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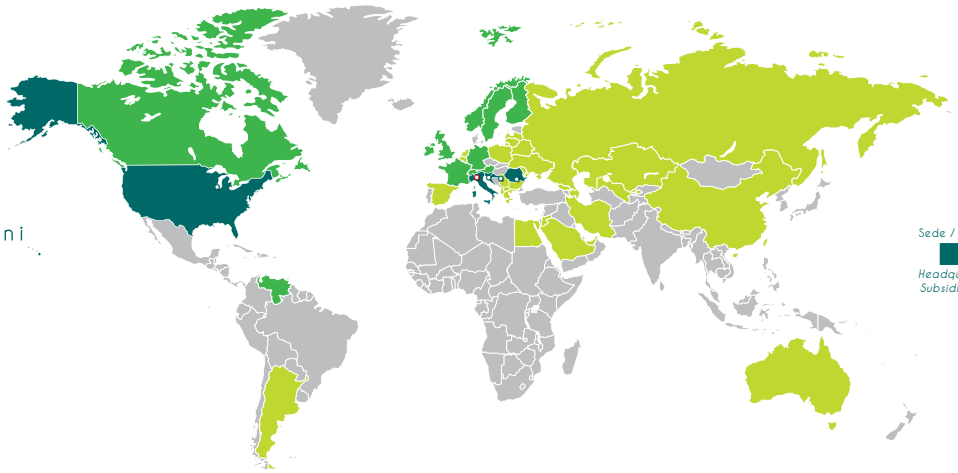
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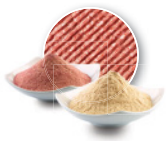
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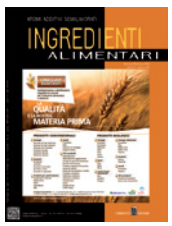
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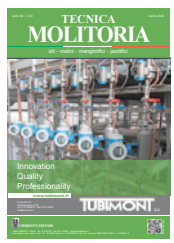
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Chiriotti Editori srl
Viale Rimembranza 60
10064 Pinerolo - TO - Italia
Tel. 0121 393127
Fax 0121 794480
E-mail: info@chiriottieditori.it

Publications Manager
Alberto CHIRIOTTI
Direttore Responsabile

Publisher
Alberto CHIRIOTTI
alberto@chiriottieditori.it

Contributing Editors
Laura SBARATO, Simonetta MUSSO,
Rossella CONTATO, Matteo BARBONI

Assistant Editor
Chiara MANCUSI
mancusi@chiriottieditori.it

Marketing Manager
Monica PAGLIARDI
pagliardi@chiriottieditori.it

Head of Advertising Strategies
Francesco COPPOLA
coppola@chiriottieditori.it

Sales Account
Luca RUSSO
russo@chiriottieditori.it

General Manager
Giuseppe CHIRIOTTI

Graphic and Advertisement
Ottavio CHIRIOTTI
ottavio@chiriottieditori.it

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Tracking effects of a food preservative on the gut microbiome

Antimicrobial compounds added to preserve food during storage are believed to be benign and non-toxic to the consumer, but there is "a critical scientific gap in understanding the potential interactions" they may have with the hundreds of species of microbes in our intestines".

David Sela, a nutritional microbiologist at the University of Massachusetts Amherst (Usa), and colleagues reported results of their study conducted in mice of one of these preservative compounds, food-grade epsilon (ε)-polylysine, in *Science of Food* journal. Unexpectedly, they found that the polylysine compound temporarily perturbed the diversity of microbes in the mouse gut, but this change was transient and over the 15-week study period, the mouse gut microbiome resolved and returned to conditions similar to those at the start of the study. While the mouse gut microbiomes differed by the animals' gender, Sela notes, the observed treatment changes to the antimicrobial ε-polylysine were experienced the same regardless of gender.

Sela says, "This is a very interesting phenomenon that we haven't seen before, to our knowledge. We're certainly interested in looking into it further. We do not know enough about what preservatives do to the microbiomes in the gut."

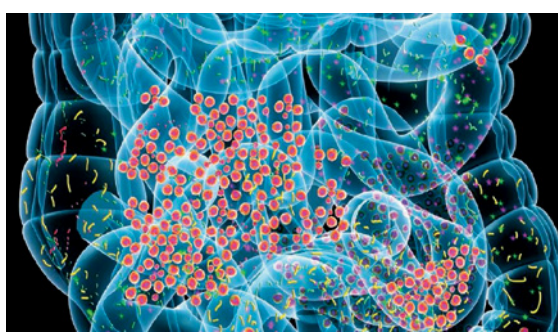
Food not only nourishes the body but it also nourishes the beneficial bacteria, the microbiome-living in the intestines, he points out. Food scientists and microbiologists are increasingly interested in these less-studied inhabitants, which may number as many as our own human cells, and the "prebiotic" foods that nourish them. Microbes in the gut make molecules and compounds that help the body, or help some of the hundreds of other beneficial members of the community.

For this study, Sela and UMass Amherst co-authors Hang Xiao and Julian McClements divided 40 female and 40 male mice into four groups of 10 animals each. They fed 10 female and 10 male mice the food-grade biopolymer ε-polylysine as found in food preservatives, while control groups of 10 animals each received food without the additives. Two other groups received ε-polylysine plus pectin or ε-polylysine plus maltodextrin, common food additives that might be expected to interact with the ε-polylysine.

As the authors explain, both ε-polylysine and pectin are not dissolved or absorbed in the upper gastro-intestinal tract and may interact with resident microbial communities there.

For their analysis of gut microbiota, the researchers sampled mouse fecal pellets at three points: baseline, five weeks and nine weeks. Sela says, "The concentrations of gut microbes changed in response to polylysine as we fed the mice throughout the study. Surprisingly, the microbiome snapped back to the original concentrations despite continuous feeding of the polylysine, but we don't understand how or the potential relevance to health."

"Starting at about week five it changed," he adds, "but by about week 9 it was back. The microbes' functions shifted, which is really interesting that you can have different populations doing different things. Typically the microbiome



will stay shifted when you give antibiotics, for example, so our results suggest that somehow there is an adaptation to the food-grade preservative.

Sela says, "We think this is going to be of interest to food manufacturers who use food-grade antimicrobial compounds and to people researching anti-microbial resistance." The work was supported by the USDA's National Research Initiative and its National Institute for Food and Agriculture.

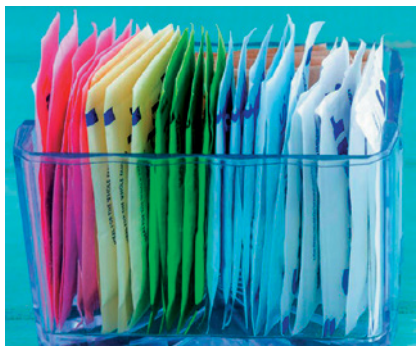
Mixing artificial sweeteners inhibits bitter taste receptors

Blends of artificial sweeteners such as saccharin and cyclamate produce less of a bitter off-taste than each of the individual components, but the explanation for this puzzling phenomenon has been elusive ever since its discovery more than 60 years ago. A study published September 14th in the journal ***Cell Chemical Biology*** solves this long-standing mystery, revealing that saccharin inhibits the activity of bitter taste receptors stimulated by cyclamate and, conversely, that cyclamate reduces the off-taste elicited by saccharin.

"Numerous sweeteners exhibit undesirable off-tastes, limiting their use in food products and beverages," says lead author Maik Behrens of the German Institute of Human Nutrition Potsdam-Rehbruecke. "Our findings in this study provide us with the tools and knowledge to find ways leading to superior sweetener blends."

High-potency sweeteners are widely used to replace energy-rich, tooth-decay-inducing sugars in food items to meet the requirements of health-conscious consumers. But in addition to stimulating sweet taste receptors, sugar substitutes also activate bitter taste receptors (known as TAS2Rs) at high concentrations, resulting in an undesired off-taste. To overcome this problem, the food industry is constantly searching for novel sugar substitutes and frequently resorts to using blends combining non-caloric sweeteners in a single formulation.

The earliest blend allowing higher sweetness levels with reduced bitter off-taste combined



saccharin with cyclamate. But since this discovery 62 years ago, the mechanism by which sweetener blends become superior to single compounds has remained obscure. A clue to this mystery came when Behrens and his team discovered that some bitter compounds not only activate a subset of the 25 human bitter taste receptors, but also can inhibit different bitter taste receptors. "Knowing that mixtures of saccharin and cyclamate exert reduced bitterness compared to the single compounds raised the question [of] whether this might be due to mutual inhibition of bitter taste receptor responses," Behrens says.

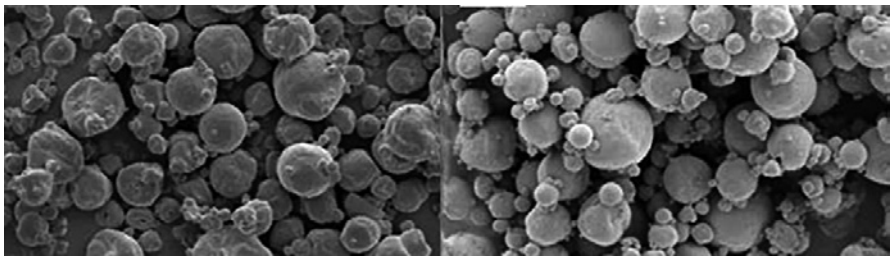
To explore this possibility, Behrens and senior author Wolfgang Meyerhof of the German Institute of Human Nutrition Potsdam-Rehbruecke expressed various human taste receptors in human cells and tested their responses to different concentrations of saccharin and cyclamate. Using this cell-based system, they discovered that cyclamate strongly inhibits the saccharin-induced activation of two bitter taste receptors called TAS2R31 and TAS2R43. This effect occurred at concentrations where cyclamate itself does not elicit a side taste. Similarly, saccharin blocked the cyclamate-induced responses of a bitter taste receptor called TAS2R1.

"Saccharin and cyclamate belong to the oldest-known high-potency synthetic sweeteners, and we were able to discover with our cell assay completely novel features of these molecules, namely their bitter-blocking ability," Behrens says.

For the time being, it remains unclear whether the components of other sweetener blends also show mutual inhibition of bitter taste receptors. "Once the activation and inhibition profiles of the 25 human bitter taste receptors have been investigated in great detail, it will be possible to tailor the composition of mixtures to develop novel sweetener formulations and to improve the taste of medicine," Meyerhof says.

An attempt to control food functionality by using freezing process

Bioencapsulation of food additives or functional ingredients aims to protect sensitive core materials during storage and consumption, transport them to designated positions in the gastrointestinal tract, and release them at appropriate rates to maximize bioavailability. Bioencapsulation systems need to be designed with GRAS (generally recognized as safe) materials, and the physicochemical processes involved in matrix formation are crucial for realizing expected functionality. From an engineering perspective, it is important to develop a processing method for obtaining products with desirable features.



Japanese Researchers reported on **Journal of the Japanese Society for Food Science and Technology** that a freezing step represents an interesting processing tool for controlling the properties of an encapsulation system. During freezing, the growth of ice crystals in an aqueous solution results in a cryoconcentrated (freeze-concentrated) phase that is controlled by phase equilibrium. The author's idea is to control matrix formation in the cryoconcentrated phase for optimizing encapsulation systems. This review summarizes this concept and future scope.

Developing a new generation of fruit based probiotic beverages

Scientists are reporting in **Food Bioscience** that pectin and pulp from passion fruit may be considered "excellent probiotic food carriers in non-fermented or fermented beverages." Dairy products are usually used for the delivery of probiotics however alternative vehicles for probiotics are needed for those who are lactose intolerant or who cannot consume milk derivatives due to the foods cholesterol content.

Pectin, a prebiotic, can be extracted from different peels, including citrus, tomatoes and yellow passion fruit. It has been shown to have potential gut health benefits. As prebiotics are a non-digestible food ingredients they can pass through the small intestine to the lower gut and "become accessible for probiotic bacteria."

Gouveia et al. investigated the use of commercial pectin (CP) and pectin (PE) from the Caatinga passion fruit peel, and the use of the pulp in the development of probiotic beverages, fermented and non-fermented by Lactobacillus rhamnosus. The scientists prepared eight pasteurised beverages containing either CP or PE (20 g L) plus the pulp of the fruit and sucrose (10% w/v). They also prepared beverages without the addition of sucrose or pectin. Lactobacillus rhamnosus was added to the drinks. Gouveia et al. used a simulation of gastrointestinal conditions (6 hours) to determine the viability of the micro-organism.

The scientists found that sucrose increased the survival of the micro-organisms when it was added to the non-fermented beverage compared to beverages without sucrose. Commercial pectin was found to decrease survival, whilst pectin from the Caatinga passion fruit peel had the highest survival. For the fermented beverages, survival was higher when sucrose and pectin were absent. When CP was added, survival was between 22-26% independent of fermentation. However, using PE, survival was 43% in non-fermented beverages and 47% in fermented beverages.

The team also evaluated refrigerated storage of the beverages over 28 days for beverages containing sucrose, with CP or PE, without and with fermentation. They measured the pH of the drink

over the storage period. The pH of the refrigerated non-fermented beverage decreased by 3% for CP and 6% for PE, whilst the pH increased by 6% for the refrigerated fermented CP beverage and decreased by 3% for the fermented PE beverage. However, Gouveia et al. report that there was "no significant difference in pH, consumption of sucrose and lactic acid concentration during storage" according to analysis of variance. The scientists discuss the amount of probiotic necessary to achieve beneficial effect, noting that no agreement has been reached in relation to the concentration needs. However, they suggest that concentrations of between 6 Log and 9



Logs are recommended. They report that a daily intake of 200 ml of their fermented beverage could reach 7 Log.

In conclusion Gouveia et al. state "The present study showed that pectin and the pulp of the passion fruit from Caatinga could be used as excellent probiotic food carriers. The results encourage further research, varying the PE concentration, to evaluate adhesion properties of L. rhamnosus ATCC 7469 to intestinal epithelial cells."

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Omega-3 supplementation may improve gut microbiome diversity



Researchers from the University of Nottingham's School of Medicine, and King's College London have reported a link between omega-3 fatty acids intake and gut microbiome diversity. Previous research has suggested DHA, an omega-fatty acid, to be associated with lower risk of cardiovascular events.

Whilst the positive effect of total omega-3 levels in humans (DHA+EPA) have been found to be associated with lower blood pressure, slowing cognitive decline amongst others. The researchers of this current study, published in **Scientific Reports**, note that previous studies have also suggested that "gut microbiota may also play an important role in the effects of omega-3 polyunsaturated acids on clinical parameters."

Valdes et al. analysed data on levels of DHA, total omega-3 serum levels and microbiome data from 876 middle aged and senior female twins. The participant's daily fibre and essential fatty acid intake was estimated using a semi-quantitative food frequency questionnaire.

Using magnetic resonance spectroscopy the team measured circulating levels of DHA, total omega-3 (FAW3), α linoleic acid (LNA), total omega 6 fatty acids (FAW6), total polyunsaturated fatty acids (total PUFA), saturated fatty acids and total fatty acids in fasting serum samples. Valdes et al. then measured metabolite concentrations from 707 faecal samples. The team measured 424 known metabolites, present in at least 80% of all samples.

Valdes et al. found a "significant correlation" between omega-3 fatty acid intake and blood levels of total omega-3. After making adjustments they found that circulating levels of total omega-3 and DHA were associat-

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ed with higher microbiome diversity, particularly for the species Lachnospiraceae.

The study notes that in humans it has been reported that members of the family Lachnospiraceae have been associated with protection against C. difficile infections and obesity, as well as being "potent short chain fatty acid producers". Increased levels of serum DHA have also been "negatively associated with Crohn's disease severity and intestinal inflammation."

38 operational taxonomic units (OTUs) were found to be associated with circulating DHA. However, circulating levels of saturated fatty acids or monounsaturated fatty acids were found to have no significant association with microbiome diversity. Whilst Valdes et al. report that the DHA effect was independent of fibre, they state "it is well known that short chain fatty acids (SCFA) result from microbial fermentation of fibre." They suggest therefore that "nutritional studies may be required to quantify and dissect the contribution of these types of dietary components on microbiome composition and SCFA production."

In conclusion, the authors state "our data indicates a strong correlation between omega-3 fatty acids and microbiome composition and suggest that supplementation with PUFAs may be considered along with prebiotics and probiotic supplementation aimed at improving the microbiome composition and diversity."

Production of low-alcohol sparkling orange wine

In order to improve the utilization level of orange resource and vary types of fruit wine, Researchers from Zhejiang University of Technology, Hangzhou, China, have developed a new brewing technique for low alcohol sparkling orange wine production on the base of the traditional process for fruit wine. The study was published on Food Science and Technology. 42, (8): 114-119, 2017.

In the first fermentation the sugar content and pH were studied using all the experiment. After primary fermentation, gelatin was used to clarify the fermented wine, and beta-cyclodextrin was used to debitterize the wine. In the post-fermentation, the effect of sugar content and fermented temperature was considered.



The results showed that the optimum conditions for the first fermentation was 10° Brix with 3.0 pH, and fermentation time was three days. Clarification of orange wine by using pectinase and gelatin, when gelatin dosage was 0.18 g/L, pectinase was 0.16 g/ L, light transmission rate of orange wine was 95.2%. beta-cyclodextrin can remove efficiently the bitter components when added in an amount of 0.8%. The optimum condition for post-fermentation of orange wine was sugar content of 10°Brix, fermentation temperature of 15°C, fermentation time was ten days. In the process of fermentation, wine alcohol content was about 7% with the obvious fruit flavours, clear color, and rich and lasting bubbles.

Lotus rhizome powder as a novel ingredient in bread sticks



Lotus rhizome is a lesser known plant food having high medicinal properties. According to a chinese study pubished on the **Journal of Food Measurement and Characterization** (11, (4): 1795-1803, 2017), the addition of lotus rhizome powder (LRP) to refine wheat flour (WF) based bakery products may significantly enrich their nutritional composition.

WF was replaced with LRP at 0, 10, 15 and 20% levels to study the rheological and baking characteristics. The mixing profile of the dough as studied using farinograph showed an increase in water absorption (56-58%), dough development time (1.3-2.27 min) and dough stability (5.58-7.43 min) with increase in the LRP. Pasting profile of the blends showed an increase in peak viscosity (699-829 BU) and break down values (336-385 BU), whereas the setback values (496-388 BU) decreased with the addition of LRP. Test baking was done to obtain the optimum level of replacement and processing conditions. The organoleptic analysis indicated that replacement of WF with LRP at 15% was optimum for making bread sticks of desirable sensory attributes. Bread sticks with LRP had higher total phenolic content (TPC) (1.06 +or- 0.03-1.22 +or- 0.20 mg GAE/g), total flavonoid content (TFC) (32.76 +or- 0.28-44.55 +or- 0.28 micro g QE/g DW) and DPPH scavenging capacity (44.76 +or- 2.01-65.62 +or- 1.11%) as against control.

In conclusion, lotus (*Nelumbo nucifera*) rhizome powder could improve the nutritional value of bread sticks and can be recommended as a functional ingredient in the food industry.



Cinnamon turns up the heat on fat cells

New research from the University of Michigan Life Sciences Institute has determined how a common holiday spice – cinnamon – might be enlisted in the fight against obesity.

Scientists had previously observed that cinnamaldehyde, an essential oil that gives cinnamon its flavor, appeared to protect mice against obesity and hyperglycemia. But the mechanisms underlying the effect were not well understood.

Researchers in the lab of Jun Wu, research assistant professor at the LSI, wanted to better understand cinnamaldehyde's action and determine whether it might be protective in humans, too.

"Scientists were finding that this compound affected metabolism," said Wu, who also is an assistant professor of molecular and integrative physiology at the U-M Medical School. "So we wanted to figure out how -- what pathway might be involved, what it looked like in mice and what it looked like in human cells."

Their findings, which was published in the December issue of the journal ***Metabolism***, indicated that cinnamaldehyde improves metabolic health by acting directly on fat cells, or adipocytes, inducing them to start burning energy through a process called thermogenesis.

Wu and her colleagues tested human adipocytes from volunteers representing a range of ages, ethnicities and body mass indices. When the cells were treated with cinnamaldehyde, the researchers noticed increased expression of several genes and enzymes that enhance lipid metabolism. They also observed an increase in Ucp1 and Fgf21, which are important metabolic regulatory proteins involved in thermogenesis.

Adipocytes normally store energy in the form of lipids. This long-term storage was beneficial to our distant ancestors, who had much less access to high-fat foods and thus a much greater need to store fat. That fat could then be used by the body in times of scarcity or in cold temperatures, which induce adipocytes to convert stored energy into heat.

"It's only been relatively recently that energy surplus has become a problem," Wu said. "Throughout evolution, the opposite – energy deficiency – has been the problem. So any energy-consuming process usually turns off the moment the body doesn't need it."

With the rising obesity epidemic, researchers like Wu have been looking for ways to prompt fat cells to activate thermogenesis, turning those fat-burning processes back on. Wu believes that cinnamaldehyde may offer one such activation method. And because it is already used widely in the food industry, it might be easier to convince patients to stick to a cinnamon-based treatment than to a traditional drug regimen.

"Cinnamon has been part of our diets for thousands of years, and people generally enjoy it," Wu said. "So if it can help protect against obesity, too, it may offer an approach to metabolic health that is easier for patients to adhere to."

Now, before anyone goes dumping tons of extra cinnamon in their egg nog in hopes of keeping holiday-season pounds at bay, Wu cautioned that further study is needed to determine how best to harness cinnamaldehyde's metabolic benefits without causing adverse side effects.



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NGA, the new generation autoclave

Ghizzoni D., which have been in the canning industry for over 70 years, mainly develops machines for processing fruit and vegetables, with production capacities from 25 to 5,000 kg/batch. The laboratory lines (from 25 to 150 kg/batch) can be equipped with the same modern solutions found in the lines of a large production capacity. The technology of this brand is based on the constant research and innovation that have achieved numerous patents which have changed and still continue to change different processing methods.

After the patented "rotating coil", where the high heat exchange surface offers a significant reduction in the product exposure time along with a particular distribution of the coils, which gives an effective but delicate mixing of the product, today Ghizzoni D. presents the new NGA generation autoclave.



The new NGA autoclave (Ghizzoni D.).

The NGA autoclave is a new solution in the sterilization process, which has been created thanks to the rationalization of the spaces. It is a cylindrical autoclave made of a light with a separating compartment inside for the baskets of the product to be treated.

The Ghizzoni D. innovations are always aimed at saving time and production costs, together with a constant attention to the environment, with an "energy saving" that also positively affects the quality of the product.

The separator compartment (which can also be applied to existing autoclaves without any drilling or welding) reduces the volume to be heated and cooled, offering time and energy savings. Also the use of compressed air is reduced in different percentages: 60% less than stainless steel which needs to be heated and cooled, 70% less steam to heat/cool the process water and 70% less compressed air. The NGA autoclave assures lower circulation times, higher turbulence and accelerated heat exchange. It also reduces the process time from about 10 to 20 minutes. The compartment can be applied

to all direct steam, rain and complete filling systems both in static and rotary/oscillating form. Hot and cold water are recovered in separate tanks and reused in the next batch.

The NGA system is also suitable for the sterilization of products in containers, laboratory equipment and can also be used in the fish sector, where Ghizzoni D. already has another patent in the direct steaming and vacuum cooling system of tuna.

In addition, Ghizzoni D. can also offer the necessary tools in the phases that accompany the process, such as systems for handling and dosing ingredients, pulpers, refiners or processing equipment for the definition and homogenization of other ingredients.

(Ghizzoni D. - Via Aldo Moro 13/A - 43035 Felino - PR - Italy - Tel. +39 0521 835509 - Fax +39 0521 834498 - email: info@ghizzoni.it - www.ghizzoni.it)

Over 35 years of sieving

Emilos was established more than 35 years ago by the innovative idea of what continues to be cutting-edge sieving systems. The company develops innovative technological systems able to improve product sorting to an increasing extent.

Initially focused on the ceramic industry, Emilos developed vibrating screens suitable for sieving earths and glazes. Subsequently, it extended the production to cater for the needs of various sectors, from the herbal sector to food, milling, dairy, mining, iron and steel, building, wastewaters and the recycling of products such as glass, paper, plastic, chemicals and pharmaceuticals.

Thanks to the Emilos sieving systems, surprising performance levels can be achieved in terms of productivity. The products are of the highest quality and are totally made in Italy. Furthermore each single machine is completely made within the company.

Emilos does not only make standard vibrating screens, but also makes customized vibrating screens according to customer requirements. The dynamism of this company is such as to be able to tackle any customer problem directly and straight away. By performing specific sieving tests, it is always able to guarantee the efficiency of the proposed vibrating screen.

Thanks to special motor drives, the hourly outputs of Emilos vibrating screens are considerably higher than those of all other vibrating screens currently on the market. The machines include circular vibrating screens from min Ø 450mm to max Ø 1800mm. The company also produces rectangular vibrating screens for high hourly outputs, vibrating screens with side motor drives instead of the traditional underneath one, and automatic and manual magnets.

Included in the wide range of Emilos vibrating screens are coarse sieves and refining vibrating screens, for all requirements. New projects and challenges are always imminent in Emilos.

Entirely made of AISI 304 or 316 stainless steel, the vibrating screens CRS series are used for sieving dense and viscous products, liquids, which are very difficult to handle.

The container of the CRS vibroscreen has a rounded monolithic shape, particularly indicated for food use, thanks to the elimination of stagnation areas and the ease of cleaning.

The features of the vibrator motor are considered as three-dimensional because the motion is at the same time shaking, swaying, and rotary. This ensures that the screen is not clogged up and therefore cleaner throughout the whole production process. It can feature a 2 or 4 pole motor vibrator and an inverter can be mounted to change the frequency.



CRS series vibrating screen (Emilos).

(Emilos - Via della Costituzione 6 - 025 Cavriago - RE - Italy - Tel. +39 0522 575010 - Fax +39 0522 575145 - email: info@emilos.it - www.emilos.it)

Pre-concentrator for tomato processing

In order to reduce energy consumption, both in terms of steam and power, **Ing. A.Rossi** has studied and produced the THOR pre-concentrator in multiple copies and sizes designed according to the highest standards and capable of improving the finished product quality. Thanks to its modular concept, THOR is able to cover a wide range of evaporation capacity, from 3 up to 100 tons/h of evaporated water.

This technology, widely used in the tomato industry to concentrate natural tomato juice up to 10°-12° Brix, has been developed to pre-concentrate a wide range of products having a difficult intermediate viscosity with fibre content and solid particles that have a moderate tendency to sediment in the exchanging pipes.

THOR ensures different advantages such as a 24H warranty for the entire tomato working season with semi-concentrated production of both cold and hot break, high flexibility in the independent regulation of the evaporation capacity and juice inlet flow, and reduction in the dwell time period. The reduced temperature difference between the heating steams and the product make evaporation particularly delicate. It is not necessary to replace the inlet product with water when the machine is in automatic stand-by mode, and it is also possible to visually monitor the operating parameters of each stage of the evaporation process.

Each evaporation module can be transported easily and requires a short installation time and minimum building work at the customer site.

The THOR machine has the Mechanical Vapour Recompression (MVR), an advanced technologically device that minimizes the amount of steam required for its operation, allowing a significant savings in operating costs, a lower environmental impact, and a reduction in the water requirements for the condenser.



The THOR pre-concentrator for tomato processing (Ing. A. Rossi).

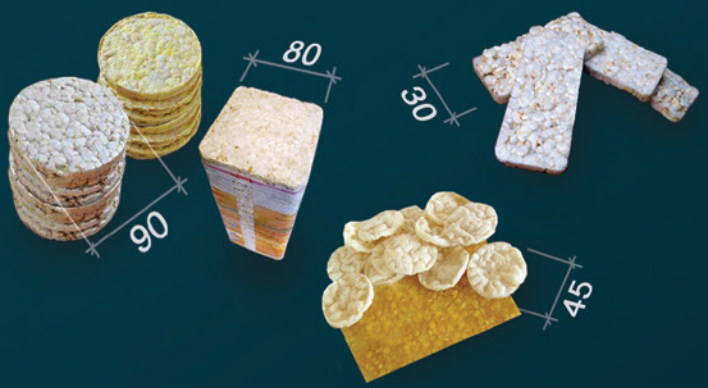
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The MVR involves the use of a centrifugal compressor driven by means of an external source of mechanical energy. This technology can achieve a null consumption of the heating steam with exceptional results in terms of savings, and it is often installed in conjunction with a steam turbine that drives the compressor and discharges low-pressure steam used at other points of the plant.

(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)

Homogenizers

Thanks to its expertise in the sector of homogenizers, piston-type positive displacement pumps and laboratory homogenizers, **FBF Italia** has been a key point-of-reference for system manufacturers and end-users in the food sector since 1987. This company has a consolidated and ever-expanding presence, via its large sales and service network in Italy and throughout the world, which has generated consistent growth in production and sales figures.

One of the reasons behind this highly positive trend is unquestionably the special and direct relationship between the company management and its customers, a relationship built on mutual evolution and innovation. The mission of FBF Italia is to offer customers not only an excellent sales service, but also to continue this relationship with a constant, direct post-sales technical assistance. Present in over 40 Countries around the world, the agents and representatives give a quick response to all requests for sales and technical support.



On-going innovation, exacting development of special materials, strict quality controls and endurance tests, allow FBF Italia to guarantee maximum performance durability, reliability, and safety.

The Buffalo Series homogenizers conform to CE standards and are available with output capacities ranging from 50 to 50,000 l/hour, with homogenization pressures of up to 2,000 bar. The models include different choices: sanitary, aseptic for UHT installations, and two-stage homogenization. The Standard is suitable for milk, yoghurt, cream, etc.; the Abrasive is suitable for fruit juices, ice cream, ketchup, etc.

Several options are available on fully customized machines for specific needs including a pressure transducer with a digital display for homogenization pressure, and electrical systems for operations at a fixed capacity, for duties requiring variable flow rates, and for use at two fixed capacities. Pulsation compensators on the product inlet and outlet and partial homogenization systems are also available.

The partial automation of these machines assures a control either manually or by a control system, and the automatic homogenization pressure cutout protects the machine from in-feed errors.

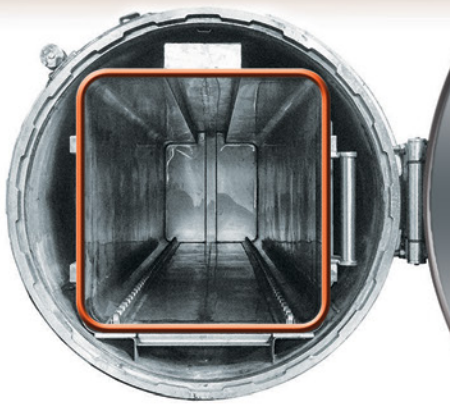
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Micro-batching systems

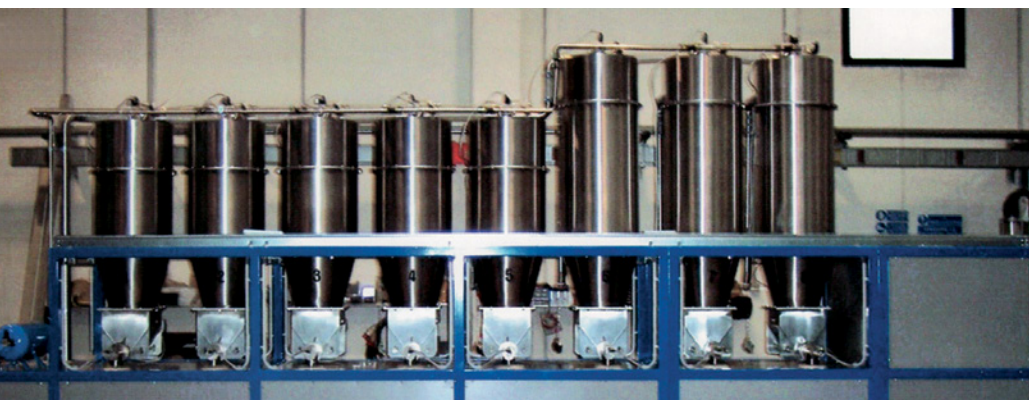
Intech develops automatic micro-batching systems. These machines ensure the automatic managing of the batching with a very high accuracy (±5 g) and each one is equipped with its own hopper for the dosing of selected ingredients.

The product level in the tanks is always under control by means of level sensors. The extraction of the product is carried out by means of a screw conveyor and this is facilitated by a blending tool keeping the material free flowing. All the parts in contact with the product are made of stainless steel AISI 304 or, if requested, AISI 316.

The customer can take out the dosed product manually by means of a simple plastic bucket on the balance. Otherwise the machine can be integrated with the silo equipment transferring the ingredients to the main hopper automatically. The tanks can be fed manually by pouring in the bags. As an alternative the machine can be equipped with a vacuum pneumatic feeding system, which sucks the product from the bag.

The purpose of Intech is to provide tailor made equipment and for this reason the company has developed a software to manage all the ingredients. With a one touch-screen panel, the customer can set formulas with macro-ingredients, micro-ingredients, and liquids. The customer can also connect it to a remote PC to download all the information referring to the consumption of raw materials.

(Intech - Via Cav. Giovan Battista Bordogna 5 - 25012 Calvisano - BS - Italy - +39 030 9968222 - Fax +39 030 9968444 - email: intechaintechsrl.it - www.intechsrl.it)



Automatic micro-batching system (Intech).

Mix solutions

MIX develops mixers, stirred bunkers, granulators, heaters, coolers, dryers, reactors and sterilisers.

The purpose of the mixer is to mix/blend different powdered, granule, fibre and paste products with the possible addition of liquids thus optimising the blend mix obtained and ensuring process control and consistency of the result. In addition, the holding tank maintains the homogeneity/fluidity of the mix avoiding demixing. The granulator granulates the powder particles, activating it with the suitable amount of liquids. The heater/cooler controls the temperature of the mix and the dryer dries the moist products (powder or paste). The reactor promotes and controls the physical and chemical reactions between the products and the steriliser sterilises the mixture through high temperatures and pressure.

The need to obtain processes with high mix homogeneity, with controlled and consistent quality, able to satisfy the different market demands, both for known and innovative products, has inspired the MIX to develop a range of machines with different types of compliance, responding to the specific needs of each individual process.

The ploughshare horizontal mixer works on the principle of "Three-Dimensional Mechanical Fluidisation" (centrifugal whirling of the products). This is done with the use of the Ploughshare-shaped mixing tools that cause high turbulence with the result of a rapid and precise interpenetration/homogenisation of the various mixing components (regardless of their physical characteristics), thus avoiding dangerous stops/machine downtime as a result of product build-up.

The rotor shaft with tools, can be a single block obtained by welding, radially fixed at both ends and axially fixed only on the drive side, or the tools can be bolted to the

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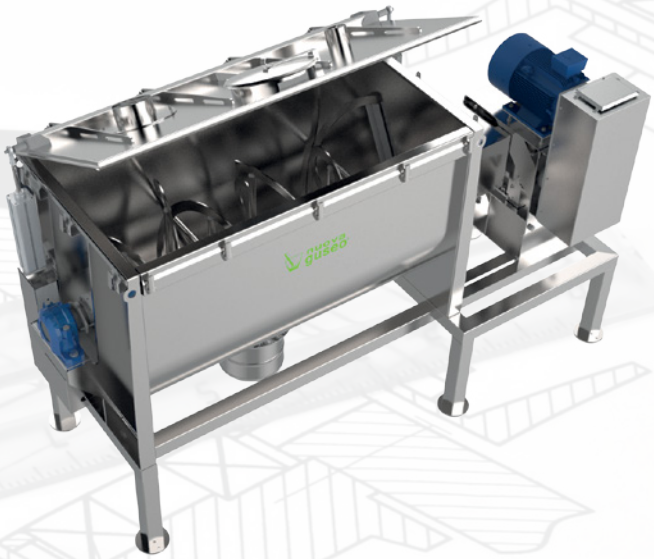
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A-MX series mixer (MIX).

rotor shaft with special self-locking bolts. The rotor shaft has a suitably dimensioned structure, depending on the products and the process planned. The specific shape of the tools is conceived to obtain the required mixing, homogenisation, granulation, aeration, depending on the mixed products.

Depending on the products to be mixed, MIX provides different tools, such as ploughshares, MIX-paddles, fourfold screw ribbons, and optional components.

The Ploughshare mixers are composed of two symmetrical plough-shaped faces. The space between the two faces is closed with a specially shaped metal sheet to prevent the the product becoming wedged in. This system works on the principle of mechanical fluidisation (centrifugal whirling of the products) and obtains excellent mixing quality in a very short time.

The Mix-Paddles requires a longer mixing time than ploughshare, but are easier to clean. The paddles are normally used with pastes and moist or sticky products. The fourfold screw ribbon is used for non-intensive and gentle mixing or to keep the product agitated to avoid lumps being formed. It is also used to homogenise different batches obtained with ploughshare or paddle intensive mixers in a single batch.

The products developed by MIX comply with European Directive 2006/42/EC and on request with EU Directive 2014/34/EU (formerly 94/9/EC) and 97/23/EC (ATEX and PED).

(MIX - Via Volturno 119/A - 41032 Cavezzo - MO - Italy - Tel. +39 0535 46577 - Fax +39 0535 46580 - email: info@mixitaly.com - www.mixitaly.com)

Big bag unloaders

Idealtec presents the FIBC unloaders. These systems are composed of a main fixed frame, including upwardly extending legs to be fixed to the ground and horizontal and diagonal cross beams located at various elevations. The bag hanger, secured to the topmost beam frame, is shaped so as to facilitate the handling of the fully loaded bag by means of a fork lift. The hanger is fitted with hooks facilitating the lifting and positioning of the bulk bag onto the unloader frame, preventing the manual handling of loads and the operator's direct exposures to fumes and dust pollutants.

The forks of the lift truck are inserted into the guides of the upper support frame, which is kept in position by horizontally extending or cantilevered beams. To avoid the risk of falling, the hanger support frame is provided with containment brackets solidly anchored to their supporting basements.

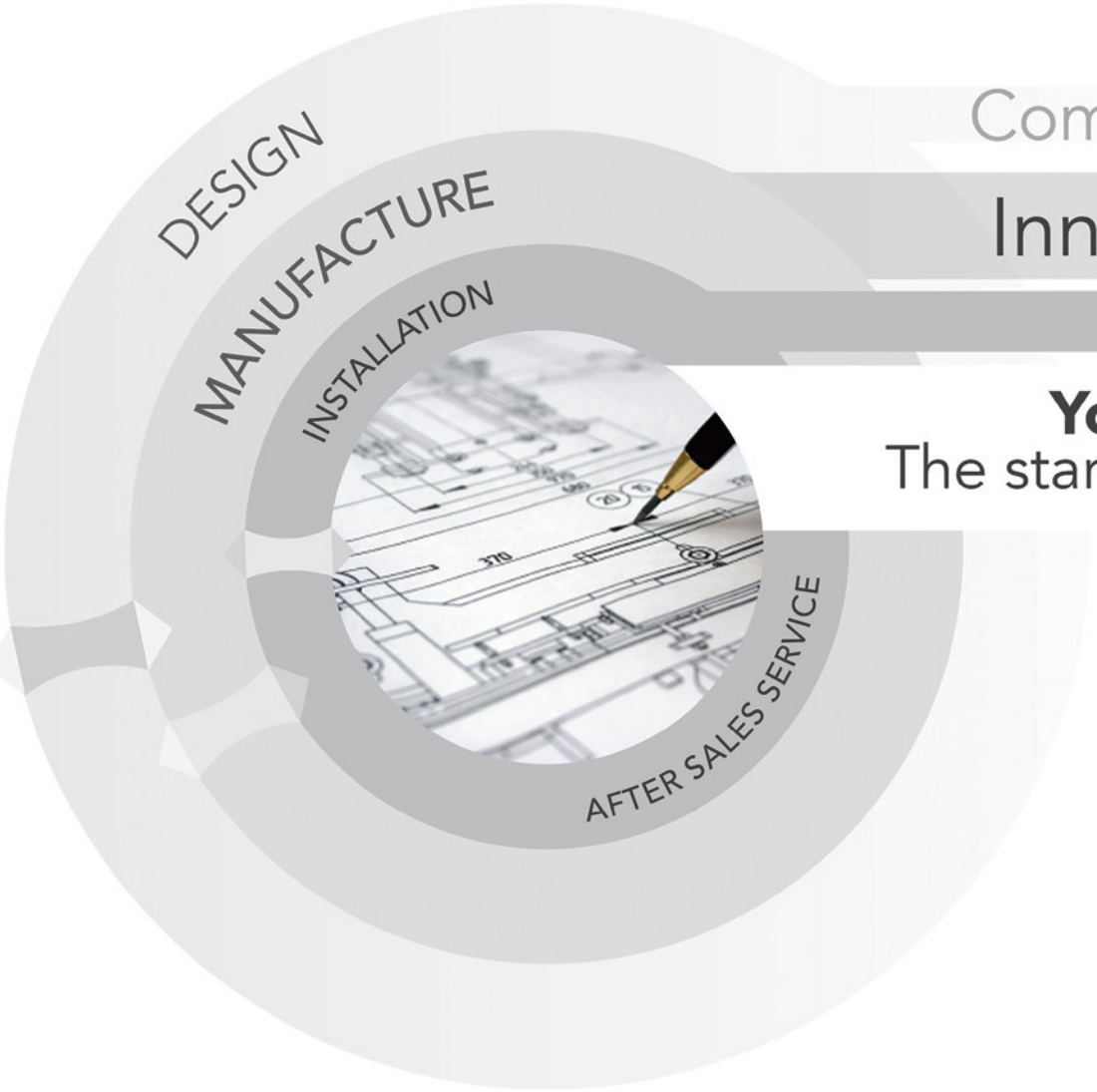
Depending on the bulk bag dimensions, the cantilevered arms or the upper telescopic frame can be adjusted to a correct height on the vertical axis of the main frame and locked in place with pins and circlips.

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A successful tradition in material handling

Technosilos develops customized systems for the management of solid and liquid bulk materials which are simple to use and have high standards of quality and safety. The company carries out the complete automation of all the operations on the raw materials such as receiving, storage, conveyance, treatment (sieving, mixing, grinding, thermal treatment, etc.), and dosage.

The storage of bulk raw materials is a requirement for every manufacturing company, which can be transformed into a competitive advantage and an opportunity for saving, in particular: savings in the purchase of raw materials, real-time monitoring of stocks, eliminating waste, space saving, and reduction of manual work.

Technosilos provides outdoor silos made of stainless steel, aluminum fibreglass, and painted carbon steel, and indoor silos made of high tenacity polyester.

In whatever form the client receives the raw materials, Technosilos offers the ideal solution to fill silos and big bags, or for direct use in production. The company develops bag dumping stations, bulk bag emptying systems, unloading systems for tanker trucks, pallet boxes, liquids storage tanks etc. All these systems are connected to management systems for stock control and traceability.

The handling of raw materials in production requires the continuous movement of ingredients from the storage area to the production area. Technosilos conveying systems automate these tasks and make them as simple as pushing a button. Solutions are made to measure in order to best meet customer needs and the product characteristics, and they include conveying augers, disks, belts, suction-conveying systems, pressure conveying systems, suction-pressure conveying systems, impulse conveying systems, dense-phase conveying systems, or a mix of these.

From main to micro ingredients, Technosilos dosing systems are adaptable to the needs of production for the automatic composition of recipes from one to dozens of solid and liquid ingredients. The ingredients are taken from storage containers (silos, big bags, hoppers, tanks, etc.) and are dosed in the desired quantity. The recipe batch is then ready to feed production machines (kneaders, presses, dissolvers, mixers etc.). The automation may include step-by-step sequences and the guided manual addition of further ingredients and their traceability.

(Technosilos s.n.c. di G. Gentili & C. - Via Piana, 67 - 47032 Capocolle di Bertinoro - FC - Italy - Tel. +39 0543 449143 - Fax +39 0543 449187 - email: technosilos@technosilos.com - www.technosilos.com)



Sieving and dosing plant (Technosilos).

Vertical mixers

The vertical mixers developed by **Nuova Guseo** are suitable for mixing both dry powders and powders with liquid additives. They can be used also for vacuum drying, homogenizing, deaeration, cooling and heating.

The simultaneous motion of suitable transmissions allows the screw to rotate on its own axis and to orbit along the inner conical vessel wall. In this way, the agitator (which generally consists of a worm screw) conveys the product from bottom to the top and it creates a horizontal motion flow. Furthermore, the conical shape of the mixing vessel allows a different motion speed of particles to be reached, which depends on their distance from the bottom where particles moves faster.



Vertical mixer for dairy (Nuova Guseo).

The vertical mixer by Nuova Guseo guarantees a low power consumption (because the mixing screw does not act on the whole product simultaneously), a minimum heating of substances, a soft mixing action and the complete emptying without product retention.

The dust seals are not immersed in the product and it is possible to work with a product volume which is lower than the maximum design capacity. Finally, it is easy to thoroughly clean.

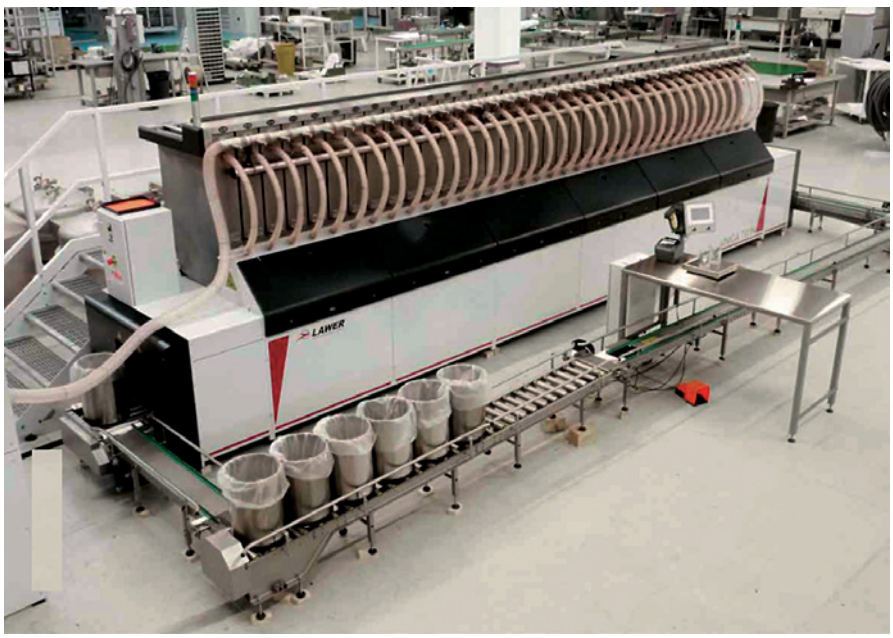
Nuova Guseo offers several vertical mixers to meet specific production requirements. They are made of good quality steel or AISI 304 and AISI 316stainless steel, depending on the type of material being processed. If necessary, special linings can be fitted to minimize abrasion, corrosion or to prevent the product adhering to internal surfaces.

(Nuova Guseo - Via Dante 8 - 29010 Villanova sull'Arda - PC - Italy - Tel. +39 0523 837149 - 837187 - Fax +39 0523 837498 - email: nguseo.commerciale@tin.it - www.nuovaguseo.eu)

Automatic weighing systems

Lawer presents the Unica Twin, a fully automatic weighing system for powder ingredients, which guarantees quality and a careful control over plastic master batches and rubber compound preparations.

The system consists of a number of independent storage silos in stainless steel, each one having a 100 L capacity, to store different ingredients. One or two weighing trolleys slide automatically, positioning the buckets under the silos



Unica Twin automatic weighing system for powder (Lawer).

with the ingredients to be dosed. Each silo is equipped with a dosing screw (Lawer Patented), which allows fast and accurate dosing.

The Unica Twin is managed by means of a touch-screen computer on the main control panel, and an efficient suction-filtering device guarantees maximum safety and a clean working area.

The Unica Twin guarantees a high productivity with single or double scale technology and a fast and accurate weighing. The powder weighing is fully automated, with no errors, also ensuring the repeatability of the recipes and traceability of the operations.

This machine provides a clean, safe and healthy working environment with the elimination of contamination and pollution and no risk for the operators

Finally, integration with external software systems is also possible.

(Lawer - via Amendola 12/U - 13836 Cossato - BI - Italy - Tel. +39 015 9899511 - Fax+39 015 9842211 - email: sales@lawer.com - www.lawer.com)

Equipment for the food production

Thanks to its ability as manufacturers and flexibility, **Giordan** has been recently investing and growing in the equipment for the food industry.

The company provides a wide range of mixers (heated and unheated), stainless steel containers (heated and unheated), bottling machines, vacuum cookers (available with resistances, with gas burner or steam generator heating) respecting the integrity and authenticity of all the products.

The cookers for jams, sauces and vegetables are made of stainless steel Aisi 304 while the parts in contact with the product in Aisi 316.

These multifunction cookers cook, concentrate and mix using vacuum system. The machines have a lid with safety closure, a vacuum system with liquid ring pump, removable mixing blades with wall's scrapers, the specula with light to check the internal process, a stainless steel hopper to add the ingredients, and a washing system to clean the tank. All the valves are safety certified.

A digital thermostat permits to regulate and control the temperature, a manometer to control the inner pressure into the tank, and the vacuometer to control and regulate the vacuum into the tank.

As optional, Giordan provides system to sterilize the product (allows the sterilization of the filled product inside the cooker), a mixer to apply to the cooker, a recorder to check the process, with the possibility to download the parameters of the process on a USB key and insert different recipes by means of the PLC touch-screen. Different heating versions are available: the gas burner heating or steam generator heating (not included), or electric heating.

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Cooker for jams, sauces and vegetables (Giordan).

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Drum mixing system

The **TECNO 3** BS range of belt drum mixers, now used by many companies, have been successfully used to make pills with chocolate.

There are different types of covered sticks, from dried fruit and coffee to candied fruit and sweets, among others.

The drum mixers used for gumming and polishing do not require any particular automation, other than the possibility of adjusting the speed of the belt and air jet (intensity and temperature). Instead, the drum mixers used for expansion are equipped with all the devices required to make the production cycle fully automatic, from special nozzles for spraying and guaranteeing the uniform distribution of chocolate, to continuous monitoring of the weight in order to stop the process at the set value.

TECNO 3 has recently teamed up with a leading confectionery company and has successfully developed the procedure for sugar coating small chocolate lenses. The process first involves gumming, then white expansion and the application of the layer of colour, and finally polishing.

Various devices have been added to the drum mixers to automate the cyclical process and ensure uniform distribution of the solutions for steady growth.

Special consideration has been given to the cleaning of the drum mixer, which can now be carried out quickly and easily.

(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)



BS range of belt drum mixers (TECNO 3).

Croissant production

High quality croissants have always been the signature of **ALBA & Teknoservice**.

Thanks to more than 35 years of experience, the company production ranges from the smallest unit in the world to the largest one, with capacities ranging from 1,500 to 70,000 pcs/h. There is also the possibility of having a flexible system, which can be changed in just a few minutes. These systems, which are attentive to the quality of the products and which use high-tech technologies, are able to combine specific applications and flexibility according to the production requirements and customer care.

The Croissant Lines produce artisan croissants with a quality that is very similar to that of a handmade product, with an industrial output. The high capacity of the groups means that a very high production can be reached, from 10 to 150 g, while maintaining a high quality thanks to a soft calibrated rolling which respects the conditions of the dough despite the high output. This rolling can be varied depending on the required capacity and type of product.

A strongpoint of ALBA & Teknoservice is that the machines can be customized according to customer requirements. The Croissant Lines are versatile in making regular or filled products and they are suitable for both sweet dough and popular savoury croissants. These lines are flexible and can be adapted to various solutions in just a few minutes. The product can be placed directly onto pre-formed, grooved or flat trays or interconnected with a proofing or freezing tunnel according to requirements.

The Croissant Lines are fully controlled by means of a PLC with an intuitive interface that allows the user to easily manage ~~easy~~ the operations on a user-friendly single screen.

(ALBA & Teknoservice - Via delle Industrie 26 - 35010 Villafranca Padovana - PD - Italy - Tel. +39 049 9070380 - Fax +39 049 9074042 - email: sales@albaequipment.it - www.albaequipment.it)



Croissant production with ALBA & Teknoservice line.



Chocolate fountains

Founded in 1977, FBM develops machinery for chocolate and baking applications and has customers all over the world, from artisan bakeries and chocolate shops to craft chocolate makers, to restaurants and hotels as well as industrial companies and large corporations.

A strong point of FBM is the ability to innovate and customize. Managed by Umberto Boscolo for nearly 2 decades, who is assisted by a young team of dynamic professionals, the company goal has always been to satisfy the unique requirements of each customer.

Among the flagship projects of the company are semi-industrial and industrial plants for customers who have found a partner in FBM to produce customized solutions which automate and improve production. In addition to chocolate tempering machines, and support equipment and accessories for the production of all types of chocolate products, FBM also develops decorative machines to be placed in the "chocolate-flavoured" shops and machines for working with a wide variety of dough (everything from macarons to sheet cakes). It was the first company to introduce a tabletop dropping machine which has now been widely imitated.

FBM sells in Italy, Europe, the United States, UAE and around the world directly through resellers, dealers and agents. In addition to the company blog and social media presence, which records the daily growth of the company and which have a huge number of followers, the company actively participates in major international fairs. Furthermore, since 2011 FBM has founded a chocolate and pastry school known as Elite FBM in its headquarters at Legnano with a "Bean to Bar" Area to produce chocolate from the bean.

The new chocolate fountain from FBM, built with the greatest of consideration being given to the fit and finish of the smallest details, is designed to be a decorative element that will enhance the ambiance of high-end retail environments. Made of stainless steel, the recirculation of chocolate is carried out by means of a screw pump and comes equipped with a protection system which only allows the pump to be turned on when the correct working temperature has been reached and maintained long enough to ensure that the chocolate has been completely melted.



The Sfera chocolate fountain (FBM).

The front of the fountain, which is backlit, includes seven little bowls of different sizes, placed at different heights to produce the chocolate fall effect.

The rear emptying system of the chocolate with reversing of the screw pump rotation helps in the cleaning of the machine.

(FBM - Via Machiavelli 15/17 - 20025 Legnano MI - Italy - Tel. +39 0331 464654 - Fax +39 0331 464886 - email: fbm@boscolo.it - www.boscolo.it)



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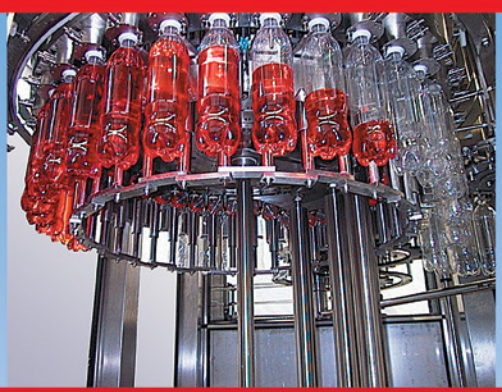


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The best solutions for food packaging

Tecno Pack has been designing, manufacturing and marketing horizontal packaging machines and automated packaging systems for more than 30 years for anyone operating in the food, pharmaceutical, non- food sectors, etc. The company employs more than 200 personnel at the Headquarters at Schio in the province of Vicenza. The other two companies in this Group, GSP and IFP are also situated in this province.

TECNO PACK has created a vast network of agents and collaborators distributed all over the world and exports more than 70% of its production. Over these years, the company has collaborated with a large number of partners, including: Bauli, Barilla, Fresenius Medical Care, Latte Trento, Bimbo, Chipita, Ferrero, Mauri, Kraf, Nestlè, Baxter, Baldi, GrissinBon, Pepsico, Vivartia, Sara Lee, Western Bakeries, Garuda Food, and many others, satisfying the requests of each customer thanks to its packaging facilities.

Always the first to lead the way in this sector, TECNO PACK continues to create innovation in their packaging systems by increasing the digitalization of the machinery and plants, offering incredible benefits to customers with extremely limited investments.



Tecno Pack headquarter in Schio, Italy.



Digitalization has been going on for a number of years in high level automation thanks to established deterministic networks based on ethernet and real-time (Ethercat, Ethernet IP, etc...) which guarantee synchronised lines, rapid response, centralized control, limitation of space used, a decrease in wiring and above all the sharing of information.

Everything is connected

Unlike the past when exchanging information between devices from different manufacturers was extremely complex, today high-level systems are available with simplified interfaces, such as Database SQL and Standard OPC UA. Thanks to these new technologies it is possible to exchange information in a

simple and immediate way, potentially with all the systems that share these instruments. Therefore, focusing on the quality of the information gives a drastic reduction in development times and reduces the possibility of making mistakes.

More specifically the machine or plant controller can open up to the outside world thanks to the cohabitation of different types of networks (field network (I/O Link), automation network (Ethercat), network interface (Ethernet/IP)) that can exchange information between each other. Using standards developed at International level (no longer custom and closed solutions) and shared by the majority of the suppliers of the products and automated systems, it has enormous repercussions for both the manufacturers and the users of the machinery and plants, giving them the possibility to have complete and capillary control, leaving space for imaginative solutions.

In the near future, the opportunities offered by Internet e data networks, thanks to the higher bandwidths available, will allow not only the use of aids for operators and maintenance staff, but will also give the management information in real time on the production trends or on the productivity of a plant, so as to generate trend profiles in order to pilot any strategic decisions to be taken.

Here are some of these opportunities: being able to see manuals and videos, which are always up to date, directly at the plant in a standard format (HTML, PDF, AVI), also with the help of the QR-Code directly on the machine itself. Being able to use devices with Augmented Reality to guide operators and maintenance staff through the format change procedures and maintenance operations, and also to provide punctual monitoring of particularly important parts of a plant. Receive notifications and alerts directly on the maintenance staff and plant manager's mobile devices. Receive in-house and/or remote teleassistance and telemonitoring from the automation supplier who can give the customer real-time support to resolve problems and, in particular, prevent breakdowns. For example, real time verification, locally or from a remote site, of the characteristic parameters of a machine to check the level of wear of the components (by means of sensors, or indirectly through the monitoring of the current, torque or deviation of other important variables).

A fundamental aspect to consider in this field is the quality of the connections. They must be private to ensure the interconnection with the customer Corporate Network through the security devices. Secure, to guarantee customer perimeter protection with firewalls that verify and carry out access controls and have apparatus that establish VPN tunnelling to the Cloud server. Reliable, that is, managed by providers that can guarantee the continuity of the service and the necessary upgrades.

This is precisely why the choice of a software partner is fundamental, while IT management must be fully aware of the risks regarding the interconnection of the Corporate network and devices in the field.

This does not regard future trends, the future is already here

The flowpack FP100 BOX MOTION packaging machine, developed using Omron automation products and finalised in collaboration with Bauli, is recognised as the state of the art digitalisation in packaging. Equipped with a BOX MOTION transversal welding unit, which is the fastest on the market today and is the product of long studies, it is able to guarantee both great versatility in format changeover and high speeds (up to 230 packages/minute). All this while guaranteeing tight seams, gas washing in modified atmosphere and a perfect appearance of the package, even if there is lateral gusseting. The Tecno Pack overlock



unit with square motion guarantees an unparalleled performance and versatility.

The future of innovation in the packaging world can be seen first-hand: TECNO PACK will be present at Ipack-Ima, in FieraMilano from 29th May to 1st June (pad. 7 - stand A50 B45)

(Tecno Pack - Via Lago di Albano 76 - 36015 Schio - VI - Italy - Tel. +39 0445 575661 - Fax +39 0445 575672 - email: comm@tecnopack-spa.it - www.tecnopackspa.it)



The flowpack FP100 BOX MOTION packaging machine (Tecno Pack).

Intermittent packaging machine for small and medium formats

Always sensitive to the requests of the packaging market, **MF Tecno** has decided to concentrate its own technology, the fruit of many years of experience, in the sector of intermittent horizontal packaging machines for small and medium pre-formed bags, of any shape, with particular reference to stand-up pouches and resealable bags.

Thanks to the superb flexibility and precision of their various devices and to the perfection of their welding systems, as well as their high production capacities, which are ensured by the use of servo-motors for the machines' main movements and an electronic management system that constantly monitors the entire operating cycle, the MF-Pouch series of horizontal packaging machines represent the ideal tools for various sectors. Boasting a precision design, complete with top-of-the-line materials and components, MF-Pouch series packaging machines represent a perfect combination of technology, quality, and reliability.

The "step" movement of the packages is achieved by a catenary activated by means of a brushless servo-motor, on which the double-pincer holding devices for the bags are assembled. The particularly smooth movement between one station and the next keeps the product from spilling and prevents any possible external contaminations. The bags are filled by means of a series of small hoppers that follow the packages while they are conveyed in a semi-circular curve.



MF Pouch intermittent packaging machine (MF Tecno).

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Automatic packing processes for food and beverage industry.

SPECIALIZATION IN:

- ***Automatic machines and lines for depalletizing, palletizing, filling and closing***

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This solution reduces filling times to a minimum, even in the presence of products with a lack of flowability. Special vibrating devices fitted in the inferior conveyors facilitate filling operations. The bags are closed by multiple heat-sealing stations and are then cooled down.

The MF Pouch 3000 horizontal packaging machines were designed for the packaging of various products, with particular issues regarding flow and/or grain size (pet food, baked goods, sweets, nuts, snacks, legumes, cereal etc.). Keeping this in mind, MF Tecno has developed a series of dosing systems to be used with the packaging machines, capable of being easily adapted to the customer products.

The particular design of the various dosing machines, in addition to the use of dedicated software created by MF Tecno Development Centre, guarantees the maximum precision for repetitive packaging operations, even for products that are large, non-uniform, and difficult to transfer, while at the same time providing excellent packaging speeds.

Different dosing systems are available such as a multi-head electronic and a vibrating channel electronic weigher, cup volumetric dosing systems and belt dosing systems.

(MF Tecno s.r.l. - Via Porziuncola, 28 - 06081 Tordandrea di Assisi - PG - Italy - Tel. +39 075 8043623 +39 075 7827487 - Fax +39 075 7827493 - info@mftecno.it - www.mftecno.it)

Automatic bagging line for powder products

Umbra Packaging is specialized in the design, development and construction of packaging line plants for loose granular and powder products in bags of all types, in any material and any size, as well as Big Bag size filling.

Its filling and palletizing line is the perfect solution for automatic packaging of loose granular or powder products. The use of this line is ideal for a variety of sectors such as pet food, cereals and seed products, zootechnic and animal foods, integrators and animal antibiotics.

Umbra Packaging also provides updates to existing plants, carries out all maintenance and provides a specific and remote assistance.

The range of packaging machines offered by Umbra Packaging represents a solution to a wide variety of needs. In particular, UPS EVO is the automatic bagging line for powder products, in preformed open mouth bags. With this system it is possible to work bags with or without gussets, bags with handle, top slider, zipper, pinch bottom bags. This line works with papers, plastic, raffia, polyethylene, and polypropylene bags, with a range of workable format (powder products model) from 2.5 to 50 kg. A constant maintenance by means of the gripping guarantees precision in closing and handling process bags. Furthermore, UPS EVO is easy to use and clean, and ensures an increased productivity of up to 500 bags/hour.

(Umbra Packaging - Viale dei Pini 46/48 - 06081 Petrignano di Assisi - PG - Italy - Tel. +39 075 809780 - Fax +39 075 80978127 – email: info@umbrapackaging.it - www.umbrapackaging.com)



UPS EVO automatic bagging line (Umbra Packaging).

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Capsule packaging machine

The HTS capsule packaging line developed by **TME** is the result of the best technologies on the market today and the very high professional standards that the company has in this sector. This line was created to satisfy the need for high speed and to support multiple production shifts.

In particular, the HTS line was designed using an efficient modular system to meet all customer requirements in terms of both quality and productivity. It comes complete with various devices such as weight measurement, vision system and remote assistance, and tailor-made packaging systems can also be implemented.

Regarding the work cycle, the feeding of the capsule takes place via an orienter that has the function of correctly orienting the capsules and conveying them into the line by means of an air jet. The mechanical movement of the HTS is managed by a particular system patented by the company, which guarantees a greater precision in movement.

The first application which the empty capsule encounters is that of positioning on the lower base of any type (filter paper, aluminum, etc.). Then the screw dosage system doses the product and, depending on the customer requirements, a paper filter or a micro-hole filter can be applied, otherwise an aluminum sheet can be applied. There is a vision control system built into the machine with a camera and a weight control with a reject system.

In the next step the capsule is ready to be packaged in a modified atmosphere using a vertical or horizontal packer with the guarantee of an extremely low oxygen residue in the bag, much lower than the limits allowed by law all to the advantage of the product.



HTS capsule packaging line (TME).

(TME - Via S. Petrini 1/5 - 43036 Fidenza - PR - Italy - Tel. +39 0524 517711 - Fax +39 0524 527771 - email: tme@tmeitaly.com - www.tmeitaly.com)

High quality packaging machinery

Concetti is a world-leading manufacturer of high quality packaging machinery and a supplier of turnkey solutions. The company develops multifunctional weighing, filling, closing and palletizing lines for packing a variety of dry bulk products into bags. Each packaging line is customized to the application. More than 2,000 distinctive Concetti systems have been installed around the world-in multi-national companies down to small businesses, over 40% going to repeat customers.

This company believes that cutting-edge innovation evolves from a combination of research and the hands-on experience that is shared with customers. It holds an ISO 9001 quality assurance standard, using the best available components and ancillary equipment.

All the machines can be equipped with a variety of bag clos-

ing devices, including simple sewing, fold-over and sewing, sewing with crepe paper, heat-sealing, PE through paper heat-sealing, and glue activated pinch-sealing.

The IGF Aerated Chemical Powders and Flour model is designed for bagging aerated and powder products in open-mouth bags from 5 to 50 kg, with a capacity of up to 500 bags/hr. This machine is suitable for different types of bags such as flat, gusseted, in paper, coated paper or paper/woven PP with inner liner, and PE.

(Concetti Group - S.S.75 C. U. Km 4.190 Fraz. Ospedalicchio - 06083 Bastia Umbra - PG - Italy - Tel. +39 075 801561 - Fax +39 075 8000894 - email: sales@concetti.com - www.concetti.com)



The IGF bagging unit (Concetti Group).





Inspection on the line: quality control for packaging

The food and nutrition industry is facing increasingly stringent requirements relating to product quality and safety. Extensive regulations govern the legislative rules that manufacturers must currently meet. For instance, both the German Food and Feed Code (Lebensmittel- und Futtermittelgesetzbuch, LFGB) and the IFS Food Standard stipulate that food must be free of contaminants. These rules seek to protect consumers and guarantee product quality. Good manufacturing practice rules under Regulation (EC) No. 2023/2006 also stipulate that a self-monitoring or quality control system shall "monitor use of good manufacturing practice" as part of efforts to safeguard consumer protection. Hazard analysis and critical control points (HACCP) are another key point here. On this issue, the German Federation of Food Law and Food Science (Bund für Lebensmittelrecht und Lebensmittelkunde) writes that "hazard analyses falling under the scope of the food packer within the meaning of the HACCP concept requires a safety assessment relating to the entire packaging system, an evaluation of the influences on packaging and packaging components as well as their interaction." Packaging lines use special sensors, scanners and inspection systems to guarantee the product safety required under national and international law, depending on their task. The latest trends in quality control will be showcased by exhibitors at **Fach-Pack 2018**.

Quality control in the packaging process

Food packaging primarily serves to protect its contents against environmental impacts and damage during storage and transportation. This packaging ensures that food has a longer shelf life by gasifying it in a protective atmosphere. In modern production facilities, the packaging line can automatically check whether packaging reliably satisfies all requirements for this task. Quality is generally safeguarded at the packaging line using non-invasive systems. This term refers to inspection processes taking place at the line without individual pieces of packaging having to be removed for this purpose. These integrated control systems support the food industry's mostly high production cycle times while simultaneously ensuring implementation of all food safety requirements.

These systems allow damaged or rejected packaging units to be easily ejected without manual intervention by connecting them with upstream and downstream components in the packaging line. At the same time, these systems can provide feedback to upstream machines, such as filling robots, sealing machines and labellers, which can then directly respond to any identified deviations.

Reliable air-tight packaging for food

A variety of technologies are available to inspect different packaging materials and processes. One particular option for primary packaging is leakage tests. After all, if perishable goods, such as sausage and cheese, are not packaged in air-tight packaging, this can not only lead to the product spoiling, but also might even damage the manufacturer's reputation and lead to costly recalls. Inline leakage tests are carried out when packaging using protective gas, for instance employing devices that make use of test gas. They have sensitive gas sensors that detect even the smallest leaks. Carbon dioxide, helium and hydrogen are used as test gas.

In addition, sealed seams in packaging, such as trays and tubular bags, can also be checked using visual inspection systems. These devices also detect contaminations in the seams and check the position of labels. Visual inspection sys-

tems generally consist of cameras that compare certain parameters in combination with evaluation software. To this end, packaged products are guided past cameras during the packaging process. If the image recognition system detects a deviation from a previously defined condition, this information will be passed on in the system and defective packaging will be automatically ejected. The previously defined parameters include untight packaging and optical defects. The benefit of these systems is that they are suitable for especially high line speeds.

Detecting contamination

No manufacturers can fully rule out the possibility of contaminants finding their way into end packaging during comminution and processing of food. However, bone fragments in sausage, metal parts from broken-off blades or plastic pieces of packaging and transport cases are a worse-case scenario for any food producer. If this happens, entire batches have to be recalled to avert any detriment to customers. A recall also requires inspecting the entire line until the source can be clearly identified. This scenario can be prevented in the first place by using metal detectors, for instance, which are fitted after the packaging process. Packaging goes through devices at the end of the process chain and is x-rayed. Metal contaminants are identified and defective units are ejected.

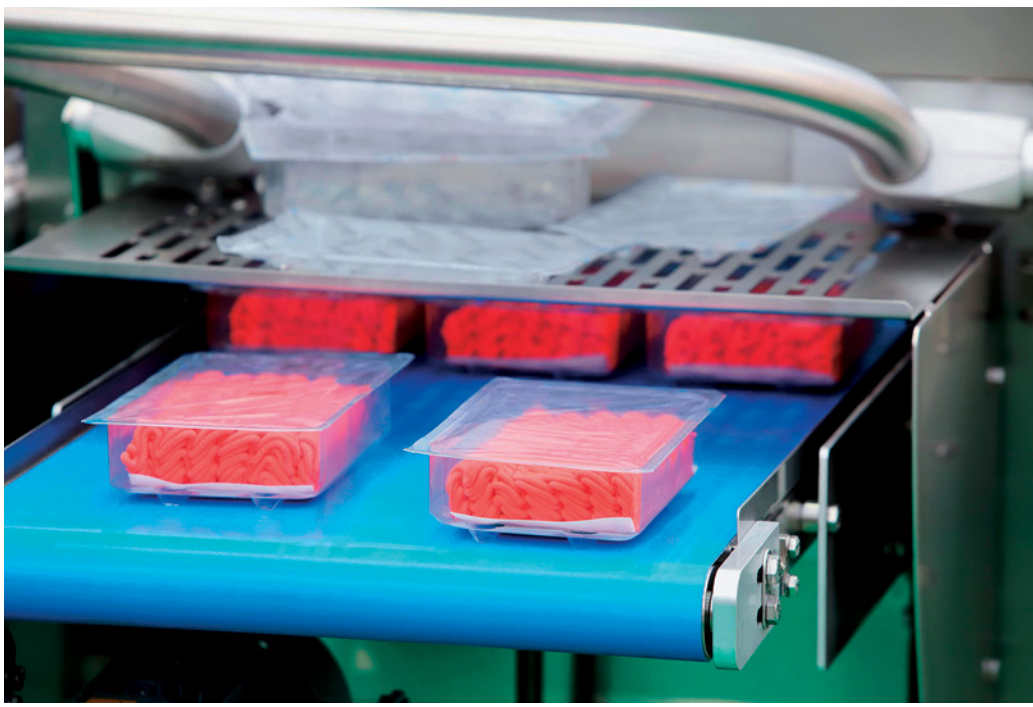
X-ray technology is used if other types of contaminants, such as stones, plastic or bone fragments are detected. X-ray inspection systems identify deviations in product density. X-ray systems can identify of all kinds of unwanted materials through predefined settings. Therefore, they are suitable for detecting contaminants and for carrying out other quality control tasks: clumps of salt can be identified, as can deviations in product composition. The x-ray device can even determine if the meat in a ready meal does not correspond to the recipe.

The product and required cycle speed determine which systems are best suited to perform quality assurance. Many exhibitors at FachPack 2018 offer stand-alone solutions for these tasks or integrate quality control into their lines.

About FachPack

FachPack is the European trade fair for packaging, processes and technology. Over a compact three-day schedule in Nuremberg from 25 to 27 September 2018, it will present its extensive range of solutions for the packaging process chain for industrial and consumer goods. Its new brand image “Tomorrow begins when you create it” makes FachPack more up-to- date and more dynamic and gives it a more distinctive look. It is solution- driven and tangible and remains as reliable and pragmatic as ever. With a unique trade fair portfolio from the segments packaging materials, packaging and packaging accessories, packaging machines, labelling and marking technology, machines and equipment in the packaging periphery, packaging printing and finishing, intralogistics and packaging logistics, and services for the packaging industry, FachPack is the No. 1 industry gathering for the European packaging market that attracts trade visitors from all packaging-intensive sectors: Food/beverages, pharmaceuticals/medical technology, cosmetics, chemicals, automotive and other consumer and industrial goods.

www.fachpack.de



Inspection systems for cap application

Sacmi has become the official "problem solver" of a leading food and drink multinational that has several plants across the USA (with dairy and ready-to-drink tea bottling lines), meeting their quality control needs efficiently and effectively. For example, a common bottling line problem concerns the need to check the cap application angle on every single container and reject all containers with caps that are either too tight (i.e. too difficult to open) or too loose (i.e. with compromised product sealing performance).

In this case, the solution is the CVS360-3D, the module for 360° quality control of three-dimensional objects. Developed by Sacmi Automation & Service Division, this advanced system (mounted on the LVS360 platform) caught the attention of the customer, who then carried out in-the-field trials plus dynamic tests performed in Sacmi Imola's Beverage R&D facility. The outcome is an output quality that is 100% guaranteed, with false rejects reduced to less than 0.03%.

Installed and started up just recently, the LVS360 system equipped with the CVS360-3D module has the outstanding capacity of being able to check for correct cap application and, more specifically, measure (using 4 HD video cameras) the exact distance between the embossed logo on the cap and the one on the bottle support ring (the PUM or pull-up mark). Moreover, advanced CVS360-3D module software, which translates the acquired 3D image into a 2D image, gives a perfect reconstruction of both cap- and bottle-neck. This allows the measurement of the distance between the PUMs (a key parameter in testing for proper cap application), allowing real-time detection of every minimal deviation from quality parameter settings.

Designed for use in the food and drink lines, the LVS360 system has an inspection capacity of 72,000 bottles per hour, with neck diameters of up to 38 mm. It is made of stainless steel, features an excellent protection rating (IP65) and can be washed with water both inside and out.

Once again, this key order underlines the soundness of Sacmi's integrated, modular and customisable quality control solutions for every stage of bottle, label and primary packaging manufacture. The same user-friendly interface of the machine – and the CVS3000 software shared by the entire range of Sacmi inspection systems – makes control incredibly easy, speeding up setting times and allowing remote control of line performance from any device connected to the corporate network.

(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)



CVS360-3D inspection systems for correct cap application (Sacmi Imola).

Innovative inspection systems

Founded in 1998, **FT System** has specialised in the design and production of quality control monitoring systems along the entire bottling and packaging line. From the inspection of empty containers and caps to the fill levels, from accurate capping to leakage detection, from measuring the internal pressure of the container to weight control, label checking to laboratory analysis, FT System guarantees the quality of the packaging products by optimising production and cost reduction.

The Application Angle Inspection is an innovative cap inspection system designed to detect the correct closure through the matching up of the markers. This system is

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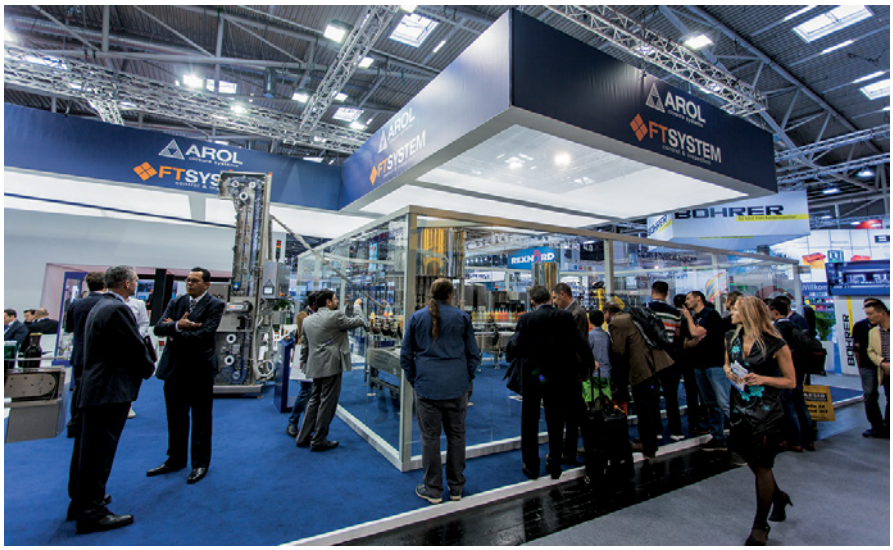
able to ensure the sealing and closure torque by means of a special patented tool, reducing the false rejects.

The PCS 700 LS H20 is the most innovative inspection system to perform a leak detection at full production speed (72,000 bottles/hour). With a type of inspection based on laser spectroscopy technology combined with an advanced software this system is able to measure, without any contact, the pressure inside all types of bottles/containers, monitoring 100% of the production.

The PCS 700 LS H20 ensures a sealing closure in the beverage industry (nitrogen dosed products) and reduces the production costs thanks to the motoring of the nitrogen doser.

The new TBI000 Hygienic Design is a squeezer system ideal for flexible containers and non-pressurized products. By means of a patented system, it is able to perform both leak detection and fill level inspection, reducing false rejects. This system offers an improved usability for the operator thanks to a new system of automatic change-over which reduces the number of errors. Its new mechanical structure and new belt system provide easy maintenance, reducing costs and operation times.

FT System also presents the new HMI FT System which has been developed to offer the best and easy way to manage the inspection machines. Based on windows 10 IOS, the best operating system for ensuring the cyber security of company data, it offers to all operator levels a complete and real-time overview of quality data by means of an intuitive graphical user interface. This means keeping the line efficiency always under control.



The cyber system realized by Arol – FT System at Drinktec show.

Finally, there is the new IE 4000. It is a 3D label inspector to perform a full label inspection on each type of label/code and container. The labelling inspector with 3D technology creates a real reconstruction based on a 3D model, which does not require orientation of the bottles. New features such as a new user interface, new design (smaller footprint), and new module of inspection have improved the performance of inspection and usability for all level of operators.

(FT System - Via Leonardo da Vinci - Alseno - PC - Italy - Tel. +39 0523 945745 - Fax +39 0523 949777 - email: info@ftsystem.com - www.ftsystem.com)

Artificial intelligence system for quality assurance

Opto Engineering presents ALBERT, the first artificial intelligence system that solves quality assurance problems for the baking industry. It is an innovative vision system for the automatic inspection of food products which is flexible and easy to use. Thanks to its advanced artificial intelligence, this system self-learns the shape and colour of products by observing a normal production batch that is immediately ready to be sorted.

Specifically, ALBERT autonomously learns the characteristics of the products directly on the production line without long and complicated programming sessions. It quickly and easily monitors the quality of the products to avoid unwanted and costly production waste.

The new ALBERT allows to save hundreds of recipes and it quickly

accesses the preferred configuration for each food product. It monitors the production 24 hours a day without pauses or distractions. Finally, it ensures all the advantages of a vision technology. ALBERT is not only reliable, it improves the production process and allows for a quick return on investment.

Opto Engineering also offers a free demo service. By sending some samples the company will deliver a free assessment, and can also schedule a free test on-site, testing ALBERT directly on the customer production line.

ALBERT originates from a joint venture between Opto Engineering® and Sensure.

(Opto Engineering - Circonvallazione Sud 15 - 46100 Mantova - Italy - email: albert@opto-engineering.com - www.oe-albert.com)



ALBERT, the first artificial intelligence system for quality control (Opto Engineering).





Squaring the circle What consumers demand of state-of-the-art packaging

The demands made by consumers on packaging are constantly changing and are often contradictory. Manufacturers have to combine convenience, sustainability and communication, and regularly update all these aspects. State-of-the-art packaging technologies and materials now offer opportunities to accommodate these demands. What are the global trends to focus on in 2018?

US market research agency Mintel has identified five global trends in a study that will set the direction for consumer packaging in 2018. In addition to reducing food waste and marine pollution, these include the increasing influence of online trading on packaging development, and minimised and clear messages on packaging.

This last aspect relates to the state-of-the- art design of packaging for frozen products and long-life goods. It is particularly aimed at younger consumers, who are focusing more on fresh foodstuffs and therefore shop mainly from the chilled and fresh shelves, while increasingly turning away from long-life and frozen products.

Less is more

To make products more attractive to this group of buyers again, manufacturers are turning to innovative packaging designs and placing a greater focus on their unique selling points. For example, this includes transparent packaging that – quite literally – creates transparency and makes the content and volume visible for the consumer.

That enables producers to take the offensive in dealing with preconceived notions – that the packaging contains lots of air and not much product, for example.

Other approaches include giving packaging and labels an attractive design. This is where less is often more. Clear package messaging that communicates information and authenticity, rather than an overloaded design, makes the choices easier for more than just the younger buyers. In addition to long-life goods, it applies in equal measure to fresh and chilled products, as well as to drinks and household goods. Brand manufacturers in particu-

lar can score by adopting calmer designs for their products and maintaining the balance between too much and too little information.

The packaging speaks for itself

Consumers are better informed now than ever before. That is why they are demanding more from the products that they buy. The duty of meeting these requirements falls mainly on the packaging. Sophisticated shoppers also look for sustainable solutions such as recyclability, savings in terms of the amount of packaging, and the use of biomaterials that should simultaneously guarantee a long shelf life and safe transport. Packaging as the most important means of communicating with the purchaser can thus provide information not only about the contents but also about itself – how it helps to reduce food waste, how it can be recycled, or convenience aspects like how to re-seal it.

Every manufacturer has the objective of creating a positive purchasing experience through packaging, and therefore focuses on freshness, sustainability or convenience, depending on the target group. At **FachPack 2018**, many companies in the packaging industry will provide their answers, and illustrate solutions for combining even contradictory market developments in an ideal and profitable way.

About FachPack

FachPack is the European trade fair for packaging, processes and technology. With its extensive range of products and services relating to the packaging process chain for industrial and customer goods, the event will be held in Nuremberg 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 machinery, 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.

www.fachpack.de



The European market for rigid plastic containers

Plastic containers are available in the most diverse designs, shapes, and materials and can be used in a wide variety of applications.

"These products of daily life are the result of continuous research and optimization; the requirements are constantly increasing," Ceresana's CEO Oliver Kutsch explains.

The market research institute has analyzed the **European market for rigid plastic containers**. In many applications, plastics replace other materials such as glass or metal: **Ceresana** forecasts the European sales of plastic containers to reach a volume of more than 12.4 million tonnes in 2024.

PET Discovers New Areas of Application

PET packaging already reached high market shares in the segments CSD (carbonated soft drinks) and packaged water. Now, PET bottles and other containers also enter other segments, such as food, fruit juices, and household chemicals (e.g. detergents). Their positive properties are the reason for that: They weigh comparatively little, are recyclable, do not break, and offer high clarity. The gas barrier properties and protection against UV radiation continue to improve. Especially in the segment food, PET containers are a growth market. Thus, Ceresana's analysts expect demand for PET in this segment, for example, in Poland to rise by an impressive 4.6 % per year.



State Regulations Change the Market

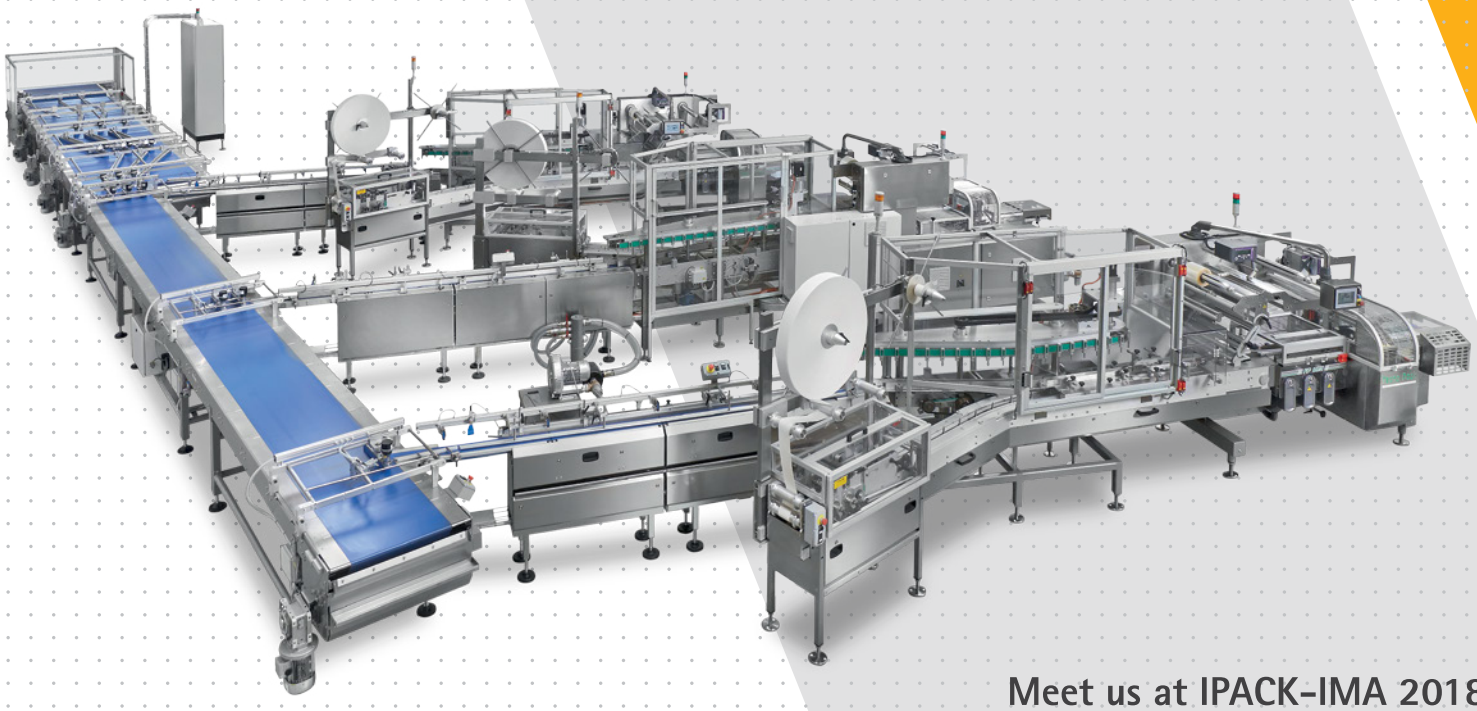
Time and again, new laws and regulations bring about changes for the market. For manufacturers and dealers, it is crucial to make decisions at an early stage and to quantify their consequences. An example are the new regulations for PET bottles for alcoholic beverages in Russia.

Convenience and Sustainability

Besides overall state regulations and economic development, the market for plastic containers is subject to a range of further influences. The beverage market in particular, including the packaging structure, income development, and social trends, must be taken into account. Urbanization and demographic change are accompanied with changing consumption patterns. In some segments, plastics are replacing traditional materials.

At the same time, rigid plastic containers also face an increasing competition by bags and other flexible plastic packaging solutions. Other trends such as convenience, rising number of women in employment, sustainability or light weighting also influence the market and require an intensive examination of the market mechanisms.

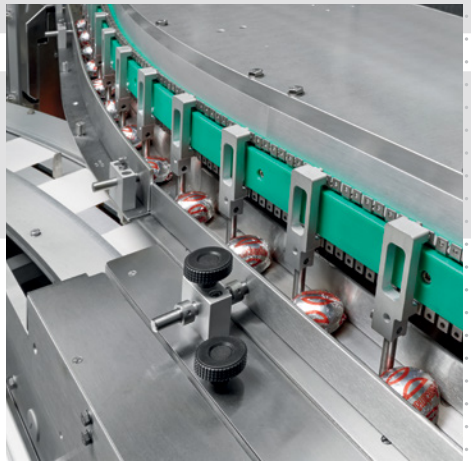
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The Study in Brief

Chapter 1 analyzes demand, production, import, and export as well as revenues in regard to plastic containers for 27 countries. Further, the study analyzes the demand for containers made of various types of plastics within the individual areas of application (e.g. PET containers in the segment food).

Chapter 2 offers a detailed analysis of various application areas of plastic containers: Data on consumption trends for lemonades, water, juices, other beverages, household chemicals, cosmetics & pharmaceuticals, food, and industry & transport.

Chapter 3 analyzes the demand for containers split by the types of plastic PET, PP, HDPE, LDPE & LLDPE, PS & EPS, PVC, and other plastics.

Chapter 4 provides company profiles of major manufacturers of plastic containers – clearly arranged according to contact details, revenues, profit, product range, production sites, and profile summary. In-depth profiles of 82 producers are given, including Amcor Limited, Ball Corporation, Berry Global, DS Smith Plc, Papier-Mettler KG, Reynolds Group Holdings Limited, Sealed Air Corporation, Inc., Sonoco Products Company, and Bemis Company, Inc.

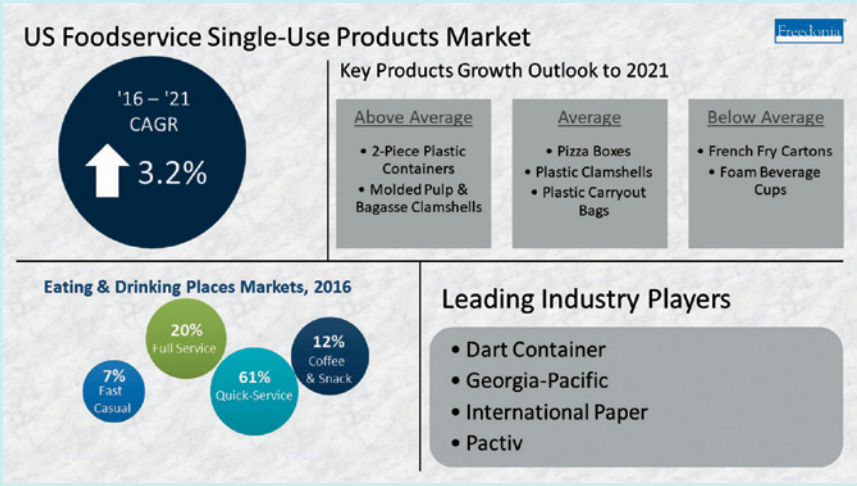
www.ceresana.com

FOODSERVICE CUP SALES TO REACH $5.4 BILLION IN 2021

Foodservice cup demand will grow 3.3% annually through 2021 to $5.4 billion, accounting for just under half of single-use serviceware demand. Beverage cups hold the largest share of this demand by far – over 90% of the total – with the remainder being portion cups. Beverage cups will post slightly faster growth through 2021. These and other trends are presented in ***Foodservice Single-Use Products in the US***, a new study from **The Freedonia Group**.

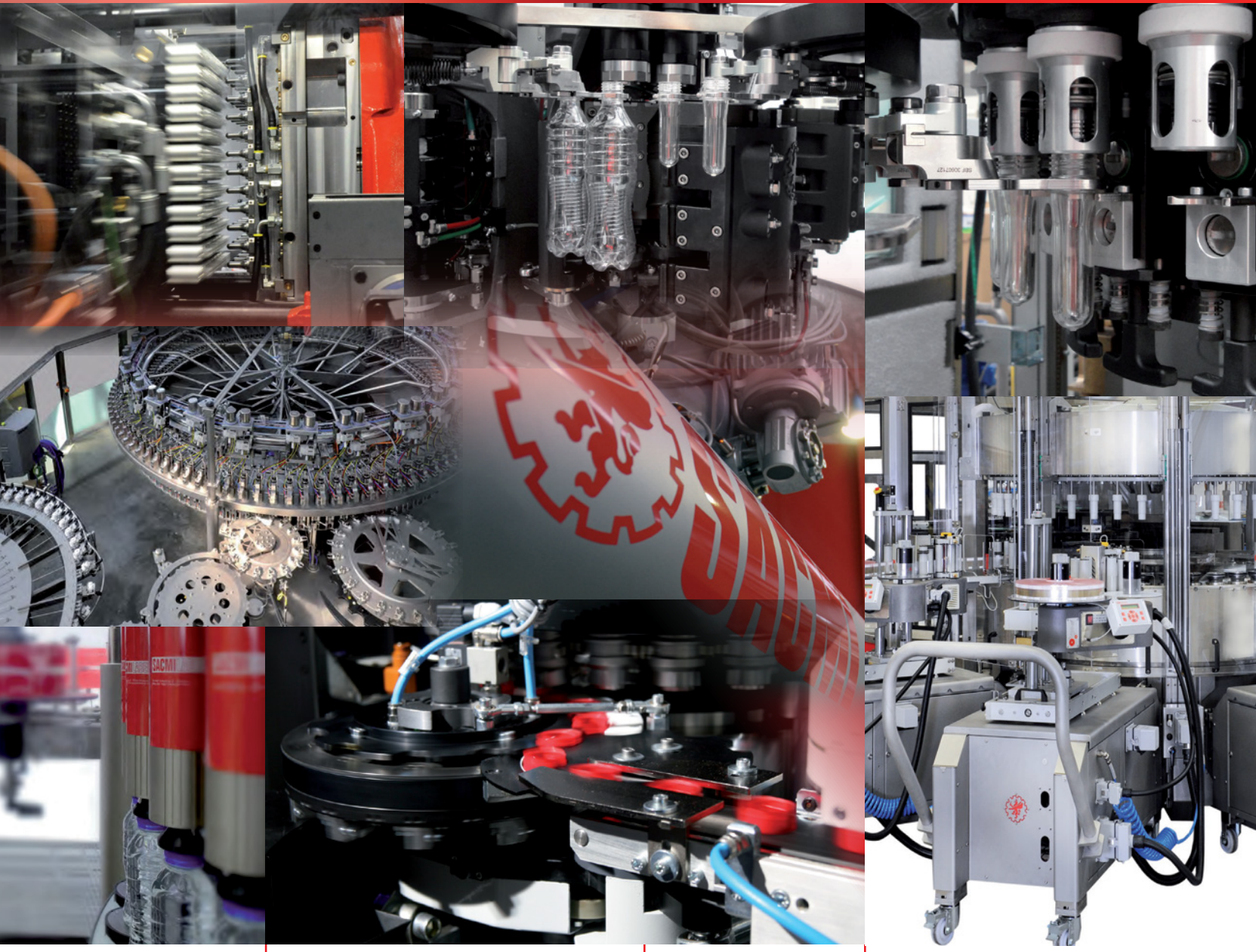
Supporting growth will be the general rise in foodservice revenues along with foodservice trends such as:

- specialty hot and cold beverages, especially iced and cold brew coffee, along with fruit-based drinks, like juices and smoothies
- increased foodservice sales at retail establishments offering various beverage options
- increased hot and cold drinks consumed on-the-go
- delivery options requiring durable portion cups for sauces



Demand for single-use disposable foodservice products, including packaging and serviceware, is forecast to increase 3.2% annually to $21.8 billion in 2021. Growth will be driven by the increased options and convenience of meals prepared or consumed away from home. Demand will also be supported by a shift toward the use of higher value products featuring durable plastic or compostable materials.

Foodservice Single-Use Products in the US (published 12/2017, 174 pages) is available for $5600 from The Freedonia Group, www.freedoniagroup.com



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Global market for bioplastics to grow by 20%

The results of **European Bioplastics'** annual market data update, presented last November at the 12th European Bioplastics Conference in Berlin, confirm a stable growth of the global bioplastics industry. "The global market for bioplastics is predicted to grow by 20% over the next five years. The transition to a low-carbon and circular economy, stronger policy support for the bioeconomy, and an increased consumer awareness for sustainable products and packaging are driving the expansion" says François de Bie, Chairman of European Bioplastics.

Innovative biopolymers are the main drivers

The global bioplastics production capacity is set to increase from around 2.05 million tonnes in 2017 to approximately 2.44 million tonnes in 2022. Innovative biopolymers such as PLA (polylactic acid) and PHAs (polyhydroxyalkanoates) are the main drivers of this growth in the field of bio-based, biodegradable plastics. PHAs are an important polymer family that has been in development for a while and that now finally enters the market at commercial scale, with production capacities estimated to triple in the next five years. These polyesters are 100% bio-based, biodegradable, and feature a wide array of physical and mechanical properties depending on their chemical composition. Production capacities of PLA are also predicted to grow by 50% by 2022 compared to 2017. PLA is a very versatile material that features excellent barrier properties and is available in high-performance PLA grades that are an ideal replacement for PS (polystyrene), PP (polypropylene), and ABS (acrylonitrile butadiene styrene) in more demanding applications.

Bio-based, non-biodegradable plastics, including the drop-in solutions bio-based PE (polyethylene) and bio-based PET (polyethylene terephthalate), as well as bio-based PA (polyamides), currently make up for around 56% (1.2 million tonnes) of the global bioplastics production capacities.

The production of bio-based PE is predicted to continue to grow as new capacities are planned to come online in Europe in the coming years. Intentions to increase production capacities for bio-based PET, however, have not been realised at the rate predicted in previous years. Instead, the focus has shifted to the development of PEF (polyethylene furanoate), a new polymer that is expected to enter the market in 2020. PEF is comparable to PET but 100% bio-based and is said to feature superior barrier and thermal properties, making it an ideal material for the packaging of drinks, food and non-food products. In 2022, bio-based PP is expected to enter the market on a commercial scale with a strong growth potential due to the widespread application of PP in a wide range of sectors.

Packaging on the top

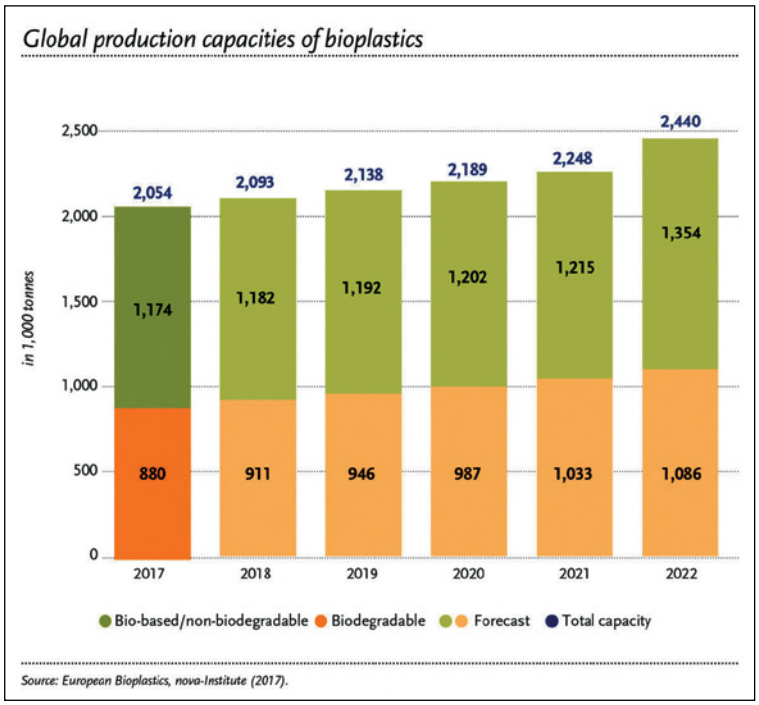
Packaging remains the largest field of application for bioplastics with almost 60% (1.2 million tonnes) of the total bioplastics market in 2017. The data also confirms that bioplastics materials are already being used in many other sectors, including textiles, consumer goods and applications in the automotive and transport sector and the agriculture and horticulture sector. With a view to regional capacity development, Asia remains a major production hub with over 50% of bioplastics currently being produced there. One fifth of the production capacity is located in Europe. This share is predicted to grow to up to 25% by 2022, with the European Commission's commitment to the transition to a circular economy model expected to accelerate the momentum of growth and development of the bioplastics industry in Europe.

The land used to grow the renewable feedstock for the production of bioplastics amounted to approximately 0.82 million hectares in 2017, which accounted for less than 0.02% of the global agricultural area of

5 billion hectares, 97% of which were used for pasture, feed and food. Despite the market growth predicted in the next five years, the land use share for bioplastics will remain around 0.02%. This clearly shows that there is no competition between the renewable feedstock for food, feed, and the production of bioplastics.

"Over the past ten years, the bioplastics industry has flourished and developed into a fast-growing innovative sector," says de Bie. "We are witnessing a growing number of major brands switching from fossil-based to bio-based materials or to offer biodegradable solutions for their products in response to the increased consumer demand for more sustainable products and an overall change in awareness about the impacts of consumption choices on the environment. The bioplastics industry is able to meet the increased demand as a result of substantial investments in research and development by the many innovative small and large companies that concentrate their strengths on the development of bio-based products designed with a circular economy in mind."

www.european-bioplastics.org



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Caps & closures for beverages to reach 1.5 trillion units in 2021

Global demand for caps and closures in beverage applications is projected to increase 3.5% annually to 1.5 trillion units in 2021. Among the most significant factors affecting the beverage industry overall is the shift in consumer preferences toward beverages that are healthy and convenient, with bottled water the primary beneficiary in volume terms. According to analyst Mike Richardson, "Premium beverages are also seeing outsized gains in developed markets."

These and other trends are presented in ***Global Caps & Closures Market, 9th Edition***, a new study from The Freedonia Group, a Cleveland-based industry research firm:

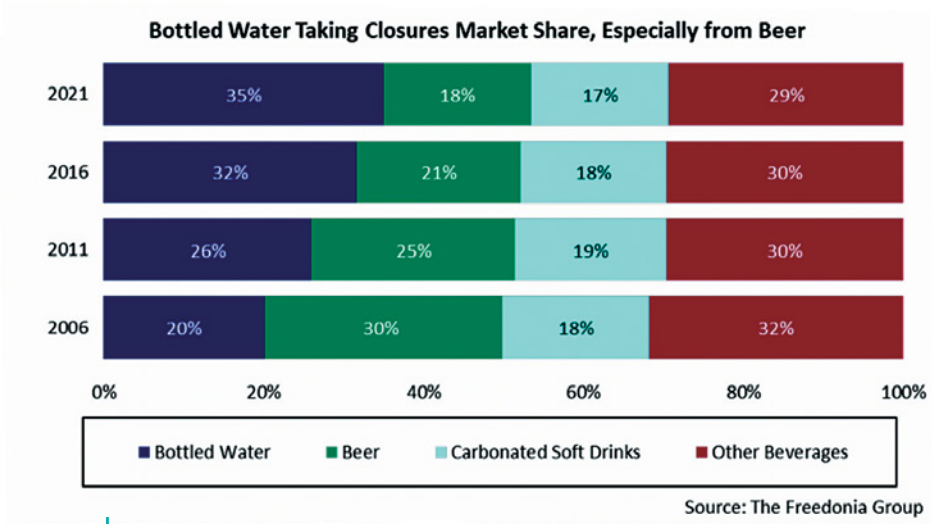
- The bottled water market for closures will register the strongest gains among major beverage types, especially in developing areas such as India and Indonesia.

- Sports and energy drinks, RTD coffee and tea, and other niche beverages are expected to register the fastest gains in production worldwide and have a greater tendency to use premium or unique packaging as a marketing tool.

Subpar gains are expected for beer, wine, and carbonated soft drinks (CSDs). The Asia/Pacific region will not only remain the most important regional market for caps and closures in beverage applications but will also see the fastest advances through the forecast period.

Plastic closures will experience rapid gains, reflecting the continued penetration of PET bottles – which mainly utilize plastic closures – in many beverage applications, particularly the sizable bottled water and CSD segments, although demand in value terms will be constrained to some extent by the commodity nature of most types of beverage closures.

Global Caps & Closures Market, 9th Edition (published 09/2017, 277 pages) is available for $6500 from The Freedonia Group, www.freedoniagroup.com



Global beverage caps & closures share of demand, 2006 – 2021.

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Global organic soy protein market

According to the report "Global Organic Soy Protein Market," published by **Market Data Forecast**, the market is projected to reach USD 805.82 million by 2021 from USD 375.50 million in 2016, at a CAGR of 16.5% from 2016 to 2021.

Since the 1960s, soy protein products have been used as nutritional and functional food ingredients in every food category available to the consumer. Modern agriculture has led to production of cereal crops sufficient to meet the world food energy requirements for the new century. However, protein supplementation of cereals is desirable in many instances because cereals have low protein contents and are imbalanced in essential amino acid composition.

As a result, cereal grains do not supply adequate protein for satisfactory growth of infants and children or for the bodily maintenance of adults. Soybean protein has been the subject of intense investigation and has played an increasing role in human nutrition over the last few decades. Soy protein products are an ideal source of some of the essential amino acids used to complement cereal proteins. At present, soy proteins are more versatile than many other food proteins in various worldwide nutritional programs. Soybeans have a long history as a protein foodstuff in Asia. Over the centuries Asians have developed a variety of soybean foods, including tofu, shoyu (soy sauce), miso, and tempeh. Processes include cooking, grinding, extracting, fermenting, and sprouting, which are normally employed for the development of these products. Cooking or dry heating destroys the trypsin inhibitor protein, which is difficult to digest. Heat treatment increases the digestibility of the protein and enhances the nutritional quality of soybeans.

Drivers & Restraints

The market for Organic Soy protein is mainly driven with increasing health awareness among the consumers, which is making them shift from dairy products which are rich in fat, to soy products, which are much healthier.

Also, the price of Soy products is comparatively cheaper than the other alternatives, which is one of the main reason for the high demand for Soy Protein products in the recent times. But, the high cost involved in the raw material processing and high production cost can dampen the market growth.

Overview

Soy protein concentrates can replace a significant percentage of other proteins in many food products without impacting the color, taste, or texture of the product, at the same time enhancing its nutritional value.

Thus, they are widely used as functional or nutritional ingredients in a wide variety of food products, mainly baked foods, breakfast cereals, and in some meat products. Organic soy protein isolates are gaining popularity among food manufacturers due to their clean label and non-allergy properties.

The dairy alternatives application of organic soy protein is expected to grow at a comparatively higher CAGR than other applications. The dairy alternatives segment is growing due to increasing demand for soymilk from lactose-intolerant consumers and rising awareness about the benefits of organic soy among consumers. The functional foods segment is estimated to lead the market, in terms of value, mainly due to the wide application of organic soy protein in functional foods. It is followed by meat alternatives applications in terms of market size.

Region-wise outlook

Geographically, Global market for Organic Soy Protein is segmented into North America, Asia Pacific, Latin America, Europe, and Africa & Middle-East. Europe leads the market contribution with over 33% market share, due to high demand for Soy Products in the European nations.

This is followed by North America, which is also indulging in shift to Soy from Dairy products. Asia-Pacific region is showing the fastest growth, with Soy gaining a great popularity due to which the demand is increasing rapidly.

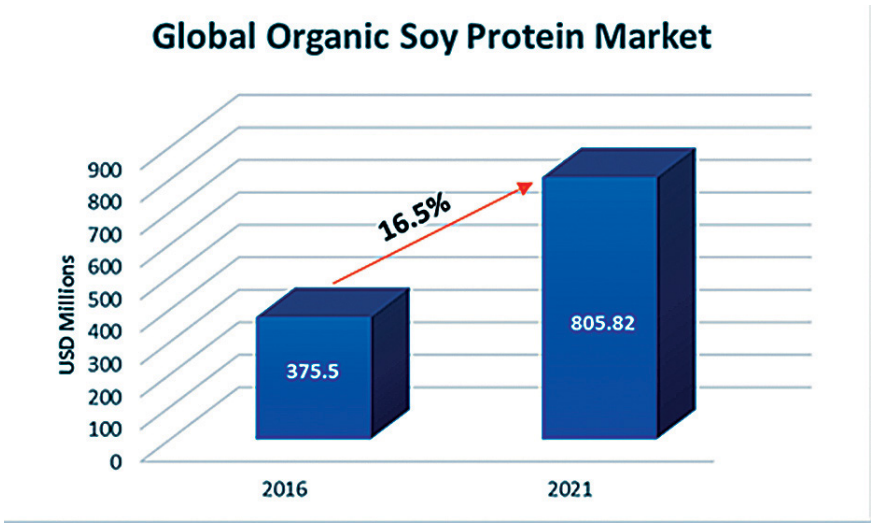
Key Players

The major players in this market include Harvest Innovations, Agrawal Oil & Biochem, Frank Food Products, The Scoular Company, Devansoy Inc., Biopress S.A.S., Natural Products Inc., Hodgson Mill, SunOpta, Inc., and World Food Processing.

This report contains global, regional and country-level analysis and forecasts of the study market, providing Insights on the geographical areas in which this industry is prospering; segment-level analysis on basis of product type, application, colour along with market size forecasts and y-o-y estimations to detect key areas of industry growth in detail; identification of key drivers, restraints, opportunities, and challenges (DROC) in the market and their impact on shifting market dynamics.

ABOUT MARKET DATA FORECAST

Market Data Forecast is a firm working in the area of market research and business intelligence. With rich experience in research across various business domains, they cater to the needs of both individual and corporate clients. From all-encompassing umbrella markets to extremely specific niche markets covering all the major regions across the globe as part of the research scope, their research services offer one of a kind specialities with competitive pricing options.



"Freshly baked": a desirable attribute

According the **latest report** by **Research and Markets** company, the global market for Bakery Products is projected to exceed US$570 billion by 2024, driven by transforming health, indulgence, and convenience needs of consumers across the world and the resulting popularity of healthy, organic, and all natural baked goods.

Once perceived as food of a sick man, bakery products comprising bread, breakfast cereals, biscuits, cakes and pastries, among others, eventually evolved to become important food items among a vast population globally.

These products are even witnessing increasing popularity among consumers in countries where rice has been a staple food for several decades. After sweeping through the developed economies, the convenience food trend is presently benefiting penetration through the developing economies.

Growth in the market is attributed to various factors including availability of broad range of products at reasonable price points, convenience of ready-to-eat products, rapid urbanization, hectic lifestyles, vast product offerings with different tastes and textures, and growing health benefits of baked goods over other food options. Bakery products with clean labels and health and wellness claims, frozen finished products and artisanal products are currently recording healthy growth with significant number of consumers, particularly millennials and health freaks, viewing a clean label as a key factor in their purchase decision making.

Future growth in the market will be driven by the ever-evolving health, indulgence, and convenience needs of the consumer. Transforming consumer trends over the years include the renewed interest in food preparation from the hitherto enjoyment of convenient processed food, and rising awareness about health and quality issues from the disconnected attitude towards food and food origins of previous decades.

Other major consumer trends influencing demand for bakery products include growing prominence of locally sourced, environment friendly, free-from, multi-grain and whole grain based baked goods that are low-fat, low calorie, organic, and enriched with vitamins and minerals; rising sophistication in flavour preferences; growing consumption of bread supported by robust demand for western styled bread products in majority of the populous Asian markets; and the gradual shift towards brown bread, whole wheat bread, multi grain bread and other healthy varieties.



Additional growth drivers benefiting market expansion in the near term include growing preference for fortified, functional, sugar-free, and gluten-free bakery products; and steady demand for doughnuts purely driven by the indulgence factor.

While bread continues to remain the most consumed bakery product worldwide, future demand is expected to be supported by cakes and pastries, which represent the fastest expanding category in the market. Demand for cakes and pastries is fuelled by indulgence, introduction of innovative flavours, and increasing penetration in some of the fastest growing regions such as Latin America and Asia-Pacific.

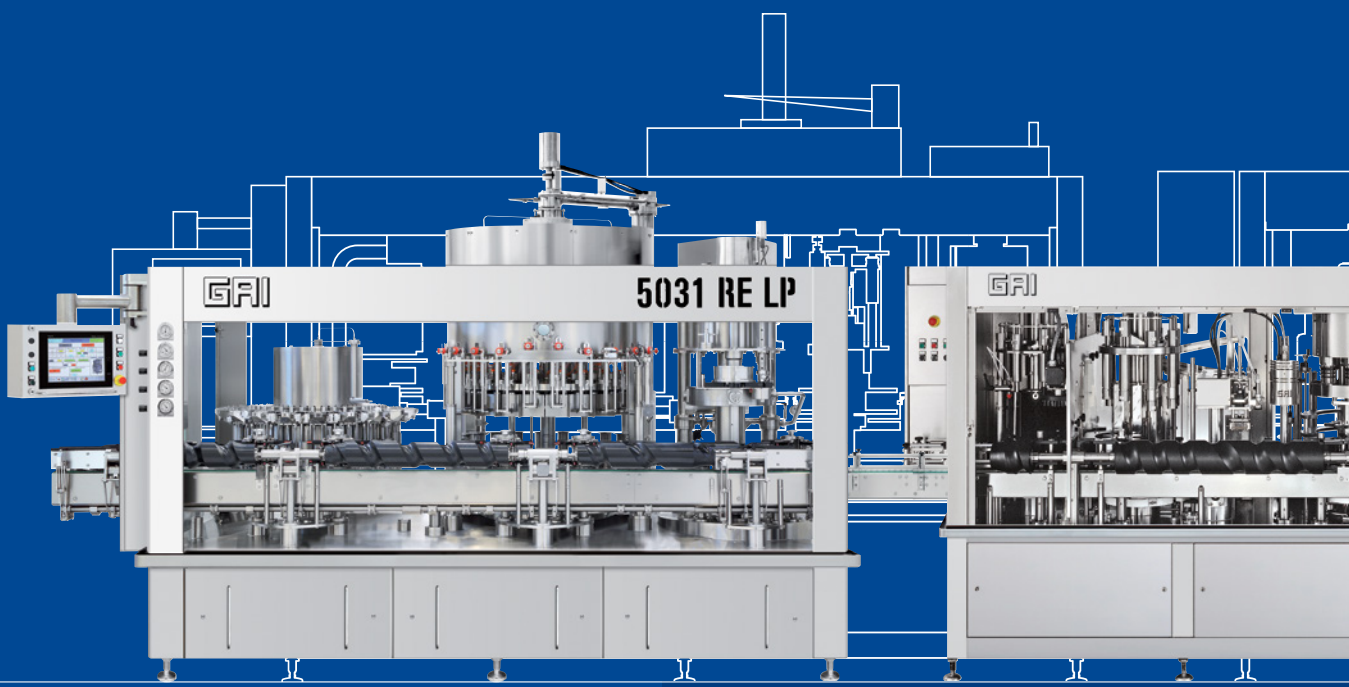
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Rising drinking culture will boost Chinese spirits

The rise of a drinking culture at Chinese social gatherings, along with increased disposable income among younger consumers, are set to drive the Chinese spirits market through a CAGR of 15% over 2016-21, says **GlobalData**, a recognized leader in business intelligence and analytics. According to its latest **report**, the market is expected to reach over $450 billion by 2021 from $205 billion in 2016.

In 2016, the Chinese spirits market held 32.8% of the global volume share and 52.3% of the Asia-Pacific regional volume share – and it is projected to reach 46.9% and 66.2% respectively by 2021. The volume of spirits consumption is expected to rise from 8.4 billion liters in 2016 to 16.9 billion liters in 2021, growing at a CAGR of 15%.

China's younger consumer base that drink on social occasions and the country's increasing number of female drinkers will play a key role in the years to come for the Chinese spirits market. Per capita spirits consumption in the country was pegged at 7.3 liters in 2016, nearly a full liter over the global average of 6.4 liters and 6.2 liters in the Asia-Pacific region. China's per capita spirits consumption is set to rise to 14.4 liters by 2021, according to the report.

GlobalData analyst Ryan Whittaker said: "The country's GDP has grown at a rate of around 7–8% in the last few years, which has increased disposable income, especially in more cosmopolitan urban areas. With more dispensable income, these Chinese consumers love to spend on social occasions, especially on drink."

Specialty Spirits are Chinese drinkers' favorite category compared to other sprit types; it accounted for 94.2% and 98.2% in terms of value and volume respectively in 2016. This large size is caused by the large amount of locally produced and China-specific spirits. The category, worth $193.3 billion in 2016, is set to grow further at 15.1% per year, dominating the overall spirits market to 2021.

Brandy was second in the market with a 3.9% value share and a 0.9% volume share, followed by Whiskey, Vodka, Gin and Genever, Tequila and Mezcal, Liqueurs and Rum. Of these trailing category, Tequila and Mezcal demonstrates the most notable signs of potential growth ahead, according to the report.

Whittaker added: "While the Tequila and Mezcal category is at the bottom in terms of value and volume, it will witness the fastest growth, rising at 21.6% over 2016–2021."

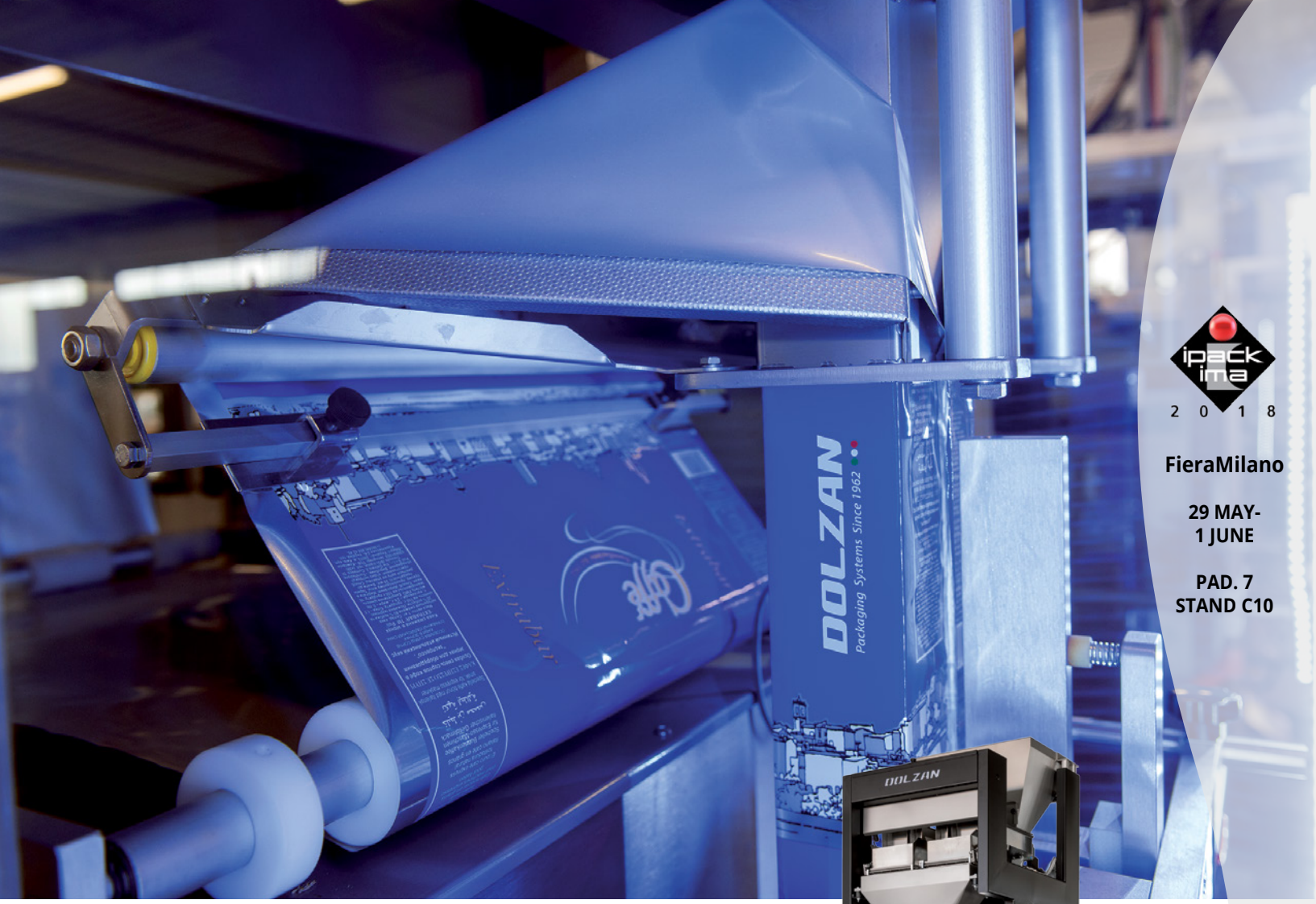
In 2016, every six in ten spirits consumers were male in China. Consumption was high among consumers with tertiary education, who accounted for 75.6% of the total, followed by 17.3% consumers with post-secondary education. In terms of geography, Spirits consumption is mostly concentrated in urban China with a significant share of 97.5%.

Whittaker concluded: "Rural China's consumption is almost negligible in all categories except Specialty Spirits. As the consumers were mostly from urban areas, hypermarkets and supermarkets emerged as the leading channel for spirits distribution in 2016, with a 54.4% share of volumes."

Beijing Red Star Co. Ltd, Niu Lan Shan Distillery and Jiangsu Yanghe Group Co.,Ltd are the market leaders in the Spirits sector of China, according to the report.

www.globaldata.com





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The key food driver for 2018

The increasingly thoughtful and mindful consumer will continue to catalyze changes in the way that companies produce, package and label their products. More conscious than ever about making responsible food choices, 4 in 10 US and UK consumers increased their consumption of "healthy foods," 7 in 10 want to know and understand the ingredient list, 1 in 5 in the US are most influenced by "real" ingredients, and ethical claims on packaging are top of mind. In response, better-for-you claims continue to be on-trend, having increased their market penetration from 42% in 2012 to 49% in 2017 YTD.

"Today's consumer displays a high level of mindfulness about well-being and the environment," reports Lu Ann Williams, Director of Innovation at Innova Market Insights, "so it is no surprise that consumers are becoming increasingly mindful in their food choices, wanting to know what is in their foods in order to make decisions about health, sustainability and ethical issues."

"Mindful Choices" leads the list of Innova Market Insights' Top Ten Trends for 2018, where the company continuously analyzes global developments in food and drinks launch activity and consumer research to highlight the trends most likely to impact the food and drinks industry over the coming year and beyond.

Innova Market Insights' top five trends for 2018 are:

Mindful Choices. Consumers are more conscious than ever about making responsible food choices, and increasingly want to know what is in their food and how it is produced. Innova Market Insights research data indicates that 1 in 2 US, UK and German consumers read ingredient labels often and that 7 out of 10 US and UK consumers want to know and understand ingredient lists. At the same time, rising levels of interest in ethical issues have resulted in the use of ethical claims for food and drink NPD soaring in recent years, with a CAGR of 44% over the 2011-2016 period.

Lighter Enjoyment. As consumers continue to look for ways to eat and drink more healthily, lightness in terms of alcohol content, sweetness, flavor, texture or even portion size is increasing its appeal, although definitely not at the expense of a familiar, high quality and indulgent taste profile.

Positively Processed. As consumers become more concerned about naturalness and minimal processing techniques, the industry is reviving traditional processes such as fermented foods and cold brew tea and coffee, alongside the development of new ones.

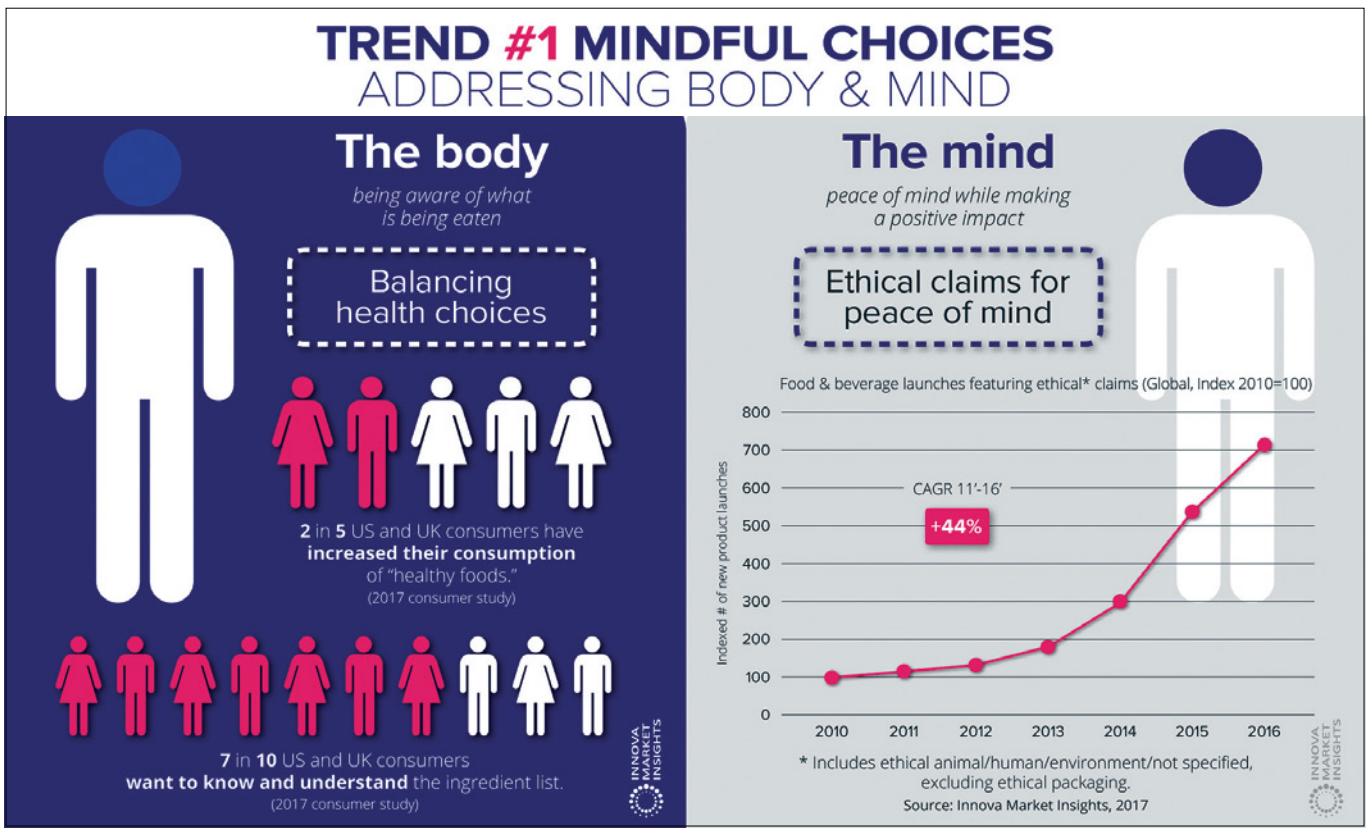
Going Full Circle. The notion of closing the circle is increasingly taking hold, with greater consumer expectation that companies and brands will be more resource-smart via developments such as tip-to-tail eating, innovative uses for food waste and more biodegradable and renewable packaging.

Beyond the Coffeehouse. While coffee is clearly trending among Millennial and Generation Z consumers, tea is also seeking to reinvent itself among the younger generations. With the taste and experiential associations of coffee and the healthy image of tea, the industry is increasingly using coffee and tea as ingredients and flavors outside the hot drinks and iced tea and coffee sub- categories across a wide variety of products as varied as energy bars, yogurt and jam.

The other trends identified by Innova Market Insights are:

Say it with Color
Dining Out, In
From Snacks to Mini Meals
Ocean Garden
Bountiful Choice

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Consumers see 'organic' and 'non-GM' food labels as synonymous



Consumers are confused between foods labelled as "organic" and "non-genetically modified," according to a new study led by a University of Florida. In fact, researchers found that some consumers view the two labels as synonymous.

When US Congress approved the National Bioengineered Food Disclosure Standard in June 2016, lawmakers allowed companies two years – until June 2018 – to label their genetically modified (GM) food by text, symbol or an electronic digital link such as a QR code. The QR code is a machine-readable optical label that displays information when scanned.

Besides QR codes, companies can label GM foods by adding words like: "contains genetically modified ingredients" in plain text on the packages, said Brandon McFadden, a UF/IFAS assistant professor of food and resource economics at the University of Florida, and lead author of the study published on ***Applied Economic Perspectives and Policy***, 2017.

McFadden and Purdue University agricultural economics professor Jayson Lusk conducted their research to find the best ways to communicate whether a food has GM ingredients. This research has implications for which foods consumers will buy, McFadden said.

To gauge consumers' willingness to pay for food labelled as GM vs. non-GM, researchers conducted a national survey of 1,132 respondents. Specifically, researchers wanted to know how much consumers were willing to spend on food labelled as "USDA Organic" vs. that labelled "Non-GMO Project Verified." Genetically modified material is not allowed in food labelled "USDA Organic," while "Non-GMO Project" means the food has no more than 0.9% GM characteristics, according to the study.

Researchers measured respondents' willingness to pay for a box of 12 granola bars and a pound of apples. Granola bars represent a manufactured food commonly differentiated by its absence of GM material, while apples are a fresh fruit that requires companies to tell if they contain GM material, the study said.

In this study, when consumers looked at packages of Granola bars labelled "non-GMO Project," they were willing to spend 35 cents more than for the boxes that had text that read, "contains genetically engineered ingredients." With the "USDA Organic" label, consumers were willing to pay 9 cents more. With apples, respondents were willing to pay 35 cents more for those labelled "non-GMO Project" and 40 cents more for those labelled "USDA Organic."

Participants' responses led McFadden to conclude that consumers don't distinguish definitions of the two food labels.

In addition to willingness to pay for GM- and non-GM foods, researchers wanted to know how QR codes impact choices for foods labelled as containing GM ingredients. They also wanted to know how much consumers were willing to pay for food labelled as GM if that information came from a Quick Response – or QR – code. Study results showed consumers are willing to pay more for genetically modified food if the information is provided by a QR code.

"This finding indicates that many of the study respondents did not scan the QR code," McFadden said. That's because if all respondents scanned the QR code, there would not be a significant difference in their willingness to pay, he said. Since there is a significant difference, one can assume that many respondents did not scan the QR code, McFadden said. "However, it is important to remember that this study is really a snapshot, and it is possible that over time, consumers will become more familiar with QR codes and be more likely to scan them," he said.









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Five strategies for harnessing the Good Carbs

Consumers' quest for better carbohydrates and fewer carbohydrates is creating a wealth of large and growing opportunities, even in the mass market, according to *10 Key Trends in Food, Nutrition and Health 2018*, the annual trends report from *New Nutrition Business*.

The trend is fuelled by emerging science – discussed in the media and online – that's associating carbs with health issues such as weight gain and blood sugar response. "Consumers are increasingly experimenting with lowering their carb intakes, or improving the carbs they eat, in the hopes of benefiting their health and/or their waistlines," says Julian Mellentin, author of the report.

In Spain, as many as 63% of consumers are regularly trying to eat fewer carbs, according to an NNB survey; in the UK, that figure is 48% and in Australia 47%.

And in North America, 36% of consumers believe they should eat less bread, pasta, potatoes and rice.

In Japan, food service operators are cutting carbs, with one restaurant chain kneading spinach and chlorella into noodles to lower their carb content by 25%.

"Companies are responding to these opportunities by adopting one or more of five strategies," says Mellentin. "The biggest of these strategies is Reformulation – not only substituting whole grains for refined wheat, for example, but offering gluten-free variants to take away a big digestive health issue that many consumers have with carbohydrates."

One area that is moving quickly is the re-formulation of pasta. Explore Cuisine is one of several companies offering pastas and noodles made not from wheat but from dried peas, beans, lentils and chickpeas.



Even the potato industry is experimenting with new low-carb varieties such as Lotatoes, successfully marketed in New Zealand by one of the country's biggest fruit and vegetable companies.

Some companies are going yet further in changing "bad" carbs into "good" carbs. Hamburg-based milling giant Good Mills has launched a new type of wheat that directly addresses consumer concerns about gluten and difficult-to-digest carbs. Called 2ab Wheat, it is free from gluten and addresses concerns about FODMAPs, a rapidly-emerging consumer concern.

Another powerful strategy that many companies are following is Greener Carbs. Convenient vegetables, and vegetables in forms that can be substituted for traditional carbohydrates, are the fruit of creative NPD and skilful food technology.

For the first time, vegetables can be as convenient as traditional carbs. For example:

- Green Giant in the US markets riced cauliflower (for use instead of rice) as well as spiralised vegetables and has massively expanded its range in 2017.
- Fazer, the Nordic bakery group, successfully markets bread with a 30% vegetable content.

The Good Carbs Bad Carbs trend shows that Key Trends often overlap with, and fuel, one another. Digestive Health, Plant-Based and Snackification are all connected to this trend.

Another trend that's a powerful driver of Good Carbs is Personalisation. Increasingly, people are going online, doing their own research and crafting their own eating style that they believe matches their needs as individuals. The belief that diet cannot be "one size fits all" is gaining ground.

For about 50% of the population, according to a survey by *New Nutrition Business*, the idea that each of us has unique nutritional and metabolic needs is becoming an accepted fact. These people, no matter what official dietary guidelines say, look upon carbs as a menu from which they feel free to select some as "good" and reject others as "bad".

This creates opportunities for companies willing to respond creatively to this much greater variety of needs and beliefs.

The 10 Key Trends for 2018 are:

1. Digestive Wellness – a long-term driver of growth
2. Good Carbs Bad Carbs – five strategies for growth
3. Plant-based – NPD and convenience transforms plants
4. Protein – a growing market for plant, dairy and meat sources
5. Personalisation and Fragmentation – where's the opportunity?
6. Beverages Redefined – sugar concerns drive opportunity
7. Sugar – four strategies for this new dietary demon
8. Fat – consumers' emerging embrace of fat gives the green light to taste
9. Snackification – a route to success that's central to strategy
10. Inflammation – an outlier trend that's rapidly gaining ground.

www.new-nutrition.com

Several reasons why whole grains are healthy

When overweight adults exchange refined grain products – such as white bread and pasta – with whole grain varieties, they eat less, they lose weight and the amount of inflammation in their bodies decreases. These are some of the findings of a large Danish study headed by the National Food Institute, Technical University of Denmark, and published on the journal ***Gut***.

The beneficial effect of eating whole grain instead of refined grain products is well documented. Epidemiological studies have shown that whole grain consumption decreases the risk of development of e.g. cardiovascular diseases.

In the most comprehensive study to date of its kind, researchers have studied the effect of exchanging refined grain products in the diet – such as white bread and pasta – with whole grain varieties. The National Food Institute headed the study, which was carried out in close cooperation with the Department of Nutrition, Exercise and Sports at the University of Copenhagen and DTU Bioinformatics. A large number of other researchers from Danish universities and hospitals additionally contributed to the study.

The study sheds light on why whole grains are healthy

Blood tests showed that the participants had less inflammation in their bodies when eating whole grains. In particular, it appeared that rye had a beneficial effect on the blood's content of inflammatory markers. Inflammation is the natural response of the body to an infection, but some people have slightly elevated levels of inflammation (so-called low-grade inflammation) even though there is no infection. This is particularly the case in overweight people. In overweight people, an increased level of 'unnecessary' (subclinical) inflammation may lead to increased risk of developing type 2 diabetes.



The study also shows that participants eat less when whole grain products are on the menu – presumably because whole grain consumption causes satiety. While eating the whole grain diet, participants have generally lost weight.

"Our analysis confirmed that there is a sound scientific basis for the dietary recommendation to eat whole grains. This may par-

ticularly apply to people, who are at increased risk of developing cardiovascular disease or type 2 diabetes," Professor Tine Rask Licht from the National Food Institute says.

"A good idea for future studies would be to examine the effect of various grain types," Tine Licht adds.

No significant changes in gut bacteria

The researchers used DNA sequencing to analyze stool samples from the participants in order to examine whether the different diet types affected the participants' gut bacteria composition. Overall, the analysis did not shown major effects of the dietary grain products on the composition of the gut bacteria.

"However, even though the analysis did not reveal significant changes in the average gut microbiota after whole grain consumption, it may well be that the individual composition of our gut microbes has an impact on the individual reaction of our body to dietary whole grains, given that our bacteria help us digest the fibres in the whole grains. This is something that further studies of our data may answer," Tine Rask Licht explains.

Eating nuts can reduce weight gain

A study recently published in the online version of the ***European Journal of Nutrition*** has found that people who include nuts in their diet are more likely to reduce weight gain and lower the risk of overweight and obesity.

The findings came to light after researchers at Loma Linda University School of Public Health and the International Agency for Research on Cancer (IARC) evaluated diet and lifestyle data from more than 373,000 individuals from 10 European countries between the ages of 25 and 70.



Senior investigator Joan Sabaté, MD, DrPH, director of the Center for Nutrition, Lifestyle and Disease Prevention at LLUSPH, said that many people have historically assumed that nuts – an energy-dense, high-fat food – are not a good choice for individuals who want to lose weight. The findings, however, contradict that assumption.

In their five-year study, Sabaté and junior investigator Heinz Freisling, PhD, a nutritional epidemiologist with the Nutritional Methodology and Biostatistics group at IARC headquarters in Lyons, France, found that participants gained a mean average of 2.1 kg during the five-year period of the study. However, participants who ate the most nuts not only had less weight gain than their nut-abstaining peers, but also enjoyed a 5% lower risk of becoming overweight or obese.

"To me, this confirms that nuts are not an obesogenic food," Sabaté said.

The pair of researchers has evaluated nuts in the past and found that they are positively associated with a variety of health benefits, including healthy aging and memory function in seniors. This study, however, represents the first time they have investigated the relationship between nuts and weight on a large scale. Peanuts, which are technically a ground nut, were included in the study along with almonds, hazelnuts, pistachios and walnuts, which are classified as tree nuts.

The team analyzed information on the dietary practices and body mass indexes of 373,293 participants, working with data gathered by the European Prospective Investigation into Cancer and Nutrition. Although Sabaté and Freisling extracted and analyzed the data and reported the findings, they were joined by 35 other research scientists from 12 European countries and Malaysia who reviewed the paper ahead of publication.

Sabaté recommends that people eat nuts more often, pointing out that they offer energy, good fats, protein, vitamins, minerals and phytochemicals.

"Eat nuts during your meal," he suggested. "Put them at the center of your plate to replace animal products. They're very satiating."

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Almonds may help boost cholesterol clean-up crew

Eating almonds on a regular basis may help boost levels of HDL cholesterol while simultaneously improving the way it removes cholesterol from the body.

In a study published in ***The Journal of Nutrition***, researchers from The Pennsylvania State University compared the levels and function of high-density lipoprotein (HDL cholesterol) in people who ate almonds every day, to the HDL levels and function of the same group of people when they ate a muffin instead. The researchers found that while participants were on the almond diet, their HDL levels and functionality improved.

Penny Kris-Etherton, distinguished professor of nutrition at Penn State, said the studybuilds on previous research on the effects of almonds on cholesterol-lowering diets. "There's a lot of research out there that shows a diet that includes almonds lowers low-density lipoprotein, or LDL cholesterol, which is a major risk factor for heart disease," Kris-Etherton said. "But not as much was known about how almonds affect HDL cholesterol, which is considered good cholesterol and helps lower your risk of heart disease."

The researchers wanted to see if almonds could not just increase the levels but also improve the function of HDL cholesterol, which works by gathering cholesterol from tissues, like the arteries, and helping to transport it out of the body.

"HDL is very small when it gets released into circulation," Kris-Etherton said. "It's like a garbage bag that slowly gets bigger and more spherical as it gathers cholesterol from cells and tissues before depositing them in the liver to be broken down."

In the controlled-feeding study, 48 men and women with elevated LDL cholesterol participated in two six-week diet periods. In both, their diets were identical except for the daily snack. On the almond diet, participants received 43 grams – about a handful – of almonds a day. During the control period, they received a banana muffin instead.

At the end of each diet period, the researchers measured the levels and function of each participant's HDL cholesterol. The researchers then compared the results to the participants' baseline measurements taken at the beginning of the study.

The researchers found that compared to the control diet, the almond diet increased α-1 HDL – when the particles are at their largest size and most mature stage – by 19%. Additionally, the almond diet improved HDL function by 6.4%, in participants of normal weight.

"We were able to show that there were more larger particles in response to consuming the almonds compared to not consuming almonds," Kris-Etherton said. "That would translate to the smaller particles doing what they're supposed to be doing. They're going to tissues and pulling out cholesterol, getting bigger, and taking that cholesterol to the liver for removal from the body."

An increase in this particular HDL subpopulation is meaningful, Kris-Etherton explained, because the particles have been shown to decrease overall risk of cardiovascular disease.

Kris-Etherton said that while almonds will not eliminate the risk of heart disease, they may be a smart choice for a healthy snack. She added that in addition to their heart-healthy benefits, almonds also provide a dose of good fats, vitamin E and fiber.

"If people incorporate almonds into their diet, they should expect multiple benefits, including ones that can improve heart health," Kris-Etherton said. "They're not a cure-all, but when eaten in moderation – and especially when eaten instead of a food of lower nutritional value – they're a great addition to an already healthy diet."



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Why high-fiber diets do not always lead to weight loss

In the era of personalized nutrition, there might be value in getting your stool tested and your gut bacteria counted before starting on a new diet. The results can be used to predict whether a particular diet will work for you. This follows a study in the ***International Journal of Obesity***, published by Springer Nature, which shows that the increasingly popular fibre-rich "New Nordic Diet" might not work for everyone. Its success depends on the particular combination of bacteria in the intestines of the dieter. The study was led by Mads Hjorth and Arne Astrup of the Department of Nutrition, Exercise and Sports at the University of Copenhagen in Denmark.

"These results are a breakthrough demonstrating that certain bacterial species play a decisive role in weight regulation and weight loss," explains Astrup. "Now we can explain why a high fibre diet does not always lead to weight loss. Human intestinal bacteria is an important part of the answer and will from now on play a role in the treatment of the overweight."

A group of 62 overweight participants were randomly assigned to follow either the "New Nordic Diet" or the "Average Danish Diet." These eating plans vary greatly in the volume of dietary fibre and wholegrain being consumed. The former is the more fibre-rich option and places greater emphasis on wholefoods such as vegetables and fruits. The participants' weight and body measurements were taken before and after they started their 26-week diets.

The results of their stool samples were used to divide participants into two different enterotype or gut bacteria groups. This was done based on the abundance of *Prevotella* bacteria types found in their intestines compared to *Bacteroides* species. About half of the group fell in the high volume *Prevotella*-to-*Bacteroides* group, whereas the other half were placed in the low ratio group. After the initial 26-week study period, all 62 participants followed the New Nordic Diet for another year.



On average, the 31 subjects who ate the New Nordic Diet for 26 weeks lost 3.5 kilograms, whereas the 23 subjects following the Average Danish Diet lost 1.7 kilograms. The New Nordic Diet worked best for participants in the high volume *Prevotella* group. They lost 3.15 kilograms more body fat when they followed the New Nordic Diet compared to the Average Danish Diet. Their waistlines also decreased more significantly, and their weight loss was maintained after following the diet for one year. The type of diet followed had no influence on how much weight participants in the low ratio group lost.

"People with a high *Prevotella*/*Bacteroides* ratio were more susceptible to body fat loss on a diet rich in fibre and wholegrain compared to an average Danish diet," Hjorth explains.

"The health promoting aspects of the New Nordic Diet in terms of body weight regulation seem mainly to apply to a subset of the population," he adds. "This could apply to as much as half of the population."

Hjorth says that research into the human gut microbiota is increasingly playing a role in personalizing nutrition. He believes that the two relatively stable groups or enterotypes of bacteria species into which people can be grouped could be valuable markers to predict whether specific diets will work for them or not.

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A fat-regulating enzyme could hold the key to obesity, diabetes and cancer

It had already been known that the enzyme known as phosphatidic acid phosphatase plays a crucial role in regulating the amount of fat in the human body. Controlling it is therefore of interest in the fight against obesity.

But scientists at Rutgers University-New Brunswick have now found that getting rid of the enzyme entirely can increase the risk of cancer, inflammation and other ills. Their findings were published online in the ***Journal of Biological Chemistry*** last month.

"The goal of our lab is to understand how we can tweak and control this enzyme," said George M. Carman, Board of Governors professor in the Department of Food Science in the School of Environmental and Biological Sciences. "For years, we have been trying to find out how to fine-tune the enzyme's activity so it's not too active, and creating too much fat, but it's active enough to keep the body healthy." The enzyme was discovered in 1957 and Gil-Soo Han, research assistant professor in the Rutgers Center for Lipid Research, discovered the gene encoding the enzyme in 2006. The enzyme determines whether the body's phosphatidic acid will be used to create fat, or create the lipids in cell membranes.

The study used baker's yeast as a model organism, since it also contains the key enzyme. Han, study lead author, deleted a gene in yeast to eliminate the enzyme. That led to accumulations of phosphatidic acid, with cells making far more membrane lipids than necessary, said Carman, who founded the center in Rutgers' New Jersey Institute for Food, Nutrition, and Health a decade ago.

"We have found that maybe a more critical role for the enzyme is to make sure that cells are not making too much membrane lipid," Carman said. "If you make too much membrane lipid, you make too much membrane and the cells are permitted to grow uncontrollably, a condition characteristic of cancer."

Since the discovery of the gene encoding the enzyme, people worldwide have studied the enzyme because of its relation to obesity, lipodystrophy, inflammation, diabetes and other conditions, Carman said.

Lately, the Rutgers scientists have been trying to understand the enzyme's structure and function. The next step is to figure out how to control it, Carman said.

"The key take-home message is that things have to be balanced," he said. "To keep the balance between making storage fat and membrane lipid, you have to have balanced diet."



Black tea may help with weight loss

UCLA researchers have demonstrated for the first time that black tea may promote weight loss and other health benefits by changing bacteria in the gut. In a study of mice, the scientists showed that black tea alters energy metabolism in the liver by changing gut metabolites. The research is published in the ***European Journal of Nutrition***.

The study found that both black and green tea changed the ratio of intestinal bacteria in the animals: The percentage of bacteria associated with obesity decreased, while bacteria associated with lean body mass increased.

Previous studies indicated that chemicals in green tea called polyphenols are absorbed and alter the energy metabolism in the liver. The new findings show that black tea polyphenols, which are too large to be absorbed in the small intestine, stimulate the growth of gut bacterium and the formation of short-chain fatty acids, a type of bacterial metabolites that has been shown to alter the energy metabolism in the liver.

"It was known that green tea polyphenols are more effective and offer more health benefits than black tea polyphenols since green tea chemicals are absorbed into the blood and tissue," said Susanne Henning, the study's lead author and an adjunct professor at the UCLA Center for Human Nutrition,

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which is part of the David Geffen School of Medicine at UCLA. "Our new findings suggest that black tea, through a specific mechanism through the gut microbiome, may also contribute to good health and weight loss in humans."

"The results suggest that both green and black teas are prebiotics, substances that induce the growth of good microorganisms that contribute to a person's well-being," she said.

Dr. Zhaoping Li, director of the UCLA Center for Human Nutrition, chief of the UCLA Division of Clinical Nutrition and the study's senior author, said the findings suggest that the health benefits of both green tea and black tea go beyond their antioxidant benefits, and that both teas have a strong impact on the gut microbiome.

"For black tea lovers, there may be a new reason to keep drinking it," she said.

The findings build on a 2015 UCLA study that demonstrated that both green tea and black tea helped prevent obesity in mice that consumed a high-fat, high-sugar diet.

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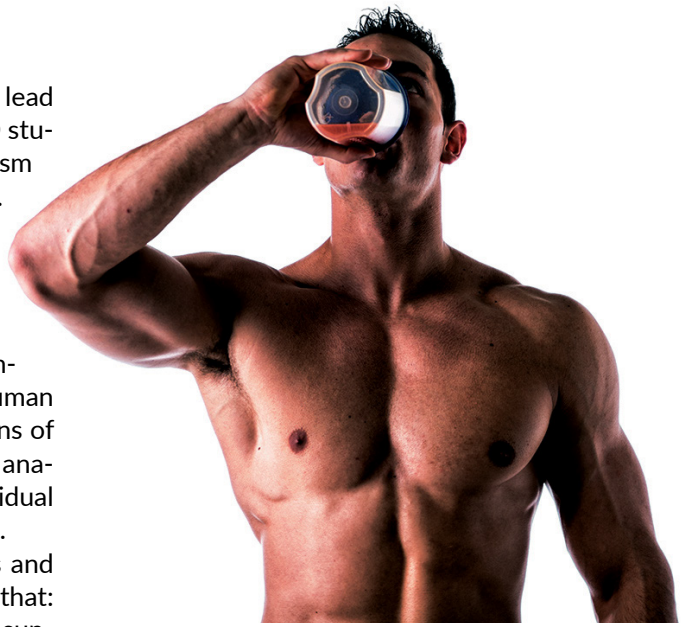
But the effects are not as big as some supplement companies would have you believe, cautions the senior author on the paper, Stuart Phillips, a professor of kinesiology at McMaster University, Canada.

The study, published online in the ***British Journal of Sports Medicine***, also suggests the benefits of protein supplements increase with resistance training experience but become less effective with older adults, pointing to a need for greater supplementation to reach optimal results as we age. But there is a limit to the amount of protein that is beneficial, plateauing at roughly 1.6 grams of dietary protein per kilogram of bodyweight per day.

The study is the largest meta-analysis of its kind and researchers say the study provides clarity after conflicting results from previous studies.

"There have been mixed messages sent to clinicians, dieticians, and ultimately practitioners about the efficacy of protein supplementation," says Robert Morton, lead author on the study and a PhD student in the Exercise Metabolism Research Group at McMaster. "This meta-analysis puts that debate to rest." Researchers combed through thousands of studies searching for specific criteria, including randomized controlled trials, human participants and study durations of at least six weeks. In all, they analyzed 49 high-quality individual studies with 1863 participants.

In addition to muscle mass and strength gains, they also found that: the effectiveness of protein supplementation during weight training is equal in women, not affected by the protein source-a whey protein supplement versus a steak, for example-nor the time of day the protein is taken, such as at regular meal times versus post-workout. One thing the researchers noted was that with increasing age there was a reduced effectiveness of protein supplementation.



"Protein intake is critical for muscle health and there is mounting research that suggests the recommended dietary allowance, of 0.8 g protein per kg per days, is too low," says Morton. "We will see more and more research, especially as our populations age, challenging that number."

Milk-alternative drinks do not replace the iodine in cows' milk

Consumers of milk-alternative drinks may be at of risk iodine deficiency, according to the findings of a new study in the ***British Journal of Nutrition***.

In the first study of its kind in the United Kingdom, researchers from the University of Surrey examined the iodine content of 47 milk-alternative drinks (including soya, almond, coconut, oat, rice, hazelnut and hemp, but excluding those marketed specifically at infants and children) and compared it with that of cows' milk.

Researchers discovered that the majority of milk-alternative drinks did not have adequate levels of iodine, with concentration levels found to be around 2% of that found in cows' milk. Cows' milk and dairy products are the main source of iodine in the UK diet however findings from the study show that most milk-alternative drinks are not an adequate substitute.

Iodine is required to make thyroid hormones, and is particularly important during pregnancy as it is essential for normal fetal brain development. Previous research in this area by the University of Surrey has shown that low iodine status in pregnant mothers is linked to lower IQ and reading scores in their children (up to 9 years of age).

Margaret Rayman, Professor of Nutritional Medicine at the University of Surrey, said: "Many people are unaware of the need for this vital dietary mineral and it is important that people who consume milk-alternative drinks realise that they will not be replacing the iodine from cows' milk which is the main



UK source of iodine. This is particularly important for pregnant women and those planning a pregnancy.

"A glass of a milk-alternative drink would only provide around 2 µg of iodine which is a very small proportion of the adult recommended iodine intake of 150 µg/day. In pregnancy, that recommendation goes up to 200 µg/day."

Dr Sarah Bath, Lecturer in Public Health Nutrition at the University of Surrey and registered dietitian, said: "Milk-alternative drinks are increasingly being used as a replacement for cows' milk for a number of reasons that obviously include allergy or intolerance to cows' milk.

"Worryingly, most milk-alternative drinks are not fortified with iodine and their iodine content is very low. If avoiding milk and dairy products, consumers need to ensure that they have iodine from other dietary sources, where possible. More information on good iodine sources such as white fish can be found in the British Dietetic Association Iodine Food Fact Sheet. If considering taking an iodine supplement, they should avoid kelp which can provide excessive amounts of iodine."

The milk-alternative samples were analysed at LGC, the UK's National Measurement Laboratory for chemical and bio-measurement. Dr Sarah Hill, Science Leader in Inorganic Analysis at LGC said: "Reliable methods to test food samples for minerals, such as iodine, are invaluable to nutrition research. As a metrology institute, one of our key missions is the provision of reference methods and materials that underpin validation of field laboratory measurements. This ensures that high quality data are generated to support researchers in these important studies."

Paleolithic diet healthier for overweight women

Overweight women after menopause who eat a Paleolithic diet can maintain weight loss in the long term. The levels of risk factors of type 2 diabetes and cardiovascular diseases also decrease. This according to a **study** at Umeå University in Sweden.

"The results are remarkable. Despite giving the women free reigns to an unlimited intake, the weight loss was stable after two years. A more significant fact than weight loss was the evident improvement in levels of fat in the blood, and signs of reduced inflammation," says Caroline Blomquist, doctoral student at the Department of Public Health and Clinical Medicine at Umeå University.

In her doctoral dissertation, Caroline Blomquist has spent two years following a group of 70 postmenopausal women with a body mass index exceeding 27, that is, overweight women after menopause. Half of the women held a diet according to Nordic Nutrition Recommendations whilst the other half followed a Paleolithic diet. Neither groups had any specific restrictions in the amount they were allowed to consume, the restrictions solely revolved around the composition of the diet. The follow ups took place after six months and again after two years.

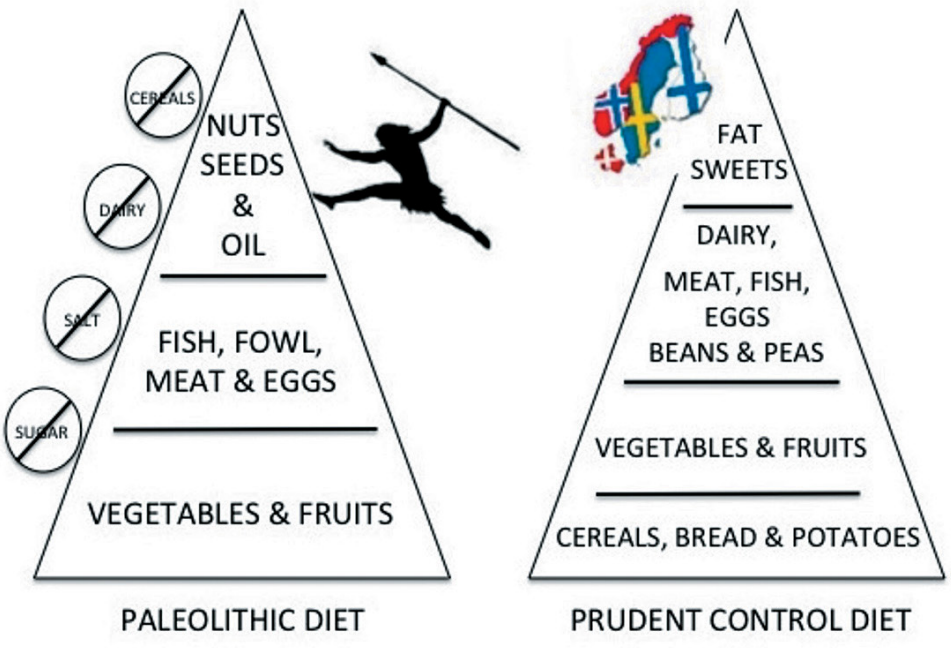
The results show that both groups lost weight. The women who had kept to a Paleolithic diet on average dropped from 87 to 78 kg, compared with a drop from 86 to 80 kg for the group that followed the Nordic Nutrition Recommendations. The weight loss in both dietary groups also contributed to reduced inflammation in both fat tissue and in the circulation.

The women who followed the Paleolithic diet had a significant reduction in unhealthy abdominal fat. In particular, evidently reduced levels of certain fatty acids and blood fats could be seen, which is of importance to the development of type 2 diabetes and cardiovascular disease. You could also see that the enzymes involved in fat storage were less active in the Paleolithic group.

"In conclusion, the study shows that the Paleolithic diet with a high proportion of unsaturated fats was healthier for this group of women, even if the Nordic Nutrition Recommendations also had positive health effects," says Caroline Blomquist.

The Paleolithic diet is characterised by a high intake of protein and unsaturated fats and has a low glycemic index. The diet consists mainly of vegetables, lean meats, fish, poultry, eggs, shellfish, seeds, nuts, oils and fruit. The biggest difference to the Nordic Nutrition Recommendations is that the Paleolithic diet excludes cereals, milk, refined sugars and added salt.

Postmenopausal women have an increased risk of obesity, for instance due to the reduction of oestrogen production in combination with an elevated energy intake and reduced physical activity.



Food pyramids that indicate the relative proportions of foods included in the two diets studied.

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Mushrooms are full of antioxidants that may have antiaging potential

Mushrooms may contain unusually high amounts of two antioxidants that some scientists suggest could help fight aging and bolster health, according to a team of Penn State researchers.

In a study published on **Food Chemistry**, researchers found that mushrooms have high amounts of the ergothioneine and glutathione, both important antioxidants, said Robert Beelman, professor emeritus of food science and director of the Penn State Center for Plant and Mushroom Products for Health. He added that the researchers also found that the amounts the two compounds varied greatly between mushroom species.

"What we found is that, without a doubt, mushrooms are highest dietary source of these two antioxidants taken together, and that some types are really packed with both of them," said Beelman.

Beelman said that when the body uses food to produce energy, it also causes oxidative stress because some free radicals are produced. Free radicals are oxygen atoms with unpaired electrons that cause damage to cells, proteins and even DNA as these highly reactive atoms travel through the body seeking to pair up with other electrons.

Replenishing antioxidants in the body, then, may help protect against this oxidative stress.

"There's a theory -- the free radical theory of aging -- that's been around for a long time that says when we oxidize our food to produce energy there's a number of free radicals that are produced that are side products of that action and many of these are quite toxic," said Beelman. "The body has mechanisms to control most of them, including ergothioneine and glutathione, but eventually enough accrue to cause damage, which has been associated with many of the diseases of aging, like cancer, coronary heart disease and Alzheimer's."

According to the researchers, who report their findings in a recent issue of *Food Chemistry*, the amounts of ergothioneine and glutathione in mushrooms vary by species with the porcini species, a wild variety, containing the highest amount of the two compounds among the 13 species tested.

"We found that the porcini has the highest, by far, of any we tested," said Beelman. "This species is really popular in Italy where searching for it has become a national pastime."

The more common mushroom types, like the white button, had less of the antioxidants, but had higher amounts than most other foods, Beelman said.

The amount of ergothioneine and glutathione also appear to be correlated in mushrooms, the researchers said. Mushrooms that are high in glutathione are also high in ergothioneine, for example.

Cooking mushrooms does not seem to significantly affect the compounds, Beelman said. "Ergothioneine are very heat stable," said Beelman.

Beelman said that future research may look at any role that ergothioneine and glutathione have in decreasing the likelihood of neurodegenerative diseases, such as Parkinson's disease and Alzheimer's disease.

"It's preliminary, but you can see that countries that have more ergothioneine in their diets, countries like France and Italy, also have lower incidents of neurodegenerative diseases, while people in countries like the United States, which has low amounts of ergothioneine in the diet, have a higher probability of diseases like Parkinson's Disease and Alzheimer's," said Beelman. "Now, whether that's just a correlation or causative, we don't know. But, it's something to look into, especially because the difference between the countries with low rates of neurodegenerative diseases is about 3 milligrams per day, which is about five button mushrooms each day."



Fructan, not gluten, responsible for upsetting people's stomachs



A team of researchers with several members from the University of Oslo in Norway and one with Monash University in Australia has found that the familiar bloating many people experience after eating foods containing wheat may be due to sensitivity to fructan, not gluten, as is commonly believed. In their paper published in the journal ***Gastroenterology***, the group describes experiments they conducted with volunteers eating foods with and without fructan and gluten and what they found.

Having a sensitivity to gluten has become a trend of sorts—some people (as much as 13% of the population) experience bloating after eating foods that contain it, and because of that, seek foods such as gluten-free bread and pasta that are just as good. But now, it appears the blame for such bloating might be misplaced. Instead of looking for gluten-free foods, people many soon be looking for fructan-free foods.

Fructan is a type of carbohydrate found in wheat and also in other foods such as onions, garlic and some other vegetables. Prior research has found a possible link between fructan and symptoms of irritable bowel syndrome. Because of that, the researchers wondered if it might be behind some other less-problematic digestive problems. To find out, they enlisted the assistance of 59 people who had self-diagnosed themselves with gluten intolerance—each was given muesli bars to eat over the course of several weeks and to write down any symptoms they experienced. Some of the bars had gluten, some had fructan and some had neither.

Afterward, the researchers studied the records kept by the volunteers and found that they experienced the familiar bloating only when eating the bars with fructan—they were fine when eating the controls and the bars with gluten. This, the researchers contend, suggests that it is fructan, not gluten that is causing widespread bowel problems.

This is an important distinction, they also note, because some recent research has found that people who put themselves on a gluten-free diet may be at an increased risk of developing type 2 diabetes.

Lemon juice could protect liver from excessive alcohol consumption

Chronic excessive alcohol consumption (more than 40–80 g/day for males and more than 20–40 g/day for females) could induce serious liver injury.

A team of Chinese researchers evaluated the effects of lemon juice on chronic alcohol-induced liver injury in mice and the results were published on **BioMed Research International** journal.

The serum biochemical profiles and hepatic lipid peroxidation levels, triacylglycerol (TG) contents, antioxidant enzyme activities, and histopathological changes were examined for evaluating the hepatoprotective effects of lemon juice in mice. In addition, the *in vitro* antioxidant capacities of lemon juice were determined.

The results showed that lemon juice significantly inhibited alcohol-induced increase of alanine transaminase (ALT), aspartate transaminase (AST), hepatic TG, and lipid peroxidation levels in a dose-dependent manner. Histopathological changes induced by alcohol were also remarkably improved by lemon juice treatment. These findings suggest that lemon juice has protective effects on alcohol-induced liver injury in mice. The protective effects might be related to the antioxidant capacity of lemon juice because lemon juice showed *in vitro* antioxidant capacity.



Whole eggs better for muscle building and repair than egg whites

People who consume 18 grams of protein from whole eggs or from egg whites after engaging in resistance exercise differ dramatically in how their muscles build protein, a process called protein synthesis, during the post-workout period. Specifically, the post-workout muscle-building response in those eating whole eggs is 40% greater than in those consuming an equivalent amount of protein from egg whites, the team found.

The discovery, reported in the ***American Journal of Clinical Nutrition***, suggests that the widespread practice of throwing away egg yolks to maximize one's dietary protein intake from eggs is counterproductive, said Nicholas Burd, a University of Illinois (Usa) professor of kinesiology and community health who led the research.

The yolks also contain protein, along with key nutrients and other food components that are not present in egg whites, Burd said. And something in the yolks is boosting the body's ability to utilize that protein in the muscles.

"This study suggests that eating protein within its most natural food matrix tends to be more beneficial to our muscles as opposed to getting one's protein from isolated protein sources," he said.

In the study, 10 young men engaged in a single bout of resistance exercise and then ate either whole eggs or egg whites containing 18 grams of protein. Researchers administered infusions of stable-isotope-labelled leucine and phenylalanine (two important amino acids) to participants. This allowed the scientists to maintain and precisely measure amino acid levels in participants' blood and muscles.

The U. of I. Poultry Research Farm developed eggs for the study that also were isotopically labelled with leucine. This allowed for precise tracking of where the food-derived amino acids ended up after participants ingested them.

The team took repeated blood and muscle biopsy samples to assess how the egg-derived amino acids were appearing in the blood and in protein synthesis in muscles before and after the resistance exercise and eating.

"By using those labelled eggs, we saw that if you ate the whole egg or the egg whites, the same amount of dietary amino acids became available in your blood," Burd said. "In each case, about 60 to 70% of the amino acids were available in the blood to build new muscle protein. That would suggest that getting one's protein from whole eggs or just from the whites makes no difference, as the amount of dietary amino acids in the blood after eating generally gives us an indication of how potent a food source is for the muscle-building response."

But when the researchers directly measured protein synthesis in the muscle, they found a very different response. "We saw that the ingestion of whole eggs immediately after resistance exercise resulted in greater muscle-protein synthesis than the ingestion of egg whites," Burd said.

"There's a lot of stress on protein nutrition in modern society, and research is showing that we need more protein in the diet than we once thought to maintain health," Burd said. "As world population grows, we need cost-effective and sustainable strategies for improving the use of protein in the diet. This work is showing that consuming egg protein in its natural matrix has a much greater benefit than getting isolated protein from the same source."





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Dietary fiber protects against obesity and metabolic syndrome

Consumption of dietary fiber can prevent obesity, metabolic syndrome and adverse changes in the intestine by promoting growth of "good" bacteria in the colon, according to a study led by Georgia State University.

The researchers found enriching the diet of mice with the fermentable fiber inulin prevented metabolic syndrome that is induced by a high-fat diet, and they identified specifically how this occurs in the body. Metabolic syndrome is a cluster of conditions closely linked to obesity that includes increased blood pressure, high blood sugar, excess body fat around the waist and abnormal cholesterol or triglyceride levels. When these conditions occur together, they increase a person's risk of heart disease, stroke and diabetes.

Obesity and metabolic syndrome are associated with alterations in gut microbiota, the microorganism population that lives in the intestine. Modern changes in dietary habits, particularly the consumption of processed foods lacking fiber, are believed to affect microbiota and contribute to the increase of chronic inflammatory disease, including metabolic syndrome. Studies have found a high-fat diet destroys gut microbiota, reduces the production of epithelial cells lining the intestine and causes gut bacteria to invade intestinal epithelial cells.

This study found the fermentable fiber inulin restored gut health and protected mice against metabolic syndrome induced by a high-fat diet by restoring gut microbiota levels, increasing the production of intestinal epithelial cells and restoring expression of the protein interleukin-22 (IL-22), which prevented gut microbiota from invading epithelial cells. The findings are published in the journal ***Cell Host & Microbe***.

"We found that manipulating dietary fiber content, particularly by adding fermentable fiber, guards against metabolic syndrome," said Dr. Andrew Gewirtz, professor in the Institute for Biomedical Sciences at Georgia State. "This study revealed the specific mechanism used to restore gut health and suppress obesity and metabolic syndrome is the induction of IL-22 expression. These results contribute to the understanding of the mechanisms that underlie diet-induced obesity and offer insight into how fermentable fibers might promote better health."

For four weeks, the researchers fed mice either a grain-based rodent chow, a high-fat diet (high fat and low fiber content with 5 percent cellulose as a source of fiber) or a high-fat diet supplemented with fiber (either fermentable inulin fiber or insoluble cellulose fiber). The high-fat diet is linked to an increase in obesity and conditions associated with metabolic syndrome.

They discovered a diet supplemented with inulin reduced weight gain and noticeably reduced obesity induced by a high-fat diet, which was accompanied by a reduction in the size of fat cells. Dietary enrichment with inulin also markedly lowered cholesterol levels and largely prevented dysglycemia (abnormal blood sugar levels). The researchers found insoluble cellulose fiber only modestly reduced obesity and dysglycemia.

Supplementing the high-fat diet with inulin restored gut microbiota. However, inulin didn't restore the microbiota levels to those of mice fed a chow diet. A distinct difference in microbiota levels remained between mice fed a high-fat diet versus those fed a chow diet. Enrichment of high-fat diets with cellulose had a mild effect on microbiota levels. In addition, the researchers found switching mice from a grain-based chow diet to a high-fat diet resulted in a loss of colon mass, which they believe contributes to low-grade inflammation and metabolic syndrome. When they switched mice back to a chow diet, the colon mass was fully restored.



Gut feeling: digestive health tops nutraceutical agenda



Digestive health has hit the top of the nutraceutical industry's agenda for the first time, a new survey shows. Experts have attributed the findings to growing consumer awareness of the importance of healthy gut microbiota, and of the potential of probiotics.

The organisers of **Vitafoods Europe** asked 220 nutraceutical industry professionals to choose the three most important health benefit areas for their companies. Nearly a quarter (23%) named digestive health, with the same number identifying general well-being and healthy ageing. Another 22% named cardiovascular health, while 21% said immunity was a key area.

Consumer awareness driving probiotic boom

The importance placed on digestive health reflects the current boom in the global probiotic industry, which is expected to reach a value of €53 billion by 2023. In the US, the number of products promoting probiotic content grew from below 100 in 2002 to nearly 1,800 in 2016.

Experts attribute this to growing consumer awareness and demographic changes. "The rapid growth of the global probiotics market is due to increased interest in functional foods, as well as rising incidence of digestive and gastrointestinal disorders" said Rosanna Pecere, Executive Director of the International Probiotics Association Europe. "Consumers are becoming more aware that a well balanced microbiota is essential for the normal functioning of the body, and they're looking for ways to ensure that the correct balance is maintained."

"Growth in the functional food and beverage market has also been driven by consumer interest in healthy living" said Dr. Yiannis Kourkoutas of the Department of Molecular Biology and Genetics at Democritus University of Thrace, who will be discussing the potential of probiotics at Vitafoods Europe 2018. "This is particularly true among younger demographics, but population ageing has also been conducive to sector expansion."

Research reveals importance of microbiome

The importance of the microbiome, and the potential of probiotics, are supported by increasing scientific evidence. Dr. Kourkoutas said "Thanks to large-scale research efforts, we now know the composition of gut microbiota is associated with a growing number of diseases. There is a large body of evidence supporting the concept that the maintenance of healthy gut microbiota provides protection against a range of problems – not just local gastro-intestinal disorders, but also neurological, respiratory, cardiovascular, and even mental illnesses."

He added: "The role of probiotics is unique in the development of healthy digestive function. Daily intake of dietary products fortified with probiotic cultures may stimulate the growth of preferred microorganisms, crowd out harmful bacteria, and reinforce the body's natural defence mechanisms. Probiotics can be exploited to manipulate the gut microbiota with beneficial effects for health, including reduced symptoms of lactose intolerance and lower risk of certain cancers."

Vitafoods Europe explores probiotic opportunities

This year's **Vitafoods Europe** (15-17 May 2018 in Palexpo, Geneva) will have a particular focus on digestive health. In the Education Programme the Probiotics R&D Forum, sponsored by DuPont Health & Nutrition, will explore challenges such as ways to incorporate beneficial bacteria into a food matrix.

The Vitafoods Europe Probiotics Resource Centre, in association with the International Probiotics Association (IPA), will also include new product showcases, a guide including a probiotics discovery trail, a presentation theatre, digital iPad presentations, and infographics showcasing the latest market statistics

Curcumin may help memory and mood

A study by researchers from UCLA and published in the American Journal of Geriatric Psychiatry suggests that twice daily supplementation with curcumin can lead to significant memory and mood improvements in adults with mild age-related memory loss.

Curcumin is a compound derived from turmeric has been shown to have anti-inflammatory and antioxidant properties with previous studies indicating lower incidence of Alzheimer's disease in Indian adults consuming curcumin daily as part of their normal diet.

This current study indicates that previous studies investigating the effect of curcumin on Alzheimer's have not looked at *in vivo* effects of curcumin on amyloid plaques and tau tangles, hallmarks of Alzheimer's disease. The team developed a technique, FDDNP-PET, which provide FDDNP binding scores and which have been shown to be significantly higher for selected brain areas in Alzheimer's patients when compared to patients with healthy aging and mild cognitive impairment (MCI). Lower cognitive scores have also been shown to be "associated with higher FDDNP binding in brain regions that control thinking and memory". In addition, Small et al. wanted to investigate the effects of a form of curcumin known to have higher bioavailability than often used.

Small et al. recruited 40 adults aged 50- 90 years who at baseline had cognitive performance scores consistent with normal ageing or who had mild neurocognitive disorder (MCI) but not dementia or Alzheimer's disease. The study randomly assigned participants to either receive Theracurmin, containing 90 mg curcumin (21 subjects), or a placebo (19 subjects) twice daily for a period of 18 months. The researchers indicate that the treatment groups "did not differ significantly in baseline demographic variables, age, sex ratio, proportion with MCI" or in assessment scores though they did differ in educational achievement. Small et al. note that at baseline, the free curcumin levels for all participants was 0 ng/ml while after 18 months the mean level was 26.2 ng/ml (ranging from 3.0 to 67.3 ng/ml) for the curcumin group and 0.1 ng/ml (range 0 to 1.2 ng/ml) for the placebo group. The researchers state this shows the participants adherence to the supplementation regime.



In cognitive tests, the curcumin group showed a statistically significant change in primary verbal memory scores (change of 20.3) while the placebo group showed no significant change (change of 1.9). In primary visual memory tests, the curcumin group again saw a significant improvement while the placebo group showed no such improvement although the change was not statistically significant. For attention measure tests and depression scores the curcumin group showed significant improvements for both while the placebo group showed no significant change and no change respectively. Following FDDNP-PET scans of participants after 18 months, Small et al report that in the amygdala, a region of the brain shown to play a key role in processing of emotions, binding levels significantly decreased in the curcumin group while there was no significant change the placebo. In the hypothalamic region, the curcumin group showed no significant change while in the placebo group a significant increase in binding values was seen.

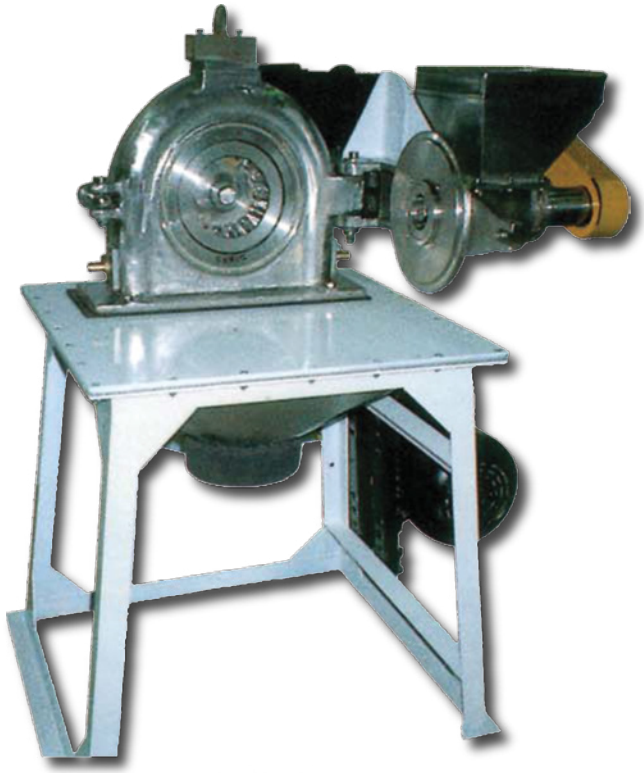
In discussion, Small et al. reiterate that their findings show that "daily oral ingestion of a bioavailable and safe form of curcumin improves memory performance over an 18-month period in middle-aged and older non-demented adults". They also state that such supplementation may lead to "less neuropathological accumulation in the amygdala and hypothalamus".

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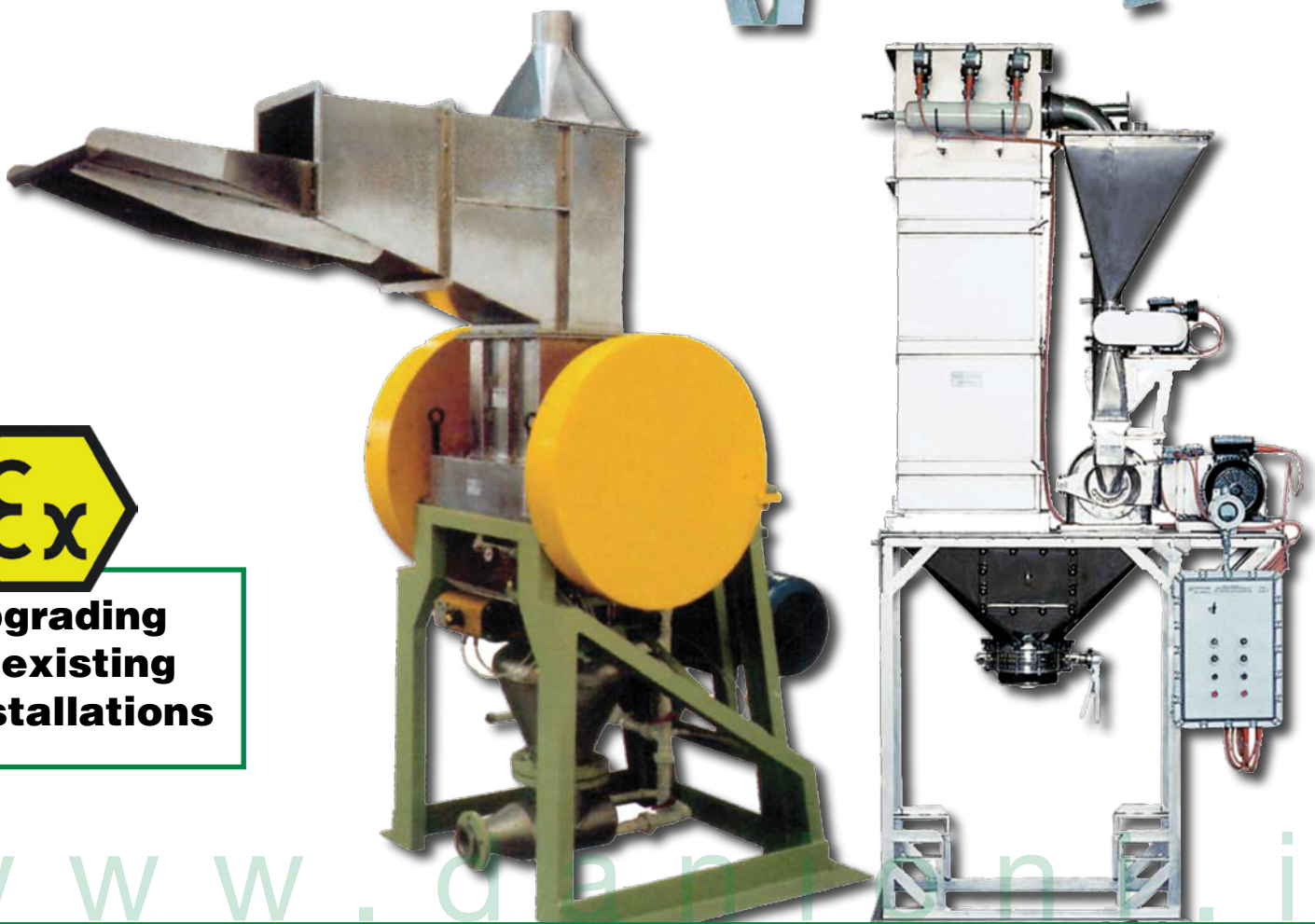
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Millennials embrace coconut as a healthy food ingredient

Once shunned for its high saturated-fat content, coconut has been reborn aas a star ingredient of better-for-you foods and beverages.

Today Millennials largely perceive coconut as a naturally healthy food, and say it's one of the main reasons they purchase coconut-based food products, new research by ***New Nutrition Business*** shows.

In a series of focus groups, people aged 24-33 from 13 different countries tasted several coconut-based milks, yoghurts, snacks and an ice-cream, and discussed their opinions.

Most of the participants liked the taste of coconut, with many expressing surprise at how much they enjoyed coconut-based products. The overwhelming opinion was that coconut was best combined with other flavours, preferably sweet ones.

The most appealing categories for coconut were bakery and confectionery, while coconut-based yoghurts were the least well-received. These results reveal a gap in the market and an opportunity for companies to develop coconut yoghurts.

Coconut-based dairy alternatives were popular among both dairy-avoiders and regular milk consumers, indicating that companies should target dairy-free products with coconut at a wider audience than dairy-avoiders, and highlight taste as a benefit.

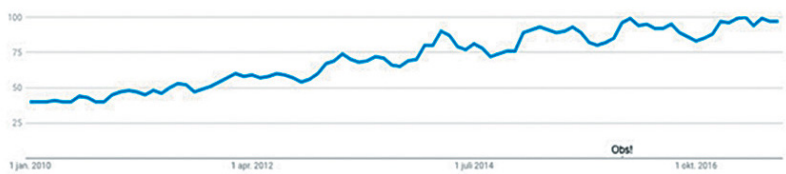


The research findings add to a growing number of factors lining up in favour of coconut, such as:

- A 318% increase in the number of products launched with coconut from 2010 to 2016
- A steady growth of scientific studies on coconut
- Google searches for "coconut" and "health" that show consumer interest in coconut's health benefits has been growing globally since 2010.

Mikaela Lindén, market analyst at *New Nutrition Business*, says: "The results show that coconut is cemented as a healthy food in consumers' minds, and reveal several possibilities for food and beverage companies to connect to the coconut trend."

Consumer interest in coconut is steadily increasing



Google searches globally for 'coconut', 2010-2017



Google searches globally for 'coconut healthy', 2010-2017

"Companies should leverage the naturally healthy message, and use social media to communicate the potential benefits of coconut," Lindén adds. "Coconut-based dairy alternatives are a great opportunity because they enjoy widespread popularity among consumers, while yoghurts still need to be improved, particularly in relation to flavour and texture."

The analysis of the coconut consumer research is available at www.new-nutrition.com and a video about the coconut trend here: https://youtu.be/WRaqKUg0A-Q.

What is the secret to long-term weight loss?

It is estimated that more than 2 in 3 adults in the United States are overweight or obese.

Excess weight can increase the risk of numerous health problems, including type 2 diabetes, heart disease, stroke, and even some types of cancer. Adopting a healthful, balanced diet is considered one of the best strategies for weight loss, but - as many dieters will know - it is not as easy as it sounds.

Every year, around 45 million people in the U.S. go on a diet, primarily with the aim of losing weight. However, research has indicated that up to 40% of people who lose weight regain more than half of it over the subsequent 2 years.

So, why are some people able to maintain their weight loss while others struggle? Lead study author Emily Feig, Ph.D., of the College of Arts and Sciences at Drexel University in Philadelphia, PA, and colleagues sought to find out.

The team's findings were recently published in the journal *Obesity*.

Fluctuation vs. consistency

The researchers enrolled 183 participants to their study, all of whom were either overweight or obese. For 1 year, each subject participated in a weight loss program. This comprised meal replacements and behavioral goals, such as increasing physical activity and calorie tracking.

Study participants were asked to keep a record of any food-related behaviors they experienced, such as cravings, binge eating, and emotional eating.

Additionally, subjects attended weekly weigh-in sessions.

Two years after the weight loss program began, participants were weighed for a final time.

The team found that participants who experienced consistent weight loss in the first 6 and 12 weeks of the program were more likely to have maintained their weight loss at 12 and 24 months, compared with those whose weight fluctuated.

As an example, the team explains that a person who lost 4 pounds one week, regained 2 pounds the next week, and lost 1 pound the following week were less likely to achieve long-term weight loss than those who consistently lost 1 pound over the same 3-week period.

Weighing in on food-related behaviors

The researchers were interested to discover that participants who reported lower preoccupation with food, lower binge eating, and lower emotional eating at study baseline experienced greater weight fluctuation and lower total weight loss. The team says that these findings indicate that it may not be a person's relationship with food or food-related behaviors that influence long-term weight loss. Rather, it may be down to the consistency of weight loss.

The researchers caution that their study cannot prove cause and effect between weight loss consistency and better long-term weight loss.

However, principal investigator Michael Lowe, Ph.D. - who is a professor of psychology at Drexel University - believes that they may have identified an effective strategy for shedding the pounds and keeping them off.



Improving the quality of bakery products

With the aim of correcting, standardizing and varying the rheological and rheofermentographical characteristics of different types of flour (such as alveograph, farinograph, extensograph, rheofermentograph, amylograph, and falling number), **Bontà Infinite** has developed the NatEnzyme line.

If NatEnzyme Stabilase G 30 is recommended when more stability is necessary in the farinograph, NatEnzyme Elastic LP highly improves the stability in the farinograph without effecting the alveographic P/L value.

NatEnzyme PL 30 is formulated for the reduction of the alveographic P/L value and it does not affect negatively the W value and the stability in the farinograph. NatEnzyme W PLUS SS 30 increases the W value while, at the same time, reducing the alveographic P/L value. The NatEnzyme Biscuit HP 3000 highly reduces the values of W and P/L, but is exclusively for use in biscuits.

Bontà Infinite proposes NatEnzyme Reologic FH 30, when more stability is required in different types of dough and more volume is requested for the finished products, and NatEnzyme Stabilase Elastic G 30 for strong flour with a good protein content but low stability. This formulation gives more stability and lowers the P/L value. Instead NatEnzyme Noodle 30 avoids oxidation and browning during the production of fresh pasta and gives it more firmness during cooking.



Bakery products improved with NatEnzyme line (Bontà Infinite).



Enzyme solution with NatEnzyme for bread (Bontà Infinite).

Regarding the bakery applications, NatEnzyme Bakery Biscuit replaces cysteine and deactivated yeast and reduces the P/L value and elasticity index (IE), and the NatEnzyme bakery Soft line extends the shelf life and the softness. The “Dolce” version is suitable for oven sweet and festivity products, while the “Salato” version is suitable for oven savoury products.

Bontà Infinite also provides customized enzyme solutions, in order to solve individual problems regarding rheological and rheofermentographical properties of flour. According to a specific request, this company offers multi-purpose enzyme complexes with controlled action.

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Vinitaly, 365 days dedicated to the wine business

Vinitaly continues to grow in terms of exhibitor numbers, international visitors and b2b contacts. With only 1 month left to the opening of the international wines and spirits exhibition, the largest in the world in terms of exhibition space and international operators, scheduled in **Verona 15th-18th April 2018**, exhibition space has already been sold out. The merit lies with its unique show formula, in also being held alongside Sol&Agrifood and Enolitech and the important work implemented by VeronaFiere (following its change of status into a joint-stock company one year ago) through the new business plan envisaging investments primarily targeting continuous improvement of infrastructures, digital innovation and the creation of new services for businesses. Not to mention the clear distinction enacted in 2016 between business at Vinitaly in the exhibition centre itself and Vinitaly and the City dedicated to wine lovers in the city centre and the province. A very evident distinction that permeates all present and future planning for the exhibition.

B2b 365 days a year and Vinitaly Directory

Things get going again, starting from the final data for the last edition and the many initiatives acting as a go-between for the 2017 and 2018 editions of Vinitaly. Last year, the show attracted 128,000 visitors, of whom 48,000 were international from 142 countries. This international attendance included 32,000 accredited top international buyers (+8% compared to 2016). A result obtained through direct incoming investments by Veronafiere as well as collaboration with the Ministry of Economic Development and ICE-Trade Agency within the scope of the Special Made in Italy Promotion Plan.



In addition to the proven Taste Buy formula that Vinitaly organizes for every edition in Verona to bring companies and consortia together with delegations of selected buyers invited to attend the event, this year seeks to enhance the role of the global wine community, created through the international activities of Vinitaly and Vinitaly International Academy, in order to implement profiling and numbers of international operators and buyers in collaboration with institutions, especially the ICE Trade Agency.

Another initiative designed to encourage, maintain and increase contact and business opportunities between wine cellars, customers and the wine business world is the VINITALY DIRECTORY - Official Catalogue & Business Guide; as of this year, this innovative portal in English, Chinese and Italian replaces the traditional online catalogue and allows users, even now, to search for companies and wines by production area, price range, bottles produced, reference markets and new markets of interest, the sales channels used and much more besides (www.vinitaly.com). This means that operators visiting Vinitaly 2018 will be able to select in advance the wine cellars of interest to them and thereby arrange an agenda of targeted appointments.

OperaWine on the eve of Vinitaly

In keeping with tradition, **Opera Wine** is held on the day before the inauguration of the international trade fair followed, in the evening, by the Gala Dinner. The

2018 edition of the grand tasting sees the presentation of 107 Italian producers, 16 of whom included for the first time, chosen in collaboration with Wine Spectator magazine. OperaWine is an invitation-only event dedicated to the most influential foreign journalists and international buyers and this year focuses on the United States market.

International Wine Hall

The Vinitaly formula is increasingly popular abroad and generating even more demand for participation. Innovations at Vinitaly 2018 include the expansion of the show area dedicated to international exhibitors (up by 25%), that as of this year has been named the "International Wine Hall.

Many new entries: debuts from Ethiopia, Denmark and Santo Domingo are flanked by new companies from France, Spain, Croatia, Georgia, Portugal, Hungary, Azerbaijan, USA, South America, Australia and even Japan. Every day, the tasting area hosts a programme of guided tastings of wines and spirits on display, from Caribbean rum to Peruvian Pisco and liqueurs based on vodka. Analysis also focuses on traditional production techniques characterising the proposals of some countries, such as Argentine Vermouth made using wines from vineyards cultivated at an altitude of 2000 metres.

ViViT, VinitalyBio, Fivi

Hall 8 is home to ViViT - Wines, Winegrowers and Terroirs, the upgraded and expanded exhibition of natural wines organised by Vinitaly in collaboration with the Vi.Te Association, as well as the group show set up by FIVI-Italian Federation of Independent Wine-Growers. The development of these two exhibition spaces is fully in line with current market trends and that portion of the Italian production world increasingly committed to identity and environmental sustainability. As for certified organic wines, the Vinitalybio Wine Point is further enhanced to offer all the labels on show in the main exhibition on the stands of constantly expanding numbers of cellars taking this production direction.

Vinitaly and the City

While business takes place in the exhibition centre itself, wine lovers will enjoy the off-show event Vinitaly and the City scheduled 13th-16th April in the squares of the historic centre of Verona. Each square is linked with an Italian region. And they are linked by a route starting off in Piazza Bra, close to the Arena, where "wine lovers" will receive a "passport" to be stamped at every stop-off. The programme includes wine & food tastings at the stands, as well as a calendar of guided tastings, cultural meetings and musical.

www.vinitaly.com

Cibus welcomes the year of food

Cibus, scheduled from **7th to 10th May, 2018, in Parma**, is preparing a special edition to celebrate 2018, proclaimed to be the "Year of Food" by the Italian Government to favour the growth of production and export of made-in-Italy food products. More than 3,000 exhibiting companies and a growing number of Italian and international buyers are expected in Parma. The most innovative products will be displayed in a dedicated area. The incoming programme for foreign buyers has been strengthened and a new exhibition pavilion will be opened.

The 19th edition of Cibus is taking place at a favourable time when investments are being made in the Italian economy and there is hope of a recovery. The food sector ended 2017 with remarkable results. Export increased by +7% versus the previous year and domestic sales recorded a slight, yet encouraging +0.8% growth. With regards to food industry exports, the estimated value at the end of 2017 was 32.1 billion euro.

With an overall turnover of 137 billion euro (about 190 billion euro, if we also consider the whole agri-food sector, including the primary one), Italian companies are committed to maintaining the pace of 2017 in 2018 with production and export increases of +2% and +7% respectively, and a more encouraging growth of domestic sales ranging between +1% and +2%.

The main food export markets, in addition to Europe and United States, are Canada, Japan, Australia and Russia. In Asia the main export destinations are: China, Hong Kong, South Korea, Thailand and Taiwan.

Cibus 2018 will also feature a new pavilion, built to meet the

growing request for exhibiting space. An area dedicated to the most innovative and original food products placed on the market, selected by a panel of experts. During the show, the new Pavilion 8 will be opened and reserved for institutional customers, i.e. regional specialities and joint projects. A new layout will house the Food Court of the various Italian regions with an "all-in-one" space dedicated to recipes, cooking shows and tasting area, all designed as a gallery of flavours and tasting and managed by specialised chefs and cooking schools.

The conference and workshop programme will be very comprehensive with innovative proposals such as the event on *In Store marketing* organised by the University of Parma and IPSOS: new face recognition technologies for consumers who enter the point of sale for customised promotions; experimental linear shelves with lower depth of choice, but unaltered exhibiting space and other current topics on retail marketing.

Cibus (and Cibus Connect, which is organised every other year) also becomes an observatory for the Italian food and beverage sector. Thanks to the collaboration with IRI (Information Resources Inc.), it proposes trends and analyses every month via the Cibus newsletter and website Cibus.it.

"2018 is expected to mirror 2017 in the agri-food sector. These exceptional export performances make the threshold of 50 billion euro by 2020 announced during Expo2015 not only possible, but even surmountable. Indeed, these performances will be accompanied by a modest, yet visible recovery of internal consumption" declared Luigi Scordamaglia, President of Federalimentare.

"These are good signs that should be reinforced by overcoming supply chain conflicts and by relaunching and consolidating the Single European Market with the too many legislative initiatives of the individual Member States. At a national level, the food industry feels the responsibility of relaunching and enhancing domestic agricultural production ensuring, through transparent and long term contracts, the qualitative and quantitative availability of domestic agricultural raw materials to be enhanced by the Italian processing industry" added Scordamaglia.

"The other great challenge regards Brussels which has to find new common food policies. An step in this direction is the EU regulation on the origin on labels which is under discussion right now and which should clarify the matter once for all, welcoming national norms that create different transparency standards for consumers and conditions of competition disparities amongst the various Community producers", concluded the President of Federalimentare.

Antonio Cellie, Ceo of Fiere di Parma, talked about the role of Cibus as a platform of made-in-Italy food, *"Cibus is the preferred observatory from where to understand the trends of a sector which is increasingly more strategic for Italy. Today, more than ever before, the agri-food sector is not only Italy's most important sector in terms of staff and added value, but it is also a decisive element for the development of the planet at an environmental, health and cultural level. For this reason, 80,000 professionals, mostly foreign ones, meet in Parma every 2 years"*.

"Cibus is the mirror of its 3,000 exhibitors, all Authentic Italian companies that can compete in the world, irrespective of their size, thanks to extraordinary quality standards combined with an exceptional flexibility. Cibus is a unique event featuring innovation and products that are appreciated by the world of retail and restaurants all over the world, thanks to intrinsic quality and safety, as well as ease of use and consumption", concluded Cellie.

www.cibus.it



Ipack-Ima and Meat-Tech warm up their engines

The forthcoming exhibitions **Ipack-Ima** and **Meat-Tech** 2018, which will be held from the **29th of May to 1st of June 2018 in Milan**, were presented to exhibitors by Riccardo Cavanna and Domenico Lunghi, respectively Chairman and Managing Director of Ipack-Ima Srl, who outlined the new features of the programme to the more than 100 people present. The 2018 edition will mark a turning point for the two shows, which are set to be larger, more international in scope and packed with more innovative content than ever before.



The showcased sectors

Four months before the shows are due to begin, more than 90% of the exhibition space has been assigned to leading Italian and international companies. The two events are growing in terms of both occupied space and number of exhibitors.

IPACK-IMA in particular will extend over 8 halls divided up according to exhibitor business communities or the specific types of products.

Halls 1 and 3 will be devoted to technologies, materials and accessories for the *pasta*, *bakery*, *milling* and *confectionary* industries. The presence of leading Italian and international companies confirms IPACK-IMA's position as the most important exhibition in the world for this sector.

In the adjacent halls 5-7, visitors will have a chance to discover the latest new products for food processing and packaging, with a special focus on *fresh & convenience*.

The offerings for *non-food* sectors, particularly cosmetics and industrial goods, will be located in hall 4 along with the *liquid filling* segment, which will also be well represented in the halls devoted to food industry technologies.

Offerings will also include machinery, equipment and devices relevant to different product sectors. Technologies for labelling, coding & tracking will be located in hall 14 while companies operating in the end-of-line stage will occupy halls 6 and 10, complemented by the products showcased at Intralogistica Italia, the event devoted to internal logistics organised by Deutsche Messe and Ipack-Ima.

Last but not least, a new satellite show focused on innovative materials and premium packaging called IPACK-MAT will be making its debut at IPACK-IMA 2018 in hall 14, where other thematic and display spaces will be available.

All halls will showcase specific materials for the various business communities. The leading companies in the field of technologies for automation and robotics will also be present at IPACK-IMA.

Technologies, auxiliary equipment and ingredients for meat processing will be on display in hall 2 at the East entrance of the exhibition centre. Now in its second edition, the exhibition is the most important European event for the meat industry and will see the participation of the leading companies in the sector.

Major themes

The circular economy and sustainability will take centre stage in the space organised by

Conai, while the products competing for the Packaging Oscar will be displayed in the area set up by the Italian Institute of Packaging.

Digitisation and themes relating to e-commerce will be discussed at a conference organised in collaboration with the Italian e-commerce consortium Netcomm. The appointment follows on from the successful event organised in late January. The exhibition companies will showcase solutions specially designed for sale through digital channels.

Other transversal themes that will be explored through dedicated events and product offerings will include anti-counterfeiting and serialisation in the food, fashion and personal care sectors. Production specifications for "free from" food and sanitary design, own brands and private labels will also be amongst the offerings targeted at food and beverage industry companies.

Exhibition 2.0

B2B meetings will be organised as part of an innovative online matching platform called My Matching, which will allow for a high level of user profiling and will make suggestions for meetings.

Another tool that is already facilitating meetings between exhibitors and visitors is the smart catalogue. This innovative online catalogue combines the classic information provided in trade fair catalogues with the information published by companies on their web channels. It also integrates seamlessly with promotional activities conducted through the two exhibitions' official social channels on Facebook, Twitter and LinkedIn.

The Innovation Alliance

IPACK-IMA and MEAT-TECH will also benefit from being held concurrently with the other exhibitions in The Innovation Alliance, namely Plast, Print4All and Intralogistica Italia, which together will occupy a net exhibition space of more than 140,000 square metres extending over almost the entire Rho-Fiera Milano exhibition centre. A single entrance ticket allowing admission to all five shows will simplify attendance for visitors.

"The Innovation Alliance" is also expecting around 1,000 selected buyers who have been invited to the five trade fairs with the support of the Italian Ministry for Economic Development and the Italian Trade Agency ITA. In particular, IPACK-IMA and MEAT-TECH will host buyers from Europe, Africa, the Middle East, South America and the United States.

www.ipackima.com

INTERNATIONAL EVENTS IN ITALY

15 - 18 April 2018 - Verona: Vinitaly, int. wine show. VeronaFiere - www.vinitaly.com

7 - 10 May 2018 - Parma: Cibus, int. food show. Fiere di Parma - www.cibus.it

9 - 11 May 2018 – Rimini: Macfrut, int. fruit processing show. Rimini Fiera - www.macfrut.com

29 May - 1 June 2018 - Rho (MI): Ipack-Ima, int. packaging, food processing and pasta exhibition. Ipack-Ima - www.ipack-ima.com

29 May - 1 June 2018 - Milano: Meat-Tech, int. deat industry show. Ipack Ima - www.meat-tech.it

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

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

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