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### Highlights

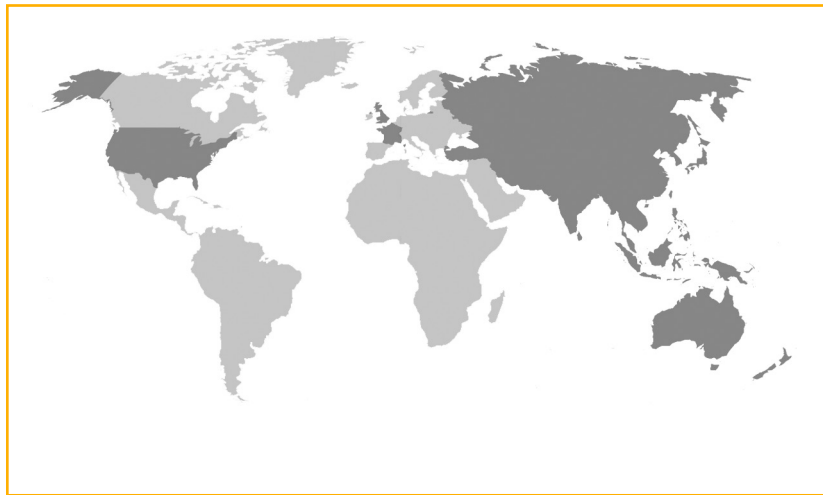
- Method to measure arsenic content in foods
- Nutritional value of saffron
- Product-friendly preservation of beverages
- Scientists use seaweed to make beverages
- Biodegradable packaging films
- 3-D image of food on the nanometer scale



The **Asian and Pacific Centre for Transfer of Technology (APCTT)**, a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives: to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.

The Centre will achieve the above objectives by undertaking such functions as:

- Research and analysis of trends, conditions and opportunities;
- Advisory services;
- Dissemination of information and good practices;
- Networking and partnership with international organizations and key stakeholders; and
- Training of national personnel, particularly national scientists and policy analysts.



*The shaded areas of the map indicate ESCAP members and associate members*

#### **Cover Photo**

A view of the solar dryer set up by the Tirumaraikadu Bio-farmers Federation at Tirumaraikadu village in Nagapattinam district, India

*(Credit: <http://www.thehindu.com>)*

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Vol. 3 No. 128

Apr-Jun 2016

## VATIS\* Update Food Processing

is published 4 times a year to keep the readers up to date of most of the relevant and latest technological developments and events in the field of Non-conventional Energy. The Update is tailored to policy-makers, industries and technology transfer intermediaries.

Website: <http://www.techmonitor.net>

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*This publication has been issued without formal editing*

\* Value Added Technology  
Information Service

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### Strategic cooperation for food safety

The United Nations Industrial Development Organization (UNIDO) and the Global Food Safety Initiative (GFSI) are expanding a long-term collaboration into a formal strategic partnership for large-scale capacity building programs. UNIDO is giving full attention to food safety as a key thematic area in their inclusive and sustainable industrial development initiative (ISID) where partnership with the private sector is a key instrument, making for a fitting cooperation with GFSI. Both entities will jointly dedicate and mobilize resources in a strategic long-term plan to scale up food safety capacity building in priority regions.

This partnership builds on the successful collaborations between GFSI and UNIDO since 2009, and follows the outstanding achievements made under the recent sustainable supplier development project (SSDP) successfully implemented in Malaysia thanks to UNIDO and AEON, also based on GFSI Global Markets. Following the joint declaration made by UNIDO and GFSI during the China Focus Day on 1st November 2015, the roadmap that is currently being crafted is designed to implement food safety capacity building projects in a number of countries based on the GFSI Global Markets Program.

The Program sets out how small and less developed food companies can meet the challenge of food safety, increase productivity and gain market access. This will be enabled by UNIDO. The new strategy will harness the focus of GFSI members, the interests of UNIDO and the maturity of GFSI in targeted geographies. Once launched, the program will focus

on key regions in the global food network, beginning with China, Africa, Middle East and Southeast Asia in a long-term roadmap approach.

*Source: <http://www.foodingredients-first.com>*

### Food quality and safety scheme in India

The Food Safety and Standards Authority of India (FSSAI) has decided to support innovative R&D proposals with respect to food safety and quality control by providing financial assistance to institutes-organisations to undertake research proposals on food safety. According to FSSAI, this will enable it to generate knowledge that would help in continuously updating and upgrading food safety standards which are compatible with international standards and also to carry out evidence-based studies for improving or building policies. FSSAI has already identified some 14 subjects related to various aspects of food safety.

The subject related to hygiene, traceability, sampling and testing methods, safety aspects of novel foods, study of chemical contaminants, radiological safety of food, toxicology, risk communication, good practices, nutritional composition, food law enforcement, quick testing methods were amongst the other areas identified for research study. The tenure of a project would be three years for R&D related projects while FSSAI will support the grantee institution for the approved project with a financial aid upto Rs 50 lakh. The projects will be reviewed by the apex food regulator every five years.

An official privy with the development stated that it was part of FSSAI's effort to streamline the

regulatory framework which had accelerated in recent times. According to FSSAI, the scheme would help in continuously updating and upgrading food safety standards compatible with international benchmarks and carry out studies for improving or framing policies. Explaining the projects, FSSAI stated that there would be push type projects wherein the body will identify the project based on needs while another is called pull type project wherein the body will indicate the broad areas of interest to the authority and solicit projects.

*Source: <http://www.fbnnews.com>*

### Philippines boosts food processing

Davao, a bustling metropolis in Philippines, with the Department of Science and Technology (DOST) setting up the Davao Food Processing Innovation Center (FPIC), a facility aimed at helping micro, small and medium entrepreneurs (MSMEs) improve their productivity and market competitiveness. The facility is under the DOST's Small Enterprise Technology Upgrading Program or SETUP, which aims to strengthen the competitive advantage of local enterprises, and increasing productivity and maximizing efficiency and income potential.

The fabrication of modern food processing equipment substantially lowers the cost of production for the MSMEs compared with buying the machineries abroad.

By adopting the locally-made equipment, the MSMEs are assured of readily available parts for maintenance and upgrading. Davao FPIC has already benefited a number of small business entrepreneurs in the different



provinces by giving them a venue to develop unique and highly marketable food products. Other FPIC-developed food products are: freeze dried durian; carrot-calamansi and carrot-pineapple powder drink using spray dryer; spray dried carrot-calamansi-sweet potato leaves powder drink; gourmet tuyo (dried herring); and spray dried atsute (annatto).

Source: <http://www.manilatimes.net>

## China's sugar and gum confectionery market

According to a Global Annual Review for 2016, China continues to lead the global sugar and gum confectionery market, while the US remains second. The poor performance of sugar and gum confectionery in developed markets is attributable to a number of causes, ranging from the continued sluggish behaviour of gum sales to the global obesity pandemic, which has led to a number of governments starting to intervene by taxing high-sugar products. As a result, consumers are cutting back on their sugar confectionery intake.

In a category with a strong focus on children, sugar confectionery has been in the spotlight not only because of its high sugar content, but also because of the artificial colour and flavour that are so popular in kid-focused products. Removing these ingredients and replacing them with natural equivalents have been expensive, and while the "free-from" products now suit parents' requirements, they are not always agreeing with the sensibilities of children, who lament the passing of the electric blue and bright white candies they enjoyed.

In 2015, manufacturers continued to hunt for the "best" sweeteners for sugar confectionery, challenged by the fact that success in producing affordable confectionery with the "right" taste and texture continue to be elusive. At the same time, there has been growing interest in using confectionery as a delivery system for functional ingredients, an area that is likely to continue to gain in importance as manufacturers look for ways to justify consumers' confectionery purchase.

Source: <https://www.foodmag.com.au>

## Food technology research in China

Taiwan (Province of China) Food Industry Research and Development Institute (FIRDI) recently held a seminar at its Hsinchu center to showcase its latest research results in food technology. According to the center's director, Dr. Chii-Cherng Liao, the institute has developed a whole host of innovations that cater to the manufacturing of health foods for the senior citizens market.

For example, the institute showcased its techniques and results in making soft prepared foods and semi-finished foods for the elderly; producing food grease from fish and algae; extracting vegetable fibers, oligosaccharides and malt fibers that promote the growth of good bacteria in the intestinal tract; formulating stable proteins; and evaluating molecular interface potentials.

The institute also showcased its success in reducing the bitterness of food peptides by up to 40 percent, and its processing techniques for producing highly dispersible,

easy to digest food powders. Moreover, the institute announced its techniques for producing several active compounds and health food ingredients from microorganisms.

Source: <http://www.taiwantrade.com.tw>

## India launches app for food safety

Food safety regulator Food Safety and Standards Authority of India (FSSAI) has launched a mobile app through which consumers can raise their concerns related to quality of packaged food and the food served in ready-to-eat outlets. Since most of the times the form of food consumed is either packed or serviced, the app provides food safety tips and food safety laws as prescribed by the regulator through its regulations, says the description of the mobile app launched by FSSAI.

According to the description, FSSAI App will allow consumers to raise their food safety related concerns. Whether it is a Packaged Food or a Food Service Establishment, now consumers are empowered to know about the food business operators and get informed about the food safety information. The app for Android smartphone users has built-in functionalities to locate the consumer's geographical location and consumers can raise any food incidents witnessed along with the captured pictures.

The app also empowers consumers to check many parameters on which the food safety is compromised for both packaged foods and food served in ready-to-eat establishments. For served food, the consumer is given an option to rate the Overall Hygiene of the food service establishment.

Source: <http://www.timesofindia.indiatimes.com>

### Safety conditions for food producers in Viet Nam

According to a recent Viet Nameese Health Ministry-drafted decree, a food production and trading establishment must be large enough for installing food production lines and facilitating food transportation. The draft, which sets conditions for food production, trading, advertising and testing, and designation of organizations in charge of regulation conformity certification or food safety inspection for imported food products managed by the Ministry of Health, requires food production areas neither to be submerged or stagnated by water, nor to be contaminated by harmful animals, insects or microorganisms.

Moreover, equipment and tools in direct contact with food must be safe and made of materials not causing food pollution. They must also be easy to clean, sterilize and maintain. The establishment must have sufficient facilities for workers to wash their hands and sanitize their boots and shoes before they enter the food production area. A food production workshop must have at least one hand sink per 50 workers. Establishment owners and workers directly engaged in food production must acquire a certificate on training in food safety knowledge. They must obtain a health certificate issued by a district- or higher-level health establishment.

Source: <http://www.vietnamlawmagazine.vn>

### Nutraceutical product approval in India

Food regulator the Food Safety and Standards Authority of India (FSSAI) has released recent

notification on nutraceuticals to provide relief to health supplement manufacturers and marketers and to clear all the hurdles in the approval process. Recently, FSSAI has restricted enforcement activity against nutraceuticals and health supplement companies to only testing of products till new standards are notified.

“This move of Authority will bring a sigh of relief and take the industry forward which has succumbed to pressure of product approval for the last four years, and this decision now clears the hurdles,” said Indian Drug Manufacturers Association (IDMA). The food regulator also clarified that the products which were launched before the Food Safety and Standards Act came into force in 2011 and others for which approvals were pending as on August 19, 2015, will only be tested for quality and as of now, may not require any approval.

Source: <http://www.indiatoday.intoday.in>

### New food labeling laws enforced in Thailand

According to new food laws labels on pre-packed foods in Thailand must comply with Thai Ministry of Public Health Notification No.367 (2014), from December 2016, marking the end of a two-year transition period. Manufacturers and importers need to prepare and be ready to use new labels that comply. The new regulation in Thailand has increased the labeling requirements for pre-packed foods.

This Regulation came into force on December 3, 2014. Manufacturers or importers of food for which labels have been made

prior to this date can extend their use for up to two years. However, the two-year transition period will come to an end on December 2, 2016.

Source: <http://www.einnews.com>

### Inorganic testing standard methods in China

In October 2015, the National Health and Family Planning Commission of the Republic of China published eight national food safety standards, of which five related to inorganic testing. They have now become effective on March 21, 2016. It includes:

- GB 5009.11-2014: National food safety standard determination of total arsenic and inorganic arsenic in foods
- GB 5009.17-2014: National food safety standard determination of total mercury and organic mercury in foods
- GB 5009.74-2014: National food safety standard method for limit test of heavy metals in food additives
- GB 5009.75-2014: National food safety standard determination of lead in food additives
- GB 5009.76-2014: National food safety standard determination of arsenic in food additives

Source: <http://www.sgs.com>

#### FOSCOLLAB

FOSCOLLAB is an online platform displaying together within dashboards various data and information useful for food safety professionals.

For more information, access:  
<http://www.who.int/foodsafety/databases/en/>

### Method to measure arsenic content in foods

The National Food Institute, Technical University of Denmark (DTU), has developed a new European standard method to determine the content of inorganic arsenic in foodstuffs. According to the World Health Organization (WHO) inorganic arsenic is carcinogenic. Being able to accurately measure the substance in different foods is necessary to ensure that the content is below the maximum levels recently set by the European Commission to protect consumers.

Inorganic arsenic is a substance which occurs naturally in soil, water and certain foods. Rice and rice-based products are the main sources in the Danish diet. In 2009 the European Food Safety Authority, EFSA, assessed that the substance is toxic at lower doses than previously evaluated. EU maximum levels for inorganic arsenic in rice and rice-based products were set in 2015. An EU recommendation was issued the same year to all member states to increase the monitoring of inorganic arsenic in foodstuffs in order to improve the dataset on which risk assessments of the intake are based.

Previous methods measured foodstuffs' content of total arsenic. However, errors in the assessments would often occur if this data is used to assess the risk from consuming inorganic arsenic from different foods. The new method has been tested and verified by 15 European and American laboratories and has now been approved as the European analytical standard for measuring inorganic arsenic in foods.

Source: <http://www.news-medical.net>

### Paper based test to prevent food poisoning

Researchers at the Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea, have developed a paper-based test that can detect food-borne pathogens hitchhiking on food before they reach store shelves, restaurants and, most importantly, our stomachs. According to one estimate by the US Department of Agriculture, the food-borne bacteria *Salmonella* alone led to nearly 20,000 hospitalizations and almost 400 deaths in the US in 2013.

Economists estimate that the treatment of all these patients and the related productivity losses cost more than US\$3 billion annually. And those numbers account for just one of the 15 pathogens responsible for most of the food poisoning cases. So Park Je-Kyun, and colleagues at KAIST set out to find a more practical way to detect food-borne pathogens. The researchers developed a paper-based test that can handle the multi-step reactions necessary for this kind of analysis by controlling the pore size of the paper.

When dipped into solutions containing the *Escherichia coli* strain O157:H7, *Salmonella typhimurium* or both, lines appeared on the dipstick indicating a positive result within 15 minutes. Because the method requires dipping the device into a solution once to produce an easy-to-read result, it could be performed by workers without special training, the researchers said.

Source: <http://www.asianscientist.com>

### New method to detect bacteria in food

Researchers at the Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea, have developed a fridge-mountable laser that detects the squirming movements of microbes on the surface of your chow. The method is cheap, easy to use, and requires no contact with the contaminated food, making it an ideal solution to a common health problem. The method works by zapping food with a series of laser shots while using a camera to watch how the light of each zap scatters off the surface.

If the surface is still, the scatter pattern will stay completely or almost completely the same with repeated laser fire. But if the food is swarming with infectious bacteria, the scatter pattern will change in a matter of seconds. This is because microbes tend to propel themselves around with whip-like tails, called flagella, causing the light to scatter differently as they wriggle and swim to and fro. As a proof-of-concept, the researchers tested their laser method on chicken breasts that were either clean or purposefully smeared with infectious bacteria, namely *E. coli* and *B. cereus*.

The laser method could easily distinguish which chicken samples were contaminated and to what extent. The researchers suggest that such a laser-camera setup could be easily installed in fridges and commercial food processing plants. Of course, the method has its limits. The laser scatter won't pick up non-twitching contaminants, such as toxins and viruses, including norovirus. And it can't distinguish between types of moving microbes. But the researchers are still hopeful that it

could substantially reduce food-borne illnesses.

Source: <http://www.arstechnica.com>

### Film-like sensor to detect spoiling of fish

A research team at Yamagata University, Japan, has developed a freshness sensor in the form of a plastic film that can detect when fish and meats have begun to spoil. The sensor works by detecting histamine, which accumulates when bacteria begin decomposing amino acids and can cause symptoms of food poisoning even in small amounts.

Devices already are available for histamine detection in foods, but the contraptions are large and cumbersome to operate. In contrast, the new sensor works simply by placing the sensor film over the fish or other food and taking measurements. The goal is to have a commercially viable prototype ready in three years, and also to devise a sensor film that can monitor the ripeness of fruits.

To make the sensor, researchers printed an electrically conductive material on a plastic film to fashion electrodes and circuitry. The team is currently developing the freshness sensor for spot testing in stores. But if a version thin enough to be used as a food wrap were developed, then the freshness of foods could be constantly monitored. This would soothe consumer concerns over safety while helping stores cut down on wasteful discarding of foods still safe to eat.

Source: <http://www.asia.nikkei.com>

### Method for detecting coffee fraud

Researchers from the Second University of Naples, Italy, have

developed a new way to identify counterfeit coffee by assessing the presence and quantity of a plant-specific chemical compound, known as homostachydrine. The new method employs existing, affordable techniques for chemical analysis, but goes a step further by isolating a plant compound that has specific concentrations in the different commercially available coffee bean varieties.

The new method developed by the scientists tests the percentage of *Arabica* and *Robusta* in a blend. It is faster, easier to conduct and uses relatively inexpensive equipment to measure the compounds in a liquid, similar to those used for doping tests. It involves mixing ground-up coffee in a water solution of formic acid and putting the liquid into a high-performance liquid chromatography (HPLC) instrument to identify the coffee's homostachydrine quantities.

Results showed that the average homostachydrine content is  $1.5 \pm 0.5$  milligrams per kilogram in Arabica beans and  $31.0 \pm 10.0$  in Robusta beans. These values are as baselines in the identification of adulterated coffees. Another one of homostachydrine's advantages is its high heat-stability, as it is extremely difficult to trace coffee fraud once the beans have been roasted. A similar test based on a different plant compound found in Robusta beans has already been certified by the German Institute for Standardisation, however, it is still cumbersome and less certain.

Source: <http://www.eatglobe.com>

### Lasers detect bacterial growth in food

Jie Shao and other researchers from Zhejiang Normal University, China, and Umeå University,

Sweden, have developed an instrument based on tunable diode laser absorption spectroscopy (TDLAS) to assess bacterial growth of various types of samples under a variety of conditions. TDLAS enables fast, accurate and noninvasive measurement of bacteria levels in food, blood supplies and other products derived from living matter. The researchers' basic setup involved a tunable diode laser as the light source, beam shaping optics, a sample to be investigated, receiving optics and one or more detectors.

The emission wavelength of the laser was tuned over a characteristic absorption line transition of the species within the gas being assessed, causing a reduction of the measured signal intensity, which the researchers used to determine gas concentration. When the wavelength is rapidly tuned across the transition in a specific manner, it can be combined with a modulation technique called wavelength modulation (WM), which enhances the sensitivity of the TDLAS technique. By applying WM-TDLAS to transparent containers of organic substances such as food items or medical samples, bacterial growth can be quickly and accurately evaluated.

Micro-organism growth is driven by many factors, which make it difficult to accurately estimate the amount of bacteria within food containers or blood samples at any given time. A better understanding of the growth process of micro-organisms could help reduce food waste and prevent sickness. Within the medical realm, the ability to assess the quality of blood samples quickly and accurately could mean that a larger percentage of blood could be directly tested for bacteria, reducing the risk of bacterial blood contamination.

Source: <http://www.photonics.com>



## Fermentation may be vital for chocolate

A lab team at the Pacific Northwest Diabetes Research Institute, the United States, recently tested unroasted coffee and cacao beans from around the world for *Saccharomyces cerevisiae*, the yeast used in baking, brewing and winemaking. “The first really interesting thing we noticed was that they were all very different from each other. So a coffee strain from Colombian coffee was very similar to other Colombian strains, but it was really different from Yemeni coffee,” said lab director and study co-author Aimée Dudley. The variations are so obvious that the team can tell the origin of a bean based only on the DNA of its resident *S. cerevisiae*.

That’s surprising because the varieties of the same species found on wine grapes are very similar, whether they come from California, Australia or anywhere else. “Wine production was perfected and developed very early in human history, and as humans migrated across the planet they brought not only those grape vines but the strains of yeast with them,” said Dudley. The *S. cerevisiae* strains her team uncovered on the coffee and cacao, on the other hand, have a mix of wine yeast DNA and local wild yeasts. Despite their strong similarities, different wine yeasts produce varied flavors out of the same grapes.

Source: <http://www.newsweek.com>

## Nutritional value of saffron

Researchers from Food Science and Technology, University of Agricultural Sciences and Natural Resources, Islamic Republic of Iran, have produced saffron powder with high nutritional value through the nanotechnology of microencapsulation of saffron extract with edible

compounds. “Producing multiple nanoemulsions comprised of water and oil is a good method for enclosing hydrophilic food and medicinal compounds,” said project director Afshin Faridi Esfanjani.

“This method, which is the main process for producing nanocapsules, has been evaluated to produce saffron powder with an aim to protect saffron’s useful properties and increase its nutritional value,” Esfanjani added. The lack of appropriate packaging and processing of saffron in Iran has led to a number of problems, including the loss of effective compounds in saffron due to adverse environmental conditions such as light and heating process.

Also, the quick release of saffron’s effective compounds in the environmental conditions of the stomach causes the added value and medicinal properties of the saffron extract to decrease. “By nano microencapsulation of saffron’s effective compounds with multi-layered walls, all these problems are solved and the absorption of these compounds will also increase,” said Esfanjani. According to Esfanjani, the results of the research can be used in producing pills and capsules containing encapsulated and effective saffron compounds for the pharmaceutical sector.

Source: <http://www.en.mehrnews.com>

## Milk protein concentrates

High-protein nutrition bars and other shelf-stable, intermediate moisture foods often harden to unpalatable levels during storage; however, a new study conducted by researchers at Iowa State University (ISU), the United States, suggests adding ground extruded milk protein concentrates (MPC) with 80 percent protein can enhance the texture

and other sensory attributes of high-protein nutrition bars. For the study, MPC80 was extruded at two different conditions and model high-protein nutrition bars were prepared.

A trained sensory panel and instrumental techniques were used to measure high-protein nutrition bars firmness, crumbliness, fracturability, hardness, cohesiveness and other attributes to characterize texture change during storage. The researchers found extrusion modification, storage temperature and storage time significantly affected the instrumental and sensory panel measured texture attributes. The high-protein nutrition bars became firmer and less cohesive during storage.

When evaluated at the same storage conditions, the texture attributes of the high-protein nutrition bars formulated with the different extrudates did not differ significantly from each other; however, textural differences were noted most of the time between the control and the high-protein nutrition bars formulated with extruded MPC80. An adapted high-protein nutrition bars crumbliness measurement technique produced results that were correlated with sensory panel measured crumbliness ( $r = 0.85$ ) and cohesiveness ( $r = -0.84$ ).

Source: <http://www.naturalproductsinsider.com>

## Scientists create diabetic-friendly bread

Food scientists from the National University of Singapore (NUS) have formulated a recipe for making healthier bread by adding a natural plant pigment, called anthocyanin, extracted from black rice. This new bread option gets digested at a slower rate – hence improving blood glucose control – and is high in antioxidants, among other health benefits. “Despite their antioxidant

capacity and associated health benefits, the knowledge of using anthocyanins as an ingredient in food products, particularly semi-solid products, is very limited," said Professor Weibiao Zhou, at the NUS.

The researchers found that digestion rates of the anthocyanin-fortified bread were reduced by 12.8% when 1% of anthocyanin extract from black rice was added into the bread dough and baked at the optimal condition of 200°C for 8 min. The digestion rate dropped further to 20.5% when the amount of anthocyanin extract increased to 4%. However, at 4% the bread became dense and less elastic. Another area of interest for the team was to explore a way to incorporate anthocyanins into bread to improve its value as a health-promoting food. The team had previously conducted a study in 2014 to examine the degradation of anthocyanins during baking.

They found that more than 80% of the antioxidant capacity was retained in the bread crust and crumb, even when baked at temperatures as high as 240°C for up to 12 min. "Our results demonstrate that it is indeed feasible to create functional food products through anthocyanin fortification, using bread as an example. We hope to conduct further studies to incorporate anthocyanins into other food items, such as biscuits. Our team is also keen to explore opportunities to work with industry partners to introduce the anthocyanin-fortified bread to the market," said Zhou.

Source: <http://www.ift.org>

### Researchers reduce sugar content of yogurt

A team from Chr. Hansen A/S, Denmark, has manipulated the meta-

bolic properties of yogurt-producing bacteria to sweeten the yogurt naturally, while reducing sugar in the final product. Similar manipulations have also all but eliminated lactose, so that those with lactose intolerance can enjoy the yogurt. They have accomplished all of this using microbiological methods that predate the era of genetic technologies. "The goal was to engineer the yogurt bacteria not to consume glucose, a fermentation product that is a particularly sweet form of sugar," said Eric Johansen, at Chr. Hansen A/S.

In certain countries, including Denmark, yogurt is defined as containing live cultures of *Streptococcus thermophilus* and *Lactobacillus delbrueckii subsp bulgaricus*.

Normally, when grown in milk, the two bacterial species break down lactose, a disaccharide, into its monosaccharide components, glucose, and galactose. They consume the glucose and secrete the galactose. "We wanted to change them so that they would eat the galactose and spit out the glucose. That required a number of changes in metabolism," said Johansen.

In the first step, the investigators grew *S. thermophilus* on a medium where galactose was the sole food source. Thus, individual bacteria had to consume galactose in order to grow. A few mutants were capable of doing so, and the investigators cultured these. The next steps were to modify the bacteria so that they would no longer consume glucose, and would no longer even transport glucose into the cell. To this end, Johansen's team grew the bacteria in a medium containing a glucose analog called 2-deoxyglucose, which is toxic to cells. The few mutants that survived in this medium lacked the ability to metabolize glucose.

Source: <http://www.phys.org>

### Researchers reduce saturated fat

In the United States, Cargill scientists showed how starches, vegetable waxes and emulsions may be used to reduce saturated fat by up to 40% in shortenings during the annual meeting of the American Oil Chemists' Society held May 1-4 in Salt Lake City. The scientists gained an understanding of how fat behaves at a molecular level and analyzed its structure at each stage of the production process, from mixing to the end of a product's shelf life.

The Cargill scientists found three promising approaches to lower saturated fat levels: a starch/oil blend, vegetable waxes and monoglycerides, and emulsions. In the starch/oil blend method, the scientists replaced some of the saturated fat with a blend of canola oil and starch. They used particle stabilization technology combined with fat crystal optimization to create a structured fat system that reduced saturated fat levels by 40% without sacrificing key performance characteristics. The second method focused on controlling how fat solidifies. As fat cools, it forms crystals. The researchers found that combining vegetable waxes and monoglycerides with canola oil and palm oil allowed the researchers to influence the size, shape and speed at which crystals form. The fat system lowered saturated fat levels while maintaining critical fat structures. The third method used emulsions to dilute saturated fat levels. While water and fat naturally separate, the researchers devised a method of encasing water droplets in shells made of monoglycerides and hard fats.

Source: <http://www.foodbusinessnews.net>

## Product-friendly preservation of beverages

Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB, Germany, has developed pressure change technology (PCT) to preserve fruit juices as gently as possible and to extract valuable ingredients. Apart from the food preservation applications, the experts also use the technology to obtain extracts and active ingredients from plant, microalgae and microbial cells. A research facility for the purpose of testing the technology under strict hygienic conditions is now in operation. PCT is a physical process for the product-friendly preservation of liquid foodstuffs.

In recent years, the Fraunhofer IGB has investigated the process, which is also called “cold pasteurizing”, and has further developed it through to application maturity. In the EU-funded project “PreserveWine”, for example, the addition of sulfur dioxide to the wine was considerably reduced by using PCT. “We have shown that the color of PCT-treated wine is preserved, even over longer periods of time, and that flavor is not affected,” said Dr. Ana Lucía Vásquez-Caicedo about the research findings.

The PCT research facility can treat up to four liters of liquid per minute continuously. The process is suitable for all beverages that are normally pasteurized, i.e. fruit and vegetable juices or concentrates, and also alcoholic beverages, milk products, plant extracts and suspensions containing active substances, e.g. cosmetic and pharmaceutical preparations. Additionally, for basic testing – for example, at a customer’s location

– a flexibly configurable and mobile PCT lab plant is currently being constructed. *Contact: Dr. Ana Lucía Vásquez-Caicedo, Nobelstr. 12, 70569 Stuttgart, Germany. Tel: +49-711-970-3669; Fax: +49-711-970-4200.*

*Source: <http://www.igb.fraunhofer.de>*

## A new solution to keep food fresher

Scientists have hailed the results of trials to prolong the life of fresh produce as “world-changing”, saying it could help tackle global hunger. Testing carried out in cold storage revealed that use of the novel system, developed at the University of the West of England, the United Kingdom, had no effect on the taste or appearance of the produce. “The technology could be implemented commercially within a year if the food industry is convinced of its benefits” said Darren Reynolds, at the university.

Tomatoes and cucumbers responded particularly well to treatment with the solution, which is produced by passing salty water through an electro-chemical cell. The activated solution, which is inexpensive to make and can be created on demand, kills bacteria commonly found on the surface of fresh produce but is harmless to human skin. The recent trials, which involved treating produce post-harvest, also saw carrots, peppers, potatoes and tropical fruit doused in the activated liquid.

*Source: <http://www.irishexaminer.com>*

## Shelf-life extended by a week

A team of researchers from Pontificia Universidad Católica de Chile

(UC) has created an edible coating that could increase the shelf-life of chilled salmon by up to a week. Researchers have developed a new technological solution, already tested with salmon, which inhibits lipid oxidation and slows down growth of microorganisms. “We have extended shelf-life by up to a week compared to chilled products without this formula. There are significant advantages over other similar alternatives, thanks to the natural active compounds in direct contact with the food,” said Loreto Valenzuela, at UC.

Trials have shown that the technology keeps microbiological growth below tolerated limits for up to 22 days when salmon fillets are stored at 0°C. “Furthermore, the product prevents increases in lipid oxidation of food during storage, which helps to preserve fish colour and quality,” Valenzuela added. Valenzuela said that the coating has only been tested with fresh salmon fillets so far, but it will be tried on other salmon products over time. The next phase is to validate its sensorial properties.

*Source: <http://www.fishfarmingexpert.com>*

## System to extend shelf-life

Researchers with Technical University of Cartagena, Spain, have patented a surface decontamination method to extend the shelf-life of packaged salads and minimally processed fresh fruit. The procedure applies antimicrobial vapors of rosemary, thyme, orange or other essential oils during the modified atmosphere packaging process – mixing with the gases when they are applied to the container. The procedure, developed



by the university's Food Safety and Refrigeration Engineering group, also destroys bacteria, fungi and yeast.

Decontamination with essential oil vapors also is compatible with the packaging of organic products and has proven effective "as an alternative to washing with chlorinated water, which can leave toxic waste". Machinery needed to implement the decontamination system at an industrial level has been developed and is ready for marketing. With this machinery, a large number of trials have been conducted for the treatment of packaged foods with the essential oil vapors and they have proven to extend shelf-life of food, especially when combined with ultra-clean packaging.

Source: <http://www.thepacker.com>

### Doubling bananas' shelf-life

Researchers at Volcani Institute, Israel, have managed to double the shelf-life of bananas by tweaking the genes that control ripening. In the genetically altered bananas, ripening is simply delayed. This means that these bananas can be shipped all over the globe without adverse effects. The bananas' taste and quality are unaffected by the slower ripening. This would have particular benefits for third-world countries where access to banana shelf-life extending 12°C temperature control is unavailable. *Contact: Agricultural Research Organization - the Volcani Center, P.O.B. 6, Bet-Dagan 50250, Israel. Tel: +972-3-9683-226; Fax: +972-3-9665-327.*

Source: <http://www.foodprocessing.com.au>

### Innovation to keep fruits and vegetables fresher

Twenty-year-old student Amit Gal-Or from Ra'anana, Israel, has designed and developed a product that can prolong the life of fruit and vegetables for months. Gal-Or, who now lives in Shanghai, established his Phresh company in 2015 when he decided to use old technology and Israeli research to benefit individual households. "The technology originated in research from over a decade ago at Ben-Gurion University of the Negev when an Israeli scientist sought ways to use oils to create organic preservative properties," explained Gal-Or.

"These oils have been known about for thousands of years, but they are very volatile and evaporate very rapidly so their effectiveness disappears very quickly. The researchers wanted to transform the preservative properties into a liquid or powder and then release it very slowly and therefore multiply its effectiveness," Gal-Or said. Gal-Or and his team then set about combining past research to create a powder that does not need to be sprayed or applied to the produce to provide protection.

Instead, the powder dissolves piecemeal and can preserve the produce for up to three times longer than usual. Using these powders for the household simply "made sense," Gal-Or said. Strawberries, for example, usually go bad after three days, and yet we can keep them good for consumption for another four or five days. At the other extreme, there are things like eggplant and potatoes that last weeks.

Gal-Or said that Phresh will soon be launching an intensive e-commerce campaign and that the product is already expanding from China, where Gal-Or lives, into the United States, Europe, Japan, and Israel.

Source: <http://www.ynetnews.com>

### Coating for longer shelf-life tropical fruits

Liquidseal, the Netherlands, makes environmentally friendly post-harvest products that extend shelf-life. In addition to the recipes developed by the company for use on lily bulbs and cut roses, an application for fruit is now available as well. "The R&D department has developed and extensively tested three new recipes for use on fruit. These special recipes for avocado, mango and papaya are in full compliance with the American FDA and the European regulations for use on fruit with a 'hard' skin. We use an environmentally friendly coating that guarantees a longer shelf-life for tropical fruits," said Victor Monster at Liquidseal.

According to Victor, there will also be possibilities for other 'hard' skinned fruits, such as citrus, in the near future. Liquidseal for Fruits can be applied directly after harvesting by means of either a spraying or dipping system. The coating is not a replacement of a specific product, but a completely new one. The very specific qualities of Liquidseal affect the metabolism and the slow release mechanism allows to sharply reduce the use of pesticides. *Contact: Victor Monster, Liquidseal for fruit, Schuttersveld 9, 2316 XG Leiden, The Netherlands. Tel: +31-0-71 30-14314.*

Source: <http://www.freshplaza.com>



### Scientists use seaweed to make beverages

A team of food scientists from National University of Singapore (NUS) Food Science and Technology (FST) Programme has devised a novel technique using *eucheuma*, a species of seaweed, which can be used to produce a range of beverages and food products. The team also came up with precise heat processing technology used to preserve the nutrients while extending shelf-life, thus eliminating the need for preservatives. *Eucheuma*, which contains properties of both seafood and vegetables, is known to be low in calories and high in dietary fibre, antioxidants, vitamins, and minerals such as calcium and potassium.

Studies have shown that regular consumption may have health benefits including lower blood pressure, cholesterol and blood sugar, prevention of cardiovascular diseases and colon cancer, as well as promoting anti-ageing, brain development and tissue repair. The researchers combined traditional oriental dietary practices with modern food and nutrition knowledge to devise the right mix of food ingredients and make the drink taste home-brewed. This involved evaluating the physicochemical properties of potential ingredients and utilising natural sugars from things such as honey, red dates, longan fruit and goji berries in place of artificial sweeteners.

These natural foods also interacted with other components in the beverages in an innovative method used by the food scientists to “stabilise” the product – that is, to ensure the ingredients are evenly distributed. The *eucheuma*-based bottled drinks took over a year to develop. They currently come in six different flavours comprising other natural ingredients such as bird’s nest, roselle and water chestnut.

The drinks contain no chemical additives, added sugar and preservatives.

Source: <http://www.atimes.com>

### Coconut water turned into powder

The Department of Science and Technology (DOST), Philippines, has tapped the expertise of scientists from University of the Philippines Mindanao (UP Mindano) to develop coconut water into powder. Using a spray dryer developed by the Industrial Technology Development Institute (ITDI), Philippines, and the Metals Industry Research and Development Center (MIRDC), Philippines, a team of food scientists from UP Mindanao has completed the process of converting coconut water into powder.

Coconut powder has a much lower price when compared with the ready-to-drink version. Wrapped in convenient individual sachets, the coconut powder is considered among the country’s leading agricultural exports. “We are very happy that our investments in various R&D efforts have resulted in many significant breakthroughs and that our Filipino scientists, engineers and researchers are showing they can deliver if only you will invest and gamble on them,” DOST Secretary Mario Montejo.

The MIRDS and ITDI successfully designed and fabricated their own equipment which allowed the construction of food innovation centers in Davao City, Tuguegarao City and Tacloban City. Coconut powder can also be used in baking biscuits, snack bars, cakes, pastries as well as in making jams and jellies and flavoring for ice cream.

Source: <http://www.philstar.com>

### Multi-step micro-filtration process

Harmless Harvest, the United States, has announced a proprie-

tary new multi-step micro-filtration process that achieves the highest levels of product safety and quality, while preserving optimal flavor, fragrance and nutrients of its critically acclaimed coconut water, which complies with FDA standards and requirements. This groundbreaking process builds upon Harmless Harvest’s history as an industry pioneer in the low-acid beverage category, and enables the company to introduce a new, more environmentally conscious bottle with an average of a quarter less plastic than previous bottles.

“The introduction of the Multi-Step Micro-Filtration process is a significant advancement for the industry. With our move to our proprietary FDA-compliant Multi-Step Micro-Filtration linked to an aseptic filling and packaging system – as with every step we take as a company – it is our goal to drive the industry forward towards better products, better practices and more environmentally sustainable business models. We have an amazing team that is committed to bringing delicious organic food and beverages to consumers with a fair and sustainable business model that will change the industry as whole,” said Giannella Alvarez, at Harmless Harvest.

Proving the company’s mantra that “the best can always be better,” this new Multi-Step Micro-Filtration, represents a groundbreaking “new method” of safe low-acid juice beverage production. Building upon the latest micro-filtration, extraction and bottling techniques from fields as diverse as pharmaceuticals and dairy, Harmless Harvest brainstormed, devised, developed and tested the Multi-Step Micro-Filtration process – ensuring it complies with FDA standards and requirements.

Source: <http://www.bevnet.com>

## Bioplastic for food packaging

Researchers at Bio-on, Italy, and the University of Tampere, Finland, have created the first material to team paper and bioplastic designed for the food packaging of the future. It will also be the only biodegradable material. A joint project launched in 2015 has produced for the very first time tetrapak type containers made of a combination of paper and bioplastic, namely the special grade EC (Extrusion Coating) of the Minerv PHA biopolymer developed by Bio-on. To achieve this, researchers replaced the polyethylene contained in current packaging, maintaining all of its impermeability, and created a material that is totally naturally biodegradable.

The project aims to develop specific, eco-sustainable and, for the first time, fully biodegradable formulations, in order to make laminates with paper without using films, but instead fusing the biopolymer directly onto the paper using an extrusion process, without losing out on the end product's functionality and aesthetic. Based on Bio-on's revolutionary biopolymer, 100% naturally biodegradable and already tested in dozens of applications, from automotive to design to biomedical, Minerv PHA EC (Extrusion Coating) is safe and particularly suited for use with food.

Bio-on bioplastics are made from renewable plant sources, some of which is waste, with no competition with food supply chains, and are 100% naturally biodegradable. The Minerv PHA EC (extrusion coating) industrial research and development project produces poly laminate via extrusion of the molten PHA polymer directly onto the paper or cardboard substrate, with subsequent cooling and consolidation of the plastic film by passing through cooled rollers (an overall process entitled Extrusion

Coating). *Contact: Bio-On S.p.A, via Dante 7/b, 40016 San Giorgio di Piano (BO), Marco Astorri, Italy. Tel: +39-051-893-001; E-mail: info@bio-on.it.*

*Source: <http://www.nasdaq.com>*

## Biodegradable packaging films

Researchers from Isfahan University, Islamic Republic of Iran, have produced biodegradable packaging films using nanomaterials. According to the Iran Nanotechnology Initiative Council (INIC), nanocomposite films can be used in the packaging of various products after mass production. In addition to having best mechanical properties, the films can be produced faster in a cheaper manner due to the possibility of continuous production in extruder in comparison with usual films used in industries.

Starch has a wide application in the production of biodegradable materials due to its availability, reasonable price and quick natural degradation. However, these materials have weak mechanical properties and low reactivity in comparison with materials produced on polymeric materials based on petroleum. Therefore, the aim of the research was to improve the mechanical properties of biodegradable packaging films by using clay nanoparticles.

In addition to having optimal mechanical properties, the films produced in this research are able to reduce the cost and increase the rate of production. Therefore, they increase the quality and efficiency in comparison with usual films, and they decrease environmental pollution due to the biodegradability of starch. These characteristics enable environmental friendly films to compete with polymeric ones. Results of the research have been published in *Journal of Film and Sheeting*.

*Source: <http://www.en.mehrnews.com>*

## Antibacterial nanocomposites for food packaging

According to Iran Technology Initiative Council (INIC), researchers from Iran have produced antibacterial nanocomposite samples that have applications in foodstuff packaging that increase durability of the foodstuff without using preservatives. Nanocomposite synthesized in this research is a combination of copper nanoparticles and polymers used in packaging industry. Copper is an essential element for cellular metabolism, and one of the important elements for connection between neurons. Taking into consideration the fact that the allowed amount of copper in diet should be 2-10 mg according to global standards, it can take the place of silver as an antibacterial material with better properties but less toxicity.

Based on studies, the nanocomposite has appropriate antibacterial properties against gram positive and gram negative bacteria. Therefore, nutritional value of foodstuff and drugs will be preserved by using the nanocomposite without the need for harmful chemical preservatives. In addition, flexibility, formability and mechanical resistance are among the important issues in packaging. Studies also showed that the produced nanocomposite has higher mechanical resistance in comparison with the pure polymer. The use of nanoparticles with antibacterial and antifungal properties in milk packaging resulted in the preservation of milk up to 32 days without using any preservatives.

*Source: <http://www.en.mehrnews.com>*

## Biobased film to increase store shelf-life

Metalvuoto, Italy, have debuted a new generation of biobased flexible

substrates designed to keep processed foods fresh on store shelves, based on NatureWorks's high barrier Ingeo polymers. While Ingeo film has been used for years in fresh food packaging, this is the first application for longer shelf-life foods that are increasingly packaged in flat, stand up, or squared bottom pouches.

The introduction comes in response to a strong interest from the flexible packaging market in packaging simplification, with brands looking to move from complex multilayer laminates to simpler packaging solutions without compromising shelf-life. The Metalvuoto film allows using a two-layer pouch with performance matching that of three-layer pouches. The new film, "Ingeo Propylester" provides a significantly better oxygen barrier than metalized biaxially oriented polypropylene, eliminating the need for an additional sealant layer and enabling a structural package simplification.

Source: <http://www.biofuelsdigest.com>

## Nanoparticle-infused bioplastics

Researchers at Tuskegee University (TU), the United States, have suggested that adding tiny eggshell pieces to bioplastic can create a biodegradable packaging material, a first-of-its-kind, which bends but does not break so easily. *Vijaya K. Rangari*, Boniface Tiimob and colleagues at TU, performed experiments with several plastic polymers. They decided upon a mixture containing 70% polybutyrate adipate terephthalate (PBAT), a petroleum polymer, and 30% polylactic acid (PLA), which is a polymer produced from cornstarch.

Unlike other petroleum-based plastic polymers, PBAT begins to degrade within three months after



Adding eggshell nanoparticles to a bioplastic  
(Credit: Vijaya Rangari/Tuskegee University)

burial. This polymer mixture has many desirable properties, but the researchers wanted more flexibility from the material. Eggshells were used to create nanoparticles, as they are lightweight, porous and mainly composed of the easily decaying calcium carbonate. The eggshells were washed and ground up in polypropylene glycol.

The shell fragments were then broken down to nanoparticles, which were over 350,000 smaller than the diameter of human hair, upon exposure to ultrasonic waves. In a laboratory setting a small fraction of the nanoparticles, shaped like a card deck, was infused into the 70/30 PBAT-PLA mixture. The infusion of the nanoparticles made the polymer mixture 700% more flexible compared to the currently available bioplastics. This flexibility would be an ideal feature for grocery bags, retail packaging and food containers such as egg cartons.

Source: <http://www.azonano.com>

## Interactive screens for packaging

According to the researchers at the University of Sheffield, the United Kingdom, in the near future, shopping or using products may include

video or interactive content displaying on screens attached to packages. A process to cheaply print electronics, and attach low-cost electronics and a screen to paper-based packaging, could herald the next generation of packaging. Displays that light up, offer information or allow customers to interact using keyboards printed into the packaging could be used to enter a message in a greeting card, or eventually be complex enough to include timed signals on pregnancy tests or hair-dye kits.

In a study published in the *IEEE Journal of Display Technology*, the researchers have detailed the process of screen-printing a series of capacitive touch pads and connecting tracks onto paper using graphite ink. The researchers then used LED arrays and small, battery-powered electronics to power them. Researchers also said printing could potentially be done on other surfaces in the future. The researchers said they are working to create fully organic displays on a plastic substrate, though the devices need to be cheap and flexible enough for packaging – which will require further time for development.

Source: <http://www.upi.com>



### Hybrid solar dryer

Hadi Samimi, a PhD student at University of Tehran for the first time in the Islamic Republic of Iran, has managed to design and produce hybrid solar dryer taking advantage of fluid cycle method. The construction of the device formed the subject of Samimi's doctoral dissertation which was accomplished under the supervision of Akbar Arab Mohammad Hosseini and guidance of Mohammad Hossein Kianmehr. The device has been designed and built for the first time in Iran and will be able to alleviate a portion of difficulties faced in the processing of agricultural products.

Source: <http://www.en.mehrnews.com>

### 3-D image of food on the nanometer scale

Scientists at the University of Copenhagen (UCPH), Denmark, for the first time ever, have created a 3-D image of food on the nanometer scale. It has promising prospects as a more detailed knowledge of the structure of complex food systems could potentially save the food industry large sums of money. "There is still a lot we don't know about the structure of food, but this is a good step on the way to understanding and finding solutions to a number of problems dealing with food consistency, and which cost the food industry a lot of money," said Jens Risbo, at UCPH.

The researchers used a cream based on vegetable fat for the research. The cream system is a good test material, since it can represent the structures of a large group of food systems, for example cheese, yogurt, ice cream, spreads, but also the more solid chocolate. All the aforementioned products contain liquid water or fat as well as small

particles of solid materials, which stick together and form three-dimensional structures - i.e. a network that provides the consistency that we like about cheese, yogurt or chocolate.

In cheese and yoghurt the casein particles form the network. In chocolate it is the fat crystals and in ice cream and whipped cream it is the fat globules. To create a three-dimensional model of the food and convert it into images and video, the scientists have been in Switzerland, where they have used the Swiss Light Source (SLS) synchrotron at the Paul Scherrer Institute. In the synchrotron electrons are accelerated to near speed of light. The synchrotron is used for research in materials science in areas such as biology and chemistry. The method the researchers used is called "Ptychographic X-ray computed tomography."

Source: <http://www.foodingredients-first.com>

### Solar dryer for value-addition to copra

Based on the success of the solar dryer set up at Vedaranyam in India, the Agriculture Engineering Department has set up second solar dryer at a village near Nagapattinam in India. The dryer, set up at Semangalam village at an estimate of Rs. 3.86 lakh, aims at promoting value-addition in copra cultivation. The dryer has been set up with a subsidy of Rs. 1.84 lakh sanctioned by the state government. This is the second dryer to be set up in the district for the benefit of copra cultivators.

In the first case, Tirumaraikadu Iyarkai Vivasayigal Sangam Kootaippu comprising 21 farmers clubs' involved in producing copra in a cluster of villages near Vedaranyam, has been set up. Under the conventional method, it took about ten days for drying the coconuts. But, the solar

dryer not only expedited it in two days but also ensured hygienic handling of the produce. The dryer, with a plinth area of 400 square feet, can handle 1,500 coconuts a day which are broken before being arranged in trays at the dryer. The dryer maintains a temperature anywhere between 60 and 70 degree Celsius and it is monitored using a sensor.

Source: <http://www.thehindu.com>

### High-end machines for food processing

The Department of Science and Technology (DOST), Philippines, has developed powerful food processing machines in shiny stainless steel frames and moulds, to equip the newly operated Davao Food Processing Innovation Center (FPIC) its distinct advantage over other food manufacturers. The Davao FPIC serves as a research and development center to assist micro, small and medium entrepreneurs (MSMEs) in Davao and the entire region raise their productivity through mechanization.

The machineries used in the facility include the following: vacuum fryer, spray dryer, vacuum sealer, freeze dryer, band sealer and water retort. All of these equipment are fabricated locally by Filipino scientists and engineers trained by the DOST and the partner institutions. The vacuum fryer reduces fat absorption by as much as 42% by using low temperature resulting in high quality fried fruit and vegetable products. The spray dryer, on the other hand, transforms agricultural products like carrots and calamansi into powder form as the machine's atomizer breaks liquid sample into small particles that are dried upon contact with hot air.

Another equipment, the freeze dryer removes moisture while



maintain cellular integrity thereby preserving highly perishable produce for a longer time. The water retort is also a useful equipment as it sterilizes food packaged in hermetically sealed containers like those in retort pouch, cans, bottles, jars. Samples of products that use this include dried tuyo (dried her-ring), laing (native Bicolano dish of taro leaves cooked in coconut milk) and sardines. Lastly, the vacuum sealer is used for any type of plastic packaging that results in optimum seal and quality performance due to accurate and consistent sealing temperature.

Source: <http://www.dost.gov.ph>

## Faster beverage tasting

According to a market research report by Reportlinker, France, global demand for commercially sterile beverages is growing more than 9 per cent annually. Taking this into consideration, 3M, the United States, have announced the launch of their Microbial Luminescence Systems UHT Beverage Screen Kit. This new rapid test expands the application of the Microbial Luminescence System (MLS) from UHT dairy products to a wide variety of UHT and ESL beverages such as fruit juices, caffeinated drinks, coconut waters, smoothies, dairy, dairy substitutes, and dairy/juice mixtures.

The system provides a rapid method for quality release testing, reducing the time-to-result by two to three days or more, compared to traditional methods like agar plates and pH measurement. Using bioluminescence technology, the Microbial Luminescence System detects ATP (adenosine triphosphate), an energy molecule universally present in all living organisms, no matter how small.

This technology allows the 3M MLS to have faster time-to-result than traditional pH or agar tests, and more reliably detect a broad range of microorganisms than traditional methods.

Source: <https://www.foodmag.com.au>

## 3D food printing

A group of scientists at the VTT Technical Research Centre of Finland (VTT), Finland, is attempting to transform food manufacturing through a combination of food, material science and 3D printing technology. The group has already conducted initial trials to test starch and cellulose-based materials for 3D food prototypes.

A major aim of the project is to eventually develop high-tech vending machines with the ability to 3D-print customised products, VTT said. However, Nesli Sözer, principal scientist at VTT, said far more work is needed before 3D food printing can be scaled-up to an industrial or commercial level. "Equipment needs to be developed in addition to materials. Such equipment could be developed for domestic 3D food printing as well as vending machines," Sözer said.

Meanwhile, VTT is also working on a separate project alongside Aalto University. That project is developing ways of 3D printing multi-textural food structures in a "techno-economically feasible and sustainable way". According to VTT, the project aims to deliver new ingredient mixes with suitable flow properties for 3D processing, VTT said. This, it said, would help create 3D food printing technologies that can be used by food processing companies and equipment manufacturers.

Source: <http://processengineering.co.uk>

## Low cost coconut deshelling machine

Researchers from Tezpur University and Assam University, India, have developed an electric motor powered coconut deshelling machine in line with the commercially available unit, but with slight modifications. The machine worked on the principle that the coconut shell can be caused to fail in shear and compressive forces. It consisted of a toothed wheel, a deshelling rod, an electric motor, and a compound chain drive.

A bevelled 16 teeth sprocket with 18 mm pitch was used as the toothed wheel. Mild steel round bar of 18 mm diameter was used as the deshelling rod. The sharp edge tip of the deshelling rod was inserted below the shell to apply shear force on the shell, and the fruit was tilted toward the rotary toothed wheel to apply the compressive force on the shell. The speed of rotation of the toothed wheel was set at  $34 \pm 2$  rpm. The output capacity of the machine was found to be 24 coconuts/h with 95% of the total time effectively used for deshelling.

The labour requirement was found to be 43 man-h/1000 nuts. About 13% of the kernels got scraped and about 7% got sliced during the operation. The developed coconut deshelling machine was recommended for the minimum annual use of 200 h or deshelling of 4700 coconuts per year. The cost of operation for 200 h of annual use was found to be low and affordable. The developed machine was found to be simple, easy to operate, energy efficient, safe and reduce drudgery involved in deshelling by conventional methods.

The research findings have been published in the *Journal of The Institution of Engineers (India): Series A*.

Source: <http://link.springer.com>

### Handbook of Food Processing: Food Preservation

This book presents the information necessary to design food processing operations and goes on to describe the equipment needed to carry them out in detail. The book covers every step in the sequence of converting raw material to the final product. It also discusses the most common food engineering unit operations and food preservation processes, such as blanching, pasteurization, chilling, and freezing to aseptic packaging, non-thermal food processing, and the use of biosensors.

Contact: CRC Press, Tel: +44-0-1235-400524; Fax: +44-0-1235-400525; E-mail: [tandf@bookpoint.co.uk](mailto:tandf@bookpoint.co.uk)

### Handbook of Food Processing Equipment

The book is an essential reference for food engineers and food technologists working in the food process industries, as well as for designers of process plants. The book also serves as a basic reference for food process engineering students. The chapters cover engineering and economic issues for all important steps in food processing. This research is based on the physical properties of food, the analytical expressions of transport phenomena, and the description of typical equipment used in food processing.

### Thermal Processing of Packaged Foods

The book discusses the physical and engineering aspects of the thermal processing of packaged foods and examines the methods which have been used to establish the time and temperature of processes suitable to achieve adequate sterilization or pasteurization of the packaged food. This edition includes new concepts and areas that are relevant for thermal food processing.

For the above two, publications, contact: Springer India Private Ltd. Tel: +91-8527-8027-70; E-mail: [Naveen.taneja@springer.com](mailto:Naveen.taneja@springer.com)

2016

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30 Aug-2 Sep  
Mashhad,  
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#### IFOOD 2016

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9-11 Sep  
Davao City,  
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#### WORLD FOOD INDIA 2016

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