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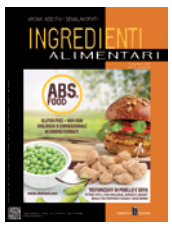
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Tasty superfood from plant cell cultures

In recent years, VTT Technical Research Centre of Finland has developed plant cell culture technologies with the aim of creating a completely new and groundbreaking method of producing vegetable foodstuffs and ingredients. As shown by the results of the study published in an article in Food Research International in February 2018, the production method developed at VTT is looking more promising than ever.

Population growth and food demands

"This is not only a completely new opportunity for the food industry but to society as a whole. There is not enough arable land to meet the growing global population's food demands; new solutions are desperately needed. Cell cultures have serious potential for meeting this need," says Emilia Nordlund, Leader of VTT's Food Solutions Team.

Cell culture production of meat has been a popular topic in public discussion. In the future, however, PCCs can be used to produce food that has higher nutritional value in a considerably faster and easier way and at lower costs.



Nutritional and sensory properties

The objective of VTT's study was to examine the nutritional and sensory properties of dried and fresh cells grown from cloudberry, lingonberry and stoneberry by using PCC technology.

The PCC samples had a pleasant, fresh and mild flavour, which resembled that of corresponding fresh fruits. The berry-like flavour was more intense in the dried samples, which were also melting appealingly in mouth. The visual appearance of cell cultures also resembled that of the corresponding fresh fruits.

The plant cells were proven to be nutritionally valuable – in most respects even more so than fruits. The PCC samples had high protein

content of 14-19%, and in vitro analysis showed good protein digestibility. The contents of essential amino acids important to muscle, bone and tissue health were higher than those reported for soy, which is considered an excellent source of amino acids. The dietary fibre of the samples varied between 21 and 37%, which is clearly more than in breakfast cereals, for example. Energy content was also higher than anticipated. The PCC samples were also found to be rich sources of unsaturated fatty acids. A previous study of VTT has shown that cell cultures have high contents of polyphenols that are known for their health-promoting effects (Ref. **Planta**, 2017).

Limitless variations

"Biomass produced with plant cell culture technology should be considered as completely new food material, which is why their characteristics should not necessarily be compared with corresponding fresh fruits.

Their excellent nutritional properties are a sign of great future potential of plant cell cultures in creating new types of superfoods. The variations produced by using different plants offer limitless possibilities," says Heiko Rischer, Leader of VTT's Plant Biotechnology Research Team.

For the food industry, plant cells and their dried versions offer opportunities to create new types of healthy food products and ingredients, such as smoothies, caviar-like compotes and snack foods.

The key thing to remember in product development and from the logistics point of view is that all materials are always at their best when they are fresh. However, only the sky seems to be the limit when exploring new product innovations with the cell materials.

For example, in the "Food My Way" project, VTT's scientists are currently coming up with ideas for future food vending machines that enable consumers to buy healthy food products tailored to their personal tastes. An appliance designed for use in a café or restaurant could include a bioreactor for growing a fresh cell compote to be added to a food product.

In addition to further research on the subject with new cell lines and food design, the market entry of PCCs requires regulatory approval as a novel food.

VTT is actively developing the concept further in the frame of the strategic Food 4.0 vision and invites parties interested in developing new plant materials, the related production processes and equipment to collaborate.

RIPE BANANA FLOUR AS A SOURCE OF ANTIOXIDANTS IN CAKES

About one-fifth of all bananas harvested become culls that are normally disposed of improperly. However, ripe banana pulp contains significant amounts of fibre and polyphenol compounds as well as a high content of simple sugars (61.06 g/100 g), making it suitable for sucrose replacement in bakery products.

Researchers from University of Valladolid, Spain, studied the feasibility of incorporating ripe banana flour (20 and 40% of replacement) in cake formulation and the results were published in **Plant Foods for Human Nutrition** journal.

Physical, nutritional and sensory attributes of sponge and layer cakes were evaluated. The inclusion of ripe banana flour generally led to an increased batter consistency that hindered cake expansion, resulting in a slightly lower specific volume and higher hardness. This effect was minimised in layer cakes where differences in volume were only evident with the higher level of replacement. The lower volume and higher hardness contributed to the decline of the acceptability observed in the sensory test.

Unlike physical attributes, the banana flour inclusion significantly improved the nutritional properties of the cakes, bringing about an enhancement in dietary fibre, polyphenols and antioxidant capacity (up to a three-fold improvement in antioxidant capacity performance). Therefore, results showed that sugar replacement by ripe banana flour enhanced the nutritional properties of cakes, but attention should be paid to its inclusion level.

A specific protein regulates the burning of body fat



Scientists at the Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC), Spain, have identified a protein that holds promise as a target for therapies to reduce obesity. Drs. Guadalupe Sabio and Nuria Matesanz have demonstrated that MKK6 controls the conversion of fat stores, known as white fat, into brown fat, in which lipids are burned to maintain body temperature and reduce obesity. The study is published today in **Nature Communications**.

The research team led by Guadalupe Sabio analyzed fat tissue samples from obese patients at the University Hospital in Salamanca, and found that these samples contained above-normal levels of the protein MKK6. Detailed analysis of MKK6 function showed that this protein impedes the conversion of fat stores, known as white fat, into brown fat, in which lipids are burned to maintain body temperature.

Brown fat has attracted a lot of interest in recent years among obesity researchers. Body fat is essential for maintaining an appropriate energy balance and regulating body temperature. But not all fat is the same. The body contains two types of fat tissue: white adipose tissue is a store of excess calories, whereas brown adipose tissue is considered a 'good' fat that burns lipids to maintain body temperature. Brown fat can be activated by cold to "generate heat instead of storing fat," explained Sabio. But the most interesting observation is that "white adipose tissue can be converted into brown adipose tissue, thus increasing body temperature." According to Dr. Sabio, this has led to a burgeoning interest in the clinical potential of brown fat, since "activation of this tissue could reduce excess weight." According to Nuria Matesanz, the results of the study indicate that obese individuals lose the ability to activate brown fat or to convert white fat in to brown, and therefore are unable to lose weight via this route.

The researchers found that the inability to convert white fat to brown in obese patients is caused by increased amounts of the protein kinase MKK6. Through the use of animal models, the research team was able to demonstrate that MKK6 prevents the conversion white fat into brown. Mice lacking MKK6 have more brown fat; consequently, these mice are protected against obesity and eliminate excess energy as heat.

The research also demonstrated that eliminating MKK6 after mice had become obese stopped the further development of obesity and led to a drop in body weight. These findings all point to the potential of MKK6 as a therapeutic target in the fight against obesity.

Camelina oil improves blood lipid profile

The use of camelina oil reduces overall and LDL cholesterol levels in persons with impaired glucose metabolism, according to a new study from the University of Eastern Finland. The findings were published in *Molecular Nutrition & Food Research*.

The study analysed the associations of camelina oil, fatty fish and lean fish with lipid and glucose metabolism, and low-grade inflammation.

Camelina oil is rich in alpha-linolenic acid, which is a plant-based omega-3 fatty acid. Earlier research has shown that fish protein and long-chain omega-3 fatty acids found in fish have beneficial effects on several risk factors associated with cardiovascular diseases. Research evidence relating to the effects of alpha-linolenic acid on these risk factors, however, remains scarce.



The study involved 79 Finnish men and women with impaired fasting glucose concentrations aged between 40 and 72. The study participants were randomly divided into four groups: the camelina oil group, the fatty fish group, the lean fish group, and the control group.

Depending on their group, the study participants were instructed to eat either fatty or lean fish four times a week, or to take a daily 30 ml dose of camelina oil for a period of 12 weeks. People in the control group were allowed to eat fish once a week, and the use of camelina oil or other oils containing alpha-linolenic acid was prohibited. The researchers found that camelina oil had a positive effect on blood cholesterol levels, but no similar effects were observed for fatty or lean fish. Moreover, there were no significant differences in glucose metabolism or low-grade inflammation between the groups.

Research could strip wine of sulfites

Winemakers have added sulfites to preserve their products since the time of the Roman Empire. Sulfites, a class of compounds including sulfur dioxide and sulfite salts, act as antioxidants and antibacterial compounds. They can occur naturally in the winemaking process or can be added by producers to preserve freshness and boost flavor in a vintage.

But, according to the U.S. Department of Agriculture, "People who have an intolerance to sulfites can experience symptoms including chest tightness, hives, stomach cramps, diarrhea and breathing problems. The underlying mechanisms for sulfite intolerance are not completely understood. For some individuals, though, the sensitivity to sulfites may be an allergic type of response. People with asthma appear to be at an increased risk of having asthma symptoms following exposure to sulfites."

Now, a research drive at the University of Kansas School of Engineering (Usa) is working toward the design and marketing of a low-cost, easy-to-use device that would filter up to 99 percent of sulfites from wine when it's poured from the bottle.

"Our idea is that you'd have a device like an aerator," said Mark Shiflett, Foundation Distinguished Professor of Chemical & Petroleum Engineering, who is leading the investigation. "You'd stick it on the top of the bottle – and as you pour a glass through the device, it removes the sulfites. And it would be inexpensive. When you're at the cash register you'd have these devices for sale. They'd be a dollar or less. You'd buy a handful. With every one sold, KU would get a fee back. It could be like the next Gatorade, the drink developed at the University of Florida."

According to Shiflett and his young researchers, there already are products in the marketplace advertised as removing sulfites from wine – but they have shortcomings. In addition to the high cost for consumers, Shiflett's group has tested these products and found they only remove some of the sulfites.

"We're showing the current products only remove about half of the sulfite based on our initial testing," said Maddie Lyda, an undergraduate senior in chemical engineering working on the project in Shiflett's group.

"We're doing a chemical separation – where the wine passes through a material that acts like a magnet for the sulfites," said William Gilbert, a postdoctoral researcher in Shiflett's lab. "These are materials that if you were to look at the atomic scale you would find chemical sites that specifically bind sulfites so they don't pass into the wine glass."

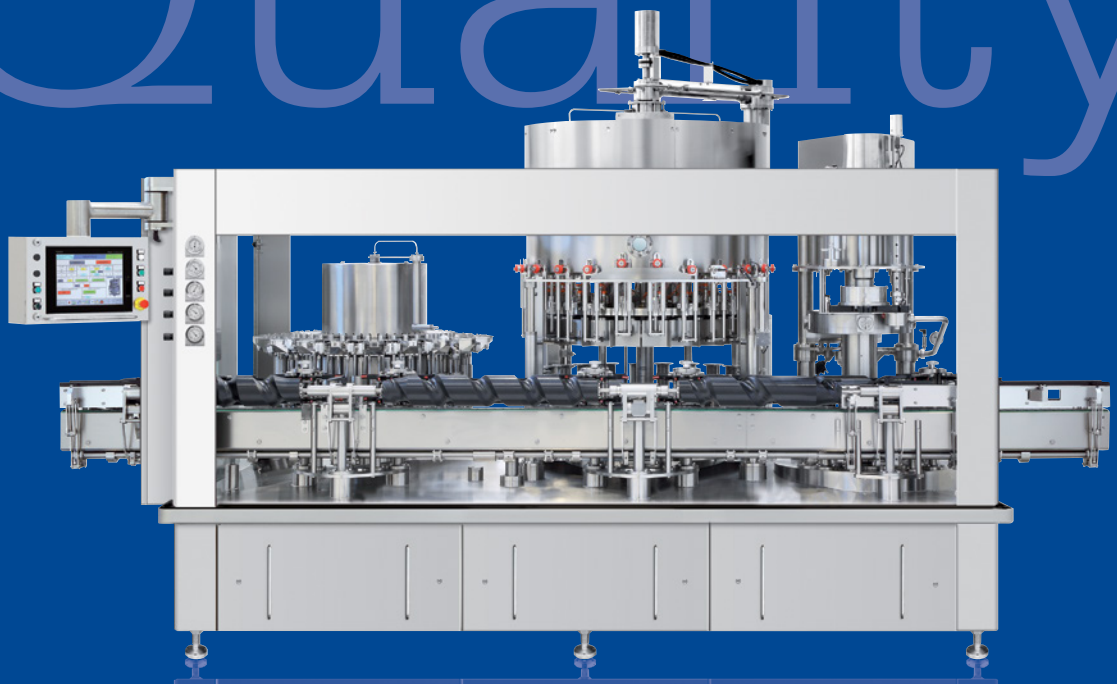
Shiflett hired one of his colleagues from DuPont, David Corbin, a world expert in porous materials called zeolites, to provide guidance on the selection of materials the researchers are testing.

"We are designing a material that would bind to the sulfites selectively," Shiflett said. "The other components of the wine, like the sugars and the tannins, won't be affected. It's adsorbing based on the idea of going specifically after the sulfites."



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Addition of collagen to gluten-free bread made from rice flour

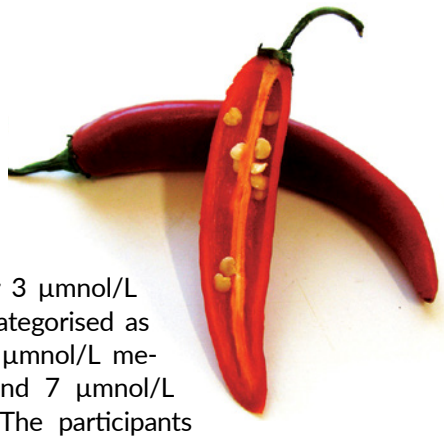


Patients with celiac disease, an enteropathy, present gluten intolerance and the restriction of food containing it is shown to be effective in the normalization of intestinal function and clinical manifestations.

A study published on the **Brazilian Journal of Food Technology** aimed to evaluate the impact of collagen powder and collagen fibre on the structural, technological and sensory characteristics of gluten-free bread made with rice flour. Firstly 2%, 4%, 6% and 8% of collagen powder and collagen fibre were added to bread formulations made from rice flour to evaluate the physical parameters (specific volume, crumb hardness, and crust and crumb colours). The bread showing the best technological properties was then characterized for its chemical composition (protein, fat, ash, moisture and carbohydrates) and cooking losses, and submitted to a sensory evaluation. A rheological assessment and scanning electron microscopy were carried out on the uncooked doughs of the control and of that containing collagen fibre. The addition of collagen to rice flour breads did not contribute to the formation of a network similar to that formed by gluten. The bread formulation containing 4% collagen fibre presented technological characteristics closest to those expected, with no significant differences in the chemical composition when compared to the control. The results of the sensory evaluation showed that the gluten-free breads (control and with 4% collagen fibre) presented sensory acceptance greater than 75%.

Brazilian Researchers concluded that the addition of collagen to gluten-free bread formulations was possible, and the bread containing 4% collagen fibre exhibited characteristics closest to the control.

Modifying the perception of saltiness using a pungent component of chilli pepper



High salt consumption has been associated with an increased risk of hypertension and cardiovascular events. Whilst there are a number of strategies which promote salt reduction, scientists are reporting that traditional cooking habits and taste can "dampened the effectiveness of salt reduction at the population level." A study published in Hypertension has investigated an alternative strategy of reducing salt intake by modifying the perception of saltiness, using a pungent component of chilli pepper, capsaicin. Previous research has found that capsaicin also has a protective role against cardiometabolic diseases.

The study by Zhu et al. recruited 606 Chinese adults aged 18-65 years and determined the participants preferences for salty and spicy flavours. The participants were asked to identify from a number of solutions that contained increasing amounts of capsaicin (1, 3, 5 and 7 µmol/L) which they preferred. They were also given a salt perception test, where they were asked to identify solutions which contained salt at various concentrations of 0, 10, 30, 50 and 75 mmol/L and a salt-threshold test where they had to stipulate which solutions containing high levels of salt (500, 750, 1000, and 1500 mmol/L) they could tolerate. Those who had a preference for capsaicin of 1 or 3 µmnol/L were categorised as low, 5 µmnol/L medium and 7 µmnol/L high. The participants also completed a diet questionnaire where they reported on salt and spicy food intake, and blood pressure and urinary sodium excretion was measured. Zhu et al. also used imaging techniques to look at two regions of around 60 participants' brains, the insula and orbitofrontal cortex (OFC), known to be involved in salty taste. Zhu et al. examined "brain metabolism chang-

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es in response to a salt stimulus in individuals with high salt consumption" and "subsequently addressed whether changes in salt-induced metabolic activity may be modified by capsaicin administration." The team further investigated the findings in rodent models, by giving mice four types of solutions (deionised water, 200 mmol/L NaCl, 150 mmol/L NaCl and 150 mmol/L NaCl with 0.5 µmol/L capsaicin) and examining the mice brains.

Zhu *et al.* found that compared to those who least enjoyed spicy foods, participants with a high spicy preference had 8 mm Hg lower systolic and 5mm Hg lower diastolic blood pressure; and consumed less salt than participants who had a low spicy preference. They state "high salt intake and salt preference were closely correlated with increased brain activity in the insula and OFC of the participants. Capsaicin administration increased activation of the insula and OFC." The authors said that this increased activity likely makes people more sensitive to salt so that they can enjoy food with less of it. Zhu *et al.* report that similar findings were also found in the mouse study with "OFC activity closed associated with salt preference and salty-taste information processed in the OFC was affected in the presence of capsaicin."

In conclusion the authors discuss the limitation of the study, noting all the participants are from China, so further research is needed to determine if these findings may be generalised to other countries. However they state that "enjoyment of spicy foods may significantly reduce individual salt preference, daily salt intake and blood pressure by modifying the neural processing of salty taste in the brain."

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Effects of whey and soy protein addition on bread rheological property of wheat flour

The development of wheat-based foods that are enriched with proteins is increasingly popular due to consumer demand regarding food nutritional content and quality.

Researchers from Nanjing University of Finance and Economics, China, published on **Journal of Texture Studies** 49, (1): 38-46, 2018, a study with the aim to compare the effect of whey and soy protein on the rheological properties of wheat dough and bread-making quality in a relatively wide range of protein addition (0-30%). They found that the incorporation of whey protein (WP) decreased dough stability time (MST), minimum torque (MMT), *G'* and *G*, but increased dough peak torque (MPT), stickiness, *G'* and *G* in temperature sweep. With the increasing level of WP from 0 to 30%, the specific volume of bread initially decreased from 2.61 to 2.22 cm^3/g, then increased to 3.08 cm^3/g when WP was at higher concentration than gluten. However, the crumb hardness increased from 173 to 1291 g at the same time. As a contrast, the addition of soy protein (SP) increased dough MST, MMT, *G'* and *G*, but decreased MPT, stickiness, *G'* and *G* in temperature sweep. With the increasing level of SP from 0 to 30%, the specific volume of bread decreased from 2.61 to 1.31 cm^3/g and the hardness first decreased from 173 to 152 g, then increased to 696 g.

The results suggested that selection of the protein source and amount with appropriate functionalities played an important role in certain applications for protein fortified bakery products.

Since it is known that the gluten network is responsible for viscoelastic properties in wheat dough and for dough structure strength and gas retention, most studies reported that enrichment of foreign proteins interfered with gluten development and therefore, had negative effects on bread quality. This study compared the effects of whey and soy proteins on the thermomechanical, dynamic rheological and microstructural properties of wheat dough and bread-making quality in a relatively wide range of protein addition (0-30%). The results suggested that selection of the protein source and amount with appropriate functionalities significantly affected the structure of the dough and quality of the bread.

Our study is essential for product development and process control when considering the popularity of protein fortified bakery products.



Characterization of PP/SP composite films for bread packaging application

To prolong the shelf life of bread, Reserachers from Yonsei University, South Korea, have studied polypropylene/sodium propionate (PP/SP) composite films prepared via a melt-extrusion process and the results were published on **Packaging Technology and Science**. 31, (4): 221-231, 2018.



To investigate the feasibility of using PP/SP composite films as a bread packaging material, their chemical structure, morphology, mechanical properties, barrier properties against water, surface properties, and antimicrobial properties were investigated. A storage test for bread was also conducted. The mechanical and thermal stability of the PP/SP composite films enhanced with increasing SP content.

Compared with pure PP, the PP/SP composites had increased hydrophilicity that increased with increasing SP content. These composite films showed enhanced antimicrobial activity against both Gram-negative and Gram-positive microorganisms. This was due to the interaction of SP and water originating from the bread, which modifies the pH of the bread and causes destruction of the cellular structures of fungi and also reduces the growth rate of bacteria.

The enhanced thermal, mechanical, antifungal, and antimicrobial properties achieved by the addition of SP can be beneficial for maintaining the freshness of bread and prolonging its shelf life.

Oregano oil may reduce risk of food poisoning

Staphylococcus aureus is a pathogenic bacterium underlying many instances of food poisoning worldwide. It is able to survive by its ability to form robust biofilms, which resist most attempts to remove the bacterium from food preparation surfaces.

Researchers from Federal University of Paraiba, Brazil, revealed that exposing the bacterium *S. aureus* to either the essential oil of the oregano plant (OVEO) or carvacrol (a phenolic compound found in OVEO) reduced the number of bacterial cells stuck to food preparation surfaces.

The study findings, published in **LWT- Food Science and Technology**, therefore highlight the potential of OVEO and carvacrol as novel anti-bacterial agents, which could be used in the fight against food poisoning in food preparation environments, said the team. Furthermore, both the oregano-derived treatments performed more effectively than sodium hypochlorite (NaClO) a 'conventional' means of removing pathogenic bacteria from stainless steel surfaces.

"OVEO and carvacrol could be considered potential substances to replace classical agents, primarily Na-



ClO, used to disinfect stainless steel surfaces in the food industry," commented senior author Marciane Magnani. OVEO and CAR also had the advantage of not causing corrosion damage to the surfaces, unlike NaClO.

Study results

A ten minute exposure to either 10 µL/mL of OVEO or 5 µL/mL carvacrol was enough to reduce the number of cells on the surfaces by over 100-fold for both strains of *S. aureus* tested. After 15 minutes, the same concentrations of OVEO and carvacrol virtually eradicated one strain of the bacteria to undetectable levels, however only carvacrol was effective in eliminating the both strains.

Indeed, carvacrol, the concentrated active ingredient of OVEO, was found to be more effective than the essential oil itself and was able to create holes in the cell membranes of *S. aureus* cells.

"The results of this study indicated that carvacrol and OVEO are effective agents to remove young and mature S. aureus biofilms on stainless steel surfaces. OVEO and carvacrol were more effective than NaClO to remove S. aureus biofilms on a stainless steel surface, while causing no damage on these surfaces, as did NaClO," said Magnani.

"Carvacrol was more effective than OVEO because the later failed to eliminate the young and mature biofilms of one (S. aureus LPMA11) of the two strains tested," she added.

Beneficial effects of white wine polyphenols-enriched diet on Alzheimer's disease-like pathology

The development of effective medicines to break or delay the progressive brain degeneration underlying cognitive decline and dementia that characterize Alzheimer's disease (AD) is one of the greatest challenges of our time.

Researchers from Portugal published on the **Journal of Nutritional Biochemistry** a work where



a selective pool of polyphenols, obtained from the white wine by adsorption to polyvinylpyrrolidone polymer (PVPP), was used to prepare a polyphenols-enriched diet, supplementing the drinking water with 100 mg/L (expressed as gallic acid equivalent) of wine polyphenolic extract.

The impact of the daily consumption of water supplemented with polyphenols for 2 months on brain of 10-month-old 3xTg-AD and NonTg mice was evaluated, considering effects on the redox state of cells, levels of amyloid-beta peptides, mitochondrial bioenergetics and fatty acid profile of whole membrane phospholipids.

The polyphenols-enriched diet promotes brain accumulation of catechin and hydroxybenzoic acid derivatives, and modulates the redox state of 3xTg-AD brain cells, increasing both glutathione/glutathione disulfide ratio and catalase activity and decreasing membrane lipids oxidation.

Additionally, the functional diet decreases the 3xTg-AD brain levels of both amyloid-beta peptides, Abeta1-40 and Abeta1-42. However, the brain mitochondrial bioenergetic dysfunction of 3xTg-AD animals was not attenuated by the polyphenols-enriched diet. Lipidomic studies showed that this functional diet modulates membrane lipid composition of brain cells, increasing C22:6n-3 (docosahexanoic acid) and decreasing C20:4n-6 (arachidonic acid) levels, which may have beneficial impact on the chronic inflammatory process associated with AD pathology. Altogether, these results indicate that the oral administration of this polyphenols-enriched diet promotes significant benefits in multiple aspects of the pathophysiological cascade associated with the neuropathology developed by 3xTg-AD mice. All rights reserved, Elsevier.

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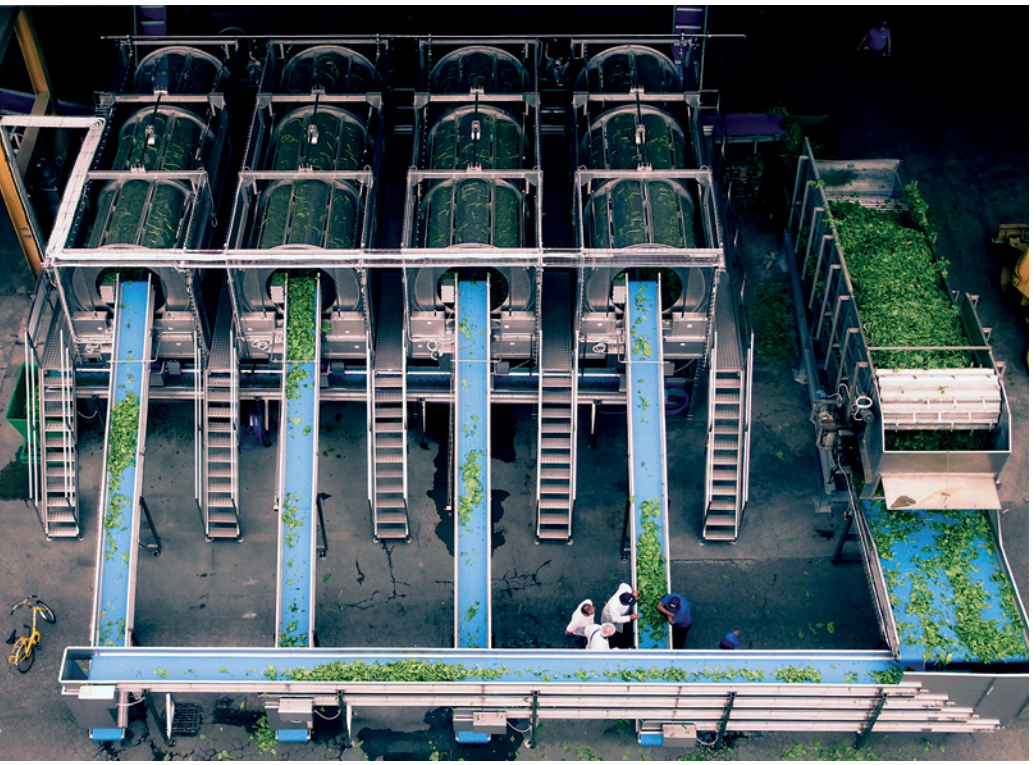
Pinco SA - Via Pra Mag, 9 - 6862 Rancate (Switzerland)
+41 91 6400800 info@pinco-sa.com

Transport and treatment of leaf vegetables

Ing. A. Rossi presents the new product line for transport and treatment of leaf vegetables with working capacity of up to 4.000 kg/h, which represents the ideal solution for the removal of sand and coarse impurities. The main feature of this line is its versatility, which makes it suitable for processing different types of leaf products, such as spinach, chicory, and leaf chard.

By means of a cascade belt and hoppers system, this line separates the product coming from the receiving section on four different sand removal lines, which carry out a preliminary cleaning of the product, before its transfer to the water washing and cooking line. All of this is controlled by PLC with automatic cycles.

In order to optimize the cleaning times, all the belts are equipped with high-pressure water nozzles, which perform fully automatic washing cycles.



Leaf vegetables processing plant (Ing. A. Rossi).



Receiving, washing and transport

The Ing. A. Rossi separation system is has been developed especially for processing leaf vegetables and it uses a rotating basket system for the separation of coarse impurities from the product, such as sand, earth, dry leaves, insects, etc.

Transport with belts

For the handling of products, for which hydraulic transport is not possible, the company manufactures conveyor belts, suitably manufactured according to the specific needs of the customer. The external structure of these systems is made of stainless steel, whereas the conveyor belt can be made either of canvas or stainless meshes or plastic material, depending on the type of product to be transported.

Separation with rotating baskets

A rotating basket system, consisting of a mesh cylinder entirely made of stainless steel, allows the separation of heavy parts and impurities, such as earth, dry leaves, stones and sand. The inclination of the basket allows the product to progress during the rotation, whereas all wastes are collected and removed by means of the belts positioned under the basket itself.

(Ing. A. Rossi Impianti Industriali - Viale Europa 68A - 43122 Parma - Italy - Tel. +39 0521 271320 - Fax +39 0521 774331 - email: sales@ingarossi.com - www.ingarossi.com)

Pasteurizing and freezing processes

Often, the production process of a food product involves two fundamental heat treatments to extend its shelf life, such as pasteurization and deep-freezing.

The pasteurizing process keeps the products at high temperatures and is used to break down the bacteria of the product or its packaging. With pasteurization, the life of a product can be more natural, without adding preservatives or additives.

Deep freezing is the bacteriostatic treatment for the preservation and the integral maintenance of the characteristics of the product. It takes place very quickly and at temperatures of at least -18°C.

The importance and the criticality of pasteurization and deep-freezing on the final result, require the use of appropriate and innovative machinery, able to take care of every detail.

Sarp has been developing spiral towers and pasteurization and freezing tunnels for over 30 years, applying the latest technological solutions in the industrial food field. This company operates in various food sectors and easily adapts the technology to different types of products, from fruit products (doypacks, spouted pouches...) to fresh pasta and ready meals.

Pasteurization process

With the Sarp pasteurization process it is possible to obtain a shelf life of approx. 2 years, including the 2 pasteurization phases, one for the finished product and one for the post-packaging one. This treatment can be done by means of horizontal tunnels and spirals with belt conveyors developed in height, thus reducing the overall dimensions.

Freezing process

In order to optimize the conservation and maintenance of the product, Sarp develops spiral deep-freezing tunnels/towers that reach a temperature of -35°C in a very short time. The Sarp deep-freezing tunnel is divided into two parts to reduce the overall space and optimize production costs. The upper part is designed to cool the product; the lower part is instead intended for deep-freezing. The tunnel is made up of high insulating panels, with fans and a divider that prevents heat transfer between the two sections.

Depending on the need, the treatment can take place with the application of spiral conveyor belts, developing the system in height and verticalizing the plant in order to safeguard the production space and adapt to the needs of the customer.

(Sarp - Via Montebelluna di S. Andrea 43 - 31033 Castelfranco Veneto - TV - Italy - Tel. +39 0423 482633 - Fax +39 0423 482468 - email: sarp@sarp.it - www.sarp.it)





Pasteurizing and cooling plant for spouted pouches (Sarp).

Process tanks

Since 1970, **Soren** has developed the activity of designing and manufacturing/supplying of complete plants as well as single machinery for the food industry. Thanks to a constant technical renovation, due to the growing demands of the market and to the progress made in technology, Soren has conquered a reputation of excellence among their Italian and foreign customers (over 200) for the quality and reliability of their own projects and products during 30 years of activity.

The company presents the PC and PCSD models of process tanks. All the models have the parts which are in contact with the product made of AISI 316 stainless steel, a mineral wool insulation with AISI 3004 stainless steel outer jacket, three product connections on top, and scraper blades made of PVDF plastic.

Both in the PC and PCSD models the dome top has a large manway, air vent, and connections for CIP spray balls. There is a dimpled jacket for water, steam or glycol circulation at 4 bar max pressure, and the anchor agitator with scraper blades and fixed baffles.

While the PC model ensures a capacity of 100 to 4000 litres, with a 15 and 35° cone bottom, the PCSD model is characterized by a cup style agitator on the bottom (1,450 rpm) powered with right angle motor drive. It has a capacity of 300, 600, 1,000 and 1,200 litres, with a 15° cone bottom.

A versatile design is available by mounting additional agitators and mounting special pump assemblies onto the discharge and installing ancillary hoppers or tanks on top.



Process tanks mod. PC (Soren).

(Soren - Via Paciotti 29 20094 - Corsico - MI - Italy - Tel. 02 451771 - Fax +39 02 45177340 - email: soren@soren.it - www.soren.it)

Cocoa bean debacterisation plant

The **Tecno 3** cocoa bean debacterisation plant is batch-operated on the whole bean, before the roasting process. The system consists of two conical-shaped tanks stacked upon each other, connected by means of a pipe and complete with two valves, which guarantee perfect insulation.

The quantity of cocoa beans to be treated is dosed into the upper tank. This operation is managed by means of two level sensors. The lower tank, a process reactor, receives the right dose of product, keeps it agitated and treats it with superheated steam for a relatively short time, sufficient in any case to drastically reduce the bacterial load. Once the operation is finished, the beans are discharged and sent to the roaster. This very short cycle is carried out in a fully automatic and repetitive mode under the control of a PLC.

Fully made of AISI 304 stainless steel, this plant is made in different models capable of feeding continuous roasters of various production capacities.

(Tecno 3 - Via Mastri Cestai 2 - 12040 Corneliano d'Alba - CN - Italy - Tel. +39 0173 610564 - Fax +39 0173 619494 - email: a.mattis@tecno-3.it - www.tecno-3.it)


Cocoa bean debacterisation plant (Tecno 3).

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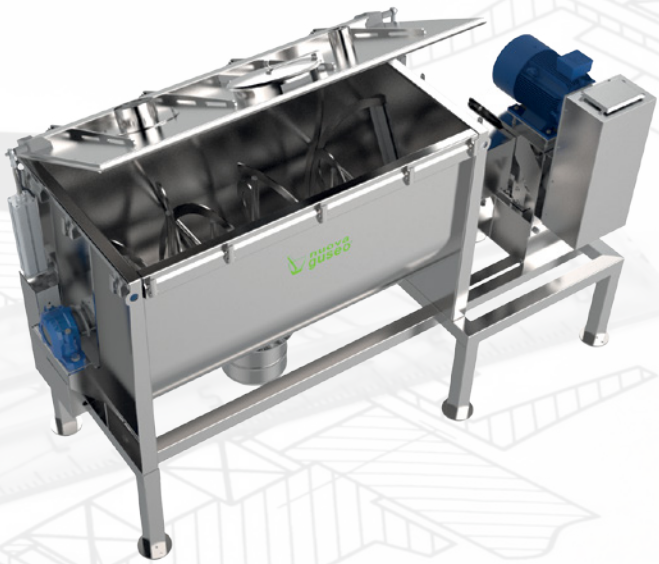
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Pigo freeze dryer solutions

"Give the best to people who expect the best", (D.Z.). Following this philosophy, **Pigo** became an initiating force in technological and consequently economical progress in the food processing industry, a world-class leader in the design and manufacturing of high technology freezing, freeze drying and drying equipment, and fruit and vegetable processing machinery.

Its machines achieve excellence, from the point of view of operating characteristics and energy efficiency and that, together with being user-friendly gives many privileges to all users.

The key advantages of Pigo Technologies that allow the user a money saving process are: a faster process with less energy, low temperature operation, and food safety and operator friendly.

In fact, the PIGO proprietary method reduces process time by up to 15-20%, while consuming less energy; the uniquely designed features allow the low temperature operation cycles, which are important for preserving the natural integrity of the product; this company designs only machinery with fully accessible and cleanable machine interiors that makes accessing and cleaning every component very easy, ensuring that bacteria or residue will not get entrapped on any equipment or food surfaces. Finally, all steps in the process are designed to facilitate simplicity.

Pigo develops EASY Freeze - IQF Fluidized bed, EASY Freeze SPYRO - spiral freezers/proofers/coolers, EFD - family of freeze dryers/lyophilizers, adiabatic multistage belt dryers PG 135, PG 103/PG 104 pitting machines, and complete fruit and vegetables processing lines.

The EASY Freeze family is a perfect solution for IQF freezing of a great variety of fruits, vegetables, sea, meat and cheese products, while EASY Freeze SPYRO freezers are more suitable for the freezing of doughy products, meat, fish, pizza etc. Pigo freezers are built in modular sizes with all components entirely made of stainless steel, and fully controlled fluidization providing the perfect IQF product.

The EFD Freeze Dryer makes it possible to save delicate aromas, producing a premium quality product; the freeze-drying technology gives you the sensorial properties of the finished product, perfectly superimposable to those of the fresh product.

The EASY DRY PG 135 adiabatic multistage belt dryer, with adjustable individual zone drying, allows you to dry the product at very low temperatures, with up to 2-3 times shorter drying time, preserving the product color and quality.

In addition to the above-mentioned machines, Pigo also presents the PG 103 high-capacity automatic pitting machine that has at least a 50-100% higher capacity than any other pitting machine on the market.

(Pigo - Via Visan 49 - S. Tomio di Malo - VI - Italy - Tel. +39 0444 905709 - email: info@pigo.it - www.pigo.it)



The Obradovic family, owner of Pigo company.

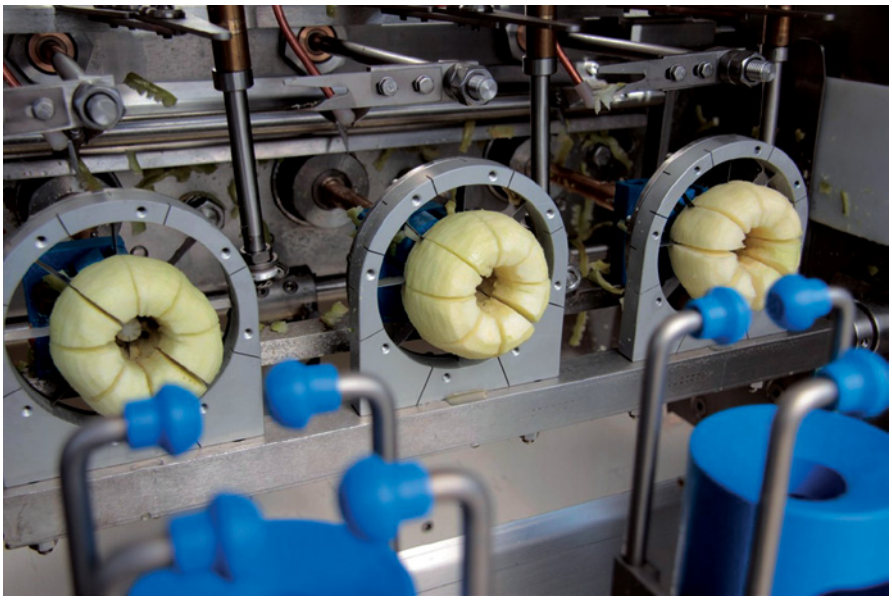
Fruit processing machineries

Among the most innovative companies in the field of construction and marketing of machines for fruit processing, **PND** is continuing to follow its path of growth and specialisation, further consolidating its leadership in international markets.

PND provides the ideal solution to its customers who are engaged in processing fruit by anticipating and supporting market trend, continuously designing and constructing new machinery. The company's success has not distracted PND from its own objectives: to design machines capable of efficiently fulfilling the required task and continually improving processes. PND's philosophy allows the company to focus only on the singular task of designing machines that will complement our customers goals. By focusing on the customer, it avoids the pitfalls of pursuing frenetic diversification. The only recognition to which it aspires is the satisfaction of its customers.

By selecting PND as a business partner, the customer chooses a made-to-measure technology. PND's ability to renovate its image and the new communication strategy (including the restyling of the company logo) make it among the most modern companies in the sector.



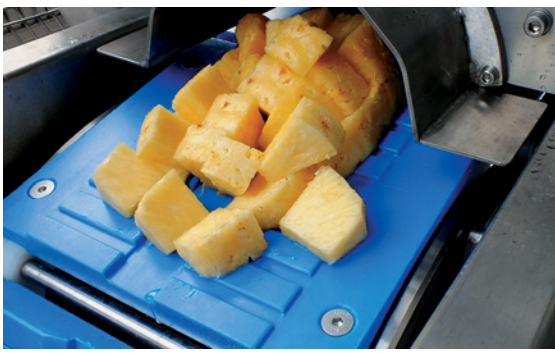


Apple processing (PND).

The company continues to search out and partner with specialized companies that complement the range of equipment currently offered, with the end goal of providing our customer with a successful solution. It has recently partnered with a manufacturer of freezing tunnels and drying ovens to further give our customers an economical advantage.

The experience that PND has gained in the last 18 years of activity, has allowed it to make continuous innovation on machinery design and creating an extensive catalogue of machinery. This includes advanced solutions for the processing of pears, apples, kiwis, oranges, grapefruits, lemons, pineapples, lemons, mangoes, strawberries, and peaches, with all possible variations in order to meet the needs of companies processing fresh products in fruit-fresh-cut, the canning industry (fruit in syrup), and dried and frozen sectors.

Among the company's top products are automatic and manual peeling, coring and cutting machines as well as treatment and prewash tanks for many varieties of fruits.



Peeled and cut pineapple (PND).

In the United States, the fresh cut sector is a fast growing and important sector of the food industry, but in other Countries, such as Turkey, the main operations are focused on dehydrated or dried

products. This trend is also proving a great success in Europe where dried fruit is racking up triple-digit figures in the percentage growth of dried fruit snacks.

The food industry has always had a need for innovation, with different requirements and uniqueness depending on the different target markets. By choosing one of the 15 semi-automatic, manual or automatic machines manufactured by PND, customers are choosing a standard machine that can be tailored to your needs. All of PND's machines are designed to facilitate inspection, maintenance and cleaning tasks, and possible replacement of damaged items, thanks to the easy access of the corresponding parts.

The PND team consists of 35 people, including administrative and sales staff, technicians and engineers, based at its headquarters in Scafati, Salerno, in the south of Italy. They work alongside the agents and technical offices all around the world (Europe, United States, Canada, Brazil, Chile, Argentina, Peru, South Korea, Egypt, Tanzania, Australia, China, Turkey, India, United Arab Emirates and Qatar).

Despite the widespread presence of PND representatives on the various continents, when it comes to installing a new machine, there is always an expert who travels from the parent company and follows the process through to completion.

(PND - Via Brancaccio 11 - 84018 Scafati - SA - Italy - Tel. +39 081 8509368 - Fax +39 081 8565168 - e-mail: info@pndsrl.it - www.pndsrl.it)



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Smart bottling and packaging systems to be more competitive

By manufacturing machines with an innovative design equipped with IoT technology, SMI provides customers from all over the world smart solutions, able to satisfy their needs concerning production efficiency, operational flexibility, energy saving and ease of managing and monitoring bottling and packaging lines.

The latest developments and the considerable and continuous investments in Research & Development have led to the creation of even more compact, ergonomic and eco-friendly machines, such as the new EBS K Ergon rotary stretch-blow moulders and the Ecobloc K Ergon integrated systems. These are innovative and unique solutions that can be installed even on small bottling plants and ensure advantages such as the ease of management and control for the line operator.

Thanks to the new EBS K Ergon rotary stretch-blow moulders series, SMI has recently been chosen to represent Italy in the category "Innovation Awards" at the European Business Awards. An example of the new EBS K Ergon range will be also showcased at the next Brau Beviale, which will be held in Nurenberg from 13th to 15th November, 2018.

The EBS K Ergon stretch-blow moulder is available in 2, 3 and 4-cavity versions and it allows the users to benefit from all the advantages of the rotary technology in a speed range (from 1,000 to 9,000 bottles/hour), traditionally served by linear stretch-blow moulders. Compared to these, the EBS K Ergon features important advantages. In fact, it features high technological content, inspired by the Industry 4.0 and Internet of Things (IoT) concepts.



(SMI).

The letter K comes from the German word "kompact" and it underlines the compactness of the machine module, which integrates the preform heating section and the stretch-blow moulding section in a single structure; a completely electronic production process with transmission system uses brushless motors equipped with integrated digital servo-driver; the stretch-blow moulding carousel is equipped with motorized stretch rods, controlled by electronic drives which do not require mechanical cams thus ensuring precise control of the path of the stretch rod, significant energy savings, and reduced mechanical interventions. The stretch-blow moulding system uses high-performance, low-dead volume valves, allowing you to reduce pre-blowing and blowing times, thereby improving the machine efficiency and the quality of the bottles produced.



Cap grapper Easy-Cap (SMI).

Ecobloc K Ergon: the most compact rotary combi in the world

Resulting from an innovative project characterized by the use of technologically advanced solutions inspired by Industry 4.0 and Internet of Things (IoT), the Ecobloc Ergon K series developed by SMI is an ultra-compact system for stretch-blow moulding, filling and capping PET containers up to 3 L.

The Ecobloc K systems offer all the advantages of the rotary technology, even for production requirements from 1.000 to 9.000 bottles/hour and are suitable for bottling lines for milk and still water (EV models) and edible oil (EM models).

In the Ecobloc version, combined with a filling and capping module, the new EBS K Ergon indeed offers optimal performance with reduced costs for manufacturing, filling and capping containers up to 3 L, since this configuration does not require the rinser and the conveyor belts between the stretch-blow moulder and the filler. Thanks to the electronic control system of the operations and the use of high-efficiency valves controlled by flow meters the filling and capping process is precise and fast; thanks to the use of false bottles integrated in the valve itself, the cleaning operations require reduced time; the “combi” solution does not need the rinser, the conveyor belts between the stretch-blow moulder and the filler and the accumulation conveyors, and the system can be installed even on small bottling lines. Furthermore, It features new design with modular frame, without welding, equipped with safety doors made of tempered, very resistant, long-lasting glass.

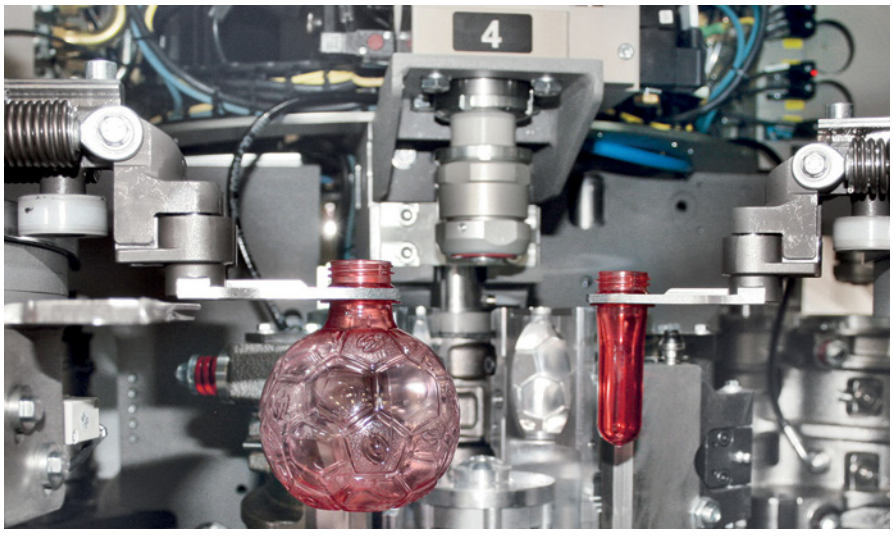


(SMI).

From today cap positioning is easier

Automation procedures on bottling and packaging lines concern every machine on the line, including the ones that carry out simple operations; for these reasons, SMI has created the gravitational cap grapper Easy-Cap, which takes the caps from the hopper, orients them properly and transfers them to the bottling line.

Mechanical functionality and technological know-how are integrated into the new Easy-Cap system, whose main feature is the integration in a single structure of three different devices, each one devoted to a specific function. The motorized hopper for the loading of loose caps, the elevated conveyor for the handling of caps from a loading to an unloading height and the outfeed cap discharger linked to the cap channel.



(SMI).

The new Easy-Cap grabber has a very compact structure made of AISI 304 steel, suitable for any layout solution; its fluid and linear movement allows you to transport only correctly positioned caps, while the others fall back into the hopper through gravity; it is a system suitable for several types of plastic caps, and a user-friendly operator interface allows the operator to use the machine easily and efficiently.

(SMI - Via Carlo Ceresa, 10 - 24015 San Giovanni Bianco - BG - Italy - Tel. +39 0345 40111 - email: info@smigroup.it - www.smigroup.it)

Bottling without bad surprises

No more exploding or defective bottles during the filling phase. No more bursts with glass fragments, risking contamination of the bottling process, with damage to machinery or long downtimes for their sanitation. **Gai** is proud to present the bottle testing machine mod. 45012, which sums up Gai's best technologies, to detect and reject the defective empty formats before their filling and closing. A simple and innovative solution, prizewinner of the *Technological Innovation Award* by *Innovation Challenge* Committee "Lucio Mastroberardino" 2017, conceived for medium and small wine bottles and producers (up to 10,000 b/h), who, everyday are facing the problems connected to wine bottling, above all in the case of sparkling products.

The Gai bottle testing machine plays a valuable and effective role. It aims to avoid any stoppage in production due to defective bottle breakages or any bottle neck blockages, by operating all checks in the phase just before the bottles go on to the filling and closing phases. It is a solution that grants food safety towards consumers and satisfies the operators, thanks to an increase in productivity, avoiding damages to the filling valves, stops in production and downtime for cleaning.



Bottle testing machine mod. 45012 (Gai).

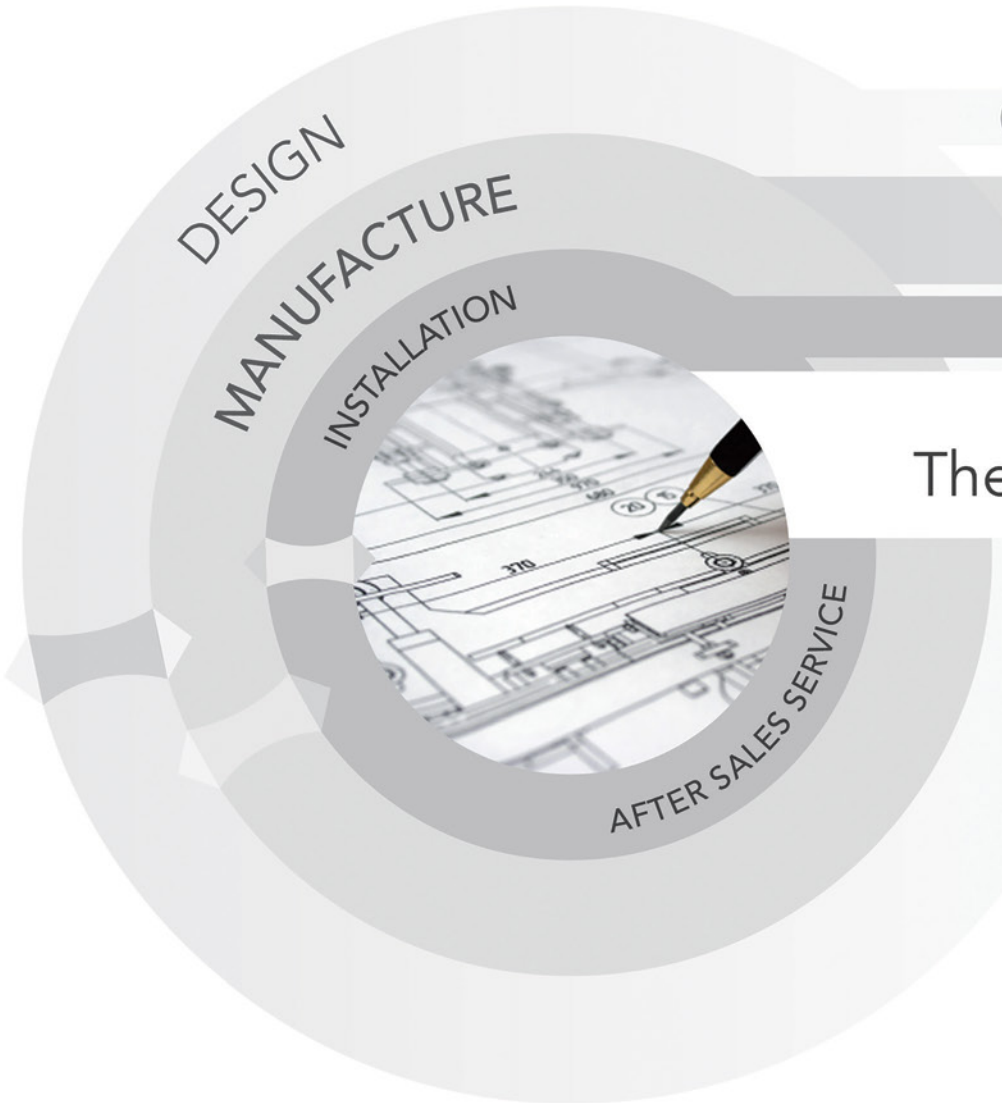
The main functions of analysis and control operated by this mod. 45012 are three. It verifies the bottle resistance to the pressure, it inspects the pressure maintenance and it controls the bottle neck.

An adjustable infeed screw conveys the bottles to the testing machine that, by means of a sealed valve, introduces compressed air inside the bottle. Pressure can be set by PLC up to max 8 bar. In this phase, two scenarios can occur, such as a controlled explosion under safety conditions (without risks of contaminations thanks to a system of washing and blowing the adjacent bottles) or, if pressure is not constant because of microcrackings on the glass, detection of the defective bottle and consequent ejection. The last check is the testing of the neck: while the bottle is still under pressure, the spring tracer checks the neck dimension and the eventual presence of blockages, with consequent possibility of ejection.

Gai bottle testing machine mod. 45012 has been designed to allow the maximal efficiency in the phase of washing and cleaning. It is equipped with dummy bottles for the sterilization and is predisposed for an automatic washing cycle by a CIP system. The machine basement is in *roof version* to make it easier for the removal of glass fragments.

(Gai - Fraz. Cappelli 33 b - 12040 Ceresole d'Alba - CN - Italy - Tel. +39 0172 574416 - Fax +39 0172 574088 - email: gai@gai-it.com - www.gai-it.com)

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New success for Akomag

Akomag bases its policy on customer satisfaction, the quality of its systems, its assistance services and technological innovation. This company has been working for several years in the bottling sector and, thanks to the proven experience developed in this field, it can guarantee its customers maximum yields, user-friendly operation, and minimum operational costs, as well as long working life of its machines built with top quality materials.

Recently Akomag delivered, installed and tested a new machine designed for washing recycled glass bottles. The machine for the PepsiCo Group is a Hydra 8.2, characterised by a production of up 37,500 bottles/h. The new model, the pride of mechanical Made in Italy, reaches a mechanical efficiency equal to 99.4%, successfully exceeding the standards required by the customer in the contractual phase.

With this new model, Akomag confirms itself once again as world leader in the construction of glass bottle washers. The bottle washer has been specially designed in order to minimise the environmental impact, with particular attention to water and steam consumptions, and also to the duration of the detergent bath. The completely automated wash cycle includes an initial bottle-emptying station followed by a pre-wash spraying and a first pre-soak bath, which significantly reduces detergent bath pollution and markedly decreases consumption levels. In the pre-soak area the project also provides for the installation of a belt filter that allows to automatically remove the main impurities typical of recycled bottles (straws, paper, cigarette butts, for instance). The washing of bottles is completed with the internal and external high-pressure detergent wash sprays, using self-cleaning and self-centring rotating nozzles.



Hydra 8.2bottle washer (Akomag).

Mains water for spray-rinsing

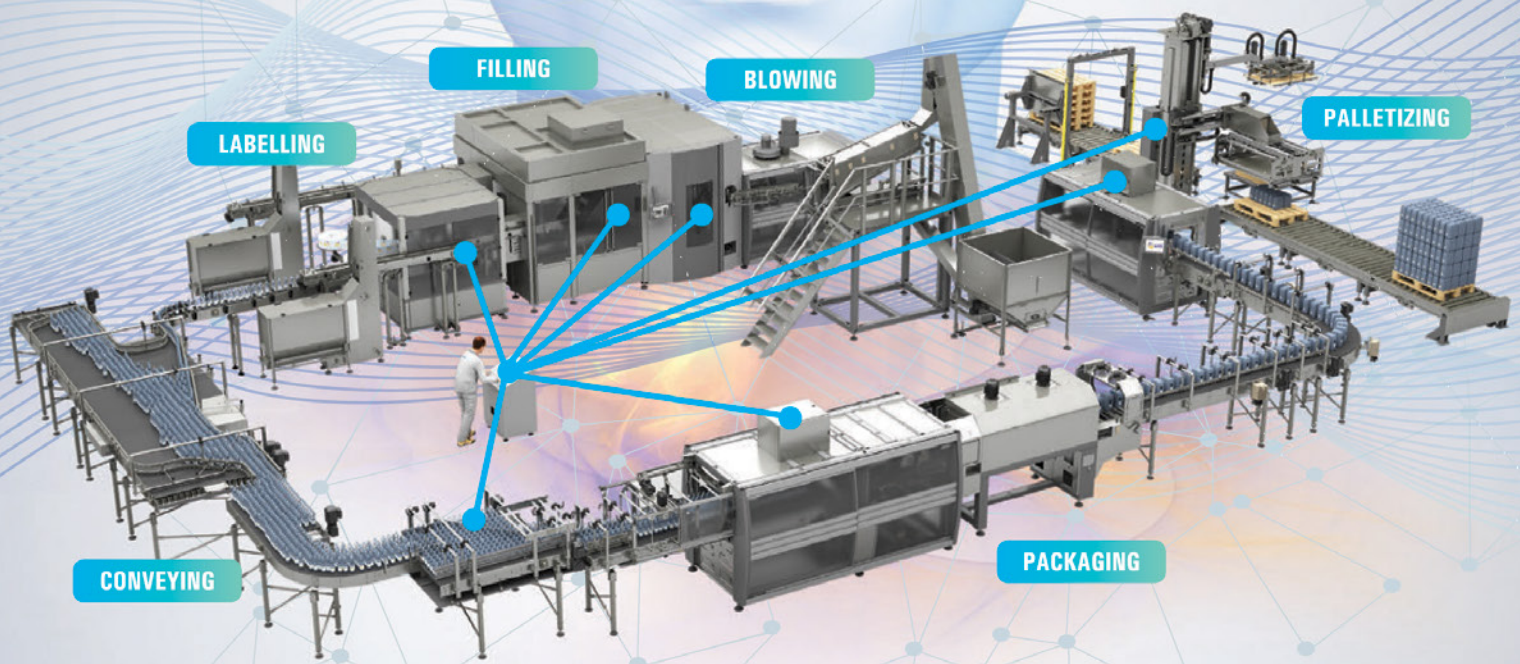
In designing the Hydra 8.2, Akomag has focused on the final rinsing sprays using mains water. The expedients developed during the design stage have allowed to achieve extraordinary results.

By installing a special valve with integrated flow meter on the mains pipe (controlled directly by means of the control panel), it is possible to detect the instantaneous and daily water consumption required for the proper washing of the bottles.

Thanks to the new design, this new machine has a water consumption equal to 0.098 litres per bottle, a lower value than the one rigidly imposed in the contractual phase, by the customer. The supply is completed with many other technological innovations, including sensors for slowing down or stopping the machine in case of missing bottles or clogging up of bottles on the conveyor belts; synchronization systems of the bot-

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the new age of smart manufacturing

SMI is specialized in designing, producing and installing complete lines for food & beverage bottling & packaging.

SMI turn-key systems feature Industry 4.0 and IoT technologies and an output rate from 1,000 to 33,600 bottles/hour.

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tle washer speed with that of the filling monobloc; control and introduction of detergent and additives in the washing bath and of sequestrants/ disinfectants in the spray tanks; self-cleaning filters in the tanks; automatic bottle loading and unloading, perfectly synchronized with the movement of the main chain.

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The flexibility is the strong point

BBM Service is a well-established name with a long and renowned experience in the sector of automated beverage packaging, specialized in the supply of turnkey bottling lines for water and soft drinks.

Flexibility is the strong point and the company's flagship product. In fact, BBM proposes itself as the only contractor on which to count for a 360° support, ranging from engineering-design to the supply, for example, of a complete line composed of used-overhauled-guaranteed machinery, complete with a team of highly specialized technicians on the machines of the main manufacturers and on the processes, and with the supply of original and compatible spare parts.

An important player in the beverage sector and not only, both for the Italian market and for the international market.

BBM's engineering department offers technological solutions that allow customers to improve production performance by reducing costs related to raw materials, and electricity, with the possibility of not replacing the machine, but to adapt it to the improvements implemented on the latest generation ones.



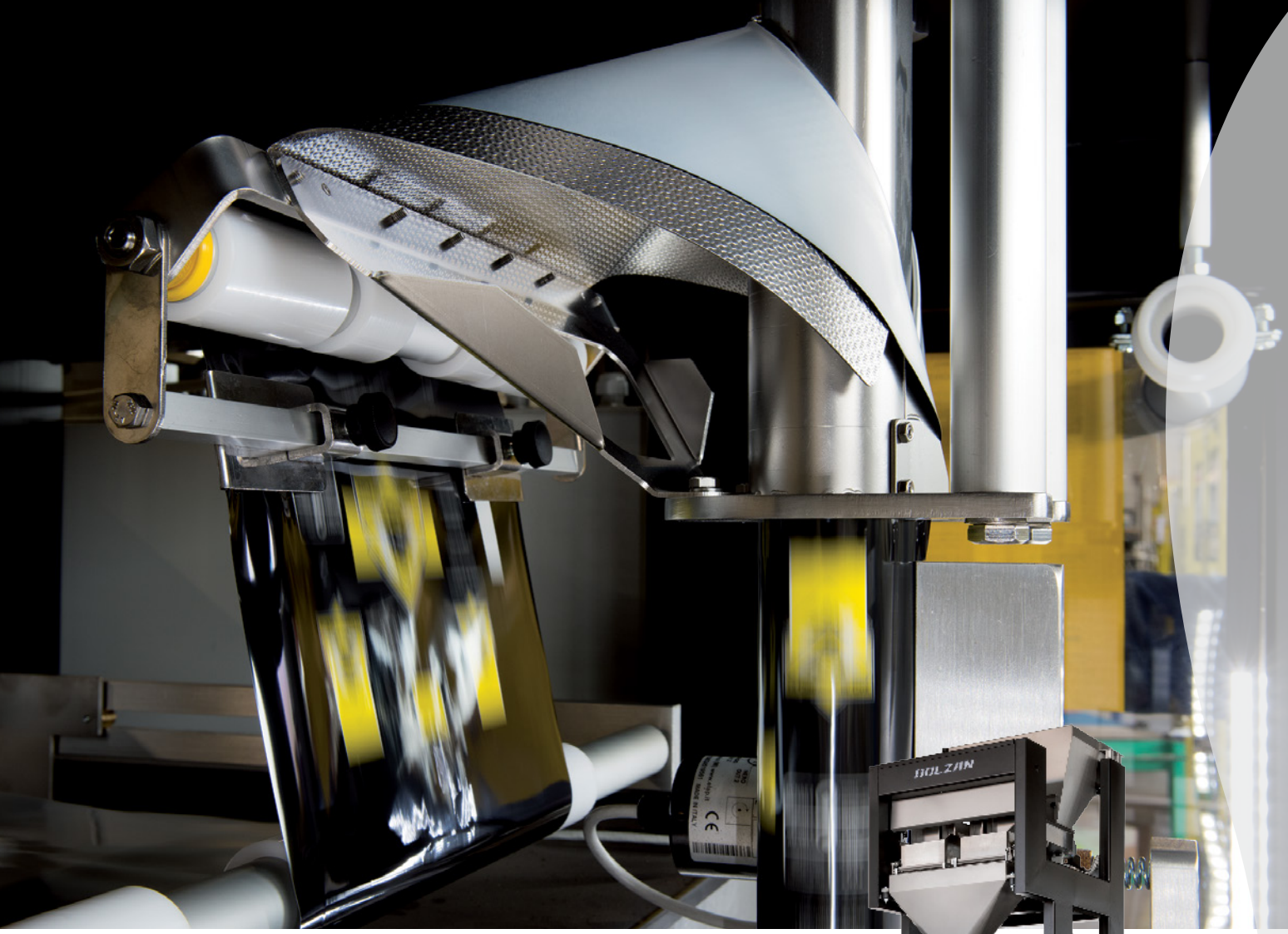
Turnkey solutions for water and beverage plants.

With a team of more than 50 qualified technicians, BBM also offers a range of services to support customers throughout the entire life cycle of the machines, operating on multiple models.

In order to keep the individual components of a bottling line efficient and to anticipate breakdowns that could compromise its functioning, BBM proposes the Lifecycle Service Contracts (LcS), check-up packages that allow the customer to have a detailed report with maintenance activities and spare parts, distinguished by priority. The LcS can be on an annual, half-yearly or quarterly basis and thanks to the flexible configuration, can also be customized with other constituent elements such as on-site training, through which BBM's technicians will share valuable information to help line operators to operate on machines autonomously, solving problems quickly.

Whether it is normal wear and tear or a matter of urgency, BBM represents a valid alternative for the supply of spare parts thanks to the large range of items available in stock, speed of shipment, and competitive prices.

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Connecting technologies

CCM (compression technology) is **Sacmi's** response to the needs of the global closures industry. It's a solution that offers the lowest running costs on the market and a series of intrinsic advantages, from reduced cycle times to high productivity and low consumption, from weight reduction to the ability to control every single mould cavity by setting its parameters directly on the operator interface and checking, in real time, output quality.

Features such as these have won over global markets. And those markets have effectively made Sacmi the undisputed technological leader in this industry thanks to a unique capacity to design, together with the customer, the entire cap-bottle system and supply all the technology needed to transform pellets into finished products. An ability to fully integrate the cap-preform system at every level - design included - has allowed Sacmi to develop ever-lighter, better-performing caps and necks, setting new market standards and pushing back barriers in an industry that is increasingly attentive to quality and production sustainability.

Years of research and extensive experience in the industry have now led to the new HEROline: this truly integrated system begins with the production of preform and cap – two processes that are, as of today, perfectly synchronised thanks to Sacmi CPB Link – and then, downstream, integrates all the stretch-blowing, filling and labelling processes. Also configurable, where requested, with the innovative HEROblock (the all-in-one blowing-filling-closing-labelling quadblock), HEROline reduces the number of handling tasks, increases logistical efficiency and cuts energy and raw material consumption. It also ensures extremely versatile product management and development. In short, it is a



response to the challenges faced by the packaging-beverage industry that takes its cue from Industry 4.0.

Real-time monitoring of all plant performance parameters with the Sacmi H.E.R.E. (Human Expertise for Reactive Engineering) supervisor and the innovative Sacmi Total Care service continue the company tradition of making quality and product personalisation its hallmarks. Just think of the possibilities: Sacmi solutions let the user colour and decorate each individual cap, directly on the line, with the selected logo (COLORA CAP); they also let the user digitally print the label for subsequent application, even with small lots or exclusive items, on the already filled, capped container (D-Match).



The Sacmi Food Division atIpack-Ima in Milan

At FieraMilano during the Ipack-Ima event, Sacmi's Food Division: Carle&Montanari-OPM and CM-FIMA, were also present on the same stand as the parent company. With over 110 years' experience in designing chocolate processing solutions, the two companies offer no less than five product lines which include machines for cocoa processing and the moulding, wrapping and primary/secondary packaging of chocolate.

The product range is as broad as it is diversified. It spans from individual machines and complete lines for chocolate preparation (mixers, pre-refiners, refiners, conches, and temperers) to intermittent and continuous-motion moulding lines (moulds from 275 to 1,200 mm) and a complete series of depositors (piston and rotary) for aerated and non-aerated chocolate masses, suitable for all processing types (solid, solid with ingredients, one shot and filled products).

On the wrapping front, CM-FIMA offers an extensive machine range able to wrap all chocolate-based product types in a range of styles: from traditional-wrap pralines (bunch, envelope, wallet, double-twist, one-twist) and special-wrap pralines (open point, sticker, strip, paper cup, etc.) to tablets and bars, hollow figures, eggs and small spheres of every size and type, not to mention an entire series of wrappers for hard and jelly candies.

With regard to primary packaging, Carle&Montanari-OPM has - alongside its tried and tested range of flow-wrap machines, distribution lines, feeding and buffering systems for the confectionery world - chosen to move into the bakery sector. It has done so by using the best available technology to design dedicated handling and wrapping solutions for delicate bakery products such as biscuits, wafers, crackers, etc.

From this standpoint, CM-OPM employs automatic feeders and slicers that can handle all bakery products, even where stack, edge wrapping or other solutions are required.

For the confectionery and bakery, Carle&Montanari-OPM produces a complete line of secondary packaging machines consisting of automatic lines, machines and robots to erect, load and close boxes, displays and cases. These include the TLP series (mono-bi-trifunctional cells with top loading robots) and the WA series (compact, modular wrap-around machines that ensure performance and high speed).

At the last Ipack-Ima Trade Fair, Carle&Montanari-OPM displayed the innovative SmartCell packager, developed to streamline size changeover management. This cell consists of independent, complementary modules for fully automatic case forming and bundle preparation/insertion. The first module – which prepares and forms the case – features fully automated size changeover; the size can be set via the operator interface without any need for manual adjustment as case dimensions vary. On the second module, two pairs of conveyor belts and an equal number of fast pickers prepare the bundle. The last module is equipped with a two-axis robot that picks the bundle when it is ready for insertion into the case; again, it features fully automated size changeover, controlled directly via the operator interface.

(Sacmi Imola - Via Selice Provinciale 17/A - C.P. 113 - 40026 Imola - BO - Italy - Tel. +39 0542 607111 - Fax +39 0542 642354 - email: sacmi@sacmi.it - www.sacmi.com)

Labeling systems on show in Milan and Chicago

This year, **Altech** took part in the Ipack-Ima Trade Fair (Milan), in June and will be attending the Pack Expo Trade Fair (Chicago), in October.

At the last Ipack-Ima Trade Fair, Altech presented its most recent innovations in material labeling and identification systems. On the back of its extensive experience in the packaging sector, the company is constantly committed to the technological development of its machines in order to offer proven reliability and high quality to end users.

Altech provides the best solution for each labeling requirement such as the ALline E/C linear system for front/back labeling of flat, elliptical and cylindrical products, the ALbelt two-section system for top and bottom labeling, and the ALline, that is specifically designed for in-phase wraparound labeling using a special three-roll device. And not only.

Altech would like to present the new ALritma T print&apply labeling head, which is easily inserted into existing packaging lines thanks to its built-in printer; a semiautomatic ALmatic C labeling system for cylindrical products, and the low-cost ALstep labeling head with a control box in a new aluminium profile casing.

The new ALcode labeling head model for printing and applying labels in real time includes a colour touch-screen monitor with a new graphic interface; the ALcode P real-time print&apply system has been developed for the application of A5 labels to two sides of a pallet, and the new ALcode model is equipped with a special vacuum belt application device for high-speed label application.

The new ultra-compact ALstep model, on the other hand, has been specifically developed to be used in packaging machines or under very cramped conditions.

Finally, a range of benchtop printers manufactured by SATO, of which Altech is Premier Business Partner, has been presented in Milan.

(Altech - Viale De Gasperi 72 - 20010 Bareggio - MI - Italy - Tel. +39 02 90363464 - Fax +39 02 90363481 - email: info@altech.it - www.altech.it)



ALline labelling station (Altech).

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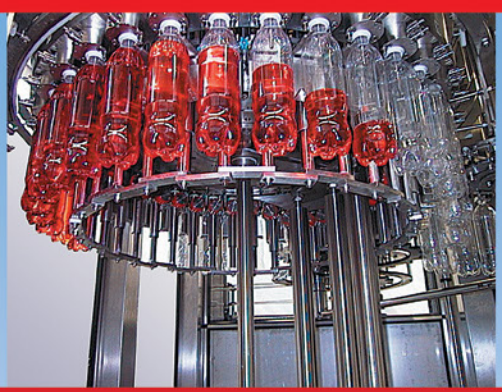


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50 years of state-of-the-art packaging technology

Since 1968, **Schib Packaging** has been designing, manufacturing and installing primary and secondary flow wrapping machines and fully automated packaging lines for the food and non-food industries.

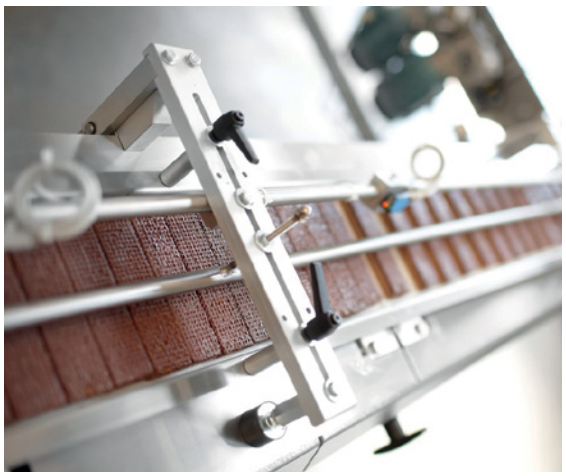
The Italian packaging equipment specialist Schib is now part of the BW Flexible Systems division of Barry-Wehmiller, a diversified global leader who primarily supplies engineering consulting and manufacturing technology for the packaging, corrugating, sheeting, and paper-converting industries.

By blending people-centric leadership with disciplined operational strategies and purpose-driven growth, Barry-Wehmiller has become a $3 billion organization with 12,000-*plus* team members spread across 100-*plus* locations in 28 Countries around the globe.

With 50 years of experience, Schib Packaging offers extensive and innovative solutions in the field of HFFS flow wrapping for the food industry. Their machines are completely designed and developed in Italy and they provide customers with modern innovative technologies and individual engineering solutions.

In this time of interconnected intelligence, Schib tackles the Industry 4.0 challenges by offering secure remote service through high-speed and intelligent communication units for service and maintenance. This allows remote software upgrades, machine configuration checks, real-time diagnostic support, and data collection, thus maximizing uptime and product quality.

Schib Packaging has an extensive project management expertise based on thousands of installations around the world and it can offer an excellent array of standalone machines or fully integrated systems dedicated to the bakery, confectionery and snack industries.



Automatic Feeder (Schib Packaging).



The Schib CO-50TG running sandwiches in modified atmosphere packaging (MAP). (Schib Packaging).

Several solutions are available for single serve or multi-pack configurations, slug, stack, and tray wrapping. Schib's portfolio includes standard and inverted flow wrappers with rotary motion, box motion or Long-Dwell HFFS technology, including top-notch components and multi-axis servo control for high-speed performance.

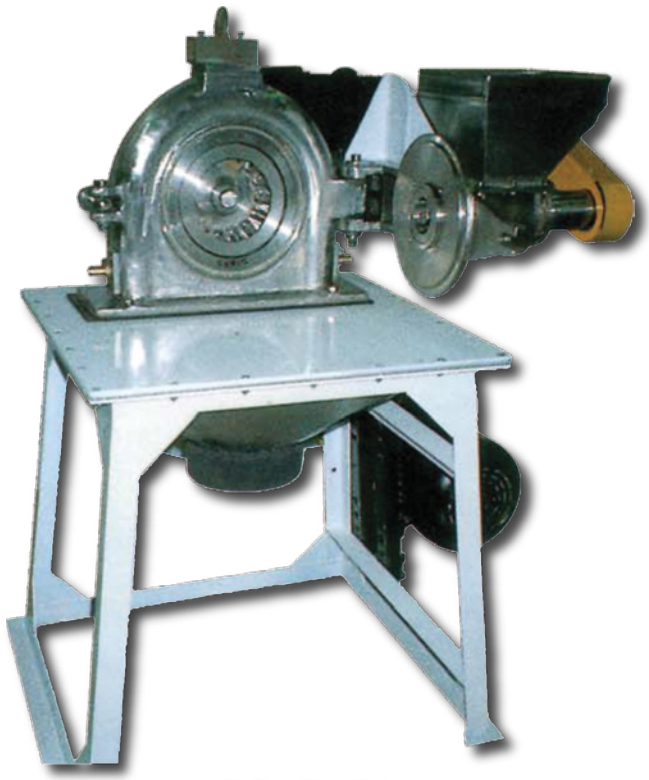
Modified Atmosphere Packaging (MAP) technology for integrity sealing is also available, to extend the shelf life of many food products. The MAP suitable machine models - in conjunction with barrier films - can deliver superior seals that will not leak after the protective gas mix is flushed inside the pack.

(Schib Packaging - Viale del Lavoro, 7/9 A - 36030 Monte di Malo - VI - Italy - Tel. +39 0445 602300 - email: info@schib.it - www.schib.it - www.bwflexiblesystems.com)

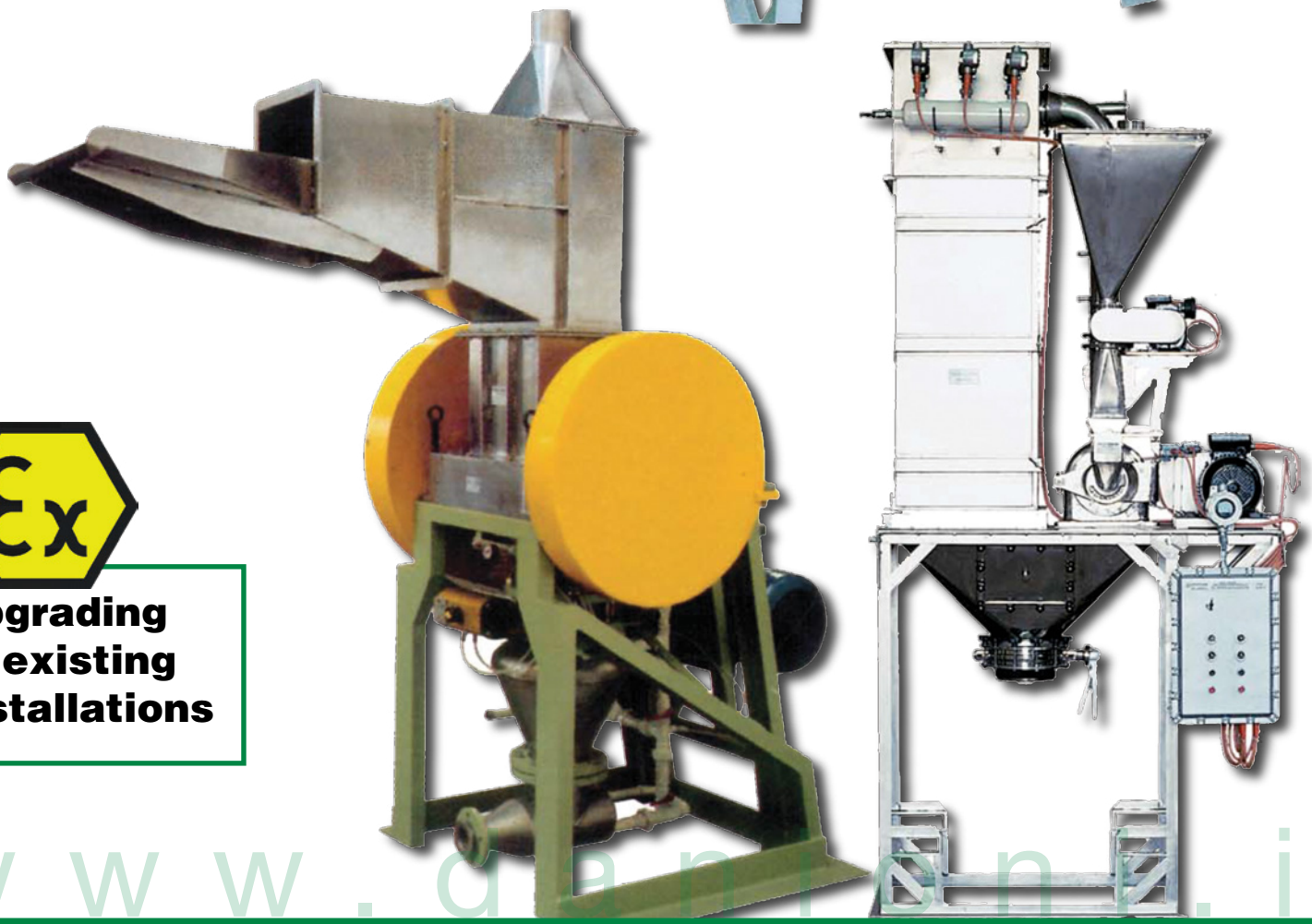
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The power of packaging to reduce food waste

Innovation in materials, container and packaging methodologies extend shelf life while smart enhance consumer confidence in product freshness

According to the Food and Agriculture Organization of the United Nations, 1.3 billion tons of food is wasted every year, costing around $680 billion in industrialized countries and $310 billion in the developing world. Imagine what that means for the 800 million people who suffer from starvation across the globe. That's billion tons of food wasted annually, enough to feed those 800 million people twice over.

Thirty-one% of all food produced in the United States goes uneaten; according to U.S. Department of Agriculture 2015 figures, each American discards more than 16 kg of groceries every month. The USDA further found that a typical American throws out 40% of all the fresh fish, 23% of the eggs and 20% of the milk that they buy.

The impact of this waste extends far beyond our overstuffed trash bins. When food goes to waste, so do the resources that it took to produce, process and transport these products. Massive amounts of chemicals, fertilizer and fuel, acres of land and—in the U.S.—25% of all freshwater used, go to produce food that is thrown away. Uneaten food ends up in landfills, where its decomposition accounts for nearly 25% of U.S. emissions of methane, a greenhouse gas 20 times more harmful than CO_2, according to the EPA.

Consumers and brands alike are increasingly aware of the environmental damage and mindful of the financial hit they take from buying food they discard. An often-overlooked part of the waste stream is fully costed waste, which results from product that has been manufactured, packaged and distributed without ever being sold and consumed. To directly address this loss, manufacturers—alongside retailers and government agencies—are increasingly motivated to implement advanced packaging solutions that extend shelf life and minimize waste.

Packaging designed to boost shelf life

Tesco's example has been much lauded. In 2014, the British supermarket chain revealed in a report that it had wasted 28,500 tons of food, a risky public relations move, but done for a reason. "We do not just want to reduce food waste in



our own operations. We have a shared responsibility to reduce food waste across the value chain wherever it occurs in fields, farms, distribution networks and in our homes," Tesco stated in the report. "By sharing this information we have added important evidence to the debate on how to tackle food waste. We are now taking action to tackle hotspots across the value chain and are donating surplus food to those in need."

In addition to community-based efforts to combat food waste, Tesco also took up the issue of better packaging. The chain's raw chicken breasts are a case in point: rather than being sold in a plastic-wrapped tray, a pre-portioned package allows consumers to cook one breast and save the other for later. Finding a way to reduce waste that relies on concept rather than technology, Tesco even absorbed the extra cost of the packaging to encourage consumers to fight waste.

Similarly, juices and milk are prone to spoilage. A design from Muchtar Ismailow of K-Bis Studio keeps beverages and liquid foods fresh for much longer. The I-Pack is compressible and has a 100% airtight hermetic seal that fits in the same space as a standard beverage carton cap and yet keeps the package pressurized after it's been opened. The result is greatly increased shelf life of opened milk, juice, soups or sauces, and the folded, emptied container is very easily recyclable.

MAP, HPP and pasteurization preserve freshness

In addition to re-examining material and container solutions to better preserve food and beverages, companies are also exploring more complex packaging solutions and methodologies to reduce waste.

Modified Atmosphere Packaging (MAP) can extend the life of fresh or minimally processed foods much longer and with less environmental impact. For example, take potato chips, meats or shredded cheese. When these products are sealed, oxygen in their bags begins decomposition. With MAP technology, packagers reduce the amount of oxygen in a bag from 29% anywhere down to zero. The gases that remain—typically nitrogen and CO_2–do not react with or degrade food products, so contents keep fresher, longer. An outgrowth of this technology, Equilibrium Modified Atmosphere Packaging (EMAP), contains a lowered level of oxygen and a higher proportion of CO2, which preserves fresh produce.



Both EMAP and MAP packaging use "gas flushing," in which the correct gas mixture is rapidly injected into the bag and pushes out the air, or "compensated vacuum," in which the air is removed from the packaging and the gas mixture is then installed. Gas packaging technology employs different films, which in the case of inert products such as meat, fish or cheese, acts as an airtight barrier against gases. In the case of produce like carrots or broccoli, which respire, the technology allows the release of waste gases.

Pasteurization is another tried-and-true method to preserve freshness and food safety. For example, "high-pressure processing" or "high hydrostatic pressure" (HHP) is a cold pasteurization process that is increasingly popular, used to kill listeria, E. coli, salmonella and other bacteria. Food is processed, packaged and then pressure-treated, usually with water, at refrigerated temperatures. The process protects food's color, texture and flavor, as well as its vitamins and nutrients. Food manufacturers can significantly extend products' shelf life with HHP, while eliminating or significantly reducing preservatives and

artificial additives, providing customers with a healthier, more natural product. As a result, more companies are adopting this method because it helps manufacturers meet consumer demand for additive- and preservative-free foods and environmentally friendly options.

Smart labels and systematic solutions

For several decades, sell-by labels have identified when a product ought to be discarded. They work, but are based on estimates, not actual conditions. Where sell-by labels leave off, smart labels pick up.

A technological leap forward that can monitor temperature and report on when a food item is at risk of spoiling, smart labels represent the revolution taking place now in the cold chain that allows more efficient, safer shipments of perishables. A good example: Timestrip monitors food in shipment. The monitor can register if product travels out of safe temperature range, and if so, for how long, recommending if food should be sold or thrown out. Though these monitors are not in wide use just yes, this type of packaging will lead to even safer shipment and consumption in the future.

While smart labels empower consumers and retailers to make more effective use of foods before diverting them to the waste stream, large-scale solutions can also stand to transform our waste management infrastructure. One systemic solution proposed by the EPA is the Food Recovery Hierarchy, which prioritizes actions to prevent food waste. The Hierarchy is designed to eliminate waste by minimizing food surpluses through source reduction, then donating surpluses to food banks to feed hungry people. Additional surplus can shift to animal feed, followed by industrial uses, composting and, in last resort, landfill. The hierarchy's top levels–minimizing surplus and donating to food banks—create the most benefits for the environment, society and economy and stress recovery of what would end up as waste.

Solutions abound at Pack Expo International

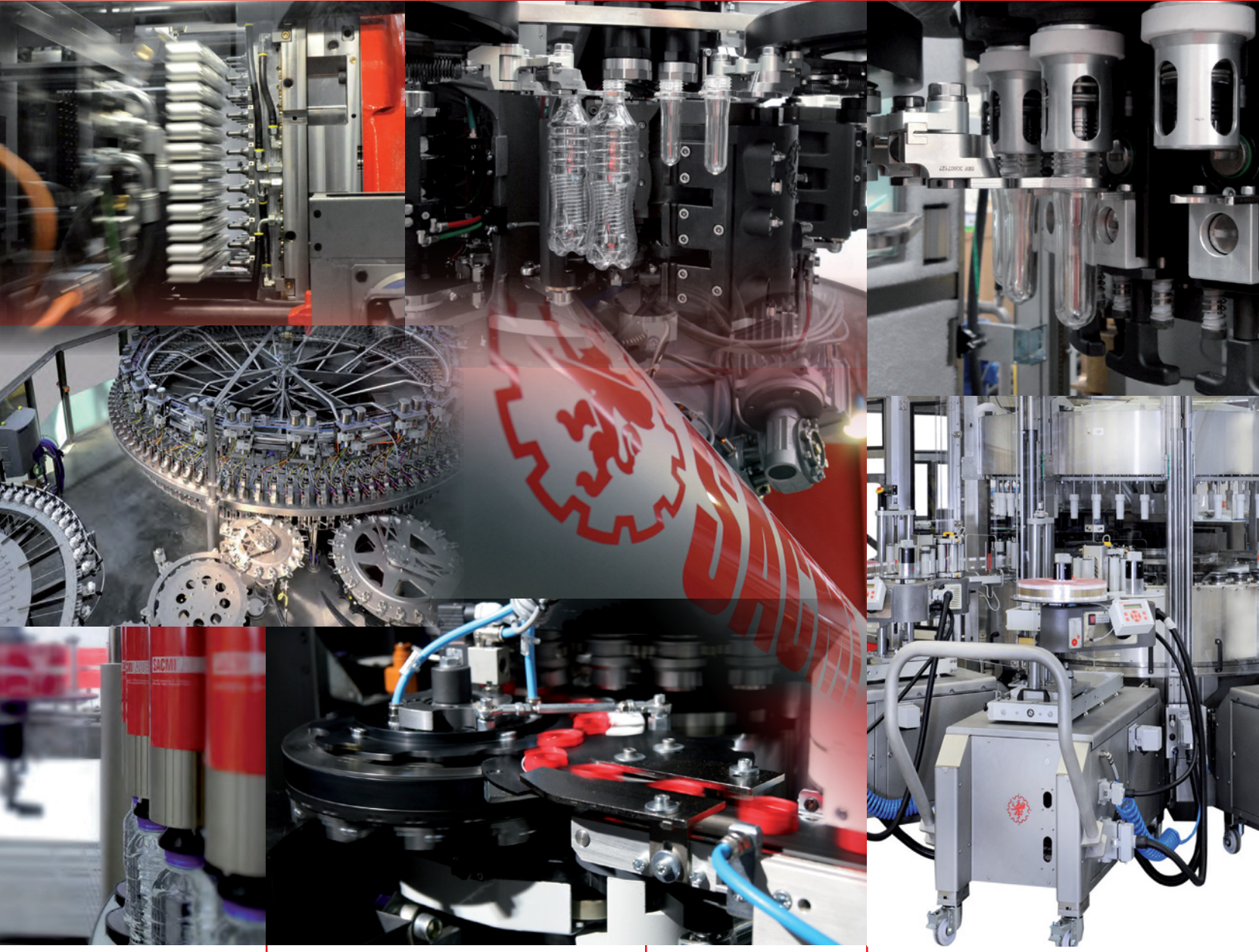
Ultimately, food waste is a global challenge that will take the cooperation of retailers, food manufacturers, suppliers and consumers to forge meaningful reductions. However, new and sophisticated packaging formats, practices and advanced labels—as well as large-scale reforms can bring us dramatically closer meeting goals for waste reduction. For food manufacturers, these changes can also bring about cuts to fully costed waste, greater brand loyalty among consumers and a healthier bottom line. To help them find the solutions they need, **Pack Expo International** 2018 (October 14-17, 2018; McCormick Place, Chicago) will offer a wide range of packaging materials, containers and equipment. The show will bring together more than 2,500 exhibitors and 50,000 attendees. In addition, show features like The Containers and Materials Pavilion and The Reusable Packaging Pavilion will display cutting-edge innovations in flexible, resealable and sustainable packaging.

Jorge Izquierdo
Vice President
of Market Development, PMMI

ABOUT PMMI

PMMI, The Association for Packaging and Processing Technologies, represents more than 800 North American manufacturers and suppliers of equipment, components and materials as well as providers of related equipment and services to the packaging and processing industry. We work to advance a variety of industries by connecting consumer goods companies with manufacturing solutions through the world-class Pack Expo portfolio of trade shows, leading trade media and a wide range of resources to empower our members. The Pack Expo trade shows unite the world of packaging and processing to advance the industries they serve: Pack Expo International, Pack Expo Las Vegas, Healthcare Packaging Expo, PACK Expo East, Expo Pack México, Expo Pack Guadalajara and ProFood Tech. PMMI Media Group connects manufacturers to the latest solutions, trends and innovations in packaging and processing year-round through brands including Packaging World, Automation World, Healthcare Packaging, Contract Packaging, ProFood World and OEM Magazine. PMMI Business Drivers assist members in pursuing operational excellence through workforce development initiatives, deliver actionable business intelligence on economic, market and industry trends to support members› growth strategies, and actively connect the supply chain throughout the year.

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SACMI

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Twist-off lids



Verimec has been present in Italy since 1985 and is a subsidiary of the Massilly Group, the European leader in tinplate packaging, especially in twist off lids. Thanks to this synergy with the French company, Vimec, of Abbiategrasso (MI) offers a unique and complete service for the packing of glass containers and cans for the food market.

Verimec advises and helps to choose the most suitable jars and in a design capacity which lid to use, the compound to be provided, according to the method (pasteurization or sterilization), customizing or offsetting of the same capsule, the capsule machine to be used as a function of the actual and future needs of the production, and finally machine control on the vacuum line to verify the accuracy of the closure process. The technical staff are always available to users of twist lids, to study and verify all the problems of food packaging in glass, helping the customer to optimize this process.



Verimec has all diameters and types of twist lids, starting from a diameter of 38 and going up to 110. In its warehouses, in addition to gold and white, standard green, gold hive, gold/red, fruit and capsules are always available, with a security flip or buttons in different colors.

Its center is at the forefront of graphics processing and allows you to quickly create executive on paper, metal or cromalin new lithographs. In addition, its service center can guide you in choosing the best compound to use, depending on the thermal process of the packaging used.

In order to provide a unique and complete service in the closure of glass containers for the food market, Verimec provides capping machines for every need, from semi-automatic at 700 jars/hour to automatic production with up to 30,000 jars/hour. The range is completed with inspection machines for the detection of the vacuum. To meet the different needs of the market, these machines can be hired/leased out with the guarantee of efficient and comprehensive technical support and spare parts.

Verimec also has a vast range of glass containers on the market and as a result of its lengthy experience in the field, can satisfy any request for a particular shape and/or capacity, even for small quantities. The modern structure of the warehouse and the ability to wrap the jars in shrink-pack, increase the flexibility of Verimec to supply any type of order, be it small or large.

(Verimec - Via Matilde Serao 27 - 20081 Abbiategrasso - MI - Italy - Tel. +39 02 94960293 Fax +39 02 94965658 - email: info@verimec.it - www.verimec.it)



Massilly group is European leader in tinplate packaging and produces in its factories located throughout the world cans, twist closures, aerosols, lithographed boxes for general line, trays and capping machines. Massilly Holding manages production facilities, service centers and service and the whole network of distributors worldwide. The quality of the factories is made according ISO 9001 and ISO 22000.

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The only feeder for every type of caps

Elevatore Unico is the first ever Cap Feeder designed and manufactured by **Marmoinox**, to work with every kind of cap, without the need to do any format changes and reaching a speed faster than 100,000 bottles/hour.

There are many different types of bottles in the world, with different shapes and sizes. Just to mention some of them: cork or T shaped caps used for wine bottles; crown caps made of iron or aluminum used for beer bottles; ring-pull caps made of aluminum used for state-of-the-art beer bottles; screw caps made of plastic used for water bottles and fruit juice boxes; screw caps made of aluminum used for wine and oil bottles, and sport caps used for sport drinks.

All these caps have different weights, shapes, and materials. So, the process to make them, transport them and use them, has to be designed and made ad hoc for each kind of cap. Elevatore Unico–was founded with the idea of removing the extra costs caused by cap format changes in a bottling line with a high level of hourly bottle production.

If you would like to find out more about which hidden problems and costs lie behind a possible wrong choice of your Feeder, you can visit the representative website for Industrial Caps Feeders www.elevatoreunico.it.

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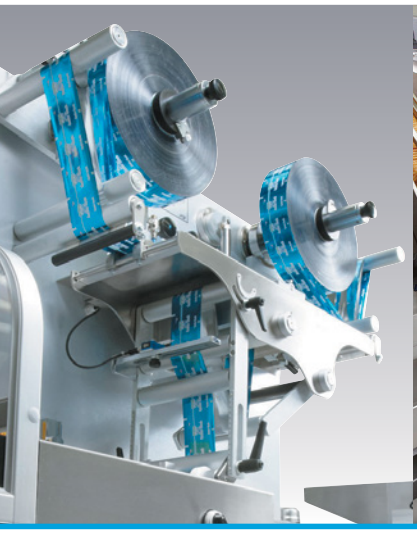


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Low-fat vs. low-carb Which diet is best for weight loss?

New evidence from a study at the Stanford University School of Medicine might dismay those who have chosen sides in the low-fat versus low-carb diet debate.

Neither option is superior: Cutting either carbs or fats shaves off excess weight in about the same proportion, according to the study. What's more, the study inquired whether insulin levels or a specific genotype pattern could predict an individual's success on either diet. The answer, in both cases, was no.

"We've all heard stories of a friend who went on one diet – it worked great – and then another friend tried the same diet, and it didn't work at all," said Christopher Gardner, PhD, professor of medicine and the lead author of the study. "It's because we're all very different, and we're just starting to understand the reasons for this diversity. Maybe we shouldn't be asking what's the best diet, but what's the best diet for whom?"

Past research has shown that a range of factors, including genetics, insulin levels (which helps regulate glucose in the body) and the microbiome, might tip the scales when it comes to weight loss. The new study, to be published Feb. 20 in *JAMA*, homed in on genetics and insulin, seeking to discover if these nuances of biology would encourage an individual's body to favor a low-carbohydrate diet or a low-fat diet.

A tale of two diets

In his quest to find out if individual biological factors dictate weight loss, Gardner recruited 609 participants between the ages of 18 and 50. About half were men and half were women. All were randomized into one of two dietary groups: low-carbohydrate or low-fat. Each group was instructed to maintain their diet for one year. (By the end of that year, about 20 percent of participants had dropped out of the study, due to outside circumstances, Gardner noted.)

Individuals participated in two pre-study activities, the results of which were later tested as predictors of weight loss. Participants got part of their genome sequenced, allowing scientists to look for specific gene patterns associated with producing proteins that modify carbohydrate or fat metabolism. Then, participants took a baseline insulin test, in which they drank a shot of glucose (think corn syrup) on an empty stomach, and researchers measured their bodies' insulin outputs.

In the initial eight weeks of the study, participants were told to limit their daily carbohydrate or fat intake to just 20 grams, which is about what can be found in a 1.5 slices of whole wheat bread or in a generous handful of nuts, respectively.

After the second month, Gardner's team instructed the groups to make incremental small adjustments as needed, adding back 5-15 grams of fat or carbs gradually, aiming to reach a balance they believed they could maintain for the rest of their lives. At the end of the 12 months, those on a low-fat diet reported a daily average fat intake of 57 grams; those on low-carb ingested about 132 grams of carbohydrates per day. Those statistics pleased Gardner, given that average fat consumption for the participants be-

fore the study started was around 87 grams a day, and average carbohydrate intake was about 247 grams.

What's key, Gardner said, was emphasizing that these were healthy low-fat and low-carb diets: A soda might be low-fat, but it's certainly not healthy. Lard may be low-carb, but an avocado would be healthier. "We made sure to tell everybody, regardless of which diet they were on, to go to the farmer's market, and don't buy processed convenience food crap. Also, we advised them to diet in a way that didn't make them feel hungry or deprived – otherwise it's hard to maintain the diet in the long run," said Gardner. "We wanted them to choose a low-fat or low-carb diet plan that they could potentially follow forever, rather than a diet that they'd drop when the study ended."

Continuing to mine the data

Over the 12-month period, researchers tracked the progress of participants, logging information about weight, body composition, baseline insulin levels and how many grams of fat or carbohydrate they consumed daily. By the end of the study, individuals in the two groups had lost, on average, 13 pounds. There was still, however, immense weight loss variability among them; some dropped upward of 60 pounds, while others gained close to 15 or 20. But, contrary to the study hypotheses, Gardner found no associations between the genotype pattern or baseline insulin levels and a propensity to succeed on either diet.

"This study closes the door on some questions – but it opens the door to others. We have gobs of data that we can use in secondary, exploratory studies," he said. Gardner and his team are continuing to delve into their databanks, now asking if the microbiome, epigenetics or a different gene expression pattern can clue them in to why there's such drastic variability between dieting individuals.

Perhaps the biggest takeaway from this study, Gardner said, is that the fundamental strategy for losing weight with either a low-fat or a low-carb approach is similar. Eat less sugar, less refined flour and as many vegetables as possible. Go for whole foods, whether that is a wheatberry salad or grass-fed beef. "On both sides, we heard from people who had lost the most weight that we had helped them change their relationship to food, and that now they were more thoughtful about how they ate," said Gardner.

Moving forward, he and his team will continue to analyze the reams of data collected during the yearlong study, and they hope to partner with scientists across Stanford to uncover keys to individual weight loss.

"I'm hoping that we can come up with signatures of sorts," he said. "I feel like we owe it to Americans to be smarter than to just say 'eat less.' I still think there is an opportunity to discover some personalization to it – now we just need to work on tying the pieces together."



The study's other Stanford co-authors are postdoctoral scholars John Trepanowski, PhD, and Michelle Hauser, MD; research fellow Liana Del Gobbo; and senior biostatistician, Joseph Rigdon, PhD.

Gardner, Desai and Ioannidis are members of the Stanford Cancer Institute. Gardner and Ioannidis are members of the Stanford Cardiovascular Institute. Gardner and Desai are members of the Stanford Child Health Research Institute. Ioannidis is a member of Stanford Bio-X.

How a Mediterranean diet could reduce bone loss in osteoporosis

New findings from the University of East Anglia (UK) show that sticking to a diet rich in fruit, vegetables, nuts, unrefined cereals, olive oil, and fish can reduce hip bone loss within just 12 months. The study, published on **The American Journal of Clinical Nutrition**, is the first long-term, pan-European clinical trial looking at the impact of a Mediterranean diet on bone health in older adults.

More than 1,000 people aged between 65 and 79 took part in the trial, and volunteers were randomised into two groups -- one which followed a Mediterranean diet and a control group which did not.

Bone density was measured at the start and after 12 months. The diet had no discernible impact on participants with normal bone density, but it did have an effect on those with osteoporosis.

People in the control group continued to see the usual age-related decrease in bone density, but those following the diet saw an equivalent increase in bone density in one part of the body -- the femoral neck. This is the area which connects the shaft of the thigh bone to its rounded head, which fits in the hip joint.

UK study lead Prof Susan Fairweather-Tait, from UEA's Norwich Medical School, said: "This is a particularly sensitive area for osteoporosis as loss of bone in the femoral neck is often the cause of hip fracture, which is common in elderly people with osteoporosis.

"Bone takes a long time to form, so the 12-month trial, although one of the longest to date, was still a relatively short time frame to show an impact. So the fact we were able to see a marked difference between the groups even in just this one area is significant."

The EU-funded trial, led by the University of Bologna, was completed by 1142 participants recruited across five centres in Italy, the UK, the Netherlands, Poland and France. Those following the Mediterranean diet increased their intake of fruits, vegetables, nuts, unrefined cereals, olive oil, and fish, consumed small quantities of dairy products and meat and had a moderate alcohol intake.

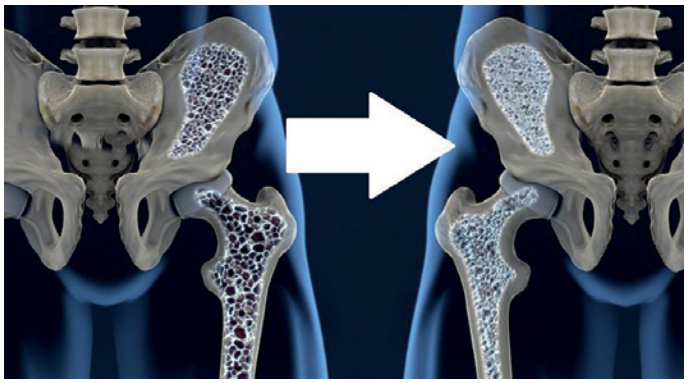
People in the intervention group were provided with foods such as olive oil and wholemeal pasta, to encourage them to stick to the diet, and were also given a small vitamin D supplement, to even out the effects of different levels of sunlight on vitamin D status between the participating countries.

At the start and end of the trial, blood samples were taken to check for circulating biomarkers. Bone density was measured in over 600 participants across both groups at the lumbar spine and femoral neck. Of these participants, just under 10% were found to have osteoporosis at the start of the study.

Co-researcher from UEA, Dr Amy Jennings said: "Although this is a small number it is sufficient for the changes in femoral neck bone density between the two groups to be statistically significant.

"Those with osteoporosis are losing bone at a much faster rate than others, so you are more likely to pick up changes in these volunteers than those losing bone more slowly, as everyone does with age.

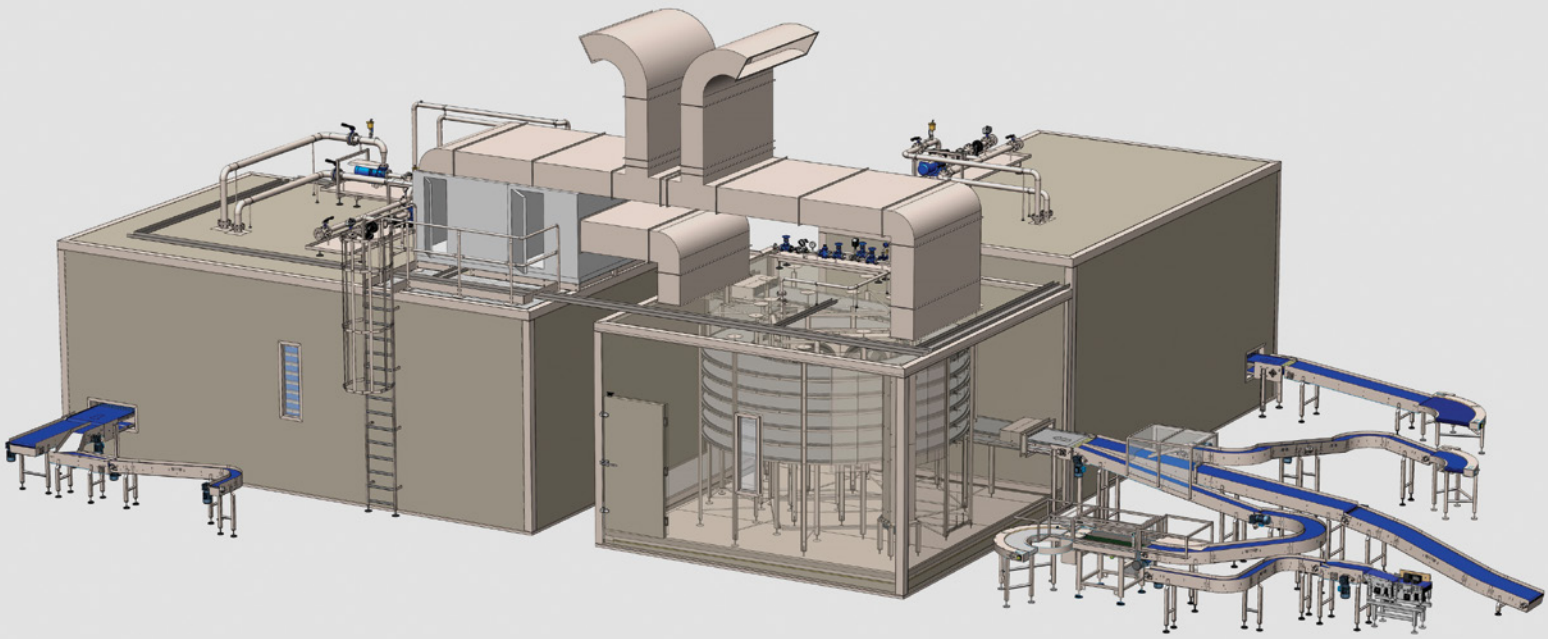
"With a longer trial, it's possible we could have picked up changes in the volunteers with normal bone density. However, we already found it quite challenging to encourage our volunteers to change their diet for a year, and a longer trial would have made recruitment more difficult and resulted in a higher drop-out."



But in the meantime, say the researchers, there is no reason for those concerned about the condition not to consider adapting their diet. "A Mediterranean diet is already proven to have other health benefits, reducing the risk of cardiovascular disease, Parkinson's, Alzheimer's and cancer," said Prof Fairweather-Tait. "So there's no downside to adopting such a diet, whether you have osteoporosis or not."

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Active consumers think hydrolysates are better than standard proteins

Nearly two thirds of consumers worldwide who exercise regularly and are aware of whey protein hydrolysates believe they are superior to normal whey proteins for sports nutrition, according to a new survey.

Researchers from **Lindberg International**, commissioned by **Arla Foods Ingredients**, questioned 2,649 consumers who exercise for more than three hours a week about their use of, and knowledge about, whey protein. Respondents were located in the US, UK, Brazil, Germany and Japan.

Nearly half of them (48%) said they had heard of whey protein hydrolysates and, within this group, 60% said they believed them to be better than standard whey proteins. Meanwhile, 29% didn't know whether or not they were better, and only 11% thought they were no better.

The results showed that, on average, those who had heard of whey protein hydrolysates consume them eight times per month. Most respondents (81%) said they consume them at least once a month, and nearly a quarter (22%) said they consume them 11 or more times per month.

The findings from the survey are presented in a new report published by Arla Foods Ingredients: '*Awareness and perceptions of whey protein hydrolysates among active populations in the US, UK, Brazil, Germany and Japan*'.

Researchers also asked those respondents who were aware of whey protein hydrolysates to pick a benefit associated with them. A third (34%) said 'muscle building', 29% cited 'faster absorption into the muscles', 24% selected 'muscle recovery' and 13% said 'increased performance'.

Troels Laursen, Director of Health & Performance Nutrition at Arla Foods Ingredients, said: "This survey demonstrates that, globally, among consumers who take their exercise seriously, there is a generally positive perception of whey protein hydrolysates and good awareness of their benefits. These findings are consistent with what we are seeing in the sports nutrition market. According to the Innova Database, the number of launches worldwide of sports nutrition products containing whey protein hydrolysates increased 26% Compound Annual Growth Rate (CAGR) from 2010 to 2016. The survey results, plus this market data, demonstrate that hydrolysates are gaining traction in the sports nutrition space. This means there is an excellent opportunity for sports nutrition companies to develop products with whey protein hydrolysates, which are at the vanguard of the industry."

Whey protein hydrolysates are premium proteins that have been finely chopped – or 'pre-digested' – so they are absorbed more quickly by the body than standard proteins. This ensures they get to work faster on helping the muscles recover after exercise. In particular, they offer a range of benefits that will appeal directly to serious users of sports nutrition. These include easy digestion, fast absorption, rapid delivery of the key amino acids for muscle building and increased fat burn for improved body composition. For sport nutrition manufacturers, whey protein hydrolysates offer a wide range of functional benefits, providing a key ingredient for producing truly crystal clear protein drinks, for adding protein into sports gels, and for increasing the softness and shelf life of protein bars.



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Enzyme plays a key role in calories burned both during obesity and dieting

Ever wonder why obese bodies burn less calories or why dieting often leads to a plateau in weight loss? In both cases the body is trying to defend its weight by regulating energy expenditure. Until now, how this happens has been a mystery.

"Human bodies are very efficient at storing energy by repressing energy expenditure to conserve it for later when you need it," said Alan Saltiel, PhD, director of the UC San Diego Institute for Diabetes and Metabolic Health (Usa). "This is nature's way of ensuring that you survive if a famine comes."

In a paper publishing in *Cell* on February 8, University of California San Diego School of Medicine researchers identify the enzyme TANK-binding kinase 1 (TBK1) as a key player in the control of energy expenditure – or calories burned – during both obesity and fasting.

"There are two important observations that we have linked to slowing metabolism in obesity and fasting," said Saltiel. "We've discovered two new feedback loops that are intertwined to self-regulate the system. Think of it like your home thermostat, which senses change in temperature to turn heat off and on."

Using mouse models, researchers observed the first loop: Chronic stress triggered by obesity causes inflammation through the activation of the pathway NFKB. This pathway induces genes associated with inflammation and obesity including TBK1. When TBK1 is activated, it shuts down AMPK, one of the master regulators of energy expenditure, thus reducing a cell's ability to burn calories, and resulting in fat storage. This is the mechanism by which obesity reduces energy expenditure.

As it turns out, the enzyme AMPK also senses changes in energy levels during fasting and increases expenditure by instructing cells – especially adipocytes (fat cells) – to burn fat as an energy source. But, when fasting activates AMPK it initiates TBK1, which ultimately inhibits AMPK's role in burning fat.

"This feedback loop blocks energy expenditure both through inflammation and fasting," said Saltiel. "Energy expenditure was restored when we deleted TBK1 from fat cells mice. But, something else occurred that surprised us – there was an increase in inflammation."

TBK1 is involved in a second feedback loop: While NKFB induces TBK1, TBK1 turns around and inhibits NFKB. The activation of TBK1 normally reduces inflammation, without completely eliminating it, causing it to be low grade. Without TBK1, inflammation increases.

Deletion of TBK1 in obese mice resulted in weight loss and in-



creased inflammation, but in normal weight mice there was no change. This also explains how restricting calories might reduce inflammation.

"Inhibiting TBK1 has the potential to restore energy balance in states of obesity by enhancing the ability to burn some fat," said Saltiel. "This is probably not the only pathway accounting for energy expenditure in fasting or obesity, but this information provides new insight into how we might develop drugs that inhibit TBK1 or other enzymes involved in metabolism."

One possible TBK1 inhibitor is called amlexanox, an anti-inflammatory and anti-allergic drug used to treat asthma that was developed in the 1980s in Japan. In a paper published in ***Cell Metabolism*** last year, Saltiel and team reported a clinically significant reduction in blood glucose during a randomized, double blind, placebo-controlled clinical trial of a subset of patients with type 2 diabetes who used amlexanox for 12 weeks.

In a previous study, Saltiel and colleagues reported that when TBK1 is induced in obese mice it caused a drop in energy expenditure or reduction in calories burned. Giving obese mice amlexanox caused them to lose weight, while their sensitivity to insulin increased, improving their diabetes and fatty liver disease.

The current paper reveals why amlexanox may have been effective.

"It may be that if we tweak this pathway we will rev up the metabolism again to improve energy expenditure," said Saltiel. "I think you'll probably still have to do both: reduce energy intake through diet and increase energy expenditure by blocking this compensatory reduction in burning calories. We know that diets alone don't work and this is why."



Walnuts impact gut microbiome and improve health

Diets rich in nuts, such as walnuts, have been shown to play a role in heart health and in reducing colorectal cancer. According to a new study, the way walnuts impact the gut microbiome – the collection of trillions of microbes or bacteria in the gastrointestinal tract – may be behind some of those health benefits.

Walnuts are just one in a line foods that contain dietary fiber and have interested scientists for their impact on the microbiome and health. Dietary fiber acts as a food source for gut microbiota, helping the bacteria to do their jobs – breaking down complex foods, providing us nutrients, or helping us feel full, for example.

Fruits, vegetables, whole grains, nuts, and legumes are important plant sources of dietary fiber. Eating a variety of these foods helps promote a diverse gut microbiota, which in turn helps to support health.

Findings from the study, published in ***The Journal of Nutrition***, show that consuming walnuts not only impacted the gut microbiota and microbial derived secondary bile acids, but also reduced LDL-cholesterol levels in the adults participating in the study; good news for cardio, metabolic, and gastrointestinal health.

"We found that when you consume walnuts it increases microbes that produce butyrate, a beneficial metabolite for colonic health. So the interaction of walnuts with the microbiome is helping to produce some of those health effects," says Hannah Holscher, assistant professor of food science and human nutrition at U of I, and lead author of the study. "It is about getting to the 'black box' that is all the microbes in our GI tract to see how they are interfacing with the food we eat and having downstream health effects.

"Some of those health effects are hypothesized to be related to the metabolites bacteria produce," she adds.



For the controlled-feeding study, 18 healthy male and female adults consumed diets that either included 0 grams of walnuts or 42 grams – about a third cup or a palm-full of walnuts – for two, three-week periods. Fecal and blood samples were collected at the beginning and end of each period to assess secondary outcomes of the study, including effects of walnut consumption on fecal microbiota and bile acids and metabolic markers of health.

Walnut consumption resulted in higher relative abundance of three bacteria of interest: *Faecalibacterium*, *Roseburia*, and *Clostridium*.

"The microbes that increased in relative abundance in this walnut study are from one of the Clostridium clusters of microbes, and there's increased interest in those because they have the ability to make butyrate," Holscher says. "Unfortunately in this study we didn't measure butyrate, so we can't say that just because these microbes increased that butyrate did increase. We still need to answer that question.

"There is a lot of interest in *Faecalibacterium* because it has also been shown in animals to reduce inflammation. Animals with higher amounts also have better insulin sensitivity. There is also growing interest in *Faecalibacterium* as a potential probiotic bacteria, and so we are trying to follow up on foods that help support *Faecalibacterium*."

The findings also show, with walnut consumption, a reduction in secondary bile acids compared to the control. "Secondary bile acids have been shown to be higher in individuals with higher rates of col-

orectal cancer," Holscher explains. "Secondary bile acids can be damaging to cells within the GI tract, and microbes make those secondary bile acids. If we can reduce secondary bile acids in the gut, it may also help with human health."

Previous research that prompted this microbial research showed that the amount of energy (calories) derived from walnuts after we eat them is less than previously thought.

"When you do calculations to determine how much energy we predicted we would get from eating walnuts, it didn't line up with the energy that was absorbed," Holscher says. "You're really only absorbing around 80% of the energy from walnuts that labels say. That means that the microbes get access to that extra 20% of calories and the fats and fiber left in them, and so what happens then? Does it produce a positive health outcome, or a negative health outcome? Our study provides initial findings that suggest that the interactions of microbes with the undigested walnut components are producing positive outcomes.

"We need more research to look at additional microbial metabolites and how those are influencing health outcomes, instead of just characterizing the changes in the microbiome," Holscher says.

Pasta can be part of a healthy diet

Carbohydrates get a lot of bad press and blame for the obesity epidemic, but a new study suggests that this negative attention may not be deserved for pasta.

Unlike most 'refined' carbohydrates, which are rapidly absorbed into the bloodstream, pasta has a low glycemic index, meaning it causes smaller increases in blood sugar levels than those caused by eating foods with a high glycemic index. Researchers at St. Michael's Hospital (Toronto, Canada) undertook a systematic review and meta-analysis of all of the available evidence from randomized controlled trials, the gold standard of research design. They identified 30 randomized control trials involving almost 2,500 people who ate pasta instead of other carbohydrates as part of a healthy low-glycemic index diet. Their results were published in the journal ***BMJ Open***.



"The study found that pasta didn't contribute to weight gain or increase in body fat," said lead author Dr. John Sievenpiper, a clinician scientist with the hospital's Clinical Nutrition and Risk Modification Centre. "In fact analysis actually showed a small weight loss. So contrary to concerns, perhaps pasta can be part of a healthy diet such as a low GI diet."

The people involved in the clinical trials on average ate 3.3 servings of pasta a week instead of other carbohydrates. One serving equals about one-half cup of cooked pasta. They lost about one-half kilogram over a median follow-up of 12 weeks.

The study authors stressed that these results are generalizable to pasta consumed along with other low-glycemic index foods as part of a low-glycemic index diet. They caution more work is needed to determine if the lack of weight gain will extend to pasta as part of other healthy diets.

"In weighing the evidence, we can now say with some confidence that pasta does not have an adverse effect on body weight outcomes when it is consumed as part of a healthy dietary pattern," said Dr. Sievenpiper.

Vitamin D reduces early mortality

A study from the University of Bergen (UiB) published on ***The Journal of Clinical Endocrinology & Metabolism*** concludes that people who have suffered from cardiovascular disease, and have a normal intake of vitamin D, reduce their risk of morality as a consequence of the disease by 30%.

"We discovered that the right amount of vitamin D reduces the risk of death substantially. However, too much or too little increase the risk," says Professor Jutta Dierkes at the Department of Clinical Medicine, UiB, which lead the study.

The study followed as many as 4,000 patients with cardiovascular diseases from year 2000, for a period of 12 years. The average age of the participants was 62 years old at the start of the study.

Difficult recommendations

The study showed that it is favourable to have blood values around 42 to 100 nmol/l. If you have higher or lower values, you are at greater risk of dying from cardiovascular disease. According to Dierkes, it is difficult to give general a recommendation of how much vitamin D supplementation one should take.

"The optimal amount of vitamin D-supplement varies from one person to another. It depends where you live, and what kind of diet you have," Dierkes points out.

For example, the Nordic countries recommend an intake of 10 microgram per day from all vitamin D-sources, USA recommends 15 micrograms and Germany 20.

"Even if Norwegians receive less sun then the Germans, the Norwegians have more fish in their diet. Fish and cod liver oil are important sources to vitamin D during the winter, in addition to physical activities outdoors during the summer," Dierkes explains.

Should measure levels

Dierkes advices all who have experienced cardiovascular diseases to measure their levels of vitamin D, so that these can be better regulated, and the need for supplements assessed. This can usually be done by your local doctor.

"It is, however, important to take in account that the levels vary seasonally A measurement in September will not show the same results as in January, in the Nordic countries."

"The levels in January or February are often lower because of the lack of sunlight, which induces the skin form to vitamin D," says Jutta Dierkes.





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High-energy breakfast promotes weight loss

In patients with obesity and type 2 diabetes, a meal schedule that includes a high-energy breakfast promotes weight loss, improves diabetes and decreases the need for insulin, new research from Israel reports. The study results was presented March 17, at ENDO 2018, the 100th annual meeting of the **Endocrine Society** in Chicago, Usa.

"This study shows that, in obese insulin-treated type 2 diabetes patients, a diet with three meals per day, consisting of a big breakfast, average lunch and small dinner, had many rapid and positive effects compared to the traditional diet with six small meals evenly distributed throughout the day: better weight loss, less hunger and better diabetes control while using less insulin," said lead study author Daniela Jakubowicz, M.D., professor of medicine at Tel Aviv University.

"The hour of the day – when you eat and how frequently you eat – is more important than what you eat and how many calories you eat," she noted. "Our body metabolism changes throughout the day. A slice of bread consumed at breakfast leads to a lower glucose response and is less fattening than an identical slice of bread consumed in the evening."

Jakubowicz and her colleagues studied 11 women and 18 men who had obesity and type 2 diabetes, being treated with insulin and averaged 69 years of age. The patients were randomly assigned to consume one of two different weight-loss diets, which contained an equal number of daily calories, for three months. One group (Bdiet) ate three meals: a large breakfast, a medium-sized lunch and a small dinner. The second group (6Mdiet) ate the traditional diet for diabetes and weight loss: six small meals evenly spaced throughout the day, including three snacks.

Overall glucose levels and glucose spikes were measured for 14 days at baseline, during the first two weeks on diet, and at the end of the study by continuous glucose monitoring (CGM). Glucose levels were tested every two weeks and insulin dosage was adjusted as needed. At three months, while the Bdiet group lost 5 kg, the 6Mdiet group gained 1.4 kg.

Importantly, the researchers found a significant reduction of overall glycemia after as little as 14 days on Bdiet, when the participant had almost the same weight as at baseline. This finding suggests that even before weight loss, the change in the meal timing itself has a quick beneficial effect on glucose balance that is further improved by the important weight loss found in the 3M diet.

"A diet with adequate meal timing and frequency has a pivotal role in glucose control and weight loss," Jakubowicz observed.



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The health benefits of seafood propel the sector

Seafood is a much-loved food all over the world. Its popularity has been growing tremendously in the recent years. Loaded with a rich source of omega-3 fatty acids, protein, vitamins, and minerals, seafood is good for the development of infants, skin, eyes, muscles, and bones. Moreover, it decreases the risk of heart disease, obesity, hypertension, and stroke. The various forms of seafood include crustaceans, cephalopods, flatfish, mollusks, groundfish, salmonids, tuna, pelagic, and more. The market for seafood is growing due to the increased interest from consumers, especially millennials looking for innovative flavors in ready-to-cook meals. Moreover, consumers look for fresh quality ingredients during their restaurant experiences which seafood often satisfy. Seafood is also considered as one of the healthiest and protein-rich foods. Other drivers of the industry include the growing population, a rise in disposable income in emerging countries, the changing lifestyle and preferences of consumers, the availability of a variety of fish, and the growing development of aquaculture technologies. According to a report by **Allied Market Research**, **the seafood market** is expected to accrue a sum of $155,316 million by 2023, growing at a CAGR of 3.6% from 2017 to 2023.

The market for seafood is highly competitive. Several large and small companies innovate their food products and adopt strategies such as product launch and collaboration to survive in the space and extend their reach globally. For instance, in June 2018, Maritech, a developer of software solutions for seafood businesses announced the launch of a digital innovation seafood lab to develop new technologies for the seafood industry. In June 2018, New Wave Foods, a leader in truly sustainable seafood announced the launch of its vegan shrimp in restaurants across New York, New Jersey, Connecticut, Philadelphia, and Long Island. In May 2018, Young's Seafood, a UK-based company launched three new premium products to appeal to a more distinct group of food shoppers.

Maritech Launches a Digital Innovation Seafood Lab

Maritech recently launched a digital innovation seafood lab with the aim of developing new and emerging technologies for the seafood industry. Located at the company's offices in Molde, Norway, the lab provides the Maritech team, its customers and partners with a great space and am-

biance to develop innovative solutions for traceability, process control and automation across the seafood value chain.

The lab aims at discovering the use of technologies such as the internet of things, big data, machine-leaning, artificial intelligence, augmented reality, blockchain and more to advance cutting-edge technology for the seafood industry. Odd Arne Kristengard, Maritech's COO said, "Since the launch of DigitalSeafood, our cloud-based suite of software, our innovation blueprint has been based on design thinking, distilling the best practices of agile development into a few simple key processes: empathize, define, ideate, prototype, and test. By applying these principles in the industry-collaborative environment of an innovation lab, we can productively combine seafood sector knowledge with the in-depth technical expertise to pinpoint the most pressing needs of our customers and come up with immediate and practical solutions."

New Wave Foods Introduces Vegan Shrimp in Restaurants

New Wave Foods announced the launch of its vegan shrimp in restaurants across several cities such as New York, New Jersey, Connecticut, Philadelphia, and Long Island. The plant-based shrimp is available in raw form or a crispy breaded variety. Kiki Adami, the founder of NYC-based restaurant consulting firm Veganizer and the representative of New Wave Foods said that the vegan shrimp would be offered at several important NYC locations, including vegan French restaurant Delice +Sarasinn, 3 Brother's Cafe, Orchard Grocer's deli counter, More Life Café, William Halet Bar, Upper Crust, and others. New Wave Foods also has plans to launch more vegan seafood products such as Sriracha and Buffalo-style shrimp, fish fillets, plant-based crab meat, tilapia, salmon, lobster, and tuna.



Young's Seafood Launches New Premium Products

Young's Seafood launched three new premium products, including the Gastro Jumbo Beer Battered Argentinian Red Shrimp, Lightly Battered Chunky Cod Fillets, and Lightly Breaded Chunky Cod Fillets. Coming with 220 grams of the value-added product, the new Gastro Jumbo Beer Battered Argentinian Red Shrimp features wild-caught Argentinian red shrimp wrapped in Young's Gastro beer batter coating. The other two products feature 100% cod fillets wrapped in either a crispy batter or golden breadcrumbs. Yvonne Adam, marketing director of Young's Seafood said, "We're excited about how our latest products demonstrate innovation, insight and our seafood expertise. Our Beer Battered Shrimp brings a new species and eating occasion to our restaurant quality Gastro range, and our industry-leading segmentation helped us identify a group of shoppers who prefer chunky portions, so we're meeting that need with a fabulous product that combines 100% natural, chunky fillet with a lighter coating."

www.alliedmarketresearch.com

Green eating driving plant-based innovation

Plant-based innovation is flourishing. Growing consumer interest in health, sustainability and ethics is driving plant-derived ingredients and products into high popularity. **Innova Market Insights** reports that plant-based product claims increased by 62% globally (CAGR, 2013-2017) with growth occurring on platforms such as plant proteins, active botanicals, sweeteners, herbs & seasonings and coloring foodstuffs.

"The dairy alternatives market has been a particular beneficiary of this trend," says Lu Ann Williams, Director of Innovation at Innova Market Insights. "With the growing availability and promotion of plant-based options to traditional dairy lines, specifically milk beverages, and cultured products such as yogurt, frozen desserts and ice cream," she states.

The dairy alternatives category was largely pioneered by and continues to be led by beverages. Global sales of dairy alternative drinks are set to reach US$16.3bn in 2018 and they accounted for over 8% of global dairy launches recorded by Innova Market Insights in 2017, up from 7% over 2016. Actual global launches have more than doubled over a five-year period.

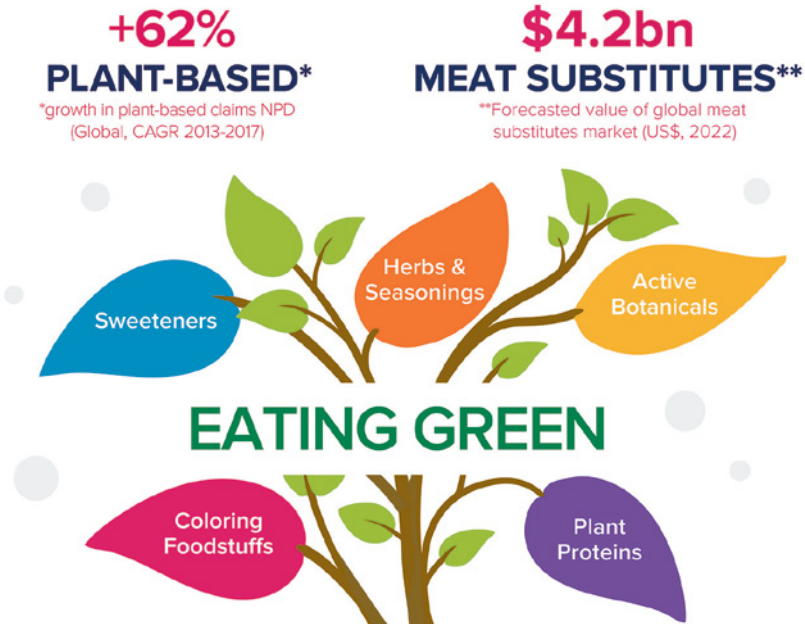
Spoonable non-dairy yogurt has also seen strongly rising levels of interest, but from a smaller base, with a 48% CAGR for the 2013-2017 period taking its share of dairy launches from less than 0.5% in 2012 to 1.5% in 2017. According to Innova Market Insights' consumer research, one in three US consumers have increased their consumption of plant-based milk/yogurt in the two years to the end of 2017.

"In the move to offer something new, we are starting to see an increasing variety of non-soy plant-based ingredients, including cereals such as rice, oats and barley," notes Williams. "We also noticed an increase in nuts, such as almonds, hazelnuts, cashews, walnuts and macadamias, as well as coconut and more unusual options such as lupin, hemp and flaxseed."

Interest in plant-based eating is clearly reflected in developments in the meat substitutes market, where global sales are set to grow to US$4.2bn by 2022. The range of ingredients used for meat substitutes includes vegetables and grains, as well as traditional sources such as soy and specialist manufactured brands such as Quorn and Valess.

Gravitation towards plant-based diets in general, along with interest in vegan, vegetarian and flexitarian lifestyles and concerns over animal welfare, have together served to increase interest and NPD has subsequently seen an 11% CAGR for the 2013-2017 period. Research also indicates that four in ten US consumers increased their consumption of meat substitutes/alternatives during 2017.

www.innovamarketinsights.com





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Strong demand for flexible packaging industry in Europe

Flexible Packaging Europe's (FPE) members manufacture all types of flexible packaging. FPE comprises more than 70 small and medium sized companies as well as the major European producers of flexible packaging for all materials. These companies cover more than 80% of the European flexible packaging turnover. Also, six national flexible packaging associations are members of FPE ensuring consistency between national and European activities and lobbying. www.flexpack-europe.org

Flexible packaging consumption in Europe grew by 2% to around €14bn in 2017, with about the same growth rates in both Western and Eastern Europe, according to research by PCI Wood Mackenzie. Total annual production exceeded €15bn, of which 75% was accounted for from Western Europe and the remaining 25% from Eastern Europe. This region remains the most significant exporter with approximately 10% of its production consumed outside Europe. Forecasts expect growth to continue, with sales achieving nearly €16bn in Europe and global consumption reaching US$107bn by 2022.

Healthy growth for most of the end user markets, such as coffee, pet food and fresh foods has driven production higher, according to Flexible Packaging Europe (FPE). Smaller households need more single serve options and there is continuing demand for more product varieties from consumers. This supports the general trend from rigid to flexible packaging, which offer greater convenience and fits better into today's lifestyle needs.

This trend is confirmed by further data measured in units from Euromonitor International. However, this research indicates a stagnation of consumption in confectionery while growth continues in the categories of savoury snacks, cheese, coffee, dry products and pet food.

FPE Chairman, Gérard Blatrix, commenting on the market research said, "These figures reveal a strength in depth for European flexible packaging demand and a resilience in core markets. The trend for more convenience and greater variety of formats is clearly being met by innovative flexible packaging styles. FPE and its members are committed to ensuring flexible packaging continues to be at the forefront of modern packaging solutions with a strong environmental message. The main rationale for flexible packaging is to minimize raw material use, generally making it the most resource efficient packaging solution available."



FPE is very active in sustainability projects within the framework of the EU's Circular Economy strategy. The flexible packaging industry supports the separate collection of all packaging to ensure that these materials are efficiently treated for recovery. FPE is a founding and leading member of the CEFLEX initiative which is committed to all types of flexible packaging in a circular economy. This supports the development of improved sorting and recycling solutions across Europe.

More winemakers turn to aluminium closures

Aluminium closures now account for just under 30% of the total global bottled still wine market, according to research recently conducted by **Euromonitor**. With 30 billion bottles sold worldwide in 2016, the aluminium closure market size is now around 9 billion units annually. This shift towards aluminium screwcaps is particularly evident for the largest still wine markets – Europe and USA.

Europe still represents the largest market for bottled still wines with volumes of more than 17 billion in 2016, according to other research by IWSR, which looked at 0.75L equivalent bottle measurement units. Both reports show a decline in bottled still wine volumes in Europe of between 5.3 and 6.4% in the five years under study. But aluminium closures made significant progress in the same period, growing by 14.5% with a CAGR of 5.2% from 2012-2016.

Commenting on the figures, Guido Aufdemkamp, representing the **Aluminium Closures Group** said, "These reports show that aluminium closures are continuing to show strong advantages over other wine closure types. Their convenience and increasingly strong branding and decoration enhancements mean more and more winemakers are turning to aluminium closures."

"In addition, it is worth noting that while the global volume of bottled still wine measured in 0.75L equivalent bottles by IWSR decreased by 2.8% in the period of 2012-2016 to 28.3 billion bottles, Euromonitor shows the total number of wine bottles sold worldwide was stable These figures rely on a more differentiated research method which results in higher numbers than many other sources forecasts in the media and elsewhere," he added.

The situation in the United States of America continues to show a strong market for wine with aluminium closures. The number of 0.75L bottled wines of all varieties sold in 2016 increased 4.4% versus 2015, according to the study by IWSR. Sales reached over 3.8 billion bottles. Euromonitor confirms that aluminium closures accounted for 44.9% of all sales of bottled wine in the US in that year. The CAGR for aluminium closures in the US for the five-year period was 6%. Expressing his delight at the continued growth of the aluminium screwcap market, Guido Aufdemkamp continued, "There is a truly global acceptance of aluminium closures, particularly with younger consumers and those new to wine, who show a real preference for screwcaps."

"Consumers are convinced by their ease of use, as surveys of our Turn 360° campaign have demonstrated. In addition, these closures are completely recyclable, so fit completely with the current demands for more sustainable performance of packaging," he concluded.



Sources: IWSR / Euromonitor International / EAF

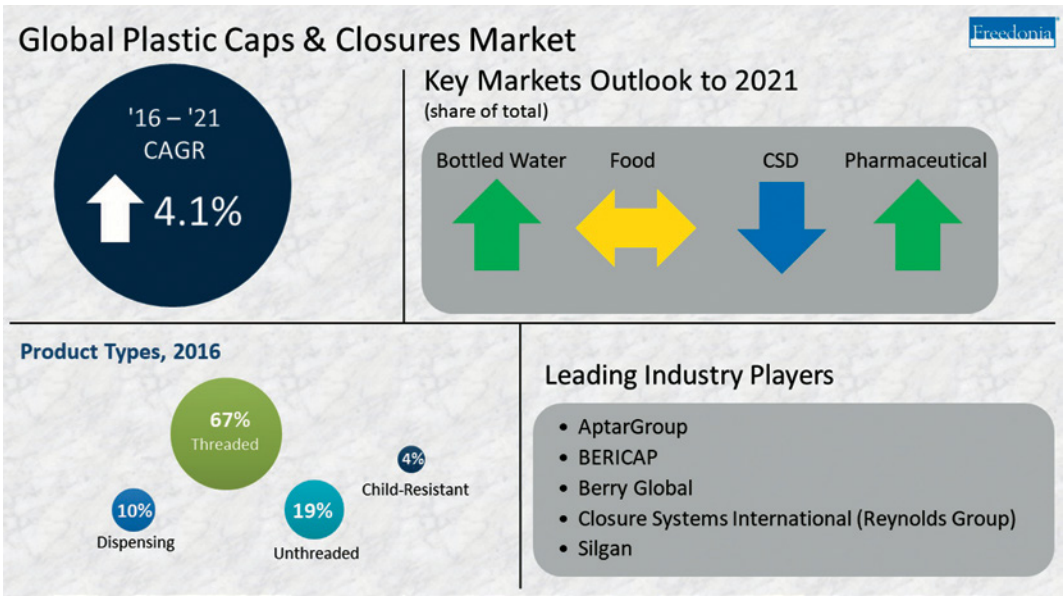
Plastic caps and closures demand to grow 4.1% annually

Global plastic caps and closures demand is projected to advance 4.1% per year to nearly 1.9 trillion units in 2021. Gains will be driven by bottled water, which has become the largest application for plastic closures and offers the greatest growth opportunities through 2021. These and other trends are presented in ***Global Plastic Caps & Closures Market,*** a new study from The Freedonia Group.

Threaded plastic caps and closures accounted for the largest share of plastic caps and closures demand in 2016 and will continue to do so going forward, totaling 67% of the market in 2021. Advances for threaded plastic caps and closures will be affected to some extent by competition from value added closure types such as dispensing and child-resistant varieties. Dispensing caps are becoming increasingly popular in applications once dominated by standard threaded caps, such as single-serve bottled water and sports drinks. These beverages are often packaged in plastic bottles featuring flip-top or push-pull caps that enable easy, on-the-go dispensing without requiring the removal of the cap.

The Asia/Pacific region will see the fastest demand growth of any global region through 2021. Increased food, beverage, and pharmaceutical production will drive above average growth for every product type.

www.freedoniagroup.com



Global Plastic Caps & Closures Market (published 12/2017, 239 pages) is available for $4900 from The Freedonia Group, www.freedoniagroup.com

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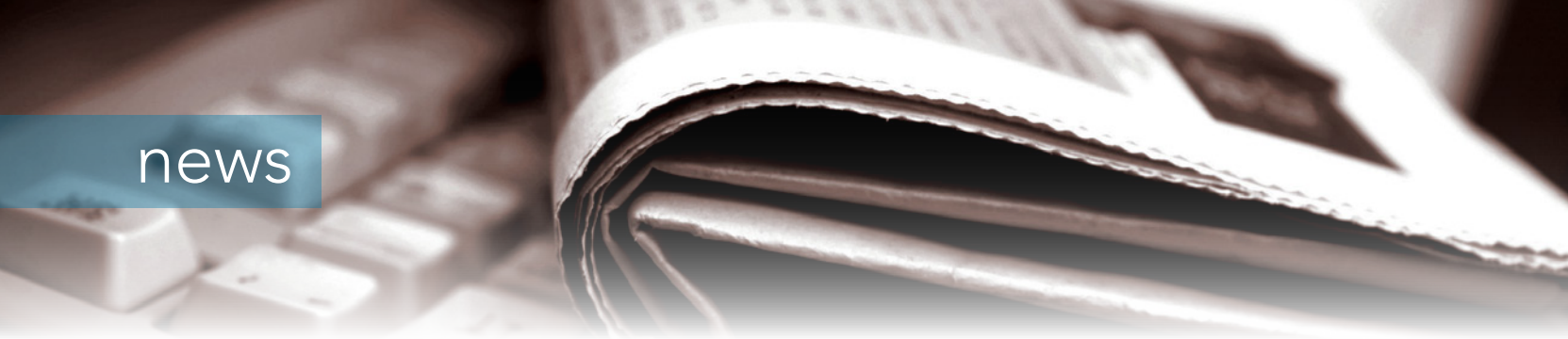
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Food safety: keeping damaging influences out

Packaging is indispensable to ensure the shelf life of food products. It protects the product from damaging influences and prevents the development of microbes that are harmful to health. Nowadays, modern food packaging ensures a high degree of safety for consumers.

Thanks to a combination of optimum packaging material, preservation and durable sealing, ideally tailored processes are available to food manufacturers. The most important suppliers of this technology will be showcasing their innovations once again at **FachPack 2018**.



Protection inside and out

The primary task of food packaging is to protect foodstuffs. It is intended to stop products from drying out and prevent the development of microbes. However, light, oxygen, steam, dirt and extraneous odours are also harmful to food. In this context, the barrier effect is particularly important. It is determined by the technological properties of the packaging material and in the case of film packaging is always adapted to the requirements of the product and the production process.

Currently, companies and research establishments are looking at how the thickness of these composite films can be reduced. For example, a research project being undertaken by the Fraunhofer Institute for Process Engineering and Packaging (IVV) aims to re-

duce the packaging requirement through thinner films without impairing their protective function (Source: **Fraunhofer Institut**).

When choosing the right barrier effect and combination of suitable polymers, manufacturers draw on their extensive experience and new developments. They will be providing comprehensive information on these topics at FachPack in September 2018.

Composite film packaging contains barrier films that do not just protect the product from oxygenation but are also indispensable for modified atmosphere packing (MAP) because they prevent the egress of inert gases like nitrogen or CO_2 from the packaging. The use of MAP extends the life of the products by days, if not weeks in some cases, during which time they are available to the consumer.

A cited benefit is that as a result, sales figures increase with every additional day. In recent years, many renowned companies have proven that MAP leads to successful product sales and larger market shares (Source: Linde Group). North America continues to be the largest market for MAP packaging, followed by the Asia-Pacific region and Europe. According to a survey by DecisionDatabase Deutschland, the market in Europe exhibits the largest growth in this area (Source: **Facts Week**).

Underrated classic

To the present day, the traditional solution offering the best barrier effect is still the tin can. Hermetically sealed and aseptically packed, its stability protects the contents from damage. The German Food Can Initiative counters preconceptions about cans being heavy and difficult to open by pointing out that many suppliers meanwhile provide cans with pull tabs and peel-back lids to meet the demand for greater convenience. It is also reported that manufacturers have been able to constantly reduce the weight of tin cans (Source: Verband Metallverpackungen).

Through the use of screw or crown caps, tin plate is being combined with the benefits of glass containers. Glass containers are popular above all for acidic contents, milk products or baby food, because glass does not react with the contents and therefore does not release any undesirable substances. Thanks to these benefits glass has a permanent place in the packaging of certain product groups.

The German organisation Action Forum Glass Packaging says that around 26% of glass containers produced is later used for packaging foodstuffs. To find out which packaging German consumers prefer for pickled preserves, the Action Forum Glass Packaging commissioned market research institute GfK to conduct a survey. GfK asked a representative sample of the German population: "You are standing in front of the supermarket shelf: Which type of packaging do you choose for preserved vegetables e.g. like red cabbage or sauerkraut?" 60.9% of respondents stated that they preferred glass packaging for pickled vegetables (Source: Aktionsforum Glasverpackung).

On opening a glass jar the consumer knows that the contents are safe if the lid makes the popping noise caused by the vacuum

ABOUT FACHPACK

FachPack is the European trade fair for packaging, processing and technology. With its extensive range of products and services relating to the packaging process chain for industrial and consumer goods, the event will be held in a compact three-day programme running from 25 to 27 September 2018.
FachPack is fresher, stronger and has a higher profile with its new brand identity "Tomorrow begins when you create it". It will be just as solution-oriented, specific, reliable and pragmatic as ever.
With a unique portfolio made up of packaging materials, packaging accessories, packaging materials, labelling and marking technology, peripheral packaging machinery and equipment, packaging printing and finishing, intra-logistics and packaging logistics and services for the packaging industry, FachPack is the meeting place for the European packaging market.
It draws trade visitors from all packaging-intensive sectors: food and beverages, pharmaceuticals and medical technology, cosmetics, chemicals, automotive and other consumer and industrial goods.

in the jar. As long as the vacuum is intact the food is safe.

Safe in a vacuum

To vacuum-seal plastic packaging the air is extracted from the food packing and therefore hinders the growth of microbes. Since a damaged vacuum can easily be seen on the packaging, any spoiled goods are quickly identified. The vacuum machines used for this process are available in different sizes and for various applications – from vacuum equipment for single packages, such as those used by butchers or commercial kitchens, to automated conveyor-belted vacuum packers for large food manufacturers.

The HPP process (high pressure processing) for extending the shelf life of vacuum-packed foodstuffs is increasingly being used. The benefit of this process is that it deactivates pathogenic microorganisms but does not damage the food.

The effectiveness of HPP for packed meat products has been investigated, for example, in a project in collaboration with the German Agricultural Society's Committee for Food Technology (Source: **DLG, e 2017 2 Expert report High pressure**).

Welding and sealing

No matter how good the materials and processes to extend shelf life are, what is really important is that the packaging stays sealed. This is why sealing and welding technology plays a role that should not be underestimated. Depending on requirement, the user can choose from three common processes. The two most commonly used sealing methods are heat sealing, in which the films are connected with one another or a food tray, and cold sealing, in which the materials are glued together. The latter is recommended above all for packing sensitive foodstuffs that could be affected by possible heat build-up. A third method for heat sealing packaging is modern ultrasound technology.

This relatively recent application offers advantages particularly for sealing viscous foods, ready- to-eat salads or ready-to-use chopped vegetables in bags. Ultrasonic welding does not need any adhesives or solvents whatsoever to join plastics with one another.

For manufacturers therefore, this process offers benefits, particularly against the background of the now stricter EU Directive No. 10/2011 that refers specifically to "multi-layer materials and items in plastic that are joined using adhesives" (Source: EUR-Lex). Manufacturers of ultrasonic sealing technology argue that this solution meets the current requirements of Industrie 4.0, because it can be readily integrated into packaging machines and ensures high cycle rates. With regard to food safety, this option is popular as it can tightly seal capsules, drinks cartons, bags or clamshell packaging despite product residues and moisture in the seam area.

www.fachpack.de

INTERNATIONAL EVENTS IN ITALY

19 - 23 January 2019 - Rimini: Sigep, int. confectionery, pastry and ice cream show. Rimini Fiera - www.sigep.it

7 - 10 April 2019 - Verona: Vinitaly, int. wine show. VeronaFiere - www.vinitaly.com

12 - 14 April 2019 - Bologna: Pharmintec, Cosmofarma, Nuce - Food-Ing, int. Pharmaceutical and nutraceutical industry show. Bologna fiere - www.cosmofarma.com

6 - 9 May 2019 - Rho (MI): TuttoFood, int. food show. Fiera di Milano - email: info@tuttofood.it - www.tuttofood.it

8 - 10 May 2019 - Rimini: Macfrut, int. fruit processing show. Rimini Fiera - www.macfrut.com

22 - 25 October 2019 - Parma: CibusTec, int. food equipment show. Fiere di Parma - www.cibustec.it

19 - 22 November 2019 - Rho (MI): Simei, int. beverage and wine industry show. UIV - www.simei.it

11 - 14 May 2020 - Parma: Cibus, int. food show. Fiere di Parma - www.cibus.it



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Sicily, a land of wonders like Marullo's Pistachio



The **Marullo** company flourished in the 60s and 70s in Bronte, a Sicilian town located at the foot of Etna, considered to be the home of high quality pistachios. And it really is the pistachio, that remains at the forefront of its production process.

The Pistacchio Verde di Bronte DOP is one of the highest quality pistachio varieties in the world, and that's why in Sicily it is so called "the green gold". This noble fruit takes on different forms and consistencies at Marullo: whole (shelled or peeled), semi-processed, natural, toasted, as a flour or a praline. All production processes use high-quality raw materials, making up the main means of supplying major confectionery industries.

Nothing is overlooked in the Marullo production chain and they carefully monitor all potential risks, whether they be physical, chemical or microbiological. The HPLC and microbiological laboratory, dedicated to the Marullo sites, constantly monitors quality levels to ensure that the food created along the production chain is safe for consumption.

All work that this company carry out is characterised by numerous checks, in order to ensure that no physical contaminants are present. The use of trichromatic sorters can detect minute variations in colour, thanks to their high-resolution RGB cameras, assuring that they use raw materials that are free from any foreign material. Scrupulous checks are then carried out on the finished product with the use of accurate X-Ray testing.

It's also thanks to these careful checks that Marullo is presently a leader in the processing of Pistacchio Verde di Bronte DOP, not just nationally, but on a global scale.

(Marullo - Via F. Baracca 59/a - 95034 Bronte - CT - Italy - Tel. +39 095 7722994 - email: info@fmarullo.com - www.marullospa.it)



Enzyme solutions for bakery products

The line NatEnzyme of **Bontà Infinite** proposes to correct, standardize and vary the rheological and rheofermentographical characteristics of flours such as alveograph, farinograph, extensograph, rheofermentograph, amylograph, and falling number.

With reference to the bakery production, Bontà Infinite presents different solutions. NatEnzyme Bakery Biscuit replaces cysteine and deactivated yeast; it reduces the P/L value and the elasticity index (IE).

NatEnzyme Biscuit HP 3000 highly reduces the values of W and P/L, but it is exclusively used for biscuits. The NatEnzyme Bakery Soft Dolce extends the shelf life and softness and it is suitable for sweet oven and festive products, while the Soft Salato version is suitable for savoury products, to extend the shelf life and softness.

NatEnzyme Stabilase G 30 is recommended when more stability is necessary in the farinograph; NatEnzyme PL 30 it is recommended for the reduction of the alveographic P/L value and it does not negatively affect the W value and the stability in the farinograph.

NatEnzyme W Plus SS 30 is recommended for increasing the W value and at the same time, lowering the alveographic P/L value. NatEnzyme REOLOGIC FH 30 is recommended when more stability is needed in doughs and more volume is requested for the finished products.

If the NatEnzyme Noodle 30 avoids the oxidation and browning during the production of fresh pasta and gives it more firmness during cooking, the NatEnzyme Stabilase Elastic G 30 is recommended for strong flours with a good protein content but low stability and it gives more stability and lowers the P/L value.

Finally, the NatEnzyme Elastic LP highly improves the stability in the farinograph without any effect on the alveographic P/L value.

Bontà Infinite also presents customized enzyme solutions, in order to solve single problems regarding the rheological and rheofermentographical properties of flours or supply multi-purpose enzyme complexes with controlled action, according to any-specific request.



(Bontà Infinite - Via Nazionale 127 S. Biagio - 98050 Terme Vigliatore - Messina - Italy - Tel. +39 090 9783091 - Fax +39 0909783234 - email: info@natenzyme.com - www.natenzyme.com)



Eating is more than just satiating yourself

All the Sicilian almonds and specially the almonds grown in the Noto Valley are nutritionally rich and this is the reason why **Di Bartolo's** family pays attention to their selection to create the ideal ingredient for a functional and healthy diet.

Since 1951, Di Bartolo's industry daily selects and researches the best Nuts and fresh fruits which are processed into high quality ingredients for the food industry. With 60 years of expertise on the field of the food ingredients, Di Bartolo's naturally transforms, the Almonds from the Noto Valley, into a smooth and creamy ready-to-use pure paste that dosen't leave any dry residue on the palate, infact its flavour delights and impresses everyone.

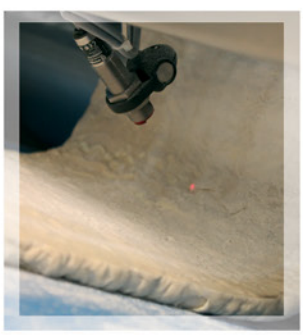


Today, thanks to its cutting-edge technology, it's easy and possible to satisfy your sense of taste, while preventing the most common metabolic and degenerative diseases, starting from breakfast. It becomes a pleasure that also offers plenty of choices, both sweet and salty, thanks to the extreme versatility of this innovative Almond Paste, naturally rich of natural antioxidants, no added sugars, that are also suitable for those following a vegan diet and for individuals who are lactose intolerant or suffer from coeliac disease.



Compared to many milk-based herbal alternatives, Noto Valley Almond paste has no aftertaste and a very low saturated fat content. It does not contain endocrine disruptors, it is perfectly digestible and ideal ingredient for a fast and easy preparation of hot and cold drinks, non-dairy yogurts and cheeses, smoothies, sauces, ice creams, sorbets, creams and bakery products. Thanks to its protein richness, balance of essential monounsaturated and polyunsaturated fatty acids, and value as a source of calcium, magnesium, phosphorus, potassium, and other ele-

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ments such as iron, folic acid, selenium and vitamin E, Noto Valley Almond paste is also ideal in diets to help prevent osteoporosis and cardiovascular and degenerative diseases. Di Bartolo's industry offers a customized service, infact its team assist customers throughout all phases, before and after the sale, supporting them with customized and flexible solutions and a great deal of experience in the processing industry, which is evident in its professionalism and craftsmanship.

(Di Bartolo - Via Garibaldi 165 - 95011 Calatabiano - CT - Italy - Tel. +39 095 645103 - Fax +39 095 6850082 - email: info@dibartolosrl.it - www.dibartolosrl.it)

Future in focus as innovative end-to-end solutions come to the fore at 5th Gulfood Manufacturing

The fifth edition of **Gulfood Manufacturing** will showcase a raft of innovative cutting-edge solutions shaping global production when the region's biggest food and beverage processing event returns to Dubai World Trade Centre (DWTC) from 6 to 8 November 2018.



Having outperformed itself year-on-year since launching in 2014, Gulfood Manufacturing will once again be categorised into five dedicated industry sectors:

- ***Ingredients***, showcasing essential ingredients that improve taste, aroma, colour, texture, nutrition, production, storage, transport and shelf life
- ***Processing***, covering everything from general cross-industry processing lines and technologies, to industry-specific equipment
- ***Packaging***, featuring equipment and machinery for packaging, printing, labeling, weighing, sorting and decorating for large, mid and small-scale industries
- ***Automation & Controls***, presenting technological innovation in automation – from Robotics, Smart manufacturing and Digitalisation, to Industry 4.0 and Industrial Internet of Things (IIOT)
- ***Supply Chain Solutions***, showcasing end-to-end solutions for the food industry

Spanning 80,000 m^2 of exhibition space across 16 halls, the three-day show will welcome more than 1600 local, regional and international suppliers and industry service providers from 60 Countries showcasing the latest manufacturing business improvement tools. With top quality products and solutions for all budgets being displayed on the exhibition floor, Gulfood Manufacturing also serves as a tailor-made business and sales platform for networking, knowledge sharing and enhancing commercial opportunities.

With tens of thousands of visitors expected to attend the landmark fifth show, Gulfood Manufacturing Innovation Tours will outline the future of the food and beverage processing and production sector in the expanded Automation & Controls segment. Expect to see examples of robots working among humans at production lines, or high-speed machines with capacity to churn out bags at 200 units per minute.

The show will also feature one of the region's largest hosted buyer programmes, with an anticipated contingent of 2,000 pre-qualified, C-Level management attendees from across the Middle East, Africa and South Asia readying to invest heavily at the exhibition.

Elsewhere, the Gulfood Manufacturing Industry Excellence Awards will recognise and reward best practices and innovation within the food manufacturing industry value chain. The awards will be judged by an international panel of qualified experts representing food processing and packaging industries, graphics experts, equipment suppliers, academia, trade press, governmental, environmental and trade organisations.

In addition, the improved and revamped Gulfood Manufacturing Conference will bring renowned thought leaders, market analysts and industry experts to address, discuss and debate industry challenges and opportunities.

For more information, visit http://www.gulfoodmanufacturing.com/

About Gulfood Manufacturing

Launched in 2014, **Gulfood Manufacturing** is a sector-specific trade exhibition for ingredients, processing, packaging and food logistics providers who service the rapidly growing food and beverage production industries established in the Middle East, Europe, Africa, Far East and Sub-Continent. The event provides food manufacturers with the ingredients, equipment and business improvement tools that enable more efficient production and distribution. Gulfood Manufacturing has five focused sectors namely Ingredients, Processing, Packaging, Automation and Controls and Supply Chain Solutions. Gulfood Manufacturing 2018 takes place from 6 – 8 November 2018.

www.gulfoodmanufacturing.com

Cibus Tec 2019: more pavilions, more buyers, more sectors

The number of food production chains represented is no longer 10, but 11: the confectionery sector has now been added. The number of exhibition pavilions has increased from four to five, in order to meet the demand–to take part by suppliers of technology for packaging, meat, beverages and bakery products. In addition, the incoming program is no longer expecting 3000 buyers, but–3500, from over 70 countries.

Expansion marks the 52nd edition of **Cibus Tec**, the highly-specialized exhibition organized by KPE (Köln Parma Exhibitions), the joint venture of Fiere di Parma and Kölnmesse, dedicated to food processing & packaging, scheduled from 22-25 October 2019 in Parma. A unique exhibition, that for the past 80 years, has been bringing together the best of the food processing chain - from selection to processing, from packaging to logistics - in a virtuous combination of tradition and innovation thus finding, in Parma, the most advanced and sophisticated applications.

Thanks to the support of Prosweets Cologne and ISM (leading international exhibitions organized by Kölnmesse GmbH) Cibus Tec opens the of doors technology dedicated to confectionery and snacks products, thus becoming the only Italian platform for another strategic segment of Made in Italy food technologies. 70% of Italian food technology companies and 60% of food industries are located within a 200 km radius of Parma. “In the field of food processing & packaging we are a model of craftsmanship throughout the world, an example of innovation, quality and design. In Parma we have been representing this sector since 1939 - points out Fabio Bettio, Brand Manager of Cibus Tec - and this standing, combined with the partnership with Kölnmesse, is generating extraordinary synergy for the exhibitors of Cibus Tec, Anuga FoodTec, and of the other international shows of our joint portfolio.”

The Italian food excellence sector mirrors that of the food technology, which continues to increase its market share. In 2016 the Italian food technology sector recorded a production value of 4.9 billion euro. 66% of this amount, namely 3.2 billion euro, are exports. The forecast for 2019 is positive, with an estimated increase both in production (+ 0.7%) and exports (+0.8%))

The previous edition of Cibus Tec closed with record numbers in terms of exhibitors (1,000 +20%), operators (35,000 +15%) but above all with an extraordinary level of satisfaction (92% of exhibitors were satisfied, 95% of operators were satisfied).

www.cibustec.com

Sigep celebrates its 40th birthday with an extraordinary edition

Forty years of success for artisan confectionery, forty years of **SIGEP**. From 19th to 23rd January 2019, at Rimini Expo Centre, The Italian Exhibition Group will celebrate the event alongside key players from the world of the great Italian and international trade of products and technology for gelato, pastry, bakery and coffee.

After the record-breaking figures of the previous edition (with 135,746 Italian buyers and 32,202 foreign buyers from 180 countries), SIGEP is ready to accelerate further, in coherence with development strategies outlined by IEG's five-year industrial plan.

A plan under the banner of investments in structures, innovation and internationality, in order to confirm its role as the major international hub for the foodservice channel.

The ingredients that ensure the expo's success are well-known and appreciated: the participation of the leaders in a logic of integration between product chains, international contexts, *meetings* of the world's confectionery Masters and specialist training.

The top 2019 events

SIGEP will host the 5th edition of the Junior World Pastry Championship, with the participation of 12 of the best under-23 pastry chefs from five continents.

As far as gelato is concerned, at SIGEP Gelato d'Oro, the finalists of the nine appointments staged during the year in Italy will compete, to select the team that will represent Italy at the IX Gelato World Cup 2020.

For the world competition, in February in Mexico City, and in April, in Singapore, the first foreign selections were staged for the Gelato World Cup, at which the first four teams were chosen to compete in Rimini in 2020: Mexico, Singapore, Malaysia and Japan. In 2019, the selections will continue until the number of teams reaches 12.

www.sigep.it

SIMEI 2019: MORE AND MORE GLOBAL AND OPEN TO LIQUID FOOD

"**SIMEI** has been substantially restructured to become an unquestionable "global" fair of technologies, products and accessories for the winemaking industry. Thanks to a large incoming operation of operators and producers from the five continents, new partnerships with trade associations, and opening up to product chains similar to wine such as oil, beer and spirits, we are working on an edition that will represent a turning point in the history of SIMEI". This is how Ernesto Abbona, Chairman of the Unione Italiana Vini, presented the 28th edition of SIMEI, the leading international fair in technology for the winemaking and bottling sectors due to be held from 19 to 22 November 2019 at Milan Exhibition Centre in Rho.

After the success of the last edition, which was held in Munich in conjunction with Drinteck, SIMEI returns to Italy, where it will be a fixed event, every two years, bringing with it significant prospects for growth and important new features.

The key word for this new edition is Incoming, a project that in 2017 brought over 150 delegates from all over the world to SIMEI. The objective is to double the presence of buyers, operators and producers from all the wine- growing regions in the world and to develop new working relationships with public institutions and the associations representing the producers and wine-growing professionals, on a national and international level.

Another new feature of the 2019 edition, while keeping its "verticality" on the world of wine, SIMEI will be opening up, in an organic and structured way, to production chains similar to wine, such as oil, craft and other beers, and the vast world of spirits that, with winemaking, are increasingly sharing processes, production practices and, therefore, technologies, products and accessories.

www.simei.it

www.foodexecutive.com

the latest news on the food&beverage world



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Chocolate and confectionery technology

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PARIGI
31.ottobre - 2.novembre 2018
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VERTICAL ROASTER FOR COCOA BEANS

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TFC is a next generation **TECNO 3** roaster, for the continuous roasting of cocoa beans. The system follows the traditional whole bean processing method: this is the best method if it is used for cocoa varieties of good and excellent quality, with particular aromas that need to be preserved up to the finished product.

The upper part features the debacterisation unit, which treats the beans with superheated steam and discharges them directly into the roaster hopper. The treatment ensures a total charge of less than 500 CFU/g.

With a vertical design, the **TECNO 3** roaster is very compact and offers good accessibility to make cleaning and maintenance operations easier. The precision of the toasting cycle is entrusted to the PLC, which manages the process stages that can all be set from the touch-screen operator panel.

Made of AISI 304 stainless steel, with an output capacity ranging from 100 to 1000 kg/h, the roaster is particularly suitable for achieving the correct level of roasting for different varieties of cocoa beans.





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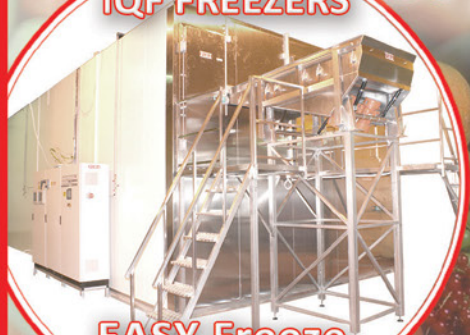
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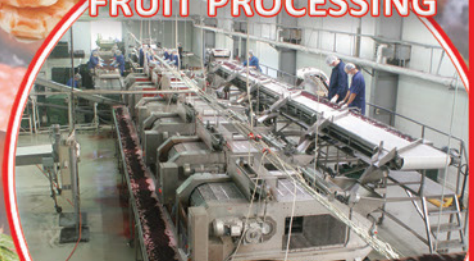
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