)**

key role in this context, and constitutes a unifying theme for the entire Krones stand. Because marrying iron and steel to clouds and data makes for an even closer intermeshing of all processes along the entire value added chain – and will in the end significantly upgrade performance levels in the production environment as well.

**High-speed filling lines**

When it comes to filling beverages and liquid foods, the speed of the filling process plays a crucial role. For this reason, Krones is continuing to prioritise high speeds for its lines.

**Individuality and flexibility**

Consumers' desire for individualisation is still rising inexorably, and Krones has precisely the right solutions for this. As exemplified by a pilot line comprising a combination of filler, direct printing machine and intelligent conveyors, Krones shows that even small batch sizes can be efficiently produced while nonetheless retaining maximised flexibility. This means that in future products can be filled on a just-in-time basis, and the containers individually dressed using a direct printing process – without order-picking and without warehousing.

**Energy savings**

Krones is also vigorously driving forward the issue of eco-efficiency – and the vision of an energy-autonomous, sustainable production operation is already taking tangible shape in the "Brewery of the Future". In this research project, a brewery is being developed step by step that can manage without fossil fuels entirely, and instead obtains its energy exclusively from recovering recyclables.

**Block technology**

In addition, the demand for space-saving layouts is steadily increasing, which is why Krones is driving forward the block concept for complete lines, and thus continually expanding its product range. A wide and varied spectrum of blocked combinations will be on show at the fair. What they all

have in common is this: they are compact, and correspondingly space-saving, cost-efficient and flexible. [krones.com/de/drinktec-2017.php](http://krones.com/de/drinktec-2017.php)

**Milliken: ClearShield UV absorbers**

Milliken Chemical will demonstrate how its ClearShield Colorless UV Absorbers bring value to PET packaging by effectively protecting UV-sensitive contents from degradation while maintaining the material's clarity and transparency. ClearShield offers an efficient way to protect beverages and other UV-sensitive contents against harmful light exposure by incorporating the UV blocker into the PET package itself. PET bottles made with ClearShield UV absorbers offer impressive results when it comes to extending ingredient shelf life (defined as 80% of initial concentration). [milliken.com](http://milliken.com)

**Robopac: High-speed wrapper**

Robopac will show Genesis Thunder – a new high-speed, automatic wrapping machine featuring a rotating ring. The new generation of high-performance ring machines for wrapping and stabilising loads on pallets using stretch film employs Cube Technology, the state-of-the-art solution adopted by Robopac for its top-end products.

Cube Technology ensures the right amount of film is provided in the most effective position, applying also the right force to ensure the product is properly secured; this triple combination means consumable costs are appreciably reduced, quality wrapping improves significantly, and damage to palletised loads during transport lessens.



**The wrapping machine Genesis Thunder cuts down TCO, mainly due to the high quality, low-wear components (photo: Robopac)**



**SACMI will show the HeroBlock, an all-new quadblock combining stretch-blow moulding, filling, closing and labelling (photo: SACMI)**

**SACMI: Dynamic cap and preform buffer**

The star of the SACMI stand is heroLINE, the new dynamic cap and preform buffer that achieves total integration both upstream and downstream from the bottling process. Visitors will have an opportunity to see this line in operation.

SACMI's HeroBlock is an all-new quadblock combining stretch-blow moulding, filling, closing and labelling – all on one machine. This solution offers unique compactness, efficiency and versatility.



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 Hall A3, Booth 335

How much  
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Industry-specific processes, integration of machines and systems, monitoring and reporting, traceability, quality management and much more. The CSB-System is the business software for the dairy industry. The end-to-end solution encompasses ERP, FACTORY ERP® and MES. And best-practice standards come as part of the package.

Would you like to know exactly why industry leaders count on CSB?

SACMI will be offering visitors a sneak peek at its digital label printing module. It is integrated in the labeller, allowing for agile customisation (with logos, codes etc.) of pre-printed labels but without the difficulties that come with the installation of complex machines designed to print directly on the bottle. [sacmi.com](http://sacmi.com)



**Carton Erector SFS 350 by Schäfer & Flottmann (photo: Schäfer & Flottmann)**

#### **Schäfer & Flottmann: Format-flexible carton erector**

Schäfer & Flottmann's focus will be the high-capacity Carton Erector SFS 350. The completely servo-driven machine prepares up to 60 cartons per minute from flat blanks which in a wrap-around procedure are folded and glued around a mandrel. Separation and positioning of the blanks onto the folding mandrel is made by means of vacuum suction-cups. After folding of the side flaps the carton blank in the first station will first be folded tubular whilst being glued. Afterwards, the bottom part is closed and the finished case, top side open, will be discharged for loading.

The machine with infinitely variable capacity and visualization of the actual state by graphic screen is characterized in particular by its high format flexibility. Cases can be produced with inner dimensions of 142 x 107 x 170 mm up to 440 x 330 x 350 mm (L x W x H), in square as well as in octagonal design. The quick and easy format changeover is made by spindles – optionally also fully automatic by servo-motors. There is no need to change the folding mandrel. [sfs-net.de](http://sfs-net.de)

#### **Serac: Reduced environmental impact**

Serac confirms its expertise in container treatment based on dry processes with an industrial sterilization solution using ebeam technology. Capable of ensuring a 5 log bacteriological reduction on *Bacillus Pumilus* without leaving any chemical residue in the container and to eliminate the consumption of chemical agents to decontaminate a bottle, BluStream is a real technological breakthrough in the aseptic filling of plastic bottles, the suppliers claims.



**BluStream operates using ebeam technology for bottle sterilisation (photo: Serac)**

BluStream is particularly interesting for manufacturers wishing to highlight:

- Production processes that respect both human beings and the environment.
- Brands that follow natural trends and target sensitive consumers (babies, elderly people, allergic people, etc.).

Unlike peracetic acid (PAA) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) treatments that rely on chemical principles BluStream is based on a physical process. It uses an issuer which throws an electron beam over the container's surface. Electrons quickly destroy micro-organisms by breaking their DNA chains. Without the use of chemicals, BluStream ensures that containers are totally free of any toxic residue. [serac.com](http://serac.com)

#### **SICK: Smart sensors**

SICK will present the DOSIC stainless steel sensor for flow measurement. It detects the flow volume of conductive and non-conductive liquids based on non-contact ultrasonic technology. With its measurement channel and stainless-steel housing, the ultrasonic flowmeter is suitable for measuring tasks in hygienic environments. The compact and rugged design makes the sensor



**DOSIC – the compact stainless-steel sensor for flexible flow measurement (photo: SICK)**

ideal for a wide range of application possibilities, including those where space restrictions or aggressive media play a role. Installation is quick and easy, and does not require medium calibration. The seal-free, self-draining measuring tube enhances process reliability. Up to two configurable digital and analog outputs as well as the IO-Link interface ensure the right output signal. The DOSIC is EHEDG-certified and FDA-compliant. [sick.com](http://sick.com)

#### **Sidel: Securing performance over time**

How services help to build, maintain and improve beverage producers' line performance throughout their asset lifecycle will be a key highlight for Sidel and Gebo Cermex services teams, exhibiting jointly as part of the Sidel Group at drinktec.



**How services help to build, maintain and improve beverage producers' line performance throughout their asset lifecycle will be a key highlight for Sidel and Gebo Cermex services teams (photo: Sidel)**

Continuous performance means maximum production uptime and constant availability of materials, technical and field support. Jean-François Tourenc, Gebo Cermex Vice President Services: "We will showcase how the Sidel and Gebo Cermex Services portfolio can help beverage producers to secure no-stop operations, via a real partnership with their OEM. Today leading organisations are leaving behind reactive maintenance: they understand that more proactive approaches can lead to more predictability over production output and costs over time. A close partnership with the OEM is crucial in adopting such a path."

Among the new Sidel and Gebo Cermex services launched at Drinktec are:

- Modular maintenance solutions, evolving from existing support and supervision packages, offering tailored answers to customers' needs. This enables manufacturers to achieve maximum availability and reliable production, while controlling costs.
- Customised training solutions, helping beverage producers build their teams' performance. This

allows a shorter time-to-market and a safe vertical start-up, together with reduced long-term Mean Time to Repair (MTTR) for better efficiency. [sidel.com](http://sidel.com)

### UNITED CAPS: Inspirational new closures

UNITED CAPS will demonstrate how their market-driven approach, supported by the strategic pillars of RELATE, PERFORM & SUSTAIN, fosters the development of outstanding closures that perform as well in the plant as they do in the hand.

With a healthy 50/50 split between customised and non-bespoke solutions, UNITED CAPS will also showcase the latest in customised solutions like the innovative Wattwiller closure, which features a petal-flower design that is not only eye-catching but allows end users to open bottles with very little effort.

The complete beverage and dairy standard portfolio has recently been enhanced by significant acquisitions and growth. True to the principle that "Less is More" - UNITED CAPS design capability has reduced the need for product line complexity. It encompasses solutions for the entire industry, everything from PET to glass bottles across an impressive range of neck sizes. The optimised product lines on display constitute a comprehensive collection wide enough to meet industry needs but simple enough to avoid overwhelming with unnecessary choice.

New closures developed to answer the requirements of the latest industry trends will be also available to experience at the show.

Enhancing this portfolio are differentiated finishing processes such as the cutting edge UNITED CAPS Bi-Injection process which yield exciting design possibilities and inspiration for brand owners.

Experts from R&D, production and technical service will be on hand to explain how UNITED CAPS helps customers to deliver Differentiated Total Packaging Solutions. [unitedcaps.com](http://unitedcaps.com)

## Lactic acid bacteria test gained independent validation

### 3 M Food Safety

3M Food Safety's 3M Petrifilm Lactic Acid Bacteria Count Plate has been awarded AOAC Performance-Tested Method, Certificate #041701 for a variety of foods. With this AOAC Performance-Tested Method designation, the 3M Petrifilm Lactic Acid Bacteria Count Plate becomes the first commercial method of its kind to receive a validation from a third-party scientific organization.

Companies can use the technology to obtain accurate results in less time, extend shelf life, reduce waste, minimize recalls and improve the look, taste, texture and smell of their products.

3M Petrifilm Plates are a more sustainable indicator test solution, producing 66 percent less waste (by weight and volume) compared to competitive agar methods. [3m.com](http://3m.com)



The ready-to-use lactic acid bacteria test plate simplifies the testing process for lactic acid bacteria spoilage organisms by serving as a unique all-in-one solution (photo: 3M Food Safety)

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# Lactoprot: Expansion ahead

A new plant in Lübeck, Germany, opens new possibilities for sales

**P**ivate milk and whey processor Lactoprot has had an astonishing growth over the past few years. The company, incl. subsidiary Dairyfood, is running four manufacturing plants and has added yet another one a year ago from Tate & Lyle. After thorough refurbishing, the new plant in Lübeck has started up several months ago. IDM visited Lactoprot's facility.

From the outside, the Lübeck plant doesn't really make much impression but when entering the facility, the true dimensions of a factory with 3,000 sqm floor space and a throughput of 20,000 tons of dry products per year come to shine. There are several mixing and packaging lines installed, partly in very specific arrangement making sure that Lactoprot has a unique position in specialty mixes and stabilisers etc. This is extremely important when it comes to allergen-free products as the mixers and one of the five bagging lines can be completely wet cleaned. The other four bagging lines are run for specific products so that cross-contamination can be ruled out. Given the strict batch separation of the Lübeck plant, Lactoprot can supply according to Kosher, Halal and organic standards.

## Ongoing investment

Production in the Lübeck plant has been clearly structured, top-down on the three existing floors. The hygienic conditions required for a dry mix facility are met everywhere and the whole plant is under conditioned air overpressure. All production takes place in a containment pattern. This means that raw products are fed from Big Bags or bags into one of the several 1,600 kg stainless steel vessels for transport inside the plant.



Lactoprot will soon add a 6,000 liter mixer to the existing 1,500 and 3,000 liter mixers (photo: IDM)

Steffen Rode, who owns the majority in Lactoprot, keeps on upgrading the new plant. A brand new 6,000 liter mixer made by Lödige will be added to the existing 1,500 and 3,000 liter

blenders soon. Besides manufacturing own blends, Lactoprot is also acting as contract producer, currently 50% of the capacities are utilised by contract productions for worldwide renowned companies as more and more such customers are now knocking on Lactoprot's door, Mr Rode told IDM. In order to cope with large production runs, the Lübeck plant will receive an automated (bagging) palletiser line next year and a packaging line for small base pouches of up to 5 kg mainly for spots nutrition powders.



Mixing vessels can be wet cleaned at the new Lactoprot plant (photo: IDM)

## Building on competence

Besides all contract production, the company has not forgotten to put a focus on own products. Lactoprot's portfolio of own manufactured products



Sonja Wagner and Lactoprot owner Steffen Rode are heavily investing in the Lübeck plant (photo: IDM)

comprises Caseinate, Lactose, WPC, milk calcium, demineralised whey products and many more. Together with other ingredients, Lactoprot composes stabilisers for the dairy, deli and meat industries and products for sports and elderly nutrition. These are activities that Lactoprot has either been in since years or that Lactoprot intends to strengthen such as stabiliser mixes on the basis of hydrocolloids. Soon, specialty packaging equipment for sports nutrition will be installed. An expert for product development has already been hired, he can make use of a brand new pilot plant in Lactoprot's Kaltenkirchen facilities.

It is by far not only the new plant in Lübeck that Mr. Rode is constantly upgrading. The "older" plants as well are receiving new equipment, such as the new spray dryer that was built at the Riedlingen plant with an investment of €7m last year.

Lactoprot currently supplies to 67 countries. As the Middle East is especially important to the company, an own office in Dubai has been opened where a technologist counsels customers in the larger area.

### Lactoprot

Lactoprot Deutschland GmbH employs a staff of 220 in four plants and post sales



Several lines are in use to supply components for the various blends (photo: IDM)

of €100 – 140m. The company processed 190m kg of milk and 500m kg of whey. Owner of the company are Steffen Rode and Georg Ruchti.

At the Leezen plant, Lactoprot manufactures acid casein and roller-dried Caseinates, Lactose, MPC, Crumbs and WMP, buttermilk and cream powders (roller-dried).

The Kaltenkirchen plant, which is the company's HQ, makes caseinates and compounds.

The Lübeck plant is a specialist for dry mixes of yogurt, deli and sausage stabilisers as well as for sports nutrition.

In Riedlingen, Lactoprot subsidiary

Dairyfood manufactures WPC 80 (also organic). Lactose (organic, from goat's milk) and demineralised whey powder (Demin 90).

Lactoprot has own sales offices in Belgium, Mexico, Greece, Iran and Dubai.

[lactoprot.net](http://lactoprot.net)

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# Milk protein fractionation by means of microfiltration

## Influence of preconcentration and diafiltration medium – part 1



Authors: Dipl.-Ing. (FH) Michael Reitmaier, Dipl.-Ing. Hans-Jürgen Heidebrecht, Prof. Dr.-Ing. Ulrich Kulozik, Chair of Food and Bioprocess Engineering, Weihenstephaner Berg 1, 85354 Freising, Germany

In three editions of IDM, future options and current issues concerning the fractionation of milk proteins by means of microfiltration (MF) will be addressed. The first article deals with the filtration efficiency of ceramic membranes during the conduction of diafiltration (DF) with different washing media. In part 2 a method to better characterize polymeric membranes during the MF of milk will be presented. The third article addresses the qualification of hollow fiber membranes for this application and a new method for an in-situ detection of the deposit layer.

### Milk protein fractionation by MF: Separation task

The prices for separated milk protein fractions differing in their nutritional and technofunctional properties go far beyond the basic value of milk and therefore offer a good option for diversification, particularly in the case of fluctuating milk prices. The challenge in the fractionation of milk proteins is to completely retain

the casein micelles with a diameter between 50-400 nm ( $d_{50.3} = 180$  nm) while maximizing the transmission of the major whey proteins with 2-4 nm ( $d_{50.3} = 3$  nm). Although pore sizes with 0.1-0.2  $\mu\text{m}$  of commonly applied MF-membranes are by far bigger than whey proteins, the transmission is far below the expected 100%, normally only around 50%. This is mainly due to the retention of casein micelles, which form a deposit on the membrane surfaces, thus acting as a secondary separation layer with a significant influence on the filtration performance.

### Purification by diafiltration: Improving sustainability and product properties

In order to achieve a preferably high product purity and a high yield a multi-step washout process called diafiltration (DF) is required. This means that the medium, which permeates the MF membrane, is replaced by a medium that does not contain whey proteins. Fig. 1 shows a DF process for the fractionation of milk proteins in which the permeate is further processed by ultrafiltration. Depending on the intended purity of the casein fraction, which can be achieved by a high degree of removal of the whey proteins, a multiple of the retentate volume must be replaced by a DF medium. Up to now, it is common to use purified or fresh water. However, this leads to an increased water consumption interrelated with an additional wastewater load, and may also affect the properties of the obtained casein fraction. Moreover, in order to save costs and increase the process sustainability, there is a great interest in closed mass loops of processing side streams such as evaporation condensates or reverse osmosis permeates by valorizing such processing side streams and making use of them towards 'zero-liquid-discharge' [de Boer 2014]. Bringing these aims together, the objective of this work is to investigate the effects of different potential DF media on the filtration performance during the MF of skim milk and hence replace fresh water as DF medium. In the dairy industry, also nanofiltration (NF)

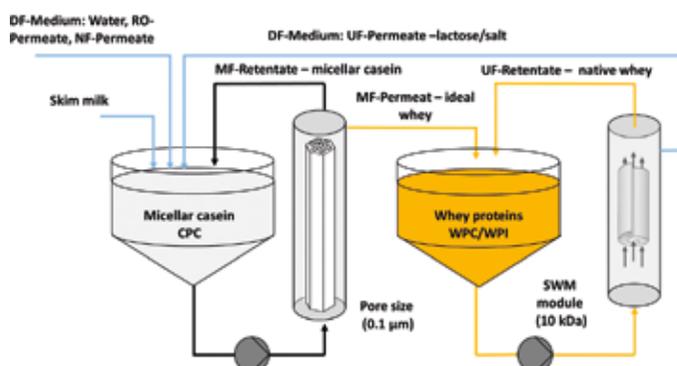


Fig. 1 Scheme of a protein fractionation process by MF and UF with potential DF media as a variable.

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or ultrafiltration (UF) permeates from skim milk and sweet or acid whey are potential media for DF. The question is what the impact of the different properties and compositions of such media is on the deposited layer structure and, thus, on the filtration performance.

### Effect of pre-concentration on time and DF medium demand

Equation (1) allows to calculate the required time to achieve a certain purity described as residual content of the permeating components ( $C_{t,DF}/C_{c0,DF}$ ) during a continuous diafiltration process. It is obvious that the time ( $t$ ) decreases when either the initial volume  $v_{0,DF}$  or the desired degree of purity decrease, or on the other hand the permeation ( $p$ ) or flux ( $J$ ) increase.

$$t = \frac{V_{0,DF}}{p \cdot J} \times \ln \left( \frac{C_{t,DF}}{C_{c0,DF}} \right) \quad (1)$$

The permeation  $p$  of the target component expected to be transmitted into the filtrate or permeate (i.e. the whey proteins in this case) is defined by equation (2):

$$p = \frac{C_{permeate}}{C_{retentate}} \quad (2)$$

The conclusion from equation (1) would theoretically be to concentrate the starting material as much as possible to decrease  $v_{0,DF}$  prior to the diafiltration process. However, it is known that the flux decreases with increasing concentration factor (Kersten 2001), which means there is an optimum between starting volume reduction and flux performance.

A first step was to determine to what extent a concentration of the milk prior to the DF process minimizes the time for the DF-process. For this purpose, pasteurized skim milk was concentrated up to a factor (CF) of 6 and the flux as well as the permeation of  $\beta$ -lactoglobulin ( $\beta$ -Lg), as the major whey protein fraction, were measured. In addition to a continuous flux decline it can be seen from Fig 2, that the permeation stays constant after an initial decline across the duration of the pre-concentration step. This means that the permeability of the deposit layer for  $\beta$ -Lg is not affected by the increasing protein concentration.

Therefore, the time required for the DF step in a subsequent DF process can be calculated as a function of the concentration factor (flux/retentate volume) (Fig. 3).

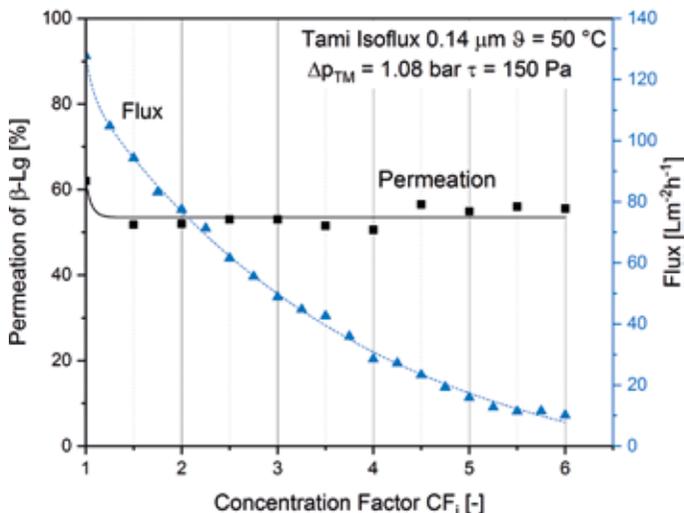


Fig. 2 Flux and permeation as a function of the concentration factor.

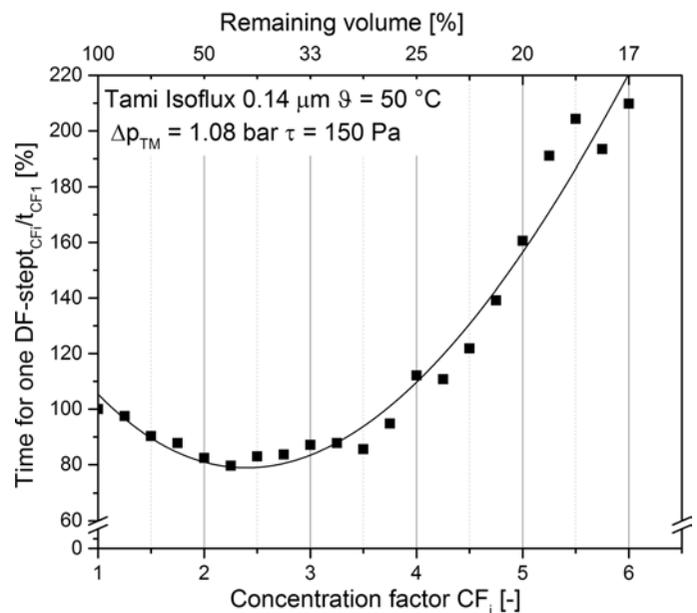


Fig. 3 Time demand for one DF step as a function of the pre-concentration of the starting material prior to diafiltration.

It can be seen from Fig. 3 that the time required for a DF step decreases by 20% to a CF of approx. 2.5 and then rises sharply. This means that the observed flux decline (Fig. 2) is over-compensated disproportionately by the volume reduction. From CF 2.5, the ratio reverses and the flux decreases disproportionately to the volume reduction. This increases the time required for one DF step.

The conclusion is that the total DF time can be reduced to a minimum when the milk is concentrated to a factor of 2-3 before starting the DF mode. If the use of a small amount of DF medium is crucial, it may be useful to concentrate higher and to accept a longer DF time.

### Characterization of process side streams as potential DF media

In order to determine differences in the composition of available DF media, more than 100 industrial samples from over 30 different processes were analyzed. Tab. 1 shows some relevant properties of the investigated media.

It is obvious from these data that the different media strongly differ in their pH value, ionic composition and lactose content. Moreover, it is known that the casein micelle is strongly affected by different milieu conditions [Broyard and Gaucheron 2015]. The hypothesis drawn from these results was that the use of different media should affect the filtration performance during the milk protein fractionation. To investigate this in detail, filtration experiments were carried out using deionized water, local hard tap water (18 dGH) and UF permeate obtained from skim milk as DF medium. The reason for choosing these media was that deionized water is similar to the composition of reverse osmosis permeate and vapor condensates, tap water is considered as a reference and UF permeate reflects the natural milieu of milk. Fig. 4 shows the remaining concentration of  $\beta$ -Lg in the MF retentate as a function of time using these different DF media. Circles are indicating the times at which the same DF step was accomplished.

It can be seen that after five DF steps a comparable depletion of whey proteins to approximately 10% of the initial content was achieved with all DF media. However, there are considerable differences in the required time to achieve the same depletion effect. The total process time using UF permeate was increased by 29% com-

Tab. 1 Major properties of potential DF media.

Potential DF media	Composition	pH range
UF permeates (skim milk)	Very close to milk milieu, varying in ion contents in dependence of process temperature and milk	6.3 - 6.8
UF permeates (sweet whey)	Close to milk milieu, process dependence of calcium, phosphate, citrate and lactose content	5.8 - 6.6
UF permeates (acid whey)	Very high calcium and phosphate content, process dependence of citrate and lactose content	4.2 - 4.7
NF permeates (sweet whey)	Residual contents of monovalent ions, low residual or no calcium, phosphate, citrate and lactose	5.8 - 7.4
RO permeates	Very low mineral content, no lactose	4.3 - 6.7
Vapor condensates	Very low mineral content, no lactose	5.2 - 7.6
Tap waters	Low ion contents in comparison to milk milieu, varying hardness (calcium, magnesium, carbonate), no phosphate, citrate, lactose	7.0 - 8.1

pared to tap water, while the use of fully softened water reduced the time by 17%. Due to the different media compositions in terms of pH and composition (ionic strength, lactose content), the casein micelles form fouling layer structures with different resistances to the filtrate flow towards the membrane. Hence, the flux is dependent on the DF media. The mechanism behind this is not fully understood yet, but it is part of the project to shed more light on this effect.

The conclusion is that when using deionized water as a DF medium, the process time can be significantly shortened in comparison to UF-Permeate or fresh water with a comparable degree of depletion of whey proteins. The practical implementation is that process flow streams used as DF media with minimal ion contents such as reverse osmosis permeates or NF-permeates can be used as DF medium. The systematic variation of pH and ion contents using synthetic DF media as well as the potential change of the protein functionality is subject of ongoing research.

The research project (AiF 18818 N) is funded by the Federal Ministry of Economics and Technology (via AiF) through the Research Group of the Food Industry (FEI) under the scheme of "Pre-competitive Research" (IGF). The project concept was awarded the Sustainability Prize at the World Congress of Food Science and Technology (IUFoST), Dublin 2016.

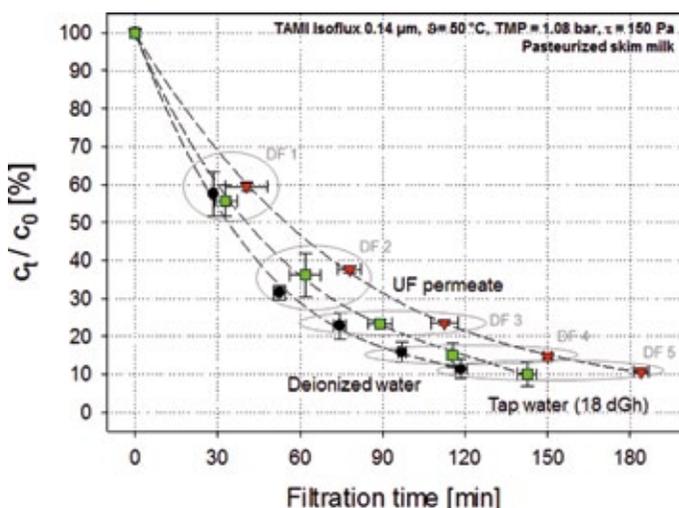


Fig. 4 Relative residual content of  $\beta$ -Lg over the filtration process for different DF media.

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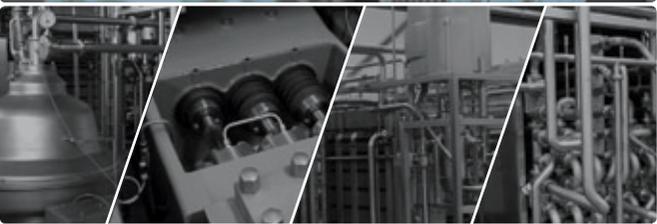
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# Food Hygiene

## Raw milk without bacteria from the stalls

**H**ow is hygiene in the foodstuff industry applied in practice and what do the regulations say about it? Where are the weak points, e.g. when obtaining and treating raw milk? What can make a new patent even better?

### The status quo

At the turn of the 2015/2016 year, the WHO published its first figures on the risk of food poisoning. In the "Global Estimates of Foodborne Diseases" report, the World Health Organisation referred to the fact that, on average, one in ten people falls ill from germs that are transmitted through food. For ten years, experts have been

looking into the hygiene of industrial food production to be more than sure of the following estimates: 600 million people – about 10 percent of the population – are infected by contaminated foods each year.

- For 420,000 people, the illness is fatal. This includes a disproportionate number of children aged five and under (30 percent).
- In Europe, the WHO report states that there are 23 million illnesses per year, with 5,000 fatalities.
- People suffer most from infected food in Africa and Asia.
- Raw meat, dairy products and eggs are most frequently contaminated.

### Three sources of germs

The WHO states very conservative figures, derived from determined or reported illnesses. This does not include an estimate of unknown cases. Particularly in the poorest and low-income regions, there is a lack of medical provision, meaning the statistics there are unable to take contamination into consideration.

31 triggers are responsible for infections, according to the survey: Bacteria, viruses, parasites, germs, spores, toxins and chemicals. In addition to this, there are particles from feed, faeces (E.coli) and urine, pet litter and insect parts. The entirety of all these typical contaminations, which are encountered in the stall air, are described by the term "bioaerosol".

In principle, the aerosols come from three sources of pathogens: Animal (cow, sheep, goat), stall and processing chain. The hygiene problem of processing, i.e. the production facilities in the food processing industry as the third source, is hidden in the often poor filter technology. When the level drops in the receiving container, the consequent vacuum draws contaminated air from the surrounding space through leaks in the connections and screw fittings of the storage container and holding vessel at the filter connection to the product. This undoes the success of the upstream sterilisation of both the semi-finished product and the air.

### Problem with stall air

The weakness in the processing is in the farmer's milking parlour, with two contamination sources. The milking process simulates the suckling of a young animal at its mother's udder. The vacuum pump and pulsator replace the calf, but with the difference that technology switches on the vacuum shortly before encircling the teat to ensure a good

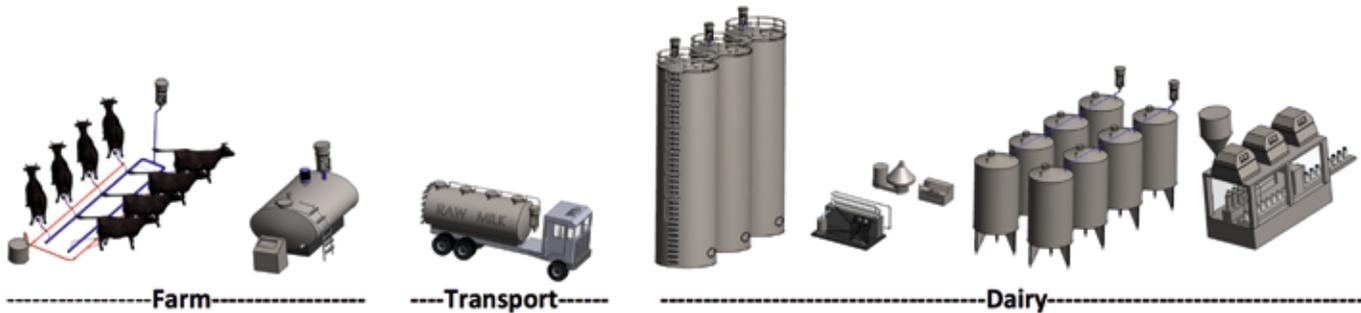


(photo: Fischer Planning)

# Ultra Clean Dairy



From the udder to the filling – without preservatives – maximum shelf-life



Milking

Cooling

Tanker

Raw milk storage

Pasteurizer

Process storage Tank

Filling

(source: Fischer Planning)

fixing position of the teat cups. As a result, this free vacuum prior to the teat connection draws considerable amounts of contaminated air into the raw milk container. The area directly below the cow can contain the highest concentration of infectious germs that can be transmitted from animal to human. These air-borne emissions from agricultural livestock farming now even concern the Federal government. The government is demanding preventative measures for dairy products (pasteurisation) as well as being concerned about contamination of residents near to agricultural enterprises. As a result, for the first time, the latest version of the Technical Instructions on Air Quality (TA-Luft)

stipulates that potential reductions in germs and endotoxins must be investigated for facilities that require authorisation. Relevant measures can, for example, be biowashers and biofilters in order to absorb a majority of the organic contamination, which would escape into the atmosphere with the outgoing stall air.

Such approaches to reduce pathogens in the outside air naturally do not benefit food hygiene. The aerosols can affect people through infectious, allergic, toxic, pharmacological and other processes. The path of infection can be through breathing and via the digestive tract: As is known, farmers and veterinarians are the two professions with

the highest risk of zoonosis, which is primarily related to air contamination (breathing). On the other hand, sometimes severe diseases caused by children drinking unboiled raw milk (not certified raw milk) on a farmyard holiday are typical of the digestive tract. For this reason, the Lower Saxonian State Office for Consumer Protection and Food Safety (LAVES) warns against drinking natural, fresh milk on its internet portal with the message, "Raw milk – an underestimated risk?"

## Prevention is better than cure

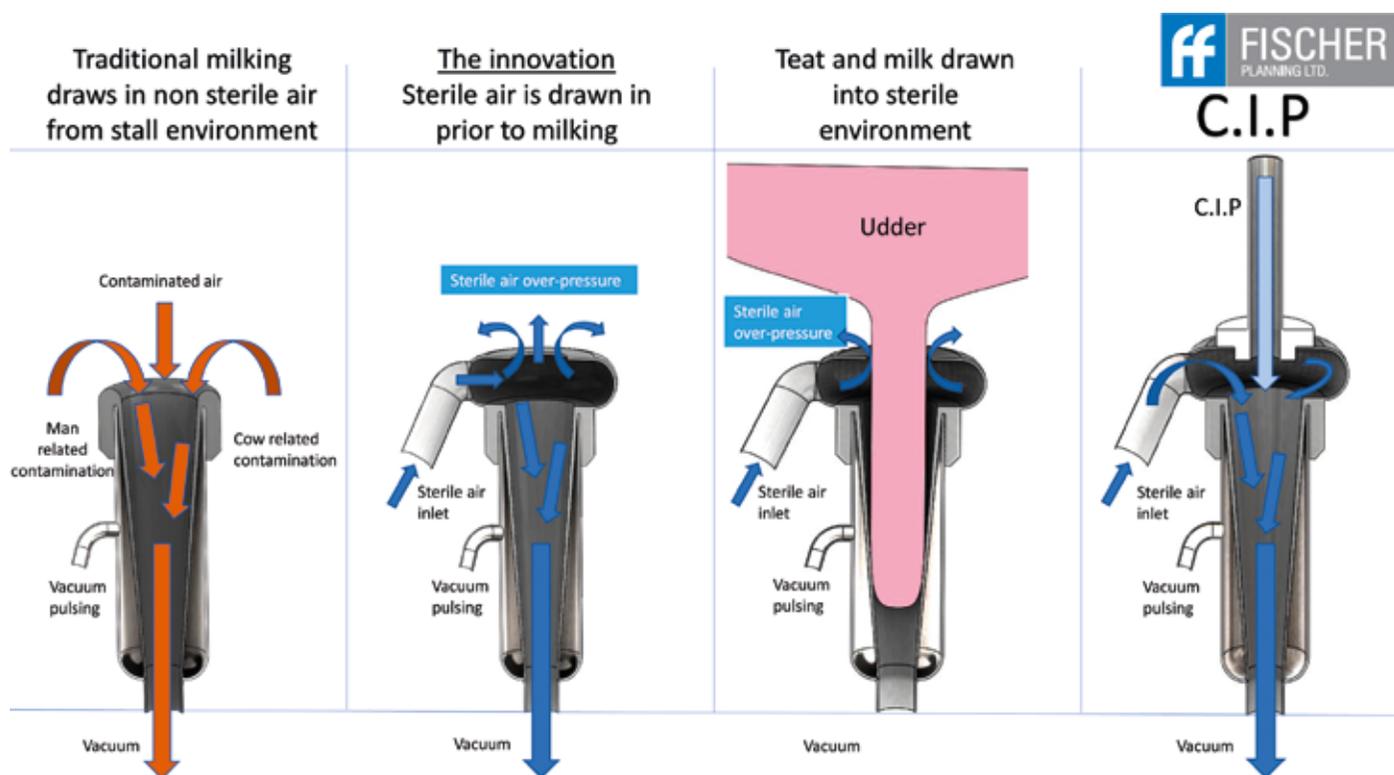
The question mark behind "risk" does not intend to invite discussion on the subject. It

# Cheeseneering

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(source: Fischer Planning)

stands for yes-and-no: Yes to a risk from un-boiled raw milk, no to a risk after sterilisation. A possibility of prevention is addressed as a result, namely the thermal and/or chemical sterilisation of the foodstuff as prevention. Consequently, the method allows a certain contamination of milk and yoghurts and cheese, but kills the aggressors by means of preservatives. This is where the description of "cure" comes from. According to a stipulation by the European Union, the additives in foodstuff and cosmetics must be listed and stated on the packaging with their e-number or precise description. However, they are suspected of triggering symptoms such as headaches, nausea and allergies in susceptible people and causing cancer, in extreme cases. Due to the low immunity of infants, the shelf life of baby food must not be extended using preservatives.

Food chemists and biochemists know about the reactions and side effects of their inhibitors. Due to the side effects, they mix a cocktail of chemical additives, some of which only have the task of alleviating these side effects. It goes without saying that there are limits to the relevant dose. As is known, this also applies for thermal treatment. Pasteurisation at about 70 degrees Celsius is aimed specifically at pathogens, vegetative cells and germs such as tuberculosis bacillus. But even higher temperatures

do not provide any greater relief, as virtually every bacteria contains heat-resistant endospores, which can survive even hours of boiling. This means manufacturers generally adopt a two-pronged approach for milk products, in the form of thermal disinfection with the addition of calcium sorbate (E203), a derivative of sorbic acid. For susceptible people, the health risks of calcium sorbate include irritations of the mucous membranes and pseudo-allergic reactions. However, the German Additives Admission Ordinance (ZZuV), which regulates the addition of preservatives, focuses less on these secondary side effects in its threshold limits and primarily on the target function of killing germs. The Food Law must simply make compromises and assess the various levels of protection and set priorities.

### Physics instead of chemistry

In the main, this is successful. There are no major hygienic issues in dairy and cheese products in Germany and Europe. Above all, voluntary and official checks keep an eye on quality and treatment of foodstuffs of animal origin. The former Regulation (EC) No 882/2004, which is currently being revised, might soon be replaced by an even stricter EU control regulation. The EU agricultural ministers agreed on this in July 2016. Various authorities are currently working on the

implementation and national adaptation of the new hygiene package: on a Regulation on the Hygiene of Foodstuffs, on the Regulation on the Hygiene of Foodstuffs of Animal Origin and on an Ordinance regulating the Inspection of Foodstuffs of Animal Origin, to name but a few of the future official documents. But, as already said, all these papers deal with protection against contamination and pathogens, and less with the side effects of the protective measures.

The collateral health risk could be most effectively reduced if infectious microbiology did not contaminate foodstuffs in the first place, if it were possible to physically shield dairy products from stall and hall air contamination. The industry is working on relevant procedures. A few years ago, German-Israeli company Fischer Planning from Netanya/Israel presented filter technology for drinks and foodstuff production ("Sterivent"), which keeps semi-finished and ready-made products free from germs – ultra clean – in the storage containers by means of gauge pressure. A blower in the sterile filter combined with regulatory electronics provides a constant gauge pressure, even when the filling level drops. The result: filtered air can only move from inside to out through any potential leaks. The gauge pressure blocks the path of the air from outside to in. A modified principle also places a cover of

sterilised air ("laminar flow") over the filling and packaging machinery. From Coca Cola to Müller to Nestle, manufacturers are using this preventative technique all over the world – from Australia to Europe, from the USA to Canada. As a result, at least this third door blocks contamination from accessing the foodstuff via the air in the production plant or dairy. (Incidentally, even public water providers such as the municipal utilities in Paderborn and Lingen are now equipping their elevated tanks with this system.)

### Gauge pressure on vacuum

Checks by veterinarians must close the first door, i.e. milk that is already contaminated within the animal. The second door of germ migration from animal to human, through the stall and milking parlour air as a carrier of infectious materials, could not previously be blocked preventatively using physical procedures. Instead of precautions, the described aftertreatment with chemical products to sterilise and stabilise the shelf life had to be used. But now dairy plant equipment specialist Fischer Planning has obtained a German patent for milking machine technology, which does not allow any stall air to gain entry into the teat cups. This method also works with gauge pressure. In simple terms, it floods the teat cup with sterile air from the ultra-clean filter technology until the valve is positioned firmly on the udder. The gauge pressure of the air dome is above the milking vacuum of about 40 kPa. It communicates until it reaches the milk cooling tank, blocking the harmful substances in the air from access-

ing the raw milk. As a result, its quality improves in the first instance and, secondly, this method extends the permitted time period until treatment.

In addition, farmers with milk filling stations could also benefit from this. Since the abolishment of the milk quota two years ago, more and more farms rely on direct marketing of their products. Farmers offer their customers the option of bottling their own dairy-fresh raw milk from the farm using milk bottling stations. As the natural milk is not homogenised or pasteurised, valuable ingredients and the special aroma are preserved. However, the regulations demand strict hygiene from such bottling stations. The raw milk must be bottled by the day after its production. With Fischer technology, the use-by date could be extended if the authorities accept the suggestion.

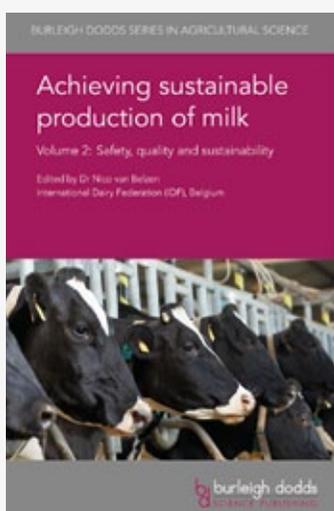
### Ideal for everyone

This saves spending the profits on storage, transportation, processing and marketing of low-germ raw milk in Germany. And furthermore, these advantages could penetrate into the second and third world. Fischer Planning talks about an immense advantage for dairy producers and, of course, for providing the population with a hygienic supply, for example in India and other south and south-east Asian countries. The German-Israeli planners and developers have looked around there and spoken with production plants. The majority of farmers there milk their one, two or maximum three cows by hand, as was the case in Germany 50 years ago. The farmers

then carry the pitchers to the collection point. From here, the milk must be collected by refrigerated vehicles within half an hour to an hour as otherwise the milk would go off and no longer be usable. For this reason, the large businesses must maintain fleets and personnel of up to 50 tankers, which constantly travel through the villages.

For this reason, Fischer Planning is considering local small-scale milking facilities for the cows in the surrounding area, among other things. With the new patent, the company is focussing less on farmers – who would not invest in Germany anyway for want of profitable milk prices, as their quality already conforms to the regulations – and more on the process plant manufacturers and dairies. For India, for example, the suggestion is for decentralised containers with milking parlour and refrigerated tank, which hygienically remove the milk from cows and store it for at least a day. Spokespeople for the companies there anticipate that the vehicle fleet alone could be reduced in this way to 15 to 20 vehicles.

The higher quality level would mean that the raw product can be used for other things and not, as is the norm in many Asian countries, only turned into cheap drinking milk or some kind of cheap cooking cheese. The low-germ delivery also allows a higher degree of finishing with better results. There are also many advantages for the dairy industry in Germany. With the gauge pressure technology, it would be possible to construct an ultra-clean chain to produce dairy products without preservatives from the farm to packaging. Bernd Genath, [fischerplanning.com](http://fischerplanning.com)



## Achieving sustainable production of milk Volume 2: Safety, quality and sustainability

burleigh dodds Science Publishing have released the second volume of "Achieving sustainable production of milk". The book, edited by IDF Secretary General Dr. Nico van Belzen, provides a deep insight into safety, quality and sustainability of milk production. Part 1 is all about ensuring raw milk quality (pathogene microorganisms, mastitis, contaminants, antimicrobial resistance), part 2 deals with sustainability (environmental targets, grassland, water and energy management, biodiversity, organic, impact of the dairy sector) and part 3 gives an overview on how to improve quality, safety and sustainability in developing countries.

The book has 398 pages and comes with abundance of references and sources that are quoted. The very well structured index allows readers to access the information they need in an instant. The book is available for 200 GBP both in print and online.

ISBN: 978-1-78676-048-7

# Powders with impeccable handling properties

Calcium carbonate is the ideal anticaking agent – being natural and guaranteed free from nanoparticles, it meets current market demands

In the food and beverage industry, many products — from raw materials to semi-finished or final products — come in powdered form. One challenge that is related to almost all powdery products is their hygroscopic effect. To prevent powder particles binding water and lumping together, the use of anticaking agents is necessary. Calcium carbonate is the natural and smart solution for this application; combining excellent performance with several advantages.

Omya is a leading supplier of natural calcium carbonate, which fulfills many functions in the food and beverage industry: it can act as a fortification agent, extrusion aid, white pigment for coatings and as an anticaking agent. The latter is amongst the most important application fields in the food segment and is, especially in Europe, growing. With consumers increasingly asking for natural and clean label ingredients, food producers are keen to reformulate with natural but multifunctional alternatives. Calcium carbonate delivers on both counts.

## How it works

Caking is strongly influenced by external factors such as temperature, humidity and pressure. The use of anticaking agents, bundled under the brands Omya Calcipur and Omyafood, presents a practical approach to prevent the lumping of powder particles during transportation and storage. Their raw materials are processed using patented technology to produce highly functional calcium carbonate with defined properties. After that treatment, they have a high porosity and an enlarged surface area that provides unique characteristics, such as outstanding flow properties and a low dust content. As such, machines need less cleaning, efficiencies can be improved and downtimes are reduced.

By adding the anticaking agent to the powder, it embraces the particles and reduces their adhesive forces, thereby preventing lumping. Thanks to both its hydrophilic and lipophilic properties, calcium

carbonate from Omya absorbs all kinds of moisture and oil, so the powder maintains its stability and can be processed easily.

## Applications

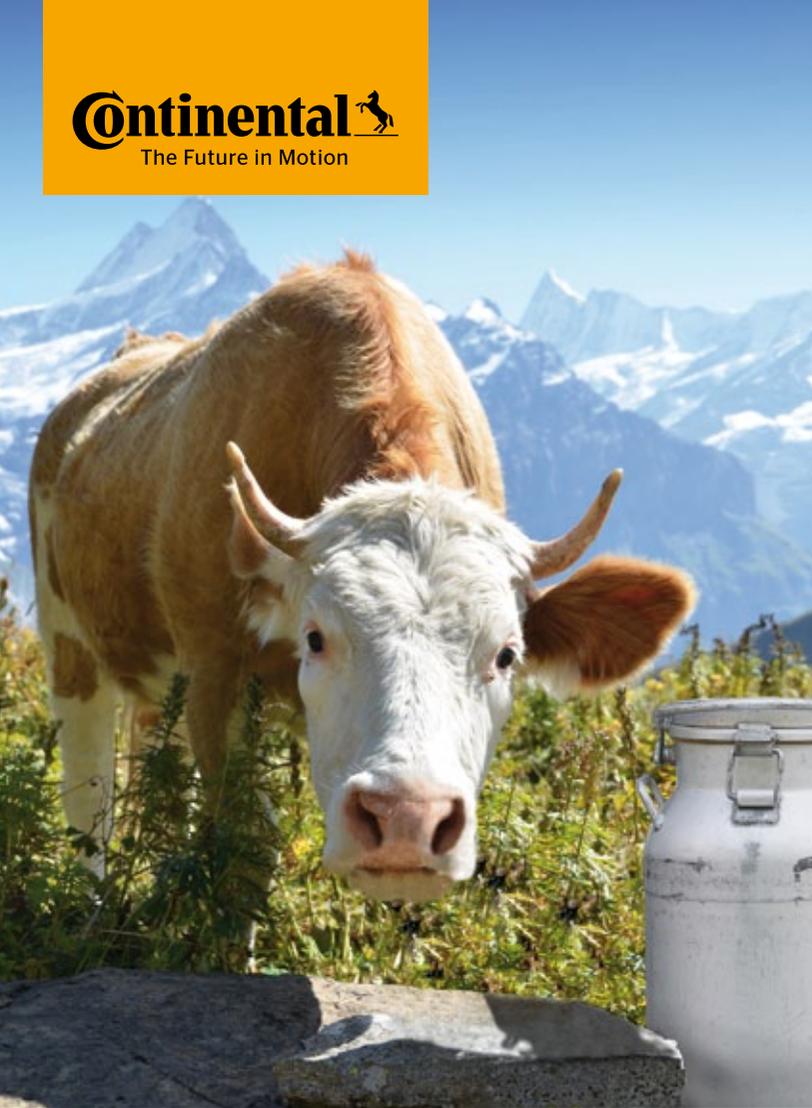
The anticaking offering from Omya is suitable for all powdery food products, including table salt and salt replacements, convenience goods such as packet soup, cocoa products, milk and milk protein powders, as well as infant formula. Especially for the latter, calcium carbonate scores because of its natural profile. Guaranteed to be free from nanoparticles and being hypoallergenic, it meets tight safety criteria. Furthermore, thanks to carefully selected mineral deposits, the company complies with very strict regulations and ensures that any heavy metal contaminants are kept to an absolute minimum — a vital aspect for producers of infant foods. As well as powdery products, the company's anticaking agent can also be used to prevent grated cheese lumping and stop cheese slices sticking together.

## Fortification and free flow: a smart combination

Calcium claims offer promising positioning opportunities in the bone health sector. Particularly with powdered formulations for sports nutrition or infant formula applications, manufacturers can make use of the double functionality of calcium carbonate by linking the anticaking effect with calcium enrichment. Thanks to its high elemental calcium content, Omya Calcipur is one of the most effective solutions in the market. Only low dosages are required to achieve significant fortification results without negatively impacting the end product's sensory profile.

## Tiny particles, big concerns

Similar to increasing concerns about additives and GMOs in recent years, nanoparticles have recently been put under the spotlight and have



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The anticaking offering from Omya is suitable for all powdery food products (photo: Shutterstock\_Copyright Madlen)

become a cause of some concern amongst consumers, scientists and health organizations alike. Despite the fact that they've been used in foods for decades — such as silica (E551), for example, which is an established anticaking agent — some scientists believe that the adverse health effects derived from nanoparticles are not fully understood.

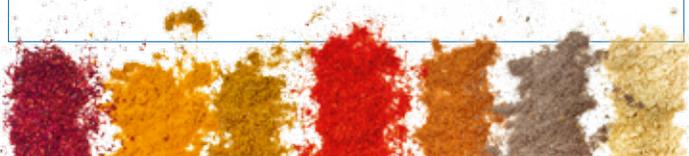
The tiny particles are thought to pass through the lining of the gut and enter the bloodstream, which may then trigger an inflammatory or immune response. They also may build up in various parts of the body, including the lungs, heart and reproductive organs, as well as in individual cells. In the EU, it has been a legal requirement since 2014 to clearly label food products that contain nanomaterials to enable consumers to make educated decisions regarding what they do or don't want to eat. To develop formulations that are appealing to consumers, manufacturers are on the lookout for non-nano alternatives.

Calcium carbonate is an appropriate alternative to silica. While demonstrating excellent anticaking performance, there is no issue with nanoparticles and, in addition, it's hypoallergenic, which is an advantage compared with starches. With regards to processing properties, it offers significant benefits compared with other established solutions — silica, tricalcium phosphate and starches — as it is less dusty than these options and more hygienic to use.

### Omya: Holistic solutions

Switzerland-based company Omya has established itself as a leading global supplier of naturally derived calcium carbonate and owns mineral deposits all over the world, ensuring continuous availability. Thanks to a thorough selection process, the company ensures that the concentrations of heavy metals in their raw materials are significantly lower than the legal thresholds. Using the latest technology, the raw material can be processed for a wide range of purposes and applications; particle sizes and functionalities can be adjusted according to individual demand, for example.

Customers benefit from the company's strong commitment to R&D, including a brand new lab, its patented products and application know-how. Their experts are always available to discuss specific customer requirements. And, to keep abreast of current developments, science-based collaborations with universities and institutes form a substantial part of their business. In addition to calcium carbonates, Omya also possesses a distribution business with a huge range of different ingredients. As a result, holistic solutions and innovative product concepts are brought to life by combining employee experience with application know-how, high quality ingredients and by working closely with customers.



# New report

## The World Dairy Industry and the changing World Agenda 2017-2025

**PM** FOOD & DAIRY CONSULTING has just published a new report about the mega trends of political, economic, and demographic factors impacting the world dairy industry from 2017 to 2025.

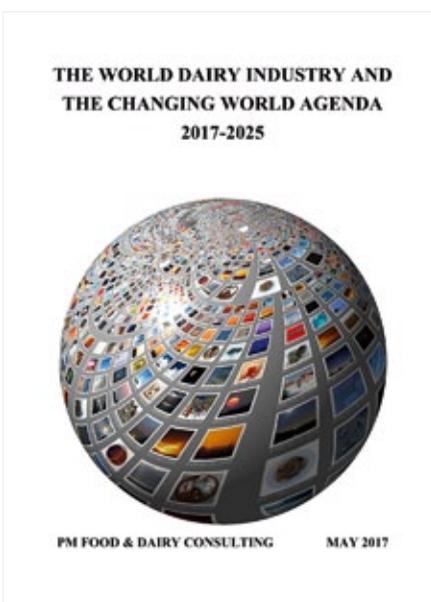
The new report contains 81 pages of valuable information and analysis of the future prospect for the world dairy sector in relation to supply and demand for milk and dairy products and the general market development.

The global agenda is changing very fast and this impact all business segments including the dairy industry. Since the 1990s, the agenda for the dairy sector has changed several times and the volatility on the world market for milk and dairy products has increased. The milk producers and the dairy industry has been impacted directly because the direct dairy support policies in several regions have been dismantled and the WTO I agreement has reduced the market protection significantly and eliminated the export subsidies.

The development until 2025 is the focus in this report and the general global agenda is expected to change significantly and impact the world dairy sector. The faster dairy companies can adapt to the changing environment the stronger is the competitive position. The losers will be the dairy companies that stick to the old agenda and act defensively to protect the markets and the products from the impact of the changing global development.

### Objectives and scope

The objectives of PM FOOD & DAIRY CONSULTING's analysis are to identify the major changes in the global agenda from political, economic, demographic, and other factors which will impact the dairy industry from 2017 to 2025. This outlines the future framework and the future agenda for the dairy industry.



Another question is: Can we learn from the past? To answer this question the global development both in general and for the dairy industry analyzed to create a framework for assessing the future development.

The aim is to relate the external developments to the dairy sector and analyze the consequences in relation the supply and demand situation for milk and dairy products. The report analyzes the impact on the dairy industry and identifies the future opportunities and threats and on this base, assesses the future winners and losers. Finally, the report outlines then future scenarios, strategies, and recommendations for the world dairy industry.

### Content

The report consists of two major parts of which Part I focuses on the changing world agenda from 2017 to 2025. This includes presenting the general framework with the different agenda's in the world from 1990 to

2025. This illustrates that there are similarities but the future will never be like the past.

The future agenda for 2017-2025, includes:

- The post-truth era
- Brexit
- The new role of the US
- Russia back to old days
- End of BRIC
- Asia's emerging leadership
- Globalization is questioned

The new agenda combined with the general economic and demographic development create the framework for the world dairy sector until 2025.

Part I of the report is a dairy sector analysis, where the impact from the external factors is assessed (chapter 1) in relation to the world milk production (supply-side) globally and regionally. The development of production of dairy products is also evaluated until 2025 in chapter 3. Chapter 4 focuses on the global demand side in total and per capita consumption. The future consumer trends are outlined both quantity and quality driven.

The international trade will be significantly affected by the new protectionist signals from several global players with the US and UK in the lead. These changes are analyzed in chapter 5. Chapter 6 contains a SWOT analysis of the world dairy sector until 2025 and in chapter 7, world dairy outlook until 2025 is outlined by evaluating three scenarios: Protectionist, moderate, and back to globalization. The future winners and loser are also evaluated. Chapter 8 concludes the analysis.

### Time scale

The report covers the period from 2015 to 2025 with estimates and prognosis for the

general economic, political development, and the specific developments for the dairy sector. To understand the future developments the report focuses on the developments for the essential parameters in the last two decades to identify the major changes and characteristics.

## Part I: The changing world agenda

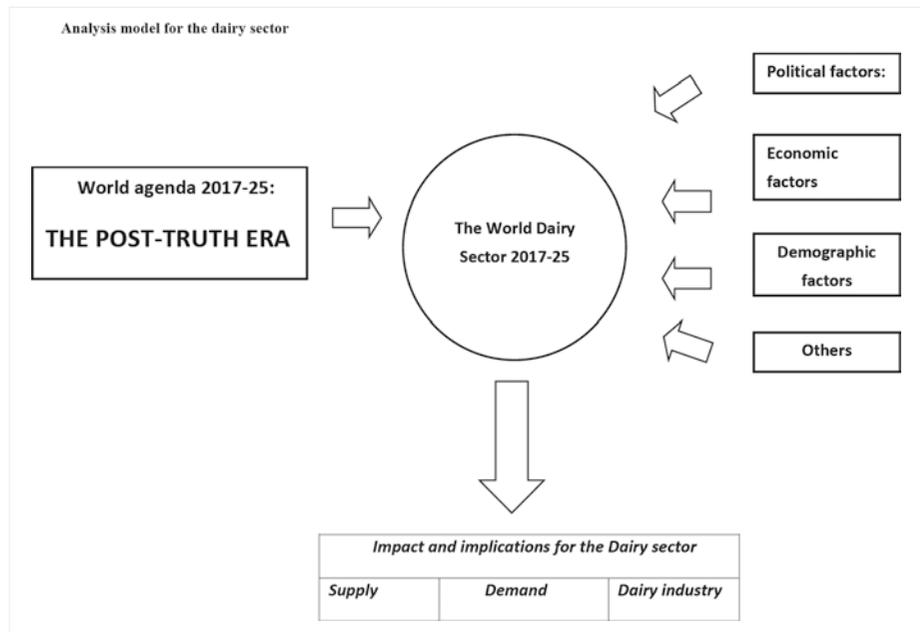
The general framework for the global economy has changed significantly since 1990 and with periods of dynamic growth as well as recessions. The political agenda has been altered complexly from a cold war scenario and a dualistic security to a global focus on terrorism.

2016-2025: The period of post truth and protectionism:

Brexit has initiated a break-up in Europe with no rational conclusion

- The Trump administration wants through a protectionist approach to secure domestic economic interests.
- Signs of increasing nationalism in Europe.
- Globalization is questions as the solution to economic problems.
- Russia has become more aggressive and the conflict with the western countries impacts the economy negatively.
- China and India are rapidly improving their position in the global economy.

The lesson from the past is that the global developments are not linear and cumulative but instead characterized by turbulence and volatility. The international situation chang-



Source: PM FOOD & DAIRY CONSULTING

es very fast and the changes are comprehensive due to the digital communication. The international economy and markets reacts very fast and the global economic recession in mid-2008 was a reality in just one month because of the increasing interdependence between the economies. Governments, economic institutions, and companies try to adapt to this fast-changing agenda by issuing new economic plans and strategies. The key words are flexibility, adaptability, and robustness.

The period from 2016 to 2025, will also bring a wide range of changes in the framework from for the global dairy industry.

## The world dairy sector

The world dairy sector has since the change of the millennium experienced several changes in the world market situation caused by the general economic and political development in the world. The world dairy industry from milk production to processing has been less protected from volatile prices since 2000 and this means direct impact from the changes in the world milk balance. The only exception is the US dairy sector where nearly all dairy policy measures from the 1990's has remained in the new century.

The world market for dairy products was from 2000 and until 2008 driven by global



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demand surpassing the milk supply which record high world market prices as consequence. The global fiscal crisis from 2008 to 2012 (the longest and the deepest crisis since WWII) impacted the dairy industry significantly. The world market prices for dairy products were more than halved and the industry and dairy farmers suffered severely.

The scenario changed again during 2012 where the world economy began to recover and the demand for dairy products increased led by Asia and especially China. However, this upturn lasted only until the end of 2014 where the Chinese demand for dairy products decreased and the Crimea – crisis led to the imposing of a ban on all western dairy products by Russia from August 2014.

At the same time the world milk supply continued to expand and create increasing

surpluses in EU and the US. In EU, the milk quota system was abolished from April 2015 and the EU milk production increased significantly already in 2015 and this continued in 2016. This resulted in a global over-supply situation from 2014 to the end of 2016 creating hardship for dairy farmers and the dairy industry in all developed dairy countries in Europe, North America and Oceania.

The demand for dairy products began first to improve at the end of 2016 and this has continued in 2017 but the development is still fragile with sudden GDV price reductions. The increasing volatility on the world market for dairy products since 2000 with several changes has been a learning period for the dairy farmers and the dairy industry. The lessons have until now been that is very difficult to adjust milk supply and

demand in a short period of time and the imbalances have been unnecessary long. The dairy farmers react to slowly on the changing demand situation both in relation to cut back production or expanding. This has made the price volatility more outspoken than necessary.

From 2017 to 2025, the world agenda for the dairy sector will be challenging and to some extent unpredictable because of the new world agenda and the paradigm-shift from rationalism to post-truth era based on emotions.

The report "The World Dairy Industry and the changing World Agenda 2017-2025" is a must-have for any company seeking new opportunities in the global dairy market. You can order it at a special price of €1,500 at [mikkelsenpreben@hotmail.com](mailto:mikkelsenpreben@hotmail.com).



## DSM Food Specialties

DSM has named Patrick Niels President of DSM Food Specialties, effective 1 August 2017. He follows Ilona Haaijer who left the company.

## New IDF Bulletin 487

It is important to identify the main drivers of dairy product consumption in various countries across the world to understand the changes in market trends.

While overall, dairy markets worldwide are enjoying positive growth, we are seeing downward trends for certain product categories in certain regions.

Economic development, the rise in purchasing power, demographic factors including marked population growth in Asia, Africa and South America, and middle-class growth will enable new consumers to access dairy products. The integration, slowly but surely, of new "Western" products into local traditional diets in many countries worldwide also provides leverage for growth over the long term.

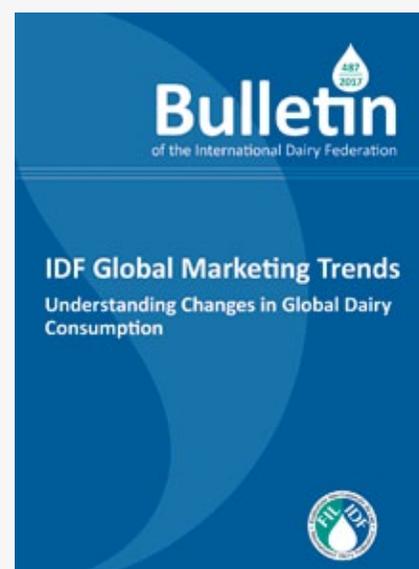
The innovative dynamism of the dairy industry plays a decisive role in market development with new product offers and ever greater availability in stores. The quest for tasty, healthy, easy to eat,

natural products also drives the development of dairy markets.

On the down side, changes in eating habits, especially the move away from eating breakfast and dairy products at the end of meals has negatively affected certain products. The emergence and spread of arguments against dairy products and cattle breeding could also jeopardize this balance with the trend toward veganism becoming more fashionable, giving rise to alternatives to dairy products.

Based on in-depth research conducted by the International Dairy Federation's (IDF) national experts, this new Bulletin of IDF n°487/2017 is intended to supplement the existing World Dairy Situation report by shedding light on global food consumption trends, with a particular focus on dairy products by geographic region.

132 pp – English only; Price: 250 Euros. This Bulletin is available on the IDF Website [www.fil-idf.org](http://www.fil-idf.org)



IDF has just issued a new Bulletin that is shedding light on global food consumption trends, with a particular focus on dairy products by geographic region (photo: IDF)

## World first aseptic pack 100% linked to plant-based renewable material

### SIG Combibloc

SIG has developed the world's first aseptic carton pack with a clear link to 100% plant-based renewable materials – a value-added solution that meets the demands of the industry and today's consumer expectations.

The SIGNATURE PACK drives the replacement of conventional plastics from fossil fuels with certified and sustainable plant-based polymer materials. The polymers used for laminating the paperboard and making the spout originate from renewable European wood sources and are certified according to ISCC PLUS or CMS 71, respectively, via a mass balance system. This means that for the polymers used in the SIGNATURE PACK, an equivalent amount of bio-based feedstock went into the manufacturing of the polymers. [sig.biz](http://sig.biz)



SIG has developed the world's first aseptic carton pack with a clear link to 100% plant-based renewable materials – a value-added solution that meets the demands of the industry and today's consumer expectations (photo: SIG Combibloc)

## Hoerger works now for PRODALIM Group

PRODALIM Group, a global market leader in the supply of juices, concentrates and oils, announces the nomination



of Stefan Hoerger as its Global Chief Sales Officer as of July 1<sup>st</sup>, 2017.

Stefan Hoerger has held various senior executive positions in the food & beverage industry. His last role was the Managing Director and Director of Sales, Marketing & NPD Europe at the Agrana Fruit Group, and previous to that he was the Head of Sales in the DACH countries at Doehler Group.

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The LifeTec filters differ in design, performance and robustness from conventional products (photo: Donaldson)

# High-performance filters from Germany

Donaldson sets quite new standards with LifeTec and the (P) series

**W**ith the "LifeTec" series, Donaldson has fundamentally enhanced liquid filters that were initially introduced in 2000. The LifeTec filters stand out not just in terms of design, but, in particular, also in terms of performance and robustness. In addition, the supplier can rapidly and flexibly meet the customer's requirements with a completely new produc-

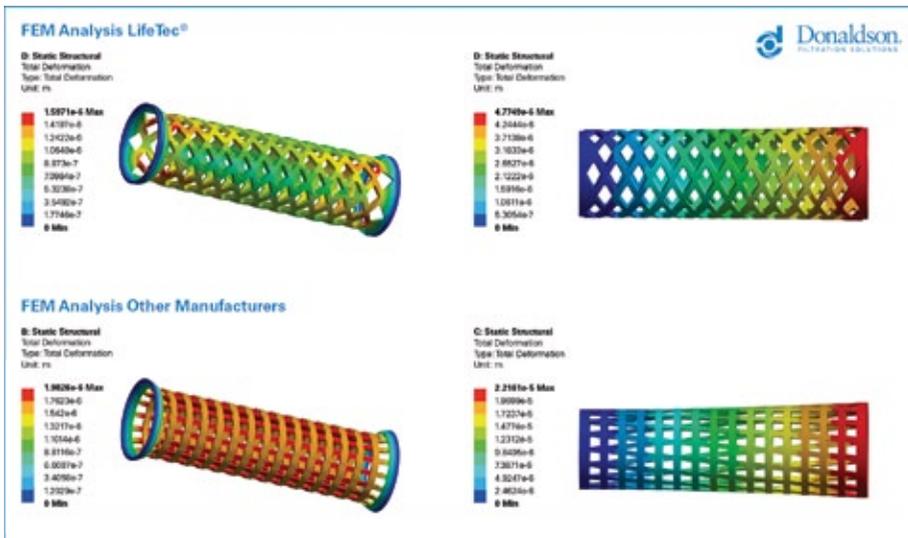
tion line. IDM has visited the Donaldson plant in Haan, Germany.

Stefan Löbber, Business Development Manager of Process Filtration at Donaldson, explains the approach that led to the development of LifeTec filters: "We want the industry to have a rapidly deliverable product, which works more efficiently than conventional filters and is even more stable, to meet the requirements in the

harsh daily production routine. When we say efficient, we naturally mean the total operating costs, namely, "Total Cost of Ownership."

## Modular construction

The LifeTec filters have a modular design on a basic module of 10" in length, from which the finished filters are created in sizes ranging between 10 and 40". The liner is made of



Computer analysis shows how pressure-resistant LifeTec filters are because of their special liners (fig.: Donaldson)

highly resistant polypropylene. It encloses the actual filter medium and provides the necessary support for the pressure stability required. A rhomboid structure ensures that the compartments, in comparison to the conventional square structure, are considerably more stable when exposed to shock and resistant to torsion – which makes unintentional damage of the filters during installation and removal almost impossible and extends the service life of the filters.

Different filter media made of PP, PTFE or PES are available, these depth and membrane filters are selected appropriately, depending on the purpose of use. The retention rates range between 0.2  $\mu\text{m}$  and 100  $\mu\text{m}$ . With a total of seven connections, the LifeTec filters fit in existing standard housings. In addition, the user also benefits from a lower pressure loss: It is possible to either save energy for generating pressure or use less filters in an accordingly smaller housing.

## High throughput

According to Löbber, the LifeTec filters are characterized by good retention and, in particular, high flow rates at a defined pressure drop as well, which, in the LifeTec PES WN model, means (in specific numbers) 17 litres/min at 100 mbar and a lower retention rate of 0.2  $\mu\text{m}$ . The permissible components according to EC and FDA standards withstand more than 100 sterilization cycles, are regenerable, come with comprehensive documentation and are 100 % tested for their integrity as membrane filters. In addition the filters are always individualized and can be unambiguously traced via their QR code or bar code. In addition to facilitating handling, these codes allow the staff in the

dairy operations to convey all necessary information to a database. One scan during installation or removal is sufficient for this.

In dairies, LifeTec filters are installed in the water area, e.g. for processing, rinsing and CIP or ingredients water. They can also be used for whey filtration.

## Fast delivery

Whereas in the past it took six to eight weeks for a defective filter or a filter which is no longer regenerable to be replaced by a new filter, Donaldson can now perform the delivery of the replacement within a few days. Considering that fewer companies can afford costly storage of parts, this is naturally an enormous relief.

This becomes possible thanks to a new production, which is organized in the so-called single piece flow. Peter Schaaf, Plant Manager of Donaldson in Haan: "We received a great deal of inspiration from automotive industry. The production is carried out in such a way that we also can produce small quantities rapidly and efficiently. The basis of the entire operation is an IT-controlled flow of parts organized according to the Kanban principle; the components are incorporated and immediately individualized for manufactured components. These components then directly undergo the integrity tests in production." Donaldson does not maintain a significant inventory of the LifeTec filters, but produces them according to the orders from the customer.

René Stoffels, the Production Manager, who designed and started the new production of LifeTec, explains the principle of the processes: "The manufacturing of the LifeTec compo-

nents is carried out in a Category 7 clean room starting with a pleating machine, which combines the support and filter medium layers. The liners manufactured by a third party are provided with a QR code, from this point on the components are then individual production items. After several work steps, the individual components are configured according to the order in the above-mentioned sizes, connected firmly to one another and prepared for the tests. These take place in a self-constructed line in the throughput processes and no longer in batch processes as was done previously."

Donaldson provides insights into the processes of LifeTec production in a YouTube video. According to Schaaf, customers are welcome to visit the plant, because: "We produce components for sensitive food manufacturing sectors, because transparency is a top priority for us!"

## New to drinktec: Sterile air filter

Donaldson will present a new range of sterile air filters for aseptic applications at the drinktec trade fair. The (P) series operates at a separating limit from 0.003  $\mu\text{m}$  with a very low Delta P. It is resistant to ozone and  $\text{H}_2\text{O}_2$  [VPH] and it is stable at temperatures of up to 200°C. This gives the user a high degree of flexibility in terms of plant design. In the case of bacteria and viruses, the filters provide an LRV > 9. For nanoscale particle even retention values of >10 have been measured.

According to Donaldson, this makes the (P) series superior to comparable filters by a factor of 500. The filters of the (P)-SRF X and V series are resistant to aerosolized CIP chemicals in tank ventilations.



At drinktec, Donaldson will introduce a new range of high-capacity sterile filters for aseptic processes (photo: Donaldson)

The membrane filters and depth sterile air filters of the (P) series accommodated in the stainless steel support sleeve are extremely robust and, can also withstand 160 cycles. From a large-scale field test, customers report service lives extended by a factor of 10-20, without impairing the performance of the filter.

The (P) filters are permissible according to relevant standards of food sector and dry within only few seconds following steam sterilization. In this process, machine downtimes and energy consumption are significantly reduced accordingly. Typical use cases of the (P) series are provided for fermentation tanks, side channel compressors, clean rooms and aseptic packaging.



LifeTec Filter are manufactured according to highest hygienic standards in a Category 7 clean room (photo: Donaldson)

## Global dairy top 20, 2017

2017	2016	Company	Country of headquarters	Dairy turnover, 2016*	
				(USD billion)	(EUR billion)
1	1	Nestlé	Switzerland	24.0	21.7
2	3	Danone	France	18.3	16.6
3	2	Lactalis	France	18.0	16.3
4	4	Dairy Farmers of America	USA	13.5	12.2
5	6	FrieslandCampina	Netherlands	12.3	11.1
6	5	Fonterra	New Zealand	12.0	10.8
7	7	Arla Foods	Denmark/Sweden	9.9	8.9
8	8	Yili	China	9.0	8.1
9	9	Saputo	Canada	8.4	7.6
10	11	Mengniu	China	8.2	7.4
11	10	Dean Foods	USA	7.4	6.7
12	12	Unilever	Netherlands/UK	6.9 <sup>†</sup>	6.2 <sup>†</sup>
13	13	Kraft Heinz	USA	6.4	5.7
14	17	Meiji	Japan	6.1	5.5
15	16	DMK	Germany	5.6	5.1
16	14	Sodiaal	France	5.3	4.8
17	18	Schreiber Foods	USA	4.9 <sup>†</sup>	4.4 <sup>†</sup>
18	19	Savencia	France	4.9	4.4
19	15	Müller	Germany	4.9 <sup>†</sup>	4.4 <sup>†</sup>
20	20	Agropur	Canada	4.6	4.2

\* Turnover data is dairy sales only, based on 2016 financials and M&A transactions completed between 1 January and 30 June 2017. Pending mergers/acquisitions not incorporated include Lactalis' acquisition of Omira and Stonyfield.

<sup>†</sup> estimate



Source: Rabobank

# Fruit juice 4.0

## Touch screen IPCs in digital-based production processes

It is getting juicy down at Lake Constance: Since July 2015, Gropper, the dairy and fruit juice producer, has been filling non-from-concentrate juices and smoothies for the retail trade from its Stockach base. The interface between SAP, the in-house developed front-end interface and the user comes in the form of touch screen industrial PCs (IPCs) from CAITRON, used for the production, logistics and time-sheet processes.

### Installation abstract

- Production control and monitoring with hygienic food IPCs
- Paperless production thanks to digital production notes
- Malfunctions recorded using IPCs for subsequent benchmarking
- Simply linking of barcode scanners to IPCs in the logistics areas
- IPCs operable with gloves thanks to PCAP multi-touch technology
- User-friendly time-recording for employees using IPCs with LEGIC RFID readers

As early as the actual planning phase for the production site opened in Stockach in 2015, Gropper was already evaluating IPCs from various vendors. The defined objective was to identify a device suited for use in the hygiene-sensitive food sector that is fail-safe and easy for users to operate, so as to ensure flawless processes. "In the end, we went for CAITRON's CS series touch screen IPCs", says one of Gropper IT managers. "We were particularly persuaded by the very high level of touch quality of the screens, and the range of integrated interfaces. The IPCs are delivered with all additional devices fully integrated, including the LEGIC RFID reader. Other plus points in this investment decision, included the extremely appealing design of the devices."

### Digital production control

With the help of the networked IPCs, the fruit juice producer has completely eradicated the use of paper in the production environment. Employees start and stop production using a touch button on the touch screen, and they can retrieve the job data centrally stored in SAP any

time they want. And at Gropper, the production notes are no longer delivered on paper, but are instead simply displayed to the production employees on their screens. In this way, Gropper ensures that employees do not overlook any important work steps. "These digital production notes can be found everywhere within the site", explains an IT manager. "For example, our packaging line employees can use their screens to call up the packaging material prescribed for the job in hand. This helps prevent errors."

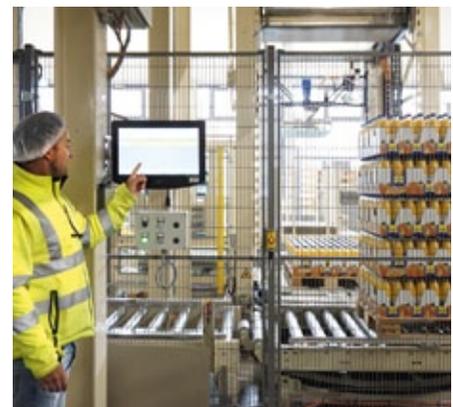
Gropper also uses the food IPCs in its production area for reporting purposes. If a malfunction brings the filling plant to a standstill, the production system automatically sends an error message to the screen of the connected IPCs. This is the signal to the relevant production employees to start identifying the error. Once the plant is operationally-ready again, the employee categorises the reason for the failure using a drop-down menu. The duration of the down-time is determined by the IPC automatically. Gropper uses this data for comprehensive OEE analysis and benchmarking, so as to improve the level of system availability.



A glance into the production area: Gropper produces non-from-concentrate juices and smoothies at its Stockach site.



Gropper's employees use a touch screen to easily start and stop jobs at the filling plant.



With the aid of a bar code scanner, Gropper's employees enter the number of loaded pallets into SAP via the CAITRON IPC.



Whether it be production or warehouse, no matter: Their individually configurable touch sensitivity means these latest PCAP multi-touch screens can even be used by employees wearing gloves.

### Simple barcode scanner integration

Once the non-from-concentrate juices or smoothies have been filled, labelled and packed into a box, a gripper arm transports the drinks automatically, shift by shift on a pallet embossed with a barcode label. Then the pallet is moved via a conveyor belt through a fixed-position barcode scanner, which is connected to the IPC installed at the palletising station. In this way, the palletized production quantity is automatically posted in SAP with the selected production order. If a pallet is not completely filled, the Gropper employee has to manually enter the quantity of drinks on the pallet, because the system works on the assumption of fully loaded pallets. Just a couple of tips of the fingers on the IPC touch screen are needed for this, meaning that production speed is not adversely affected. Gropper has wall-mounted IPCs in its warehouse in Stockach, showing a visual display of current stock levels based on a warehouse layout. These digital diagrams help Gropper's



Putting paid to piles of paperwork: The digital layout of the warehouse means employees can immediately see what articles are stored where.

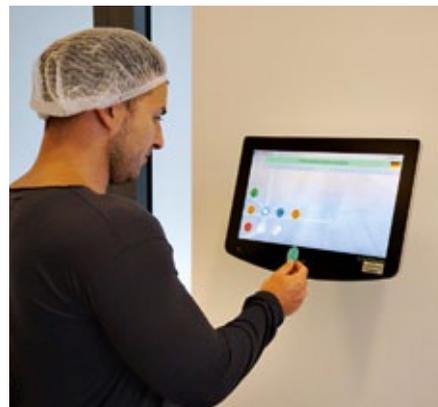
staff to maintain a permanent overview, and to quickly locate goods when it comes to the loading process, for example.

### Operable with gloves

Gropper's employees wear various types of hygienic gloves in the production and warehousing areas. It used to be the case that glove-operable devices needed resistive touch screens, which would begin to wear after just a relatively short period of time. CAITRON's PCAP multi-touch technology overcomes this technological deficit. Its capacitive touch screens are extremely robust and long-lasting, but the individually configurable touch sensitivity means that these devices can be operated even by those users wearing thick gloves. "It used to be the case that our employees in the main plant at Bissingen, tried to operate the touch screens with pens or other hard objects, which ended up damaging the resistive touch screens that we used to run," says an IT manager. "That's all history now thanks to our new, robust capacitive touch screens, because the IPCs don't respond to information entered using objects."

### Added value with shift schedule management

Apart from its production and warehouse processes, Gropper also uses CAITRON IPCs to help record its employees' working times. Employees log into the system at the start of the shift, by holding their personalised token up to the LEGIC RFID reader of the IPC. They log off in the same way once the shift is over. In this way, Gropper is able to record the employee working hours largely



At the start of their shift, employees use their personal token to log into the IPC via the integrated LEGIC RFID reader.



If ever there is a production stoppage, the employee uses the touch screen to enter the length and reason for the interruption – providing the basis for an intensive benchmarking process.

automatically for the personnel department, saving a great deal of administrative effort in the process. But the IPC also assists Gropper in the distribution of shift schedules. "The system knows exactly when an employee last called up their shift schedule. If there is any change made to the shift schedule, this information is displayed on the screen to the employee, who can then directly retrieve the schedule, with the option of forwarding it to their mailbox," explains a Gropper IT manager at Gropper.

### Summary

Whether it be production, warehousing or work time-recording, it makes no difference: With CAITRON IPCs as the front-end interface to its system landscape, Gropper has simplified its operating processes and made them more efficient. Employees can easily control plant and SAP applications via the touch screen IPC, from directly within the production environment. In this way, Gropper has achieved high-performance, trouble-free operating processes.

### About Gropper

Molkerei Gropper GmbH & Co. KG, based in Bissingen, Germany, is a private label specialist to the national and international market. Its customers include food retailers in the discounter, full-line supplier and self-service department store distribution channels. The product range includes traditional milk-based articles, milk drinks, yoghurt, desserts and coffee/milk combination drinks. The second production site in Stockach on Lake Constance focuses on bottling non-from-concentrate juices and smoothies.



# The world's highest performance milk drying plant

Fonterra and GEA have set a milestone

**T**he currently most efficient milk powder plant worldwide has been taken into official operation by Fonterra in Lichfield on the North Island of New Zealand December 2016. The capacity of "Lichfield Dryer 2" is an impressive 30 tons of powder per hour with rawmilk input of up to 4.4m litres a day. GEA, with a few exceptions in terms of supply, was in charge of the turnkey construction.

The plant in Lichfield is almost a copy of the Fonterra plant in Darfield, near Christchurch, that began its production in 2013 and features the world's largest spray dryer. At the Lichfield plant, GEA worked very closely together with Fonterra's engineers to use the experience gained at Darfield to further enhance the design. The objective was to build the best performing and most efficient milk powder plant worldwide. Im-

provement of heat, water recovery and more efficient packaging lines are the key that made Lichfield the most sustainable milk drying operation worldwide.

## Plant size

GEA was responsible for the turnkey construction of the milk powder plant and has provided the processing technology: From milk reception and standardisation to evaporation, drying, powder handling and final packaging. The spray dryer has an 18-meter chamber that weighing 124 tons (incl. cladding, roof and air dispersers) had to be lifted 34 meters above the roof and placed precisely within the building. The plant has been designed for 24/7 operation.

## Designed for efficiency

Although the dryer at Lichfield is nearly a copy of the sister plant in Darfield,

GEA engineers have included several innovations that simplify the processes on site and reduce the total cost of ownership even further. Energy efficiency was also a key focus for the project team, GEA designing the plant for low water consumption. Water is being recovered through evaporation using a RO (Reverse Osmosis) plant. As a result Fonterra leads the way for water conservation in milk drying plants.

"Highly-productive and efficient spray dryers, such as the one in Lichfield, play a decisive role in the industry," said Clint Brown, responsible for the GEA operation in New Zealand. "The demand for milk in expanding markets, such as China, can only be met by easily transportable and stable high quality milk powder. This is processed regionally into various dairy products supported by other processing plants incorporating GEA technologies."

## Construction phase

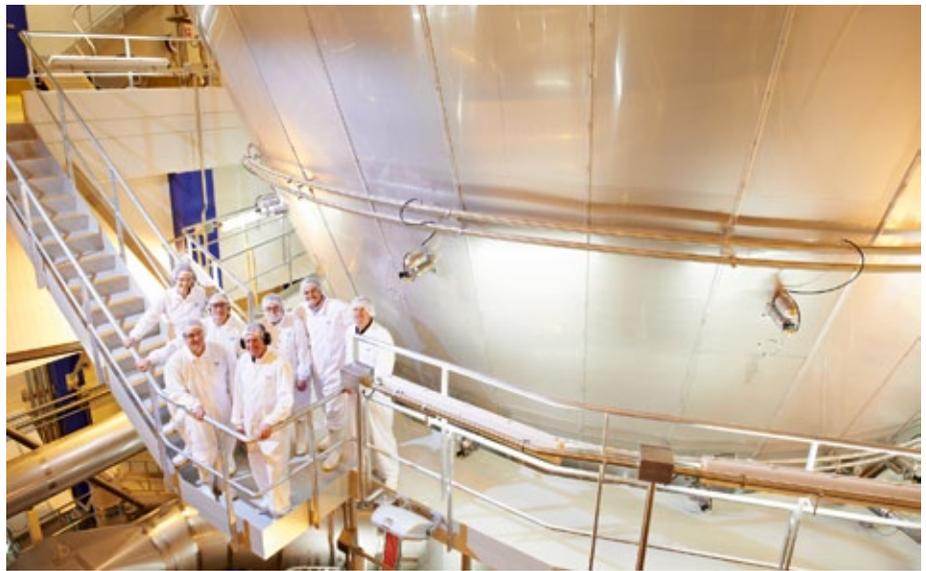
GEA was responsible for the construction of the milk powder plant (excluding boiler, water, wastewater treatment & chilled water plants) cooperating with a local project engineering office. They have developed an integrated design and construction process based on 3D models and engineering know-how to integrate the process plant and the building as it is erected. Part of the supply included four additional tanker unloading bays capable of feeding raw milk silos prior to the milk treatment and standardisation process. Other core components of the supply included evaporation, CIP systems and powder handling and storage systems. Lichfield features three fully automated packing lines each capable of inert gas packing wholemilk powder at up to 12 tonnes per hour. An automated palletizing system with three robots and a wrapper/labeller completed the plant. GEA was also responsible for full plant automation and control including the ventilation systems.

GEA had up to 350 people working on-site during construction and installation stages, many more were involved in pre-fabrication and manufacturing.

## Volume of production

Technical details:

- Overall milk throughput is approx. 4,700 m<sup>3</sup>/day processed through four evaporators.
- The dryer is fed with a concentrate, producing powder output of 30,000 kg per hour
- Two skid mounted RO Polishers capable of polishing up to 250,000 litres per hour of evaporator condensate/recovered water were included in the



The Lichfield team in front of the mega-dryer during the first production run (photo: Fonterra)

project. The plant generates more potable water per day than it consumes, with a daily excess of over 1 ML per day.

- Steam and electrical power consumption are at industry leading low levels, and fell well within the guarantees agreed at the project outset.
- To achieve overall output requirements, GEA supplied three RBF1200Li (limited intervention) filling lines each with a peak output of 12MT per hour fill powder into 25 kg kraft paper bags with a gas barrier liner. The GEA Avapac RBF's feature fully automated empty bag handling and filling capability meaning that all three lines can be operated by a single operator.

## Fonterra's comments

Fonterra's Chief Operating Officer Robert Spurway commented, "Premium milk powder is a valuable product for Fonterra in its own right but people often un-

derestimate the strategic importance of powder production to the Co-operative's overall asset mix. The capacity these assets give us takes the pressure off during the peak of the season, meaning, we have more freedom to prioritise milk into higher returning products."

"Our goal is to strike a balance in our assets that enables us to switch between products quickly to meet demand changes in global markets, push the pace on production when milk volumes dictate, and ultimately deliver the best product mix to generate returns," said Mr Spurway.

South Waikato Operations Manager Sam Mikaere added, "The successful commissioning of this project is the result of an exceptional breadth of experience and knowledge. We sought expertise locally, nationally and globally from more than 200 companies and their dedication has seen the project come in on time and under budget."



Standardization and pasteurization department at the Lichfield plant (photo: GEA)



GEA has developed an integrated design process based on 3D models (photo: GEA)



Limited intervention filling lines operating in the Lichfield plant (photo: GEA)

## Reduced costs and increased accuracy by standardizing labeling and marking printing Arla Foods and NiceLabel



NiceLabel, the world's leading developer of label and marking productivity software solutions, recently worked with Arla Foods that needed a standardized label management solution for all of its industrial printers. NiceLabel's next generation technology enabled this large food manufacturer to significantly reduce costs and increase label accuracy and productivity.

A critical part of Arla's brand identity is being able to guarantee freshness and provide their customers with accurate product information. However their unique set-up, as a company consisting of more than 70 dairies around the world, presented a range of challenges in their quest to provide accurately labeled products. The company needed a single solution with a standardized method of integration between each dairy's label and direct marking printers and the Manufacturing Execution System (MES).

Using NiceLabel's label management system, Arla was able to automate printing by implementing a standardized integration with the MES at each dairy. Now, master data flows directly from the MES to the printers, eliminating manual data entry errors, mislabeling and the associated costs. By introducing centralized label management, Arla have a more transparent label management process that helps them ensure accurate product and production data throughout the entire label printing process. The company's centralized IT team now provides 24x7 support to each site, rapidly addressing issues before they result in production downtime. In addition, Arla can remotely monitor all activity and diagnose errors. [www.nicelabel.com/food-beverage](http://www.nicelabel.com/food-beverage)

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(fig.: Tetra Pak)

# Tetra Pak PlantMaster

Innovations in automation to deliver efficiency, quality and confidence



Author: Anders Andren, Head of Automation, Tetra Pak

Today's food and beverage producers must deliver to exacting requirements — providing products of the highest quality while constantly improving their production efficiency and profitability. Increasingly, this depends on the innovative application of a range of automation solutions.

## Evolving automation

For a number of years, automation has played an important role in helping to achieve greater production efficiency, controlling equipment and moving products through the factory. However what we actually mean by automation has changed over time. Automation has evolved from analogue processes, which are dependent on people for information management, to digital processes, which — with the increase in processing power — enable the collection of enormous quantities of

data. With this data, it is possible to monitor such things as downtime, wastage and overall equipment efficiency, enabling manufacturers to optimise their process. As market demands and technology move on, the next



**The new Tetra Pak PlantMaster provides customers with a simple end-to-end solution by unifying plant control in one single data system (photo: Tetra Pak)**

evolution of technologies and automation solutions must be employed to increase equipment reliability and reduce operational costs.

Last November, at BrauBeviale, we launched the new plant automation and information solution from Tetra Pak, the Tetra Pak PlantMaster. It is a perfect example of how Tetra Pak is pushing the boundaries of automation within the industry.

The Tetra Pak PlantMaster, which is an upgrade to the Tetra PlantMaster, enables manufacturers to programme their entire plant through a single data management system. The upgrade includes the Tetra Pak PlantMaster MES Suite (Manufacturing Execution Systems), a new software programme specifically designed for the food and beverage industry, which provides a user-friendly interface. Based on Tetra Pak's extensive food production knowledge, the Tetra Pak Plant-



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- Customize it with the right modules relevant for you today
- Quickly and easily create new functions for your future needs



### REDUCE TIME LOSSES, DOWNTIME AND WASTE TO CUT OPERATIONAL COSTS

You get real-time information on your entire operation, supporting operators to make the right decisions at the right time and eliminating the risk of human error.



### SECURE CONSISTENT PRODUCT QUALITY AND FULL CONTROL OF FOOD SAFETY

- Simplify your quality management with one system for your entire operation
- Replace manual quality reporting with a digitalized system
- Get complete automated control of workflows, operations, process parameters and critical control points in real time



### FULL END-TO-END TRACEABILITY

Cover the origin of materials, ingredients and processing and packaging routing for complete logging and tracking of all production parameters – for easy compliance with food safety regulations and full transparency throughout the supply chain.



### ONE OPEN MES SOFTWARE SOLUTION INTEGRATES WITH THE CLOUD AND ERP SYSTEMS

Seamlessly integrate any equipment or data source into other systems and turn data into insights in reports and dashboards to continuously drive and optimize performance.



Master is the only piece of software available in the industry that covers food producers' entire operations – from raw material reception to finished packaged and palletised products, with any brand of equipment, and at all their sites. It streamlines data collection, facilitates accurate data analysis and, ultimately, improves efficiency.

## Integration and information to improve efficiency

### Consistency

For food and drink manufacturers, uniformity of ingredients, taste and quality is paramount. In globalised – and increasingly standardised – markets, retailers and consumers expect consistency in every single product. Growing consumer awareness of food safety is also driving demand for more information on the beverages they buy. This, in turn, is leading to increasingly stringent food safety laws, with compliance often dependent on the provision of regular and detailed production data. Innovations such as the Tetra Pak PlantMaster are part of Tetra Pak's commitment to supporting customers with all their manufacturing needs, from processing right through to packaging.

Traditionally in the food and beverage industry, manufacturers use different equipment

from different suppliers in one plant, and many of these machines even require manual data collection. With the new software, the Tetra Pak PlantMaster provides a single set of tools that integrate all operations and enable manufacturers to programme their entire plant through a single data management system, from incoming raw materials to finished, palletised products. This gives manufacturers complete control of operations, enabling them to maximize the value of their production while cutting down on waste and reducing time lost to inefficiencies in the process. They also secure consistent product quality and full control of food safety, while creating full end-to-end traceability, from raw material to consumer. Finally, the solution is customised to fit each food producers' specific operations – with the right modules relevant for their operations today and enabling quick and easy creation of infinite new functions for future needs.

### Efficiency

Tetra Pak PlantMaster consists of three levels, the first of which is embedded automation. These are machine-specific automation solutions built in to all Tetra Pak equipment that create a solid automation base. Second, at the production control level, food producers get production and process management in real

time, with one system that gives total control over production. Third, the all new MES suite allows food producers to integrate their entire operation, enabling everything to be digitalised into one interface and even combining multi-site production information into common reports.

This collection and visualisation of unprecedented amounts of information allows producers to plan production, monitor efficiency and trace the lineage of all raw materials. At any stage in the process, reports can be generated giving up-to-date information on any aspect of the process, including how many packages are being produced, how many litres are being processed, production performance, machine efficiency and even cleaning-in-place. Additionally, ongoing data analysis, visualised in ways that are familiar to staff, can be used to constantly improve efficiency.

The new Tetra Pak PlantMaster provides customers with a simple end-to-end solution by unifying plant control in one single data system, reducing complexity in their management processes and increasing productivity, which in turn, positively impacts the bottom line. The continuing evolution of systems such as the Tetra Pak PlantMaster means that producers are in control and ideally placed to meet the needs of today's changing markets – and those of tomorrow.

# Nutritional beverages

Adding value and growth



Author: Bent Oestergaard, Managing Director OCon ApS, Denmark; bent@ocon.one

**N**utritional beverage (Nutri-Bev) is a new example of product crossover between dairy and food & beverage industries. Ice cream was a dairy product, however today it is more a confectionary product and another example is the crossover in butter and margarine, resulting in new dairy blends categories.

Ready to drink nutritional beverage combines healthy and functional dairy protein ingredients with delicious beverage fruit and flavors etc. There is a growing potential for new value added categories including dairy and none dairy proteins and a wide range of tasty flavor ingredients to satisfy the consumers thirst for functional, health & wellness beverage combined with indulgency demands.

Both the dairy and beverage industry (none alcoholic) are increasingly focusing on nutritional beverage categories and this article will deal with new growth opportunities and industry co-creation as a mean for disruptive innovation of new attractive Nutri-Bev categories.

## Nutri-Bev categories and formulations

The potential composition or formulation of Nutri-Bev categories is enormous, however the two-main dairy based categories comprises: High acid (cultured), e.g. yoghurt, and low acid dairy protein based beverage. Each main category can be divided in series of subcategories designed for e.g. infants, children, adults, seniors and sports drinks. Other product series can be according to fruit, flavors, tee/coffee, cereals, vegetables and particulates etc. Also, the basic formulation can vary significantly:

- Milk and/or vegetable fat, from low to high content
- Milk with adjusted casein or whey protein content
- Pure whey protein or fractions, or pure casein; reduced or fortified
- Combined whey and soy proteins and/or other vegetable proteins
- Animal proteins; insects like crickets and mealworms (future options)
- Lactose free: No, or low lactose content (lactose intolerance)
- Reduced salt and/or increased calcium content (senior beverage)

### About OCon ApS

Based on 40 years of experience from the global dairy, food & beverage industry Bent Oestergaard, OCon ApS offers consultancy services within:

- Process and product innovation advisory
- Strategic business development
- B2B marketing and communication
- Facilitation processes for value creation
- Board membership & advisory support

Carbonation can add another dimension to the taste, promoted by specific starter cultures, or CO<sub>2</sub> gas dispersion prior to packaging. Also, a wide range of starter cultures, e.g. probiotics, can form the basis for its own healthy categories.

### Processing and packaging

The processing of Nutri-Bev combines raw material (liquid and or powder) handling and preprocessing, recipe formulation, possibly functionalisation and mixing & blending followed by flavor ingredients dosing prior to thermal treatment. Prior to filling sterile carbonation or dosing of e.g. enzymes might take place.

Depending on categories and types of Nutri-Bev the processing might be fairly complex, e.g. for products with particulates. The optimal processing balance cost efficiency with optimal yield and function of the ingredients, protection of vital components like vitamins and overall quality and food safety.

For dairy protein fractionation/concentration and lactose free products membrane filtration is a key technology. For efficient mixing or functionalisation; e.g. microparticulation of whey proteins to add an additional dimension of functionality and creamy mouthfeel, Cavitation technology has proven to be ideal.

Due to ambient storage, in particular for low acid products, UHT is the dominant thermal technology and new UHT innovations combines high kill rate with gentle treatment and excellent taste. New alternatives like High Pressure Processing (HPP) and Pulsed Electric Fields (PEF) Processing are entering the market.

Several ingredients and process technology providers do have significant experience across dairy, food and beverage formulations and processing. Supported by their innovation centers, they can be important partners, in creation of the most optimal formulation and processing of new Nutri-Bev categories.

Choice of packaging design, material and size is an important part of Nutri-Bev impacting marketing that appeal to the various consumer segments, from modern young consumers to sports and senior consumers.

### Co-creation of value and growth

Successful disruptive innovation of Nutri-Bev categories requires a substantial market-, formulation-, processing and marketing insight and knowledge. A new industry trend is to collaborate across the value chain to foster a strong specialist platform for disruptive innovation. Figure 1. is an example of key stakeholders for co-creation of new Nutri-Bev products and processes adding value and growth to engaged dairy and beverage producers.

OCon ApS can help the industry in facilitation of co-creation, from ideation to implementation, of new disruptive value added Nutri-Bev categories to stimulate liquid dairy and beverage growth.



Fig. 1. Key stakeholders in co-creation of value added Nutri-Bev categories.



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#### Also complete dairy factories

# Froneri Schöller uses Fristam FDS double-screw pumps to dose its ice cream ingredients

## Hygienic, versatile and powerful double-screw pumps

The industrial production of ice cream consists of two phases: it starts with the preparation of raw materials to create a premix and is followed by the finishing process where different flavorings are added.

Froneri Schöller in Uelzen, Germany, invested in four Fristam double-screw pumps for dosing the various ingredients to the premix. Under demanding ambient conditions, the FDS 3 pumps (fitted with frequency converters) can transfer products as thin as 1cP at 25 bar and thick products up to 1,000,000cP from 1000-litre tanks to the premix vessels. The FDS pumps can therefore switch between pumping thick product to acting as CIP return pumps within seconds. This not only simplifies the process, but reduces costs as there is no need for additional pumps, bypass lines and instruments for CIP cycles. In a factory that produces around 250 different types of ice cream and where batch changes often occur several times a day, this is of course a major advantage.

### Creating the premix:

Pumps used in ice cream production must be able to transfer many different flavorings to the premix. Before lemon juice, kirschwasser, raspberry pulp, strawberry pieces or nuts can be added, the premix is prepared. At Froneri Schöller, skimmed milk, dairy cream, quark, yogurt, sour cream and sugar are mixed, homogenized and pasteurized at exactly 81°C. This



**Figure 1: Fristam FDS double-screw pumps – sturdy, versatile and hygienic**

**Figure 2: Fristam FDS – conveying screws with various pitches for maximum flexibility**



mixture is then transferred to storage tanks where it sets for at least six hours. The premix is then cooled in the freezer to a temperature between  $-5$  and  $-10^{\circ}\text{C}$  and rotating blades prevent the product from getting stuck to the inside wall of the cooled drum, while air is added to the mixture to make it light and creamy.

### Delivering the ingredients with the FDS:

The factory in Uelzen is equipped with four delivery stations including load cells for the various flavoring ingredients. At these stations, the 1000-litre stainless steel tanks and IBCs in which the ice cream ingredients including fruit juices, fruit pulp, nuts and egg-sugar mixtures are delivered to the factory and are connected to the production system. The FDS is designed to transport shear sensitive ingredients such as whole cooked strawberries without crushing them, as well as also pumping very "bitty" product such as nuts and seeds. The smooth axial movement through the pump means these products cannot get caught between the screws, so there's no chance of causing any damage to the product or the pump itself.

The process requires a constant flow rate of  $8 \text{ m}^3/\text{h}$  at a differential pressure of 8 bar. When switching tank at the delivery station, air enters the pipeline system, which must be eliminated during the initial pumping phase. At the pressure side, the pipeline features a non-return valve that must be pushed open by the pump. Due to the excellent suction power of the Fristam FDS, there is no need for an automatic, pressure-side bleeding system, which is a known source of contamination. The ability of the Fristam pumps to transfer media of various viscosities is not only a huge advantage for production, but also for cleaning. At the Froneri Schöller plant, there are no bypass lines or CIP fittings, as the FDS pumps also serve as CIP return pumps, which effectively prevent contamination.

## Full-range provider thanks to double-screw technology

The FDS double-screw pump series launched in spring 2016, it joins the already broad range of Pumps and Powder Mixers available from Fristam. By opting for a Fristam solution, Froneri Schöller benefitted from having a completely tailor-made solution provided for them, which was perfectly suited to fulfil each complex stage of its intricate process.

### Pump specifics:

The Froneri Schöller engineers were particularly impressed by the sophisticated design, versatility, high performance and low maintenance of the Fristam double-screw technology. In addition to this, the pump housing consists of three parts so that the connections can be easily adapted to suit any production system. The central positioning of the gearwheels allows for an extra compact design. The solid shafts are reinforced at all critical points to ensure maximum rigidity. Large bearings and increased bearing distances make the pumps particularly stable. All these design features guarantee smooth running and minimum wear. For easy maintenance, the gear system can be accessed without having to dismantle the pump and it only takes a few seconds to replace the mechanical seals in the FDS.

### Smooth running since summer 2016:

Since they have been installed in the summer of 2016, the FDS double-screw pumps at Froneri Schöller have been running without any problems. With an output of around 51 million liters of ice cream, the factory in Uelzen is one of the largest ice cream manufacturing plants in Germany. It was built in the early 1980s and extended in 1993 with a plant for the



Figure 3: Fristam FDS – solid shaft for smooth running and minimum wear



Figure 4: Fristam FDS in operation at Froneri Schöller in Uelzen

production of frozen dough products. In October 2016, Nestlé transferred the Uelzen plant into a joint venture with R&R. It is now part of the Froneri Group which produces ice cream, frozen food and chilled dairy products in 22 countries. Its annual turnover is around 2.6 billion Euros.

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# Oxygen and undesired reactions

## AIP: Platform for Active and Intelligent Packaging

**A**t present up to a third of all food is thrown away. Active and intelligent packaging systems can help reduce this wastage. Active packaging systems are able to prolong food quality, whilst intelligent packaging systems contain indicators which display quality parameters.

The development of active and intelligent packaging systems is a very dynamic area of research which is complex and intricate, even for scientific organizations working in this area. This is why the Platform for Active and Intelligent Packaging (AIP) was initiated to collate information about active and intelligent packaging systems. The AIP Platform is an EU project within the CORNET research program for supporting small and medium-sized enterprises. The impetus for the project was the fact that there are many patents and publications about AIP systems but few commercial applications. The aim was to develop a platform for AIP systems via which existing results could be collated, evaluated, validated, and made available.

The project involved 7 associations, 7 research organizations, and more than 40 SMEs in Germany, Austria, Belgium, Hungary, the Netherlands, Slovenia, and Spain. These organizations and companies carried out cooperative work on antimicrobial packaging systems, oxygen scavengers, freshness indicators, time/temperature indicators, and tracking systems, the project was organized by a.o. Fraunhofer Institute for Process Engineering and Packaging (IVV). A conference in October 2011 at the Fraunhofer IVV highlighted the project results and findings.

Dr. Rieblinger (Fraunhofer IVV) explained the key role of oxygen in undesired reactions. There is often some oxygen in the packaging after the packing process emanating from foods. Greater caution has to be taken with fatty foods than watery foods because fats can dissolve up to 6 times more oxygen than water.

Dr. Müller (also from the Fraunhofer IVV) gave an overview of oxygen-scavengers. They come in a variety of forms: separate elements (labels and sachets), closures for bottles, PET bottles with oxygen-absorbing additives in the plastic, oxygen-scavengers incorporated into films, and/or for further processing into trays. A key step for the wider industrial acceptance of oxygen-scavengers is the standardization of test methods. A DIN work group on "Active packaging – oxygen-scavengers" is tackling this issue.

O<sub>2</sub>Control's oxygen-scavenger Freshcare can prolong the shelf-life of foods by up to four fold. The use of this oxygen-scavenger also means that preservatives do not have to be used. One area



**A multinational approach for active and intelligent packaging systems was made by the AIP Platform**

of application is for organic products where the use of additives is not permitted.

Shelfplus from Albis Plastic contains iron powder which reacts with oxygen. Multilayer films containing this additive can be used for bags, trays, and tubes to absorb oxygen from the packaging headspace. It also reduces the oxygen transmission, namely it provides an active barrier.

Fraunhofer IVV have developed a system based on sorbic acid. Ms Hauser explained that sorbic acid is naturally present in berries and is commonly used as a preservative in many foods. High acceptance of this system can thus be expected. Tests on cheese were successful. Bacterial growth was significantly reduced.

Fraunhofer IVV pointed out that EU Regulation 450/2009 applies for active and intelligent packaging systems. In addition, active and intelligent materials, like all packaging materials, are subject to EU Framework Regulation 1935/2004. They must be evaluated by EFSA and then be approved by the European Commission. There is still a need for clarification in Europe about this relative new area. The positive list for EU Regulation 450/2009 must be drawn up. The EFSA evaluation process is however not yet complete.

A CD containing the conference presentations is available from Fraunhofer IVV for €150 (€125 for IVV members). Contact Sven Sänglerlaub: [svn.saengerlaub@ivv.fraunhofer.de](mailto:svn.saengerlaub@ivv.fraunhofer.de).

# Fermented dairy products

DSM identifies drivers for the development of the category



(photo: DSM)

Fermented dairy products are popular with consumers worldwide. DSM, as one of the major supplier of cultures and ingredients for fermented milk products, is constantly analysing developments and trends in the markets. IDM asked Mark Fahlin, Global Marketing and Business Line Manager, DSM Food Specialties, to share some of this knowledge with our readers.

**IDM:** How is demand for fermented milk products developing worldwide?

**Mark Fahlin:** According to an Euromonitor report, the overall dairy market grew by 1.5% between 2012 and 2016 in retail value worldwide.<sup>[1]</sup> Amongst other dairy categories, yogurt, as well as yogurt and sour milk products, are the two segments that recorded the fastest growth, with respectively 3.3% and 3.7% growth in retail value between 2012 and 2016.<sup>[2]</sup> This is expected to continue, with a 6.5% increase in retail value for yogurts between 2017 and 2021, and 6.4% for sour milk products.<sup>[3]</sup> Mainly driven by Asia Pacific, Middle East and Asia, the growth is also noticeable in Western Europe, with a forecasted growth of 1.3% growth between 2017 and 2021.<sup>[4]</sup>

Drinking yogurt and fermented beverages accounted for 8.5% of total global dairy launches recorded by Innova in 2015.<sup>[5]</sup> Based on DSM's consumer studies, we also know that on a global basis, drinking yogurt is the dominant yogurt segment – with 17% of surveyed adults drinking it daily, and 25% consuming it weekly.<sup>[6]</sup> To make the most of these growing opportunities, dairy companies differentiate themselves by introducing new ranges and products to their portfolio such as skyr, kefir and high-protein drinking yogurt.

**IDM:** What are the drivers for new development and innovation in the fermented dairy category?

**Mark Fahlin:** From a drink to a snack or even a meal replacement, from a protein-rich sport drink to a fat- or lactose-free dessert, a fermented dairy product can be whatever a consumer wants it to be. When it comes to understanding this market, one thing is clear – it is its versatility that allows it to deliver great results so long after it was first discovered. Fueled by customers’ curiosity, innovation paves the way for fermented products. As a result, an increasing number of dairy producers are expanding their product portfolio, introducing new ranges and making the most of the growing market opportunity.

**IDM:** Which recent and actual market trends that have a direct impact on product launches in this category?

**Mark Fahlin:** Apart from health and taste, convenience remains one of the key drivers for consumption of fermented dairy products. Easily consumed on-the-go, drinking yogurt appeals to busy, active and health-conscious dairy lovers. This has led to a growing number of portable formats, such as carton boxes and squeeze bags.

At the same time, consumers are increasingly looking for dairy that is better



**Fermented dairy offers a great opportunity to target different consumer segments for producers (photo: DSM)**

for them. Fermented dairy offers a great opportunity to target different consumer segments for producers. For high-protein products for instance, manufacturers can reach out to either older people, or active consumers, depending on their needs.

In addition, consumers with a healthy lifestyle search for ways to lower their sugar intake. DSM reveals that 80% of the consumers agree that dairy food with low or no sugar is better for their health.<sup>[7]</sup> In addition, over 60% are concerned about sugar content in these products.<sup>[8]</sup> Category growth in low/no/reduced sugar products is mainly driven by Europe, Latin America and Asia Pacific where launches have doubled since 2011.<sup>[9]</sup>

Despite an increasing interest for sugar-reduced dairy, however, consumers do not want to compromise on taste and quality. The industry faces the challenge of balancing public demand to reduce added sugar whilst also creating great-tasting, indulgent and creamy dairy options. Artificially sweetened dairy has proven to be an unpopular alternative. When asked why they did not choose sugar-reduced dairy products, consumers indicated that apart from taste (48%), the concern around artificial sweeteners (36%) was the second reason for avoiding such products.<sup>[10]</sup> This represents a significant challenge for dairy producers of sugar-reduced dairy, as they need to maintain the taste of their products without the use of artificial sweeteners, or any other additives, to appeal to consumers. The desire for fermented dairy

products formulated with natural and authentic ingredients is also growing rapidly. As a result, more transparency from food and beverage manufacturers about how ingredients are sourced and how products are manufactured is required.

**IDM:** How do enzymes and cultures help to address the demand for less sugar in fermented dairy products?

**Mark Fahlin:** Choosing the right ingredient helps manufacturers of fermented milk products to overcome technical challenges. This also enables them to meet customer requirements for sugar-reduced products that have a good texture, whilst remaining fresh and tasty. Because of the specific functionalities they add to the product, enzymes are a valuable tool in optimizing manufacturing plant processes and meeting various consumer demands.

By using the natural sweetness present in lactose, lactase enzymes can reduce the amount of added sugars but the taste remains the same as full-sugared varieties. The use of specific cultures can also help to retain the texture and shelf life stability in sugar-reduced formulas. That way, manufacturers can benefit from fewer and simpler ingredients, avoiding the use of artificial sweeteners, with less additives and stabilizers.

**IDM:** In your opinion, what fermented dairy items are next on the horizon?

**Mark Fahlin:** The Icelandic low fat and high-protein yogurt – skyr – is definitely on the rise in Europe, as it is a dairy product made with simple ingredients, meeting the demand for high-protein yogurt. Consumers are increasingly looking for natural and authentic food. According to Mintel, the number of launches in the skyr category has increased from 6 in 2012 to 92 in 2016 worldwide.<sup>[11]</sup> The growth is even more noticeable in Europe, with three launches in 2012 to 72 launches in 2016.<sup>[12]</sup> For dairy producers looking to tap into the skyr category and make the most of growing opportunities, DSM offers its Delvo Fresh range of cultures. The innovative solution provides more options to create high-protein, sweeter and creamier yogurts, with firmer textures, ranging from mild to authentic tastes. Moreover, the range



**Mark Fahlin, Global Marketing and Business Line Manager, DSM Food Specialties: consumers are increasingly looking for dairy that is better for them (photo: DSM)**

offers very high pH stability, adding further value to producers looking to extend product shelf life and allowing them to offer better and unique dairy to an increasing number of consumers.

Kefir, also known as the 'champagne' of fresh dairy drinks is growing rapidly too. Over recent years, kefir has become increasingly popular in Europe and it is perceived as a good source of probiotics in North America, Australia and the United Kingdom. For consumers, kefir is believed to have a positive effect on the human body, associated with the effect of probiotics, such as digestion, immunity and blood pressure. At DSM, we have seen that different options are created for kefir to fit with local taste preferences. Kefir is traditionally a sour product and some consumers like it to taste authentic. However, in certain European markets, mild versions and buttermilk flavors are preferred. In Southern Europe, the tendency for more buttery flavors is also growing.

At DSM, we want to help make existing diets healthier and more sustainable and are driven to help create foods that people

around the world can enjoy, without compromise. To this end, DSM has developed a range of cultures for high quality kefir production, enabling better dairy for everyone. These cultures provide the opportunity for dairy manufacturers to offer healthy solutions and differentiate their products with unique flavors. DSM's new range for kefir also contains selected probiotic strains that provide consistent stability over shelf life.

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<sup>[8]</sup> DSM GIS- Understanding consumer preference on sugar reduction - dairy (2015) [http://www.dsm.com/markets/foodandbeverages/en\\_US/news-insights/campaigns/sugar-reduced-dairy.html](http://www.dsm.com/markets/foodandbeverages/en_US/news-insights/campaigns/sugar-reduced-dairy.html)

<sup>[9]</sup> Mintel, GNPD (2016) - sub category matches one or more of flavored milk drinking yogurt & liquid cultured milk, spoonable yogurt and claims matches low/no/reduced sugar as the claim

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<sup>[11]</sup> Mintel, GNPD (2017)

<sup>[12]</sup> Mintel, GNPD (2017)



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# The future of Dairy in the Post-2020 Common Agricultural Policy of the EU

Market orientation and simplification should be the focus of the future Common Agriculture Policy



Author: Flora Dewar, Trade & Economics Officer, European Dairy Association

With the 2013 Common Agriculture Policy (CAP) just being implemented, the discussion at all EU levels intensifies on what the CAP will look like post 2020.

"Dairy is one of Europe's most important agricultural sectors and present in all 28 EU Member States," as director Jens Schaps of DG AGRI always puts it.

Dairy contributes substantially to the EU's positive trade balance and is an important source of income, considering that EU is the world's leading exporter of dairy products (36% of the world's dairy exports originates from the EU). The European Dairy sector is among the most profitable parts of European agriculture, consisting of more than 700,000 farmers across Europe. Taking this into account, the importance of the Common Agricultural Policy (CAP) becomes evident, especially for rural Europe.

The idea of the CAP was born in 1957 in the Treaty of Rome, where it was foreseen as the only real 'common' policy. In 1962 the CAP was

officially adopted and ever since it has seen many amendments and modifications. The current CAP consists of two pillars, the first focusing on direct payments to farmers and the second on rural development policy. Presently the discussion around the CAP focuses heavily on EU Commissioner for Agriculture Phil Hogan's "Omnibus" proposal for the simplification and modernisation of the current CAP. This is not the end goal though, as the planning for the CAP post-2020 has already commenced in different institutions.

On 2<sup>nd</sup> February 2017, the European Commission launched a public consultation on "Modernising and Simplifying the Common Agricultural Policy (CAP)". We submitted our views on the future policy through constant contact with our members, consulting and drafting the position paper on the modernisation and simplification of the CAP and its Post-2020 future since the beginning of 2016. Not only we participated to the Commission conference outlining the results of the consultation

on 7<sup>th</sup> July 2017, EDA president Michel Nalet and EDA Secretary General Alexander Anton also met with EU officials at all levels and several national ministers to share our position.

The planning of the Post-2020 CAP is a complex exercise for policy makers. It requires the development of a balanced policy which will oversee the EU institutions' vision for the future of the European agriculture and at the same time will satisfy all the relevant stakeholders (farmers, processors, retailers, environment groups etc.) and be beneficial for the consumers. Especially for the EU dairy sector, a number of key factors are crucial when policy makers develop their proposals.

The orientation of the Post-2020 CAP should continue to address the needs of all three pillars of sustainability; the economic, social and environmental. In addition the continuous sustainability and improvement of the competitiveness of the sector and the needs of food security should be taken into account. Furthermore the promotion



by the EU institutions of the nutritional and health benefits of dairy products to consumers should be increased. The EU school milk scheme should be promoted as it plays an important role in shaping the perception of future generations on the benefits of dairy products. In this context, the legal protection of dairy terms like 'milk', 'whey', 'yogurt' or 'butter' must be kept enshrined in the CAP. The future should also address environmental concerns such as animal welfare schemes established by dairy companies, investment into research on systems for phosphate and nitrogen cycles in the dairy sector and promote the concepts of bioeconomy and cyclical economy.

It is of paramount importance for the future CAP to continue its market orientated approach. This can be achieved when pursued at a pace where the dairy farmers and processors have sufficient time to adapt to changes in the market. The EU single market offers undeniable benefits to the dairy and therefore its integrity should be maintained resisting practices that could cause fragmentation, such as national initiatives for the introduction of mandatory country of origin labelling.

The present time offers the opportunity to adopt a spherical approach into tackling new issues as well as persisting ones. A major challenge that creates uncertainty is the fact that the EU dairy sector is exposed to volatile and cyclical world market price trends. The recent crisis in post-quota era has shown that there is a continuous need for an efficient safety net.

Overall the idea of a two-pillar structure of the CAP should be maintained, with direct payments still playing a stabilising role in the income of individual farmers but within a policy framework that does not distort the market orientation of the CAP and does not prohibit industrial restructuring and competitiveness. Further simplification and modernisation to alleviate the current CAP from the bureaucratic constraints would be welcomed, as EU Commissioner Phil Hogan's initiative proposes.

However, a fruitful discussion on the CAP cannot happen without a view on a possible budget. EU institutions and member states have begun examining the future of the Multi-annual Financial Framework 2021 – 2028,

where the issue of Brexit will be predominant. The wish to keep a stable CAP budget while having one of the main contributors leaving the EU will be a difficult task to handle in the coming months.

This debate will be part of one of the forefront sessions at our EDA Annual Convention 'European Dairy: Local Roots & Global Business' in Stockholm (Sweden) on 28 – 30 September 2017 – registration is open: [www.eda2017.eu](http://www.eda2017.eu).

Not only we will discuss the future of the CAP with a high-level podium of agricultural specialists, we are also grateful that EU Commissioner for Trade, Ms. Cecilia Malmström, accepted our invitation to give a keynote speech and discuss with European dairy leaders on the future opportunities for European dairy at world level.

Our EDA Annual Convention 2017 in Stockholm will not only provide you with enriching presentations from high level speakers and give you an update on key dairy subjects, but will also offer you an excellent opportunity to meet dairy leaders and dairy experts from the European and global dairy sector.

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**OBJECT MANAGER:**

Burkhard Endemann, Direct line: +49 (0) 26 33/45 40-16, Email: be@blmedien.de

**EDITOR:**

Roland Sossna (responsible), Office Dülmen/Germany, Direct line: +49 (0) 25 90/94 37 20, Cell phone: +49 (0) 1 70/4 18 59 54, Email: sossna@blmedien.de

Office Dorsten: Anja Hoffrichter, ah@blmedien.de, Cell phone: +49 (0) 178 233 0047

**Food Ingredients:**

Max Schächtele, Mengener Str. 2, 79112 Freiburg im Breisgau, Germany, Direct line: +49 (0) 76 64/61 30-96, Cell phone: +49 (0) 172 357 0386, Email: ms@blmedien.de

**CORRESPONDENTS:**

Ferda Oran, Middle East, ferdaoran@hotmail.com; Jack O'Brien, USA/Canada, executecmktg@aol.com; Joanna Novak, CEE, Joanna.Novak@sparks.com.pl; Tatyana Antonenko, CIS, t.antonenko@molprom.com.ua; Mario Schacher, South America, supermario@gmx.com; Brian Norwood, Australasia & Pacific, ttoronto@bigpond.net.au; Chris Walkland, UK & Ireland, chriswalkland@ntlworld.com; Bent Oestergaard, Scandinavia, OCon ApS, bent@ocon.one, Claudia Vasquez Alarcon, Spain/Portugal, cva@blmedien.de

**PRODUCTION:**

Stefan Seul, Direct line: +49 (0) 26 33/45 40-17, Email: sts@blmedien.de

**GRAPHICS, LAYOUT:**

Nikolai Janz, Direct line: + 49 (0) 26 33/45 40-25, Email: nj@blmedien.de

**ADVERTISING MANAGER:**

Heike Turowski, Office Marl/Germany, Direct line: +49 (0) 23 65/38 97 86 Fax: +49 (0) 23 65/38 97 47, Cell phone +49 (0) 1 51/22 64 62 59, Email: ht@blmedien.de

**PUBLISHER'S REPRESENTATIVES:**

Italy: Bruno Frigerio, Via Roma 24 20055 Renate Brianza (MI)/Italy, Direct line: +39 (0) 362 91 59 32, Email: effebibrianza@libero.it

UK/Ireland/France/Spain/Portugal/Benelux and Scandinavia: dc media services, David Cox, 21 Goodwin Road, Rochester, Kent ME3 8HR, UK, Phone: +44 845 393 1574, Email: david@dcmediaservices.co.uk

USA/Canada: Media International Ms. Hanna Politis, 8508 Plum Creek Drive, Gaithersburg MD 20882/USA, Direct line: +1 (30) 18 69 66-10; HPolitis@comcast.net

**SUBSCRIPTIONS:**

B&L MedienGesellschaft mbH & Co. KG, Office Munich, Ridlerstr. 37, 80673 Munich/Germany

Sales manager: Dominic Aiglstorfer, Direct line: +49 (0) 89/3 70 60-2 72 Email: d.aiglstorfer@blmedien.de

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