



VATIS UPDATE

# Food Processing

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## Highlights

- New test flags gluten protein in food
- Modified starch as fat replacer
- Pre-biotic, fortified fruit juice
- Honey, a natural preservative
- Metallized compostable pack
- Machine to sort pomegranate seeds



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- 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 bottle filling plant featuring the Weihenstephan Standard for the communication of bottle filling and machines in the beverage industry  
(Credit: ELAU GmbH, Germany)

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## IN THE NEWS

### New centre on underutilized crops for food security

An international body for gathering and promoting knowledge about underused crops is to be established in Malaysia. The new body, Crops for the Future, could have major benefits for improved food security and the ability of food systems to adapt to climate change.

“There are thousands of crops that poor people rely on but are not commercialized,” said Ms. Hannah Jaenicke, Director of the International Centre for Underutilized Crops (ICUC), which is merging with the Global Facilitation Unit for Underutilized Species (GFU) to create the new body. ICUC, currently based in Colombo, Sri Lanka, says that Crops for the Future will be hosted by a joint venture between Biodiversity International and the Malaysia campus of United Kingdom-based Nottingham University.

Topics that might be handled by the new body include studies of the market chain and niche markets to determine what risks producers of low volume high value crops face; promoting extended shelf life, for example by dehydrating jackfruit; and encouraging dual use of crops such as making juice from marula fruit and using the oil from its nut for cosmetics. (Source: [www.scidev.net](http://www.scidev.net))

### Guidebooks on food safety

Mr. Subodh Kant Sahai, India's Minister of State for Food Processing Industries, has released a guidebook titled “14-point check on Food Safety for Street-vended Foods” brought out jointly by the Confederation of Indian Industry (CII) and the Ministry of Food Processing Industries. He also released, at the opening of the 2<sup>nd</sup> International Food Regulatory Summit, another guidebook on “Food Safety Tips for Housewives”. The two-day summit was organized by CII and the Food and Agricultural Organization (FAO).

On the occasion, the Minister called upon developed nations to share technology related to food safety and regulations to help harmonize global trade and standards in the processed food sector.

Pointing out that only 7-10 per cent of food is processed in India, the Minister stressed upon the need to increase this to 20 per cent by 2015, and eventually to 70 per cent, as in the developed world. This, he said, means that the farmers would need to be trained and made aware of good agricultural practices.

Mr. Ashok Sinha, Secretary, Ministry of Food Processing Industries, underlined the need to increase awareness among consumers about food safety regulations. He also stressed on the need for food safety audits of mass feeding programmes in the country. Speaking on India's stake in the global food processing market, Mr. Rajeshwara Rao, Joint Secretary in the Ministry of Food Processing Industries, emphasized the need to increase by many times India's share of the global trade from the current 1.6 per cent.

Mr. Kazuaki Miyagishima, Secretary of the Codex Alimentarius Commission, said access to safe and healthy food is possible only when effective national food safety control systems are in place. He described food safety as “the shared responsibility of a nation's regulatory authority, the food industry and the consumers”. Mr. Gautham Mukavilli, Chairman CII National Committee on Food Regulatory Affairs, said in his welcome address that having food and safety regulations in place is becoming increasingly important “given the rapid internationalization of taste and commerce”. Ensuring food safety will also help us address nutritional challenges caused by rapidly changing lifestyles and diets, he said. (Source: [www.commodityonline.com](http://www.commodityonline.com))

### Stricter control in Viet Nam on imported foodstuffs

All eggs imported from China found contaminated with melamine will be destroyed, said Mr. Cao Minh Quang, Deputy Minister at the Ministry of Health (MoH) of Viet Nam. According to information received from Hong Kong health and food authorities, eggs may contain melamine because of poultry eating cattle feed contaminated with melamine. MoH would work with the Ministries of Agriculture & Rural Development, Industry & Trade and Science & Technology, and to strengthen quality checks of imported food products. Sale of products of unclear origin, such as illegally imported eggs, would not be permitted, Mr. Quang

said. High-risk food products must be certified as free of melamine contamination before being imported into Viet Nam, he added.

Health inspectors have found melamine content in imported cattle feed, used as poultry feed by some farms, and have decided to zone off the region and destroy all tainted products. Chickens that eat food containing melamine are likely to be affected by the substance and may lay melamine contaminated eggs, so the production and trade of cattle feed would also be placed under strict control, Mr. Quang said. However, the majority of eggs were illegally imported into Viet Nam from China, making it difficult for authorities to control it. (Source: [www.nhandan.com.vn](http://www.nhandan.com.vn))

## Philippines may miss coconut-oil export target

The Philippines may miss its target of increasing coconut oil (CNO) exports by 12 per cent this year, owing to declining demand and buyers' shift to other commodities. Ms. Yvonne Agustin, Executive Director of the United Coconut Associations of the Philippines, said export growth rate might not reach double digits. She identified buyers' shift to cheaper oil substitute like palm kernel oil as the reason for the decline in CNO demand.

CNO shipments in July totalled 69,000 metric tonnes (MT), but went down by more than 50 per cent to 36,000 MT in August. The decline continued in September, as shipments reached only 34,000 MT. However, Mr. Arturo Lique, Deputy Administrator of the Philippine Coconut Authority (PCA), said that exports for January-September 2008 was 10 per cent more than the 579,000 MT exported in the same period in 2007. "Exporters should be shipping out more than 100,000 MT every month from October to December if they are to export more than 1 million tonnes this year," said Mr. Lique. Ms. Agustin, for her part, said the industry is not so optimistic about more CNO purchases during the last quarter of 2008. (Source: [businessmirror.com.ph](http://businessmirror.com.ph))

## Bangladesh to form regulatory body on food

The Government of Bangladesh has decided to set up a regulatory body specific to checking

adulteration of food items, the Health and Food Adviser Mr. A.M.M. Shawkat Ali said recently. The decision will be implemented over the following two years and in the interim, two committees will help ensure quality and contain the use of impurities in food, he said. Of the committees, one will be high-powered and formed under the Ministry of Health. It will draw representatives from the Ministries of Commerce, Home and Local Government and the National Board of Revenue. The other committee will be a technical one.

Mr. Ali said many experts have suggested setting up an agency modelled on the United States Food and Drug Administration. The decision to form such a regulatory body was taken because it is difficult for Bangladesh Standards and Testing Institution (BSTI) to ensure food safety, as it has to deal with a lot of non-food products as well. BSTI has little capacity in terms of work force and logistics to handle so many food and non-food items. Besides, it tests only the first-batch products. (Source: [www.thedailystar.net](http://www.thedailystar.net))

## Pakistan plans to boost local tea production

To save the precious foreign exchange being spent on the import of tea, the Government of Pakistan has initiated a scheme on 'Commercialization of Tea Production through Public Private Partnership' worth PRs 5.272 billion (US\$66.2 million) to boost domestic tea production. This programme will be implemented in key tea growing areas with the help of private sector. About 4,200 acres of land would be brought under tea production. At the completion of the scheme in 2011, the country would be producing about 1,000 kg of tea per acre per annum, said an official in the Ministry of Food, Agriculture and Livestock (MINFAL).

The per capita consumption of tea in Pakistan is 1 kg, almost all of which is being imported. Last year, the government imported about 102,000 metric tonnes (MT) of black tea at the cost of Rs 13.73 billion (US\$172 million) and 1,260 MT of green tea at the cost of Rs 104 million (US\$1.3 million). Pakistan imports its black tea from 21 different tea-producing countries with the major share of 63 per cent from Kenya. Green tea is imported from China, Viet Nam and Indonesia. (Source: [www.dailytimes.com.pk](http://www.dailytimes.com.pk))

## Sri Lanka sets up Tea Price Stabilization Fund

The Sri Lankan government has decided to set up a Tea Price Stabilization Fund with an initial investment of SL Rs 1.5 billion (US\$13.13 million) to safeguard the industry ailing from the sharp decline of demand. Tea Board Chairman Mr. Lalith Hettiarachchi said the Fund will be set up with initial treasury funding.

Commercial banks have also been directed to cut interest rates on loans offered for purchasing tea by six per cent, while the existing grace period of one week for settlement of these loans is to be extended to four weeks. (Source: [www.colombo.page.com](http://www.colombo.page.com))

## Industrial park in India for coconut promotion

In India, the Kerala Industrial Infrastructure Development Corporation (Kinfra) and Coconut Development Board (CDB) propose to jointly set up an industrial park in Thrissur, Kerala, to facilitate value addition in coconut. The park is expected to bring together farmers, processors and retailers to link agricultural production to the market.

The proposed "Kera Park" will be a well-defined processing and value addition zone, containing state-of-the-art processing facilities with support infrastructure and well-established supply chain. The primary objective of the project is to facilitate establishment of an integrated value chain that will put to full commercial use all parts of the coconut tree, thus ensuring the zero wastage and enabling farmers to realise better earnings. Farmers would be organized into clusters, with all the clusters in turn forming a "special purpose vehicle," which will co-ordinate exclusive coconut farming for the industries at Kera Park. It will also be engaged in primary processing.

A separate special purpose vehicle that includes potential investors as well as farmers' clusters will manage the park. Setting up processing units for edible and non-edible products and common facility centres would be a priority, sources said. The project, to be developed in the public-private participation model, would be completed in three years. (Source: [www.financialexpress.com](http://www.financialexpress.com))

## STANDARDS/ REGULATIONS

### Processed GMO food to carry markings

In the Republic of Korea, all processed food with genetically modified organisms (GMO) will be required a GMO mark regardless of the amount. The Korea Food and Drug Administration recently notified the new rules on GMO indication standards. According to the new rules, all processed food products including soy sauce, soy oil, ice-cream products and drinks will be required to indicate their GMO contents. If the products contain any remaining GMO ingredients, a mark will be required. (Source: [english.kbs.co.kr](http://english.kbs.co.kr))

### China reviews food safety draft law

China's top legislature re-examined a draft law on food safety, which sets strict food quality standards and demands greater government responsibility. The draft underwent a revision after the recent contaminated dairy products scandal. It bans all chemicals and materials except authorized additives in food production. Health authorities are responsible for assessing and approving food additives and setting their usage. The draft requires health agencies to conduct inspections and assessments of problematic food products as soon as they receive complaints. It also requires a quick and transparent reporting system, making it mandatory for enterprises, hospitals and quality supervision agencies to immediately report all food safety incidents to the authorities.

Food producers must strictly stick to the food additives and their usage approved by authorities, on penalty of closure, or revocation of production licenses in serious cases, according to the draft law. Food safety supervision authorities are prohibited from issuing inspection exemptions to food producers.

The draft asks health authorities to write and issue "scientific, safe and reliable" food safety standards, which are compulsory for all food producers,

to ensure public health. The standards would combine the current standards for edible agricultural products, food hygiene, food quality and other relative standards in the food industry. The draft law directs health authorities to refer to international standards and listen to opinions of food producers and consumers when writing the standards. (Source: news.rednet.cn)

## Pakistan to test all edible oil import consignments

Pakistan Standards and Quality Control Authority (PSQCA) will henceforth test all imported edible oils for standards and issuance of Conformity Assessment Report (CAR) before marketing of the product in the country. Following the objection from PSQCA, the Collector of Customs, Model Customs Collectorate Preventive (MCCP), Karachi, has decided "to dispense with referring the cases to Provincial Health Departments (PHDs)", as PHDs do not have the capacity and the legal mandate to undertake such responsibility.

Henceforth, the data of all imports of edible oils shall be communicated to PSQCA, on weekly basis, so that they could monitor the imports at refining/processing and packaging stages for standard and quality check. The chemical analysis of these products at import stage shall continue to be done by the Customs House laboratory. No one will be allowed to produce, package or sell food items without PSQCA approval. Import of food grade palm oil by non-manufacturers will not be allowed, and PSQCA will be given powers to seal premises of non-compliant manufacturers. (Source: www.pakwatan.com)

## Listing nutritional facts made compulsory in India

In India, labels of packaged foods must henceforth compulsorily list nutritional facts per 100 gm or 100 ml or per serving. This has been spelt out by the new Prevention of Food Adulteration (Fifth Amendment) Rules, 2008. The Ministry of Health and Family Welfare, which issued the notification on 19 September 2008, has given the industry six months to put the norms in place. So far, listing of nutritional profile on food product labels has been voluntary.

The new rules stipulate that all ingredients in a packed product must be listed in a descending order in terms of both weight and volume. Significantly, the list must also include the nutritional profile of a product such as: its energy value in kcal; the amount of protein, carbohydrates, sugar and fat in grams; and other vitamins and minerals in metric units.

The rules also lay down that a fruit juice, squash or beverage that does not contain a specified amount of fruit juice or pulp cannot be described as a fruit product. So, an item that is not a true fruit product can no longer pass off as one. The new rules mandate that foods using hydrogenated fats or bakery shortenings must specifically declare so on the label and also mention that they contain transfat.

Nutritional information, however, is not necessary in the case of raw agricultural commodities such as: wheat, rice and spices; non-nutritive products such as soluble tea, coffee and packaged drinking water; fruits; vegetables; and single-ingredient products. Foods served for immediate consumption at hotels, hospitals, and by vendors and confectioneries, are also exempt. (Source: timesofindia.indiatimes.com)

## Philippines to continue tighter food monitoring

In the Philippines, the Bureau of Customs (BoC) has assured the public of tighter monitoring of imported food products to prevent the entry of contaminated food in the country. "We will not allow the release of any contaminated goods," Mr. Napoleon Morales, Customs Commissioner, said.

The National Meat Inspection Service (NMIS) has been conducting tests on imported food products, mainly from China, including several brands of canned meat, for the presence of toxic materials.

Imported foods need to be covered by certificates of registration as well as certification from the Bureau of Animal Industry. "The NMIS would not issue a certificate of product registration if they are not sure that it is safe and fit for human consumption," Mr. Morales said. Other imported food items will have to be checked by agencies such as the Bureau of Food and Drugs. (Source: news.info.inquirer.net)

## SAFTEY/ QUALITY CONTROL

### New high-throughput method to detect melamine in food

MDS Analytical Technologies, the United States, has announced the validation of Abraxis Melamine Detection Kit for use on its SpectraMax® absorbance microplate readers with SoftMax® Pro 5 GxP analytical software, an industry-standard analysis software for FDA 21 CFR Part 11 compliance. The detection kit was developed by from Abraxis, a biotechnology company in the United States.

The MDS-Abrax solution is claimed to offer a cost-effective, high-throughput, quality-assurance method to detect melamine contamination in such food products as milk, infant formula, pet food and confectionery. This enzyme-linked immunosorbent assay (ELISA) solution will enable quality assurance technicians in food-safety laboratories to easily detect the presence of melamine down to 10 ppb. SoftMax Pro 5 GxP software runs on all microplate readers offered by MDS Analytical Technologies. It offers five parameter logistic (5PL) curve fitting, parallel line analysis (PLA) with observation weighting, more than 120 ready-to-run assay protocols for instant results generation, etc. *Contact: MDS Analytical Technologies, 1311 Orleans Drive, Sunnyvale, CA 94089-1136, United States of America. Tel: +1 (408) 747 1700; Fax: +1 (408) 747 3601; E-mail: info@moldev.com.* (Source: www.moleculardevices.com)

### New test flags gluten protein in food

Scientists from Spain and the United Kingdom have developed a test that could speed up identification of gluten, a trigger for people with celiac disease. Although gluten-free foods are already on the market, gluten can lurk in products that people might not expect. The new test, which flags a gluten protein called gliadin, is faster and said to be as sensitive as any currently available test.

The scientists, who included graduate student Mr. Hossam Nassef from Spain's Universitat Rovira

i Virgili, assessed the new gliadin test on foods that contain gluten and gluten-free foods. The new test was found to be "highly sensitive" and only took 90 minutes, compared with a currently available test of similar sensitivity that takes eight hours, Mr. Nassaf and colleagues report. The scientists are working to make the new gliadin test even faster. (Source: www.webmd.com)

### New way to test milk

China's Ministry of Agriculture has announced a new testing method to determine the actual protein in milk products. The method – recommended for food producers and regulators across the country – will separate melamine and other crude compounds that contain nitrogen from the real protein before analysing the content, said Prof. Hou Caiyun, a China Agricultural University food testing expert who led the research team.

The commonly used Kjeldahl method does not distinguish melamine and other false nitrogen compounds from real protein. The white, talc-like chemical melamine can be mixed with animal feed, milk and other food products to raise the protein content. The new test uses a chemical to distinguish real protein from other nitrogen-containing compounds and can be conducted using common laboratory equipment, Prof. Hou said. It costs far less than the high performance liquid chromatography method, used to detect melamine in milk. (Source: www.chinadaily.com.cn)

### Fluorescence method for detecting mercury in fish

Researchers at the University of Pittsburgh, the United States, have developed a simple and quick method for detecting mercury in fish and dental samples, two substances at the centre of public concern about mercury contamination. The technique involves a fluorescent substance that glows bright green when in contact with oxidized mercury. The intensity of the glow indicates the amount of mercury present.

Developed by Prof. Kazunori Koide, a chemistry professor in University of Pittsburgh School of Arts and Sciences, the new method can be used on site and can detect mercury in 30-60 minutes for dental fillings (or amalgams) or 10-30 minutes

for fish. The fluorescence results from the reaction of mercury ions with a hydrocarbon called alkyne, which gets converted into a ketone, thus creating a fluorescent molecule. Prof. Koide's method differs from other mercury indicators in that it accommodates the oxidation process that mercury samples must undergo prior to testing.

In testing fish, Prof. Koide and his team oxidized a piece of salmon (about the size of a fingertip) in water mixed with a chlorine solution similar to household bleach. Afterwards, they added the alkyne solution and the mixture glowed bright green. They also submerged two amalgam-filled teeth in the amino acid cysteine to mimic sulphur-rich foods thought to increase mercury seepage from amalgam. Again, the cysteine solution turned bright green when the indicator was added, suggesting that Prof. Koide's method can also be used to monitor mercury leaching brought about by sulphur-rich food. (Source: [www.sciencedaily.com](http://www.sciencedaily.com))

## Electron beam for decontamination

Researchers are using electron beam emitters to find ways of replacing thermal and chemical processes for cleaner, more efficient, lower-cost manufacturing and greener packaging. The United States-based Advanced Electron Beams (AEB) has recently announced a collaboration with the University of Reims in France, under which the latter will use AEB's Application Development Emitter Unit to study the effects of accelerated electrons on a broad range of chemical compounds with a focus on electron beam-induced polymerization and polymer modification. This research has several potential applications, such as creating more environment-friendly and sustainable packaging, improving product safety, as well as helping companies transform inefficient and wasteful manufacturing processes.

More and more beverage and food manufacturers are choosing the technology for surface decontamination of PET bottle pre-forms, caps, cans, packaging film, gable tops and packs, and aseptic pouches, said Mr. Dave Icke, AEB Vice President of Marketing. The technology enables polymer sterilization to be conducted in milliseconds at room temperature, thereby helping companies to reduce energy consumption by 60-90 per cent.

AEB's emitters use a stream of electrons that can sterilize the inside of the bottle prior to filling by applying energy directly to the inside surface of the bottle. This eliminates the need for chemical sterilants and, consequently, rinse water. Mr. Icke says that electron beam technology enables a rapid, six log reduction of surface microbes. The technology can also improve the heat and creep resistance, tensile strength, and oxygen or carbon dioxide barrier properties of polymers.

The technology allows a reduction in overall resin, as the low temperatures employed means heat-withstanding heavy weight bottles are not needed, according to Mr. Icke. It can be used for curing of inks, coatings and laminate adhesives for indirect and direct food contact surfaces. It is used increasingly in place of traditional solvent-based techniques. (Source: [www.foodproductiondaily.com](http://www.foodproductiondaily.com))

## Nanotechnology for food safety

Scientists led by Mr. Bosoon Park, an engineer at the Quality and Safety Assessment Research Unit of the Agricultural Research Service (ARS), United States Department of Agriculture (USDA), have developed a microscopic biological sensor that detects *Salmonella* bacteria. The sensor could be adapted to detect other food-borne pathogens as well.

Mr. Park, and co-researchers from the University of Georgia, used nanotechnology to develop the biosensor. These biosensors include fluorescent organic dye particles attached to *Salmonella* antibodies. The antibodies hook on to *Salmonella* bacteria and the dye lights up like a beacon, thus making the bacteria easier to see. (Source: [www.ars.usda.gov](http://www.ars.usda.gov))

### Database on Global Food Safety Legislation

This database provides information on and links to websites containing data on food safety regulations world-wide. The database is searchable by country, subject and information type. Search results give access to the websites and the information as well as a description on how the information is presented. For more information, access:

<http://legislation.selamat.net>

## INGREDIENTS

### Dairy ingredient: preparation and use

Fonterra Co-operative Group, New Zealand, has filed for a United States patent on a method for producing a dairy powder or concentrate. The pH of the liquid dairy starting material – comprising casein and whey proteins – is adjusted if necessary by addition of acid or alkali to a pH in the range 5.0-8.0. The pH adjusted material is then heat-treated to denature whey protein in the presence of casein. This treated material is either retained or dried to form a powder or concentrate. The ingredient may be used for forming a product such as a processed cheese, spread, yoghurt or dairy dessert. In this process, the ingredient is dissolved/suspended (if necessary) and its pH is adjusted to 4.5-6.5. The material may then be cooked to form a molten mass, which is then cooled to form a milk protein gel. (Source: [www.flex-news-food.com](http://www.flex-news-food.com))

### Low-glycaemic palm sugar

Coconut Power, an organic evaporated palm sugar from Navitas Naturals in the United States, is a healthy new alternative sweetener that is low-glycaemic and rich in nutrients. This new organic product is made from the sweet juice of coconut palm blossoms. The sweet nectar is harvested by gently slicing the flower. Once collected, the nectar is kettle-boiled into a thick caramel and then ground into a fine brown crystal.

Navitas claim that Coconut Power is a pure cane sugar alternative that is 100 per cent organic, unprocessed, unfiltered, unbleached and contains no preservatives. The product is naturally low on the Glycemic Index (GI), with a rating of 35, which is about half that of cane sugar (GI 68). Coconut Power is especially high in amino acids, potassium, magnesium, zinc and iron and is a good natural source of the vitamins B1, B2, B3, B6 and C. *Contact: Navitas Naturals, 9 Pamaron Way, Suite J, Novato, CA 94949, United States of America. Tel: +1 (888) 645 4282; Fax: +1 (415) 883 1083; E-mail: [info@navitasnaturals.com](mailto:info@navitasnaturals.com).* (Source: [www.npicentre.com](http://www.npicentre.com))

### Modified starch as fat replacer

Studies have found that the calorie-content of yoghurt could be reduced by more than 50 per cent using Etenia, an ingredient developed by Avebe Group. In the Netherlands, researchers from NIZO Food Research BV, DSM Food Specialties and the Avebe Food Innovation Centre, independently tested the quality and functionality of Etenia. The researchers investigated the perception of creaminess in yoghurts formulated with the ingredient in order to reduce the fat content of the final product.

Mr. Arno Alting from NIZO food research, the lead author of the study, said that the ingredient “is a serious candidate for fat replacement.” Etenia, derived from potato starch, may be labelled as ‘starch’ rather than ‘modified starch’, meeting clean label requirements that are being put in place by manufacturers and retailers. Etenia is said to have both gelling and thickening properties. Moreover, it has some of the same properties as gelatine, the most common gelling agent, but is vegetarian.

The researchers formulated a low-fat yoghurt with amyloamylase-treated starch (ATS) ingredient. The low-fat yoghurt, containing 1.5 per cent fat, was found to have the same perceived creaminess as full-fat yoghurt with a fat content of 5 per cent. Moreover, in yoghurts with a fat content of 3 per cent, the ATS was found to be “four times as effective as maltodextrin,” which is a current fat replacer in set-style yoghurt. “The perceived creaminess resulted from in-mouth melting of these ATS domains owing to a combined effect of their physical melting and hydrolysis by amylase present in the saliva,” the researchers have reported.

Mr. Alting and colleagues say that the energy value of the resulting low-fat yoghurt would also be about half that of the higher-fat yoghurt, since polysaccharides have a lower energy value than fats. Assuming a conversion factor for fat of nine, compared with four for polysaccharides, they calculated that “replacing 3.5 per cent fat in a 5 per cent fat-yoghurt with 2 per cent ATS will result in a reduction of the fat-related energy value from 45 to 21.5 kcal/100 g”. The ingredient could be used in different yoghurt types. (Source: [www.ap-foodtechnology.com](http://www.ap-foodtechnology.com))

## Chitosan and lecithin combo as nano-encapsulator

Combining chitosan and modified lecithin could offer interesting nano-encapsulators for a variety of ingredients, according to a new study from Japan. The spontaneous self-assembly of the ingredients into stable nanoparticles was investigated and encapsulation of ingredients was found to be as much as 63 per cent in some cases.

The study by scientists from University of Tsukuba and National Food Research Institute looked at the formation of nanoparticles through the self-assembly of modified lecithin and chitosan. It produced nanoparticles that ranged in size from 123 to 350 nm. The particles “exhibited excellent stability at over an extended pH (3 to 6) and ionic strength range,” report the researchers.

Dextran-fluorescein isothiocyanate, bovine serum albumin and Coomassie brilliant blue were used as model compounds to test the ability of the self-assembled nanoparticles to encapsulate ingredients with no charge (non-ionic), or a positive and negative charge, respectively. Encapsulation efficiency ranged from 8.7 to 62.7 per cent. Model water-soluble compounds could be entrapped within the nanoparticles at fairly good efficiency, the scientists noted. (Source: [www.beveragedaily.com](http://www.beveragedaily.com))

## Pre-biotic potential of enzyme-converted durum wheat

Researchers from the Universities in Reading, Naples and Barcelona have reported that treating the insoluble cereal fibre with *Trichoderma* enzymes produced soluble feruloyl oligosaccharides, which displayed bifidobacteria and lactobacilli-boosting properties when tested in a model gut system. If human studies confirm the pre-biotic potential of the new fibres, it could see the soluble feruloyl oligosaccharides from durum wheat joining the growing list of pre-biotic ingredients.

The scientists treated durum wheat fibre (DWF) with *Trichoderma harzianum* strain 22. This produced soluble feruloyl oligosaccharides. These soluble fibres were then tested in a model gut system, which mimics the microbial environment of the human colon. Results showed that the enzyme-treated DWF (ET-DWF) did stimulate

the growth of bifidobacteria and lactobacilli. No effect on short-chain fatty acids formation was recorded by the researchers. (Source: [www.nutraingredients.com](http://www.nutraingredients.com))

## Natural ingredient that can boost metabolic health

Prof. Michael Zemel, Director of the University of Tennessee Nutrition Institute, the United States, has invented Innutria, an all-natural ingredient that he says will help make people less efficient at storing fat while giving a boost to metabolic and cardiovascular health. “It is true we can do that by eating a really good diet all the time, but we are creating an alternative for the 90-plus per cent of individuals who don’t do that, said Prof. Zemel.

Prof. Zemel plans to market the ingredient to food and beverage companies through Nutraceutical Discoveries Inc., a licensee of the University of Tennessee Research Foundation. He expects to develop a family of Innutria products aimed at different markets like men’s and women’s health, weight loss and active living. The business is targeting such beverages as water and teas, as well as foods like oatmeal and beans. “We want to put it in better-for-you foods. We want ‘powered by Innutria’ label to mean something,” said Prof. Zemel. (Source: [www.knoxnews.com](http://www.knoxnews.com))

## Heat-stable flavouring compositions

Quest International Services B.V., the Netherlands, has applied for a United States patent on particulate flavouring compositions having, based on the total weight of the composition, 0.1-40 wt per cent of flavouring substances, 10-90 wt per cent of hydrocolloids and 0.1-50 wt per cent of a lipid material having a melting point above 75° C. These flavouring compositions are claimed to be particularly suitable for application in food and beverages, as well as in confectionery products such as chewing gum. Other aspects of the invention relate to a method of producing a particulate flavouring composition, to a food product containing such a flavouring composition and to a process of manufacturing a reconstitutable food product. (Source: [www.flex-news-food.com](http://www.flex-news-food.com))

## BEVERAGES

### Oil-based additive for beverages

Friesland Brands B.V. and Mr. Edwin Aart Riegan, the Netherlands, have been jointly assigned a WIPO patent on a powdery fat-phase additive for beverages, soups or other liquid food, such as a dairy or non-dairy creamer, dairy creamer with encapsulated gas, cappuccino foamer, instant cocoa beverage or instant soup. The additive is typically hot-soluble and contains – depending on the purpose of use – about 5-60 per cent fat phase (oil and/or fat); 1-30 per cent proteins; 20-75 per cent carbohydrates; 0-5 per cent emulsifiers; 0-6 per cent stabilizers; 0-1 per cent anti-caking agents; and maximum 5 per cent, or more preferably 3.5 per cent, liquid.

The fat phase of the additive is mainly based on unhydrogenated palm kernel stearin, which helps the product meet the following requirements: a creamy flavour; a creamy, non-greasy mouthfeel; and a shelf life at room temperature (about 20°C) of at least 18-24 months. *Contact: Friesland Brands B.V., Blankenstein 142, PE Meppel, NL-7943, The Netherlands.* (Source: [www.freepatentsonline.com](http://www.freepatentsonline.com))

### Pre-biotic, fortified fruit juice

Fructo-oligosaccharides (FOS) can be used to partially replace sucrose in fruit juices without detrimentally affecting physical characteristics of the juice, says new research from Central Food Technological Research Institute (CFTRI), India. CFTRI scientists report that fortification with the pre-biotic fibre does not affect the colour, pH or the amount of solids in the beverage. Moreover, the initial FOS content of juices made from mango, pineapple or orange were all about 3.5 g/100 ml.

“The present study clearly indicates that fruit juice beverages can successfully be fortified with FOS with shelf life of 4 months and 6 months at ambient and refrigeration temperature, respectively,” wrote the CFTRI researchers. They prepared FOS by enzymatically transforming sucrose and then added this to fruit juice beverages as a partial replacement of sucrose. Sensory analysis showed no undesirable changes, particularly for colour of the product. (Source: [www.ap-foodtechnology.com](http://www.ap-foodtechnology.com))

### Nutritional beverage to promote bone health

The Coca-Cola Company in the United States – along with inventors Mr. Mark W. Lada, Mr. Reza A. Kamarei and Mr. Timothy A. Anglea – has been assigned a WIPO patent for a method that is said to enhance the bone health of a consumer. The method comprises providing the consumer at least 237 ml (8 fluid ounces), twice a day, of a nutritional beverage that contains: (a) at least one beverage base; (b) about 10-60 per cent daily value (DV) each of magnesium, potassium and calcium; (c) about 10-85 per cent DV phosphorus; (d) about 10-60 per cent each of DV vitamin D and vitamin K; (e) about 150-600 mg food-grade strontium; and (f) about 1-10 mg of food-grade boron.

The regimen is claimed to improve availability of minerals in the body, prevent bone loss and promote bone health. *Contact: The Coca-Cola Company, 1 Coca-cola Plaza, Atlanta, Georgia, GA 30301, United States of America.* (Source: [www.freepatentsonline.com](http://www.freepatentsonline.com))

### Vacuum freeze drying for lime juice production

Researchers from the Department of Mechanical Engineering, Khon Kaen University, Thailand, have developed an experimental process for the continuous production of lime juice powder. They have also determined the characteristics of lime juice powder produced using the experimental freeze-drying process.

The method consisted of two processes: freezing (air blast freezer) and freeze-drying (tray method with heating plate type). Sodium bicarbonate (2 per cent by weight of lime juice) was dissolved in lime juice as solid aid. It was found that this method can produce lime juice powder that has properties similar to those of fresh lime juice. The study concluded that the experimental dryer, which combines the processes of freezing and freeze-drying, can efficiently achieve desirable results on continuous production mode. *Contact: Mr. Wasan Theansuwan, Department of Mechanical Engineering, Khon Kaen University, 123 Mittra-parb Road, Muang District, Khon Kaen 40002, Thailand.* (Source: [www.scipub.org](http://www.scipub.org))

# PRESERVATIVES

## Dried plums as alternative to synthetic preservatives

A recent study conducted by researchers from University of Oriente, Venezuela, and Texas A&M University, the United States, found that dried plums (prunes) are just as effective as synthetic preservatives, such as butylhydroxyanisole (BHA) and butylhydroxytoluene (BHT), at preventing the oxidative deterioration of ready-to-eat meat products.

Researchers used raw pork pate to prepare sausages using a variety of preservative methods: 0.02 per cent BHA/BHT, 3 or 6 per cent dried plum puree, 3 or 6 per cent dried plum and apple puree, or a control sausage with no preservative at all. The sausages were then: refrigerated raw; cooked, vacuum packed and then refrigerated; or cooked, vacuum packed and then frozen.

At both concentrations, dried plum was as effective at preserving the cooked sausages as BHA/BHT. At 6 per cent, it was actually more effective at preventing the oxidation of fats in refrigerated meat, but caused noticeable discolouration of the sausage. Trained taste testers concluded that the purees masked the flavours of pork fat and sage, as well as spicy or peppery flavours. The purees increased the sausages' sweetness, and decreased their saltiness and bitterness. At concentrations of 3 per cent however, these flavour changes were not objectionable. "Overall, pork sausage with 3 per cent dried plum puree or dried plum and apple puree was as acceptable to consumers as the control or those patties with BHA/BHT," the researchers concluded. (Source: [www.naturalnews.com](http://www.naturalnews.com))

## Natural preservative for citrus flavours

Citrus flavours, citrus essential oils, citrus-oil derivatives and complex citrus components (such as citral and d-limonene) are highly susceptible to oxidative stress and oxidative degradation, leading to a loss of fresh citrus flavour. Vitiva from Slovenia has introduced a new, natural citrus-flavour protection formula of its Inolens® rose-

mary extract line. Inolens fully protects citrus flavours and citrus flavoured-food and beverages.

Vitiva researchers conducted extensive tests, including sensory protocols, to evaluate protection effectiveness of Inolens at minimum dosage. The results showed that even 20 ppm provides up to six-fold protection for various citrus flavours in comparison with materials protected with BHT. Inolens does not alter taste, odour or colour of citrus flavours or citrus-flavoured food and beverage formulations. It is easy to handle and dose, has excellent solubility in oil-based media or emulsions, and is classified as "natural flavour" by European Council directive 88/388/EEC. Vitiva offers a full range of reduced-odour rosemary extracts, in a wide range of concentrations. These pure extracts are soluble in oil or water and available in powder and liquid forms. *Contact: Ms. Dushka Dimitrijevic, Product Manager, Vitiva d.d., Nova vas pri Markovcih 98, 2281 Markoci, Slovenia. Tel: +386 (2) 1788 8738; Fax: +386 (2) 788 8731; E-mail: [service@vitiva.si](mailto:service@vitiva.si); Website: [www.vitiva.eu](http://www.vitiva.eu).* (Source: [www.npicentre.com](http://www.npicentre.com))

## Honey, a natural preservative

Antioxidant-rich honey is a healthy alternative to chemical additives and sweeteners in commercial salad dressings, according to a new study at University of Illinois, the United States. "We found that the antioxidants in honey protected the quality of the salad dressings for up to nine months while sweetening them naturally," said Dr. Nicki Engeseth, associate professor of food chemistry.

Dr. Engeseth's study substituted honey for EDTA, an additive used to keep the oils in salad dressings from oxidizing, and high-fructose corn syrup, used to sweeten salad dressing recipes. Clover and blueberry honeys were chosen for the study after an analysis of the sweetening potential, antioxidant activity and phenolic profiles of 19 honeys with varying characteristics. The researchers used xanthan gum as a thickening agent, as enzymes in honey broke the emulsion in the dressings. The dressings were stored at 37°C (accelerated storage) for six weeks and 23°C and 4°C for one year. "After nine months of storage, both types of honey were as effective as EDTA in protecting against oxidation or spoilage," Dr. Engeseth said. (Source: [www.hindu.com](http://www.hindu.com))

# PACKAGING

## Metallized compostable pack

Recent developments in 'metallized' compostable packaging may lead to further advances for global use in beverage products like coffees and tea, claims the material supplier Innovia Films, the United States. The company says that the extended applications of its NatureFlex material, which provides a home-biodegradable standard of laminated film, has allowed Guayaki, makers of Yerba Mate brand health beverage, to combine both the barrier properties of metallic foil with compostability.

According to Innovia, the new cellulose-based bag packaging supplied to Guayaki combines two different compostable films in a bid to meet the company's requirements for greener packaging with strong barrier content. These materials include the Natureflex NM product, which contains 0.02 per cent metal, laminated onto the glossy transparent NatureFlex NVS film. Innovia claims that the small metal content of the package makes the product suitable for home composting along with the other pack materials, though it is modified enough to ensure high moisture barrier rates to protect the product inside. The transmission rate of the packaging barrier is less than 10 g/m<sup>2</sup>/day at 38°C, 90 per cent relative humidity. The new pack is designed to comply with international standards like the EN13432 and ASTM D6400 standards. (Source: [www.beveragedaily.com](http://www.beveragedaily.com))

## X-ray technology to detect food pack defects

European researchers have developed pioneering X-ray technology to ensure that contaminants and defects in food packaging can be detected before products end up on supermarket shelves. The Modulinspex technology uses low-energy X-rays to produce detailed images of food and other packaged products. The images can then be scanned by inspection software, which will alert users of any irregularities.

Modulinspex, a European Union-funded technology, was developed by a consortium of European companies. Before Modulinspex, higher-resolution,

low-energy systems were not a viable means of checking packaging because the slow scanning significantly reduced the production rate at processing and packaging plants. The Modulinspex project led to the development of a detector that takes 300 images per second, fast enough to scan products moving on a conveyor at a 0.5 m/s. Modulinspex produces X-ray images with a resolution of 0.1 mm, which is 16 times higher than that of high-power systems. It is also modular, enabling hardware and software components to be adapted to suit varying types and sizes of packaging. (Source: [www.meatinternational.com](http://www.meatinternational.com))

## Hot-fill machines for pumpable foods

Propac Industrial, Australia, is supplying an integrated hot-fill liquid packaging system that uses film from AMPAC Flexibles. The vertical form-fill-seal system combines the company's hot-fill bag makers with AMPAC's 9000 VF films to package pumpable food products.

The manufacturer says the machines can handle products at temperatures up to 92°C, and is ideal for cook/chill applications. Fluids with particulate up to 25 mm in size can also be packaged in a one-part fill. The unit can fill bags up to 20 kg and expel all the air from them. The company has also just released a heavy-duty version capable of packaging high-viscosity pumpable products. *Contact: Propac Industrial Pty. Ltd., Unit 2, 61 Prince William Drive, Seven Hills, NSW 2147, Australia. Tel: +61 (2) 9674 9261; Fax: +61 (2) 9674 9267; E-mail: [info@propac.com.au](mailto:info@propac.com.au).* (Source: [www.fluidhandling.com.au](http://www.fluidhandling.com.au))

## VFFS packaging system with rotary double jaw design

TNA, a leading Australian supplier of integrated packaging and processing solutions for food production companies worldwide, has launched the robag® 3 ttx 320 rotary double jaw (RDJ) that doubles production rates. Claimed to offer the highest economic value of any VFFS packaging system, the robag 3 ttx lowers utility costs and waste while providing high performance packaging.

Available in many combinations of jaw sizes and types, the highly flexible machine can produce

several bag formats including pillow pack, block or quattro bottom, and inner and outer bag configurations. Designed for easy maintenance and service access, the servo-driven robag 3 ttx has 30 per cent less moving parts than a conventional VFFS machine, driving down repair and maintenance needs. Integrated electronics and hardware further enhance the ease of operation.

The machine comes with user-friendly digital settings and centrally located touch screen controls. The system integrates seamlessly upstream or downstream with other packaging equipment including TNA's gateless, reversible transfer and distribution system and other ancillary equipment. *Contact: TNA Australia Pty. Ltd., 24 Carter Street, Sydney Olympic Park, NSW 2127, Australia. Tel: +61 (2) 9714 2321; Fax: +61 (2) 9748 2970.* (Source: news.thomasnet.com)

## High-speed, environment-friendly packaging process

In the United Kingdom, researchers at the University of Bath and Campden BRI are leading a project to create a new high-speed, environment-friendly packaging process that will use recycled materials and reduce the amount of plastic used. The project is focused on improving the 'form-fill-and-seal' packaging used for foods such as rice, pasta and crisps. By designing a more efficient way of sealing the packaging, the scientists hope to reduce the amount of material used by 13 per cent, which would lead to a saving of more than 39,000 tonnes per year of landfill waste.

Dr. Ben Hicks, Prof. Glen Mullineux and Dr. Jason Matthews from the University's Department of Mechanical Engineering are working as part of a consortium including Campden BRI, Hayssen-Sandiacre Europe, Amcor Flexibles Food and United Biscuits. They will examine the process used to mechanically fill and seal the packaging and then use this information to design a new packing machine that uses less plastic and can use recycled materials. The researchers are also investigating new sealing processes that can be used with the new biodegradable materials, which will lead to further environmental benefits.

Dr. Hicks, Deputy Director of the University's Innovative Design Manufacturing Research Centre

said: "The project is building on theoretical and modelling expertise of the University's Department of Mechanical Engineering and using the materials and packaging testing facilities of Campden BRI to try out the new system. The scientific knowledge base is further enhanced by the materials processing knowledge of Amcor, the practical experience of consumer goods packaging from United Biscuits and the machinery design knowledge of HayssenSandiacre." (Source: www.packagingnetwork.com)

## Flow wrapping machine with hermetic sealing

Sigpack Systems, Switzerland, presents the HxL horizontal flow wrapping line for output in medium and high ranges. The HxL is equipped with longer sealing technology (Long-Dwell sealing) for flow wrappers. The new line is suited for fresh, chilled and frozen food, as well as for applications in the pharmaceutical industry.

The seal point in the 4-layer fin seal approach has conventionally been a weak point. This point is vulnerable to damage and prone to leakage due to material bulge. The HxL's Long-Dwell sealing technology works with a patented sealing mechanism that allows 40-times longer sealing times and higher sealing pressures than traditional sealing processes, ensuring packaging film thickness and product quality, Sigpack claims.

The HxL system comes in two separate models with different output rates. The HCL model is suitable for medium-speed range output, at 150 packages per minute. The HSL system, with an output of 350 packages per minute, is designed for high-speed ranges. The HxL's sensor technology controls the parameters online to ensure tight seal. The 2-D Matrix Code provides greater traceability by recording more information than conventional bar codes, and thus prevents counterfeiting. The HxL can effortlessly print at high speeds while working and verify the code online with a new vision-system. *Contact: Mr. Andreas Graf, Director, System Integration, Sigpack Systems AG, Rheinstrasse 36, CH-8212 Neuhausen, Switzerland. Tel: +41 (52) 674 6695; Fax: +41 (52) 674 6875832; E-mail: andreas.graf@bosch.com; Website: www.boschpackaging.com.* (Source: news.thomasnet.com)

## MACHINERY/ EQUIPMENT

### Pomegranate processing tool

The pomegranate processing technologies, developed by the Central Institute of Post Harvest Engineering and Technology (CIPHET) of India, received wide attention at the recent "World Pomegranate Fair" held in Kabul, Afghanistan. The company demonstrated its simple but easy-to-operate tool for removing pomegranate arils (juicy seeds). For removal of arils, the fruit has to be broken open by hand, which is difficult, or cut with a blade, which may damage the arils. The hand-tool developed by CIPHET makes it very easy to remove the arils from pomegranates. (Source: [www.indianexpress.com](http://www.indianexpress.com))

### Air cycle system for frozen food

A research team from the United Kingdom claims to have developed a combined air cycle system for food heating and cooling, to meet the rapid and continuing expansion of the chilled and frozen food industry. Engineers at the Food Refrigeration and Processing Engineering Research Centre at the University of Bristol said that they are at present testing and optimizing air cycle refrigeration equipment for food processing that requires a linked need for the cooking and cooling of product.

Until now, it has been difficult to link the processes because the heat generated by direct expansion refrigeration systems is not high enough to be useful in cooking, said lead researcher Mr. Alan Foster. However, air cycle refrigeration generates large quantities of fairly high heat (above 230°C), simultaneously producing air at very low temperatures (-100°C), he claimed. Further, the very low temperatures of the combined air cycle system allow rapid cooling and freezing, potentially improving quality, and reducing weight loss, residence time and factory footprint for the process.

Mr. Foster says that the temperatures achieved equate to process temperatures of -64°C in the cooling tunnel and 150°C in the heating tunnel. The downside of the system is its lower energy efficiency. Mr. Foster says that this is compen-

sated by benefits such as zero ozone depletion and global warming potential, and non-toxicity and non-inflammability. The system is also far less susceptible to leakage than vapour compression systems and is therefore more reliable. (Source: [www.foodproductiondaily.com](http://www.foodproductiondaily.com))

### Novel drying method

MCD Technologies, the United States, says that a key feature of its concentration and dehydration technology is the ability to preserve a product's beneficial properties, including its nutrition, colour, aroma and flavour through its gentle approach to drying. Its Refractance Window (RW) process involves a slurry of liquid product being applied evenly to the top surface of a continuous sheet of impermeable, transparent plastic, which floats on hot water. Infrared energy then passes from the water to the slurry at the speed of light.

Ms. Karin Bolland-Magoon, President of MCD Technologies, explains: "The infrared energy and conducted heat employed by RW drying deliver rapid drying at atmospheric pressure rather than under a vacuum, and also inhibits oxidation of the product due to the reduced surface area that results." RW method can be used to dry a range of food and beverage products such as vegetables, fruits, eggs, cocoa mix, tea, coffee, meat, fish and poultry. The method is claimed to outscore conventional freeze and spray drying techniques also in terms of the net savings to the end user with regard to initial equipment cost and low environmental impact. (Source: [www.beveragedaily.com](http://www.beveragedaily.com))

### Machine to sort pomegranate seeds

The difficulty in separating out the seeds from pomegranates disheartens many consumers. Now a Spanish invention enables this food to be de-seeded automatically. Researchers from Instituto Valenciano de Investigaciones Agrarias have developed a machine that automatically separates the pomegranate seeds from the rind and pith. The mechanism uses a computer vision system to distinguish and sort the different parts of this fruit.

The seeds arrive at the machine in a pile, mixed with the rest of the fruit, following a prior process of wholesale de-seeding. The material is placed on

a conveyor platform with hoppers that organizes it into a queue before going on to the “inspection chamber” where two video cameras record each object going through. Images are processed in a computer with specially designed vision software that identifies what is seed from what is not (pith, rind, foreign matter), in addition to evaluating the quality of the seeds.

This information enables the fruit material to be put to one side in the “separation area”, which has four exits. When the system detects that an active skin is passing through, a “blast” from an array of air projectors pushes it towards the first exit. By means of these “blasts” the rest of the material too is separated gradually. The seeds that do not fulfil the quality requirements are eliminated through the second exit, prime quality seeds go through the third exit, and those of excellent quality go through the fourth exit. (Source: [www.sciencedaily.com](http://www.sciencedaily.com))

## Drying equipment for ethanol plants

Ethanol is traditionally produced by fermenting sugars present in plants such as sugarcane and corn with yeast. The process requires the use of the most edible parts of the plants, which are rich in starch, and certain types of sugars called hexoses, resulting in the loss of a valuable source of nutrition. New technology that enables bio-waste to be turned into bio-ethanol means that much needed energy can now be harvested without damaging the food chain. Denmark-based GEA Niro’s spray drying equipment are used in the process to dry yeast cream – ethanol’s by-product – decanted from the resulting slurry, into protein powder that can be used for animal feed.

The drying process is achieved in three steps:

- Using a falling film evaporator, yeast cream is concentrated at 60°C into a slurry that has about 20 per cent total solids and 150 cP viscosity;
- The concentrate is then dried in a spray drying plant equipped for either rotary or nozzle atomization, depending on the required properties of the final powder; and
- The resulting powder is transported to silos for immediate use or packed into bags for storage or distribution.

A Niro falling film evaporation plant operating at low pressure and using thermal or mechanical recompression of vapour has low specific energy consumption. Where there are no particular property demands for the dried yeast cream powders, spray drying using rotary atomization could be used. The powder produced using this method will have a bulk density of approximately 500 kg/m<sup>3</sup> and an average particle size of 100 µm, making it suitable for mixing with animal feedstock. For more complex powder properties, a spray dryer with nozzle atomization may be employed. (Source: [www.mhwmagazine.co.uk](http://www.mhwmagazine.co.uk))

## New hygienic conveyor drum motors

Frequent stop and start operations, exposure to salt water and heavy loads are just a few of the challenges that motorized drums have to undergo at cheese manufacturing plants. With a demand to increase the processing from 90,000 to 160,000 cheese blocks per week, the Swiss cheese maker Fromco SA decided to introduce automation technology into cheese processing. The automation specialists, Patric Concept SA, designed and implemented a tailor-made conveyor system that automated the ageing process.

With each cheese weighing 35 kg, the load on the drum motors driving the conveyor system is large, not to mention the wear demands of constant stops/starts within the process (40,000 per motor per week). The drum motors are exposed daily to corrosive salt water and high pressure cleaning. These considerations led Fromco to opt for Interroll’s drum motors for their durability and all-in-one hygienic sealed design.

With a diameter of 165 mm, the 165E drum motor has a high radial load that makes it especially suitable for handling the heavy cheeses along the flat sections of the conveyor line. After analysing performance requirements, the 0.75 kW version for conveyor speeds of 0.25, 0.32 and 0.4 m/s was found ideal. For transporting the cheeses down inclining and declining sections of the processing line, the TM220M drum motors provided a solution with an output of 2.2 kW at a conveyor speed of 0.32 m/s. A polymer covering, to promote friction, is a standard add-on to the motor’s stainless steel drum. (Source: [www.mhwmagazine.co.uk](http://www.mhwmagazine.co.uk))

## RECENT PUBLICATIONS

### Chilled Foods: A Comprehensive Guide (Third edition)

This major new edition has extensively revised and expanded coverage (including more than ten new chapters) and significant participation from those in the chilled food industry. It explores raw materials and packaging materials, with expanded coverage of particular ingredients such as fish, cheese and poultry. Technologies and processes in the supply chain receive extensive treatment. The guide also covers microbiological hazards and critical issues in safety and quality management.

Contact: Woodhead Publishing, Abington Hall, Granta Park, Great Abington, Cambridge CB21 6AH, United Kingdom. Tel: +44 (1223) 891 358; Fax: +44 (1223) 893694; E-mail: wp@woodheadpublishing.com.

### Handbook of Meat, Poultry and Seafood Quality

The handbook discusses basic scientific factors responsible for the quality of fresh, frozen and processed muscle foods. Factors affecting the quality of beef, pork, poultry and seafood – such as additives, aroma, colour, flavour, mouthfeel, texture, contaminants and microbiology – receive in-depth coverage in the publication.

### Biofilms in the Food Environment

This publication examines biofilms produced by food-borne micro-organisms, the risks associated with biofilms in the food chain, the beneficial applications of biofilms in the food environment, and approaches for biofilm removal to improve sanitation and safety in the food environment.

For the above two books, contact: The Customer Service Department, John Wiley & Sons Pte. Ltd., 2, Clementi Loop #02-01 LogisHub@Clementi, Singapore 129809. Tel: +65 6463 2400; Fax: +65 6463 4604; Email: csd\_ord@wiley.com.sg.

## TECH EVENTS

- 12-14 May**  
Shanghai  
China
- BAKERY CHINA 2009**  
Contact: Gesellschaft für Handwerksmessen mbH, Willy-Brandt-Allee 1, 81829 München, Germany.  
Tel: +49 (89) 949 55-115;  
Fax: +49 (89) 949 55-239;  
E-mail: messe@ghm.de
- 17-20 Jun**  
Bangkok  
Thailand
- ProkPak Asia 2009**  
Contact: Bangkok Exhibition Services, SPE Tower, 9th Floor, 252 Phaholyothin Road, Samsennai, Phyathai, Bangkok 10400, Thailand.  
Tel: +66 (2) 615 1255;  
Fax: +66 (2) 615 2991-3;  
E-mail: enquiry@besallworld.com.
- 25-27 Jun**  
Cebu City  
Philippines
- CEBU FOOD EXPO 2009**  
Contact: Global-Link Inc., Unit 1003, Antel 2000 Corporate Centre, 121 Valero Street, Salcedo Village, Makati City, The Philippines.  
Tel: +63 (2) 750 8588;  
Fax: +63 (2) 750 8585;  
E-mail: jing@globallinkph.com.
- 12-15 Aug**  
Jakarta  
Indonesia
- INDOFOODTEC 2009**  
Contact: PT. Wahana Kemalaniaga Makmur, Kompleks Perkantoran Graha Kencana Blok CH - CI, Jl. Raya Perjuangan No. 88, Jakarta 11530, Indonesia.  
Tel: +62 (21) 5366 0804;  
Fax: +62 (21) 532 5887;  
E-mail: info@wakeni.com.
- 14-17 Oct**  
Jakarta  
Indonesia
- PROPAK INDONESIA 2009**  
Contact: PT. Pamerindo Buana Abadi, Deutsche Bank Building, 13th Floor, Jl. Imam Bonjol No. 80, Jakarta 10310, Indonesia.  
Tel: +62 (21) 316 2001;  
Fax: +62 (21) 316 1981;  
E-mail: info@pamerindo.com.
- 29 Oct**  
Beijing  
China
- CHINA FOODTECH 2009**  
Contact: China International Exhibition Centre, 6 East Beisanhuan Road, Chaoyang District, Beijing 100028, China.  
Tel: +86 (10) 8460 0308;  
Fax: +86 (10) 8460 0996;  
E-mail: ciec@ciec-expo.com.

## PUBLICATIONS from APCTT

### PERIODICALS

(Free access at [www.techmonitor.net](http://www.techmonitor.net))

- Asia Pacific Tech Monitor (6 issues/year) (e-version)
- VATIS Update (6 issues/year)
  - Biotechnology (e-version)
  - Non-conventional Energy (e-version)
  - Food Processing (e-version)
  - Ozone Layer Protection # (e-version)
  - Waste Management (e-version)

### BOOKS

	Indian Rupees* (India, Bhutan and Nepal)	US Dollars*
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- |  |                                      |                                  |
|--|--------------------------------------|----------------------------------|
| <input type="checkbox"/> Managing Innovation for the New Economy: Training Manual, 2002<br>Volume 1: How to Guide & Quick reference materials<br>Volume 2: Articles & Lectures   | 1,000.00                             | 50.00                            |
| <input type="checkbox"/> Regional Capacity-building for the Adoption of ISO-14000 and Transfer of Environmentally Sound Technology: Training Manual, 2000  | 600.00                               | 30.00                            |
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