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Highlights

- Global partnership to tackle food safety
- China passes amendment to the food safety law
- Scientists develop handheld device to detect bacteria on food
- Researchers develop method to reduce fats in food
- Blackberry juice effective as food preservative
- Whey-based beverage prepared from ripe banana juice
- Extending shelf life by packaging containing garlic molecules
- Advanced X-ray systems for food packaging
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.
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UN forges links between researchers and farmers

In a UN-convened meeting held in Bangkok, Thailand, it was announced that farmers across Asia and the Pacific could soon have access to new and innovative technologies that would help them meet the region’s demand for increased food production and food security. Leaders in agricultural research and extension services from across the Asia-Pacific region and representatives from civil society, private sector and international organizations concluded an Expert Consultation on ‘Strengthening Linkages between Research and Extension to Promote Food and Nutrition Security.’

The consultation, attended by over 40 delegates from more than ten countries, discussed ways to connect research results and new technologies on food and agriculture production with farmers on the front lines of Asia’s food production systems. The need for such transference of information is critical. By 2050, Food and Agriculture Organization (FAO) of the United Nations, estimates that food production will need to increase by 60 percent, a target that cannot be met unless we harness our research and transmit it to farmers’ practices.

The consultation was convened by FAO (Regional Office for Asia and the Pacific) and the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA), a regional institute of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). The meeting addressed the current challenges faced by farmers in the region who require stronger support to realize research results and new agricultural technologies for application in a practical and meaningful way. The meeting also assessed existing linkages between research and extension systems in member countries to identify opportunities for enhancing their integration. The important role of farmers’ groups, civil society and private sector organizations, including information and communications technology service providers was particularly highlighted in this context.

Source: http://www.fao.org

Global partnership to tackle food safety

In a meeting held at the Global Food Safety Partnership (GFSP), Singapore, more than 70 countries, private companies, international organizations, trade associations, academic institutions, and non-governmental groups evaluated their first-year achievements and discussed future plans to scale up and shape the world’s response to food safety challenges. There is an ongoing world food safety problem that threatens every economy and food company, challenging governmental regulatory authorities, sickening millions of people each year, introducing barriers to trade, and hurting corporate bottom lines. As a result, the international community faces the critical task of strengthening food safety capacity in developing and middle income countries in order to safeguard public health, while promoting food security and economic development.

“Safe food should not be a luxury for so many at our global table,” said Juergen Voegele, World Bank Director for Agriculture and Environmental Services. “Everyone involved in the global food chain has an obligation to ensure food safety. At the same time, meeting international or industry standards creates both challenges and opportunities for poor farmers and agri-businesses competing in these growing markets. Our partners recognize that no single organization acting alone can have the impact we all want. By building the understanding, knowledge, and motivation to fully address food safety risks, this unique partnership can help to decrease food-borne hazards, reduce poverty, and improve food security.”

Uniquely, the GFSP actions are supported by a World Bank multi-donor trust fund that can accept funding from both public and private contributors. The GFSP’s mission is to create a new paradigm of public-private collaboration for food safety capacity building. It aims to reduce risks to consumers and businesses and increase the benefits to both public health and the economy by strengthening food safety protections and supporting effective and efficient global supply chains.

Source: http://www.worldbank.org

Opportunities in food processing

According to the Federation of Indian Chambers of Commerce and Industry (FICCI) and KPMG report on “Enhancing Competitiveness of Indian Food Chain”, the Indian food value chain is on the verge of a great transformation, from one characterized by high wastage, low processing and low global contribution to one that is more streamlined, more integrated and more significant in the global trade. The report says, the opportunities in the food processing industry are significant and expected to reach a size of Rs. 400,000 crore by FY15 contributing to around 6.5 percent to the GDP.
The vast Indian agri business market has also triggered a surge in private equity (PE) placements and mergers and acquisitions (M&A) in the past few years. Over 2008-2012, private equity (PE) investments in agri business have grown to 3.8 percent in 2012 from 0.2 percent in 2008. During the same period, venture capital (VC) investments in agri business grew from 0.2 percent to 1.6 percent of the total investments. Agri-logistics is the other area that has been attracting a lot of attention from investors with over $60 million invested just in 2012, the report pointed out.

According to the report, problems exist at each stage of the value chain. The unreasonably long supply chain results in a steep increase in the total cost owing to procurement, transit and other taxes and service charges levied at various layers. Consequently, the price received by the farmers is in the range of 25-60 percent of what the consumer pays. ITC group head (agribusiness), S Sivakumar, said the food processing industry was growing twice as fast as agriculture. He also pointed out that the job multiplier of the food processing sector was much higher than any other industry.

Source: http://www.business-standard.com

FDI in food processing sector in India

According to the latest data published by the Department of Industrial Policy and Promotion (DIPP), Government of India, the food processing industries in India have attracted foreign direct investments (FDI) worth $1,970.09 million between April 2000 and July 2013. In Tamil Nadu, there has been an increase in participation of entrepreneurs, bankers and financial institutions in the food processing sector.

At a conference organized by Associated Chambers of Commerce and Industries of India (ASSOCHAM), K. Rosaiah, the state governor, emphasized on the need to take advantage of huge investments in this sector. “The state government is working sincerely to realize the mission to promote industries, specifically identified as thrust areas in food processing and agro-based industries, and is providing support to enhance the level of food processing to increase value addition and thus, increase India’s share in global food trade,” Rosaiah said.

“The food processing industry in India is on the path to growth and profitability. It is expected to attract phenomenal capital, human, technological and financial investment. The total food production in India is estimated to double over the next ten years. Hence, there is an opportunity for large investments in food and food processing technologies,” said Sannareddy, who is also founder and managing director, Sri City Pvt Ltd.

Source: http://www.fnbnews.com

Sri Lanka to uplift food processing industry

Sri Lanka Food Processors Association (SLFPA) has signed an agreement with the Sri Lankan-German SME Development Programme, implemented by GIZ, Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany, in cooperation with the Ministry of Finance and Planning (MoFP), to facilitate training and capacity building of the SME in the food processing industry in Sri Lanka. This joint programme is expected to introduce innovative approaches and good manufacturing practices to enhance the quality and safety of food processing sector as a whole.

Through jointly funded capacity building initiatives, the SME engaged in the food processing sector will have access to well developed, internationally recognized certificate courses covering Thermal Processing, Food Safety Standards (HACCP), Hygiene (sanitation and GMPs), Cool Chain Management and Operations, Post-harvest activities, proper Packaging Technologies, risk management in Production, and finance related topics.

Mervin Gonawela, Hony. Secretary of the SLFPA said that strengthening the food processing base with individuals trained in the skills associated with modern concepts will directly support the improvement of food processing companies in their respective business development and will also contribute to betterment of livelihoods of individuals.

Source: http://www.iib.lk

Viet Nam seafood exports seen up 5%

According to the Viet Nam Economic Times newspaper reports, Viet Nam’s seafood exports in 2013 could rise beyond $6.5 billion, or 5% from a year earlier, according to the Viet Nam Association of Seafood Exporters and Producers (VASEP).

Shrimp has been the key export item this year and shipment is expected to rise ahead of the Christmas and New Year holidays, with the U.S. market surpassing Japan to become the biggest buyer since August 2013, the report said.

Source: http://www.reuters.com
Nepal to reform food safety inspection

The International Finance Corporation (IFC), a member of the World Bank Group, has started working with the government of Nepal to improve food safety standards at hotels and restaurants and spur tourism spending in the country. The initiative, according to IFC, is expected to help the government to reform its food safety inspection activities, and adopt international best practices and standards. A workshop was held in Kathmandu, in which frontline market inspectors from key government agencies were trained on market monitoring and inspection techniques. Inspectors learned that a risk-based approach to food safety allowed them to focus limited resources on high-priority high-risk areas. South Asia Enterprise Development Facility (SEDF), managed by IFC in partnership with the United Kingdom government and the Norwegian Agency for Development Cooperation (NORAD), Norway, supported this initiative.

“The Nepali hospitality sector must focus on quality services to fully realize the country’s great potential in tourism,” said Hari Narayan Belbase, director at the Department of Commerce and Supply Management (DoCSM). “Improved inspection will help hospitality entrepreneurs improve standards and become more profitable.” Experts in inspection reform from the UK government’s Better Regulation Delivery Office are working with IFC to study inspection and enforcement techniques for the tourism industry and build capacity in the concerned Nepal government agencies. They will also help develop and support new and existing citizen empowerment approaches to food safety in the country.

Source: http://www.ekantipur.com

Seafood surge nets exporters $5.37b in Viet Nam

According the Ministry of Agriculture and Rural Development (MARD), Viet Nam exported US$689 million worth of seafood products in October 2013, bringing its total seafood export turnover over the first 10 months to around $5.37 billion, up 6 per cent year-on-year. During the reviewed period, the US remained the largest importer of Vietnamese seafood, accounting for 21.7 per cent of the country’s total export value. Meanwhile, exports to other big markets such as China, Canada and Thailand, have also seen encouraging growth at 55.3 per cent, 21.6 per cent and 10.6 per cent, respectively. However, the period saw decreases in some export markets such as Australia, Republic of Korea and Italy. In January-October period, the domestic fisheries sector produce over 2.37 million tonnes, marking a modest rise of 3.5 per cent, the ministry said.

The industry will produce 7 million tonnes of seafood by 2020, according to a master plan ratified by the Prime Minister in August. Under the plan, the country’s seafood exports are projected to rake in $11 billion by 2020 with an average annual growth rate between 7 and 8 per cent. Aquaculture is expected to make up 65 per cent of the output. The plan lays out ambitions to industrialize the sector by 2020, with a view to modernize the industry by 2030, while staying committed to sustainable and competitive development to integrate into the global economy. The sector’s total output is expected to reach 9 million tonnes between 2020 and 2030, 70 per cent of which will come from aquaculture. Export turnover is also projected to climb to $20 billion within the same time frame.

Source: http://www.vietnamnews.vn

Garlic helps kill contaminants in infants formula

Dr. Xiaonan Lu, assistant professor of food safety engineering at University of British Columbia, Canada, has found that garlic can significantly reduce the contamination risk of Cronobacter sakazakii, a foodborne pathogen that can lead to fatal infections of infants in the production of dry infant formula powder. The study published in the Applied and Environmental Microbiology identifies for the first time that two compounds derived from garlic—diallyl sulfide and ajoene—can make the product safer to consume.

C. sakazakii infection is rare but often fatal for infants and can poison a baby’s bloodstream and lead to life-threatening cases of meningitis. Outbreaks of C. sakazakii have occurred worldwide. “A trace dose of these two compounds is extremely effective in killing C. sakazakii in the food manufacturing process.”

“They have the potential to eliminate the pathogen before it ever reaches the consumer.” The garlic compounds could be used to prevent C. sakazakii contamination on food contact surfaces and in every step of food production from processing, packaging and delivery, said Lu. “Pipes used in the manufacturing of milk products are typically cleaned with chemicals like chlorine, but these garlic compounds are a natural alternative,” said Lu. “We believe these compounds are more beneficial in protecting babies against this pathogen.”

Source: http://www.theborneopost.com
China passes amendment to the food safety law

The Ministry of Health and Welfare (MHW), China, has passed an amendment to the Act Governing Food Sanitation that introduces stricter food quality control management, raises the amount of fines for violators of the law, and establishes principles for setting up a compensation fund for victims of tainted foods. The MHW said that even though the act was previously amended in May 2013, the recent cooking oil scandals demonstrate a need to increase punishments for perpetrators.

Shiu Ming-neng, deputy minister of the MHW, noted that the amendment states that any food companies which manufacture food products that are harmful to humans or adulterate their products will face fines of between NT$60,000 and NT$50 million. Prison time for violators was also raised from three years to five years in extreme cases, Shiu added. Violators who mislabel their products or use untruthful advertising will face fines of between NT$40,000 and NT$4 million, Shiu said.

Source: http://www.chinapost.com.tw

India approves mandatory use of jute in packaging

In pursuance of the Jute Packaging Material Act, the Cabinet Committee on Economic Affairs (CCEA), India, has approved mandatory use of jute in packaging for the jute year 2013-14, which runs from July 1, 2013 to June 30, 2014. As per the approval, packaging of 90 percent of the production of food grains and 20 percent of the production of sugar in the jute packaging material for the jute year 2013-14 is mandatory.

The CCEA approval is expected to provide relief to 370,000 workers employed in jute mills and ancillary units as well as support the livelihood of around 4 million farm families. Besides, it will help protect the environment as jute is a natural, biodegradable and reusable fiber.

Source: http://www.english.vietnamnet.vn

Viet Nam raises fines on food safety violations

The Ministry of Health, Viet Nam, has decided to raise fines against sidewalk food stalls from VND300,000 to VND500,000, if they do not have appropriate tools to ensure food safety or the food sellers touch food by hands. If using expired raw materials, food additives or those of unknown origin, food processors will be fined from VND500,000 to VND1 million ($25-$50).

Specifically, the act of using materials of unknown origin, materials without certificate of origin issued by state agencies will be subject to VND30-50 million fines ($1,500-2,500). The fines on the use of food additives out of the permitted list will be increased up to VND30-40 million ($1,500-2,000) and up to VND70-100 million ($3,500-5,000) if the additives contain toxins.

Mr. Tran Quang Trung, Director of the Food Safety Department believed that the new fines are high enough to prevent food safety violations. Trung said that in special case, if the violations are harmful to society, the fines may reach billions of VND (hundreds of thousands of USD). According to Trung, food safety is dependent on economic and social situation and the awareness of the people. People should buy products of clear origin and pay special attention to food processing.

Source: http://www.chinapost.com.tw

China prepares draft on new safety laws

The Chinese government has published a draft of proposed changes to the country’s laws governing food safety. Companies operating in China may need to make significant changes to how their supply chains and distribution networks.

A draft of the changes, submitted by the China Food & Drug Administration (CFDA) to the State Council, suggests an increase in fines for breaking various Chinese food safety laws and attempts to clarify legal responsibilities regarding food safety across the country’s labyrinthine network of provincial and national government bodies charged with implementing the current law. Exactly when the new rules will be enacted, and how they will be enforced, is still unclear, but the draft is an important indication of food safety policy under China’s new political leadership, that assumed office in February, 2014.

Source: http://www.just-food.com
Sorting good germs from bad

Scientists at Arizona State University’s Department of Chemistry and Biochemistry, in the College of Liberal Arts and Sciences, the United States, have developed a new device that could significantly speed up the identification process for harmful bacteria and other microorganisms. The team, led by Professor Mark A. Hayes, hopes to create handheld, battery-operated devices that could deliver answers in minutes, instead of days. Identification takes place within a microscopically small channel in a chip made from glass or silicone polymer. The microchannel features saw-tooth shapes that allow researchers to sort and concentrate microbes based on their unique electrical properties. The phenomenon that makes this work is called dielectrophoresis, which involves an applied voltage that exerts force upon the bacteria. This force acts like a coin-sorter, causing bacteria to become trapped at different points along the channel. Where they stop, and at what voltage, will depend on their molecular and electrical properties.

Using this approach, Hayes’s team has separated extremely similar bacteria – pathogenic and non-pathogenic strains within the single species, E. coli. Their results have been published in “Online First” on SpringerLink and in the journal Analytical and Bioanalytical Chemistry. So far, the device has only been used to test pure cultures of bacteria, but they hope soon to test complex mixtures of particles that are found in nature or the human body. The next step is to create cheap, portable devices that would enable point-of-care or field based analysis. Such a device would require no time-consuming culturing or other tests, which would allow rapid response to disease or contamination, hopefully saving lives. Contact: Jenny Green, Arizona State University, USA. Tel: +1-480-965-1430; E-mail: jenny.green@asu.edu.

Source: http://www.eurekalert.org

New test system for microbial counts

Neogen Corporation, a medical device company, the United States, has introduced a “clearly better” test system for microbial counts. Neogen’s new NeoFilm microbial tests require only the inoculation of a fabric sample pad and an incubation period. Following incubation, the sample pad is evaluated for bacterial colony growth. NeoFilm tests are available for coliforms, E. coli, yeast and mold, Staphylococcus aureus, and aerobic bacteria.

“NeoFilm is designed with the user in mind and offers advantages, such as greater visual clarity and easy enumeration,” said Ed Bradley, Neogen’s vice president of Food Safety. “The test films are color-coded for easy identification, and the required incubation time is printed right on the test to simplify the procedure for the technician. The advanced design of NeoFilm simplifies the technician’s workflow by allowing test films to be stacked as they are inoculated, freeing up valuable bench space, and eliminating any wait time between inoculation and incubation. NeoFilm requires no ‘spreader’

Source: http://www.scienceblog.com

Scientists develop handheld device to detect bacteria on food

Scientists at the Auburn University’s Center for Detection and Food Safety, the United States, have developed a wireless device which could detect the presence of Salmonella, E. coli and other pathogens and give an alarm in response. “What we want to do is very fast detection and that anyone can do it,” said Yating Chai, who helped develop the device. She said that current bacteriological testing can take several hours, needs a lot of high-technology expertise and consumes a lot of energy. “In the future, we want it so anyone can do the test in their kitchen,” Yating said. “We want to simplify the entire process so we can directly test the food.”

Yating and her colleagues have developed a two part device that consists of a very small sensor which is placed directly on the food surface and then a detector to do the scanning. As described in a Scientific American podcast, “the sensor that touches the food has a sliver of metallic glass coated with phage E2, a virus that, for example, will only stick to salmonella typhimurium bacteria.” The scientists recently published results from their five year study of the device in the Journal of Applied Physics. The U.S. Department of Agriculture (USDA) has funded this work and anticipates everyday applications.

Source: http://www.eurekalert.org

Generic E. coli and bacteria populations isolated on a microdevice (Credit: Paul Jones)
Researchers create bio-based coatings

Researchers develop test to improve food composition screening
Researchers develop method to reduce fats in food

Researchers from the University of Birmingham, the United Kingdom, is developing a method to produce food that has the same taste and look but contains 50 percent less fat than regular food products. Chemical engineers believe that if they manage to alter the typical food product nutrition qualities they might be able to offer consumers more healthy food, which still tastes good. They think that using hydrophobins, natural protein extracted from fungi, could be the answer.

Researchers explained that hydrophobins can serve as “foam” to aerate and bind ingredients better. Typically this role is played by fats and sugars, and these can be cut in half by using hydrophobins. Thanks to their emulsifying properties, the food can retain all of its flavors and textures. Hydrophobins can replicate the crumb structure in bread or the frothy head on beer, scientists say. If this technology is developed and becomes commercially available, people could still enjoy their favorite foods without gaining weight. Food products that require the use of foams and emulsifiers, such as mayonnaise, salad dressings, whipped cream, smoothies, crisps, marshmallows, cakes, chocolate, ice cream and cappuccinos, could be modified to become less calorie-laden and healthier.

According to David Brown, chief executive of the Institution of Chemical Engineers (IChemE), re-engineering food is a potentially effective solution in the battle with obesity but it is likely to take time. Whether it is able to help curb the rising obesity rates will mostly depend on consumers’ attitude and on how responsive they are to the technology. Since the majority of people are reluctant to change their fixed eating habits, education and high public confidence in chemical engineering will be necessary, he added. Brown gave the example of artificial sweeteners that took time to be widely adopted but are now a common feature of food production globally. This has led to a drop in sugar consumption, particularly in fizzy drinks. If people get to trust hydrophobins in the same way, food manufacturers could be forced to modify their products and contribute to promoting healthier lifestyles worldwide, he said.

Source: http://www.processingmagazine.com

Effects of drying methods on vitamin C content

Rodger Jonas, director of national sales, PL Thomas Inc., the United States, has prepared details of a unique, infrared drying method by Vivid Harvest that preserves the vitamin and antioxidant content and capacity of fruits and vegetables. Jonas discussed the pioneering, patented drying technology called Radiant Zone Drying (RZD). To preserve delicate nutraceuticals, the process uses infrared energy that targets water molecules without disturbing the antioxidants, phytonutrients, vitamins, minerals or enzymes in the fruit. The system handles fruits and vegetables in most forms, from thin-film liquids (juices, purees, slurries) up to pulps and pieces, and subjects them to a low, controlled temperature process that takes only minutes to dry, in typically less than 10 minutes.

In addition to nutrient and phytochemical antioxidant retention, the value, flavor, color and other organoleptic characteristics are preserved. The resultant powders, when used in formulations, provide the exemplary taste, smell and appearance of true fruit. The system allows for the reduction of carriers and drying aids that also could impact nutraceutical performance. Flowability, dispersibility and solubility are excellent, along with bulk density. Plus, the ultra-low-water activity assures the active compounds have an increased shelf life.

For processors striving to help Americans meet USDA requirements of at least 2 cups of fruits and 2½-3 cups vegetables per day as natural sources of vitamins, minerals and phytochemicals, such as antioxidants, Jonas noted small amounts of RZD fruit or vegetable powders can allow processors to incorporate the equivalent of a cup of produce in single-serving size products. For example, 14g of RZD blueberries, 11g of RZD strawberries, 6g of RZD kale and only 3g RZD spinach all equal a cup of their respective ingredient in fresh format.

Source: http://www.preparedfoods.com

Acid whey concept named ‘Best Beverage Ingredient’

An innovative processing solution that enables manufacturers of traditional Greek strained yoghurts to profit from their acid whey waste stream has been named ‘Best Beverage Ingredient’ at the Beverage Innovation Awards, held at the Drinktec trade show in Munich on 19 September 2013. Based on Arla Foods Ingredients’ Nutrilac® protein, the new process allows companies to use their acid whey to make value-added dairy products, such as high protein fermented beverages, whey smoothies and fermented desserts. However, Arla Foods Ingredients, Denmark, has developed a unique and simple process using Nutrilac® protein, which is derived from milk, to turn acid whey into a range of dairy products that can be sold at a high
margin on consumer markets. The result is a fresh tasting and nutritious product that is a good source of calcium, protein and essential amino acids. In addition, using acid whey in this way eliminates the storage and transportation requirements associated with other methods of disposing of it.

After collecting the award at Drinktec, Carsten Valentín, Senior Director – Functional Milk Proteins at Arla Foods Ingredients, said “We’re very pleased to win this award and delighted the judges have recognised the ground-breaking nature of our new acid whey concept. It is an important development for the Greek yoghurt industry and winning this award reflects the hard work and skills of our superb development team.” Contact: Lars Vestergaard Nielsen, Marketing Communication Manager, Marketing and Communication, Arla Foods, Denmark. Tel: +45-893-819-97, Fax: +45-893-810-00, E-mail: lanib@arlafoods.com.

Source: http://www.foodprocessingbazaar.com

European Commission approves rooster comb as safe food ingredient

The European Commission authorized the use of rooster comb extract as a food ingredient in the European Union. This is the first ever novel food approved in Spain, and it has been developed by a Spanish biotech company, Bioiberica S.A. It is also a world’s first, for it is the first ever ingredient for joint care that can be added to dairy products of everyday consumption. This authorization constitutes the positive culmination of an administrative process lasting almost three years, which began in February 2011 and which was given definitive endorsement in September of the present year, when the European Food Safety Authority (EFSA) issued a favorable opinion about the security of adding rooster comb extract to milk products suitable for daily use. Simultaneously, an independent panel formed by US experts also issued a statement giving GRAS (Generally Recognized as Safe) status to the addition of rooster comb extract to an ample range of foods and beverages.

Bioiberica which specializes in joint care, realized years ago that joint problems should not be approached only with drugs, but also from the fields of personalized medicine and nutrition. Therefore, the next logical step was to introduce ourselves into the food industry,” said José Escaich, Bioiberica’s CEO. Bioiberica will market the rooster comb extract under the trademark “Mobilee”. They are already negotiating with several key companies in the food industry, both national and international. “Our current challenge is that this ingredient is added to the largest possible number of everyday consumption food products, the sooner the better. The authorization from the European Commission opens new business and innovation opportunities in a growing market,” declared Mr. Escaich.

Source: http://www.bioiberica.com

New curcumin ingredient

Frutarom Switzerland Ltd., Health BU Switzerland, and Aquanova AG, Germany, have joined forces to market NovaSOL® curcumin, a solubilized, highly bioavailable form of curcumin. A yellow pigment found in turmeric, curcumin is used as a coloring agent by the food industry and as a phytochemical in the dietary supplement industry. Frutarom Health will work in collaboration with Molecular Health Technologies, its sales and marketing agent in the U.S. and Canadian markets.

Source: http://www.foodbusinessnews.net

Researchers found cure to prevent spread of new avian flu

Researchers at the University of Illinois at Chicago College of Medicine, the United States, have found a common food additive which can block a deadly new strain of avian influenza virus from infecting healthy cells. The compound, in wide use as a preservative, binds to a part of the flu virus that has never been targeted by any existing antiviral drug, raising hopes for its effectiveness against multi-drug-resistant flu viruses.

“The recent H7N9 outbreak in China March 2013 had a mortality rate of more than 20 percent,” says Michael Caffrey, associate professor of biochemistry and molecular genetics at UIC. That strain, which is new, is already showing resistance to the majority of existing drugs used to treat it, Caffrey said. Preventing an outbreak that could lead to mass casualties would be difficult with the current arsenal. “The need to develop new antiviral therapeutics now is crucial,” he said.

Flu viruses enter host cells using a special protein called hemagglutinin, which acts as a “key” that opens receptors on the cell surface. If hemagglutinin is disabled, the virus is locked out and can’t infect cells. Caffrey, found that the FDA-approved food additive tert-butyl hydroquinone sticks to a specific region on the hemagglutinin molecule. The additive, he said, “attaches to the Achilles’ heel of the virus – a loop-shaped portion of hemagglutinin necessary for binding to cells, making cell infection impossible.”

Source: http://www.thealmagest.com
Rosemary ingredient naturally extends shelf life

Kancor, the United States, has launched Oxikan – a full range of natural antioxidants derived from rosemary to increase shelf life in products without the use of chemical ingredients. Kancor has identified three active properties in the rosemary molecules that inhibit oxidation, which are used in Oxikan to improve shelf life, while also stabilizing natural colors, fighting rancidity in oils, and providing superior flow and oil miscibility.

Oxikan comes in a full range of flavor profiles to suit multiple applications, and has proven effects in meat and poultry applications. The Thiobarbituric Acid Reactives Substances (TBARS) analysis method tested ground chicken and buffalo patties treated with Oxikan for lipid oxidation, which showed lower oxidation levels than untreated samples.

Source: http://www.foodproductdesign.com

Blackberry juice effective as food preservative

Researchers from University of Maryland, the United States, have found that blackberry juice could be used as an antimicrobial in food products to prevent food borne infections, and as a food preservative. In a study published in the journal Food Control, researchers showed that blackberries possess several biological activities, including antimicrobial and nutritional effects. The researchers investigated the antimicrobial activities of blackberry (Rubus fruticosus) juice against food borne pathogens including Listeria monocytogenes, Salmonella typhimurium and Escherichia coli O157:H7.

The effects of blackberry juice on the growth of Lactobacillus casei, Lactobacillus plantarum and Lactobacillus rhamnosus were also investigated in Man-Rogosa-Sharpe (MRS) broth and skim and whole milk supplemented with blackberry juice. The researchers found that the growth of L. monocytogenes, S. typhimurium and E. coli O157:H7 were significantly inhibited by blackberry juice by 1-3 logs in both milk and broth. They also observed that the growths of Lactobacillus strains – good bacteria – were significantly stimulated (1-4 logs CFU/mL) by blackberry juice in both milk and MRS broth. According to the researchers, the results demonstrate that diluted blackberry juice can be used as a preservative in food processing and a preventive in food borne infections as a natural antimicrobial.

Source: http://www.freshplaza.com

A natural shelf-life extender

A&B Ingredients, the United States, has announced the addition of the natural shelf-life extender CytoGuard™ Stat-HA to its line of natural food ingredients. CytoGuard Stat-HA is a proprietary blend of CytoGuard Stat-NTM – lignin fractions containing actives from carbonyl compounds, organic acids and residual phenolics – and vinegar. The result is a mild flavored product for prepared meat products and dressings that can be used in ingredients.

“CytoGuard Stat-HA works as a natural means of extending shelf life,” said Gil Bakal, A&B Ingredients’ managing director. “And, it has been tested in a variety of applications, including meat, poultry, seafood, dairy and non-dairy items such as dips/dressings, refrigerated salads, as well as vegetable-based food products.”

CytoGuard Stat-HA can take the place of water when incorporated into products. According to A&B Ingredients, the most typical use level is 2% of the finished product. CytoGuard Stat-HA can improve shelf life of all-natural products by 30% to 50%, according to the company. CytoGuard Stat-NTM benefits include:

- Clean label – can be labeled as “Natural Flavors” or “Flavoring”;
- Water-soluble liquid with activity over a wide pH range;
- GRAS and approved for use in USDA and FDA regulated food products;
- Effective against a wide range of bacteria, including yeast and molds;
- Cost effective;
- Allergen and GMO-free – contains no dairy derivatives; and
- Easily adapts to multiple product formulations.


Source: http://www.foodproductdesign.com

Oregano oil may extend sunflower seeds’ shelf life

A study in the Journal of Food Science published by the Institute of Food Technologists (IFT), the United States, has shown that the addition of oregano essential oils to sunflower seeds preserved their positive sensory attributes and freshness. Sunflower seeds and sunflower oils have been shown to decrease risk of cardiovascular disease as well as...
have potential beneficial effects on obesity, bone health and blood pressure. However their high protein and fat content mean they can have a short shelf-life.

The addition of natural additives instead of synthetic ones covers the present trend in the food industry aimed at increasing consumer demand. The oregano oil helps to stop lipid oxidation in the roasted seeds, delaying the development of rancid flavors. In addition to preserving the quality of sunflower seeds, oregano oil also can have positive affect human health by helping to relieve gastrointestinal disorders. The roasted sunflower seeds with the addition of oregano oil were also positively accepted by consumers. The addition of these essential oils should be considered by the food industry as a natural source of antioxidant additives for preserving the shelf-life of sunflower seeds.

Source: http://www.laboratoryequipment.com

Antimicrobial option for preventing listeria in organic meats

According to a study in the Journal of Food Science published by the Institute of Food Technologists (IFT), the United States, showed that extracts from pecan shells may be effective at protecting meats, such as chicken from listeria growth. The majority of consumers that eat or buy organic products do not want synthetic antimicrobials or antioxidants added to their foods and prefer a "clean label".

Unroasted and roasted organic pecan shells were subjected to organic extraction processes to produce antimicrobials that were tested against Listeria spp. and L. monocytogenes bacteria. The effectiveness of pecan shell extracts were further tested using poultry skin to see how much these extracts inhibited bacterial growth of Listeria. When this all-natural antimicrobial was tested on raw chicken skin it decreased the levels of pathogens by 100 times and at the same time reduced the levels of spoilage organisms by more than 1,000 times, thus greatly increasing the shelf life of the chicken. The researchers concluded that the natural pecan shell extracts may prove to be an effective alternative antimicrobial against food pathogens and supplement the demand for organic antimicrobials.

Source: http://www.sciencecodex.com

UV light in food storage could double shelf life

A team from the U.S. Department of Agriculture (USDA) and Sensor Electronic Technology, Inc. (SETi), the United States, has demonstrated that low irradiance ultra-violet (UV) light exposure of strawberries in low temperature and very high humidity – typical home refrigerator conditions – can delay spoilage over long periods. The researchers have developed a novel device incorporating light-emitting diodes (LEDs) that emit UV at wavelengths found in sunlight transmitted through Earth’s atmosphere.

LEDs are now commonplace thanks to their long life and energy efficiency, and their ability to span the wavelength range from near UV to infrared. The full UV spectrum, however, had presented challenges for LED manufacturers – until recently. SETi developed a special technology to fabricate UV LEDs across the entire UV spectrum from UVA to UVC. This flexibility allowed them to tune the emitted light to the wavelengths most effective for this application. “UV-LEDs presented the opportunity to try low power devices that work well in the cold and can be engineered to work in small spaces such as refrigerator compartments,” says lead USDA researcher Steven Britz. “These findings are expected to have a major impact on the appliance business to extend the shelf life and preserve nutritional value of fresh produce, while reducing waste and saving money for every household,” states Remis Gaska, president and CEO of SETi.

Source: http://www.futuretimeline.net

Food preservation device launched in the United States

A team of scientists, chemists, biologists and physicians from the United States, have developed Freshy™, which reduces oxidation and retains the moisture in food. Freshy™ is a small, egg-shaped device that is placed both in the refrigerator and pantry to prolong the shelf life of food. Freshy™ contains natural mineral elements and emits safe energy that reduces oxidation, retains moisture and slows the growth of bacteria in food. Freshy™ works on fruits, vegetables, meats, poultry, fish, bread, juice, dairy, leftovers and more.

“Freshy™ is an excellent noninvasive, safe way to prolong shelf life and freshness of many foods,” says Dr. Daniel Y.C. Fung, professor of food science and animal sciences and industry at Kansas State University. “Freshy™ inhibits or kills spoilage and potential microbial pathogens.” Contact: Freshy, LLC, USA. E-mail: Customerservice@freshyworks.com.

Source: http://www.theshelfbyreport.com
Researchers develop food of the future

The Central Food Technological Research Institute (CFTRI), India, has developed a drink ‘Green Milk’ that it said is food of the future. The CFTRI director Ram Rajasekharan said green milk is a power packed product coming out of the premier R&D institute after 16 months of invention and testing. It is basically a nutritional supplement and we are marketing it as a meal.

Its components are from plant sources and the CFTRI is for the first time in its history producing and marketing too. Though many entrepreneurs wanted to procure the technology, we are producing and marketing it. We will apply for patenting the technology involved to get green milk, he stated. The product is age group based but in the first installment the CFTRI is releasing a variant. This can be consumed by both kids and adults, he stated.

Source: [timesofindia.indiatimes.com](http://www.timesofindia.indiatimes.com)

Whey-based beverage prepared from ripe banana juice

The Department of Processing and Food Engineering, College of Agricultural Engineering and Technology, Junagadh Agricultural University, India, has developed a delicious and nutritious Ready-to-serve (RTS) beverage prepared from the ripe banana juice and milk whey. The M. arvensis extract was used as a natural flavoring agent. The proportion of banana juice, M. arvensis extract and milk whey was varied from 5-15 ml, 1-5 ml and 72-86 ml per 100 ml of the prepared beverage, respectively. The screening of beverage samples was done on the basis of their physicochemical and sensory characteristics.

As a result of various studies conducted for optimizing the proportions; an acceptable whey banana RTS beverage was prepared having 15 ml banana juice, 3 ml M. arvensis extract, 8 g sugar powder and 77 ml milk whey per 100 ml of the prepared beverage, respectively. The developed RTS beverage could be recommended for the large scale production at industrial level. Contact: Dr. N. K. Dhamsaniya, Technical Officer, Junagadh Agricultural University, Junagadh-362001, Gujarat, India. Tel: +91-285-2671784; Fax: +91-285-2672004; E-mail: nkdham-sania@yahoo.com.

Source: [omicsonline.org](http://www.omicsonline.org)

Fruit juice processing enterprise module

The Industrial Technology Development Institute (ITDI), Philippines, has expanded its line of fruit juice processing equipment. The Fruit Juice Processing Enterprise Module can be used for producing a wide range of fruit juices and concentrates, including purees. A variety of fruit processing equipment are offered to clients in line with this module.

Contact: Food Processing Division, Industrial Technology Development Institute, DOST Compound, Bicutan, Taguig, Metro Manila, Philippines. Tel: +632-837-2071-82; Fax: +632-837-6156; E-mail: fpd@dost.gov.ph.

Source: [itdi.dost.gov.ph](http://www.itdi.dost.gov.ph)

Techniques with juice and milk

Scientists at Fonterra, New Zealand, are working for know-how in preventing coagulation, so that a new breed of milky juices can be successfully manufactured and commercialized at scale. Using their expertise in stabilization of protein and processing of beverages, the juice-infused product still looks like milk and maintains a smooth texture, with no layers of separated protein.

“To enable this, you have to find an acidic milk stabilizer that can stop the proteins coming together,” says Rama Gulla, research technologist in consumer beverages at Fonterra. “[But an anionic stabilizer] has a negative charge, so is able to coat the protein, and it keeps the protein particles from coming together – this is called steric stabilization,” says Gulla. It sounds relatively simple, but the stabilizer dose is extremely important, and needs to be paired with optimum process including homogenization, to increase the interactions between the stabilizers and the milk proteins.

Globally, a combination of stabilizers and processing systems are used, but Gulla says the processing method Fonterra has developed is ahead of the pack, and “because we understand the proteins at a deep level, and we can optimize the process as well as the stabilizer.” Fonterra has already commercialized its stabilizing expertise, which has been taken up by customers around the globe.

Source: [fonterra.com](http://www.fonterra.com)
Revolutionising ready meal food sector

Developed by HH Global, the United Kingdom in conjunction with Parkside Flexibles (Europe) Ltd., the United Kingdom, unlike traditional ready meal packaging, the HH Global Lidd™ utilizes a two layer laminated film construction to not only seal the product, but also displays the usual printed marketing information, allowing branding on the upside and nutritional information on the reverse. This innovative approach reduces packaging weights by over 45% and packaging costs by at least 10%. This makes Lidd™ not only a cost-effective but environmentally friendly solution too. Lidd™ can be used in any environment, ambient/chilled or frozen, on plastic, aluminum or paper/plastic tray combinations.

HH Global has been working with a major food group to introduce Lidd™ to product lines totaling 100 million+ units per year. The associated packaging weight reduction from utilizing the HH Global product is expected to be 600 tons per year, with an expected cost saving of nearly US$1,000,000 PA. Tony Massey, CMO at HH Global said: “Lidd™ represents a quantum leap in food packaging development. By utilizing the new solution, very significant savings can be unlocked across all ready meal product ranges. As such, we truly believe that this technology has the potential to revolutionize the food packaging market, worldwide.”

Source: http://www.packagingeurope.com

Tomato packaging made from by-product waste

The BIOCOPAC Consortium, Italy, is developing a new range of alternative bio-based lacquers for the tinned food industry – using the humble tomato processing wastes intended for metal packaging, which will comply with EU Directive 2008/98/EC and decrease waste. Led by Stazione Sperimentale per l’Industria delle Conserve Alimentari (SSICA) of Italy, BIOCOPAC is creating bio-based thermosetting lacquer.

The team started by analyzing and characterizing tomato wastes. The focus now is on developing an extraction method and optimizing the bio-resin. The partners are using environmentally friendly techniques to extract the bio-resin from tomato peel. The bio-resin is actually cutin – a wax-like water-repellent material found in the walls of various plant cells. The lacquer for the metal packaging used for food products with chemico-physical properties will also be entirely natural. The final lacquer will be similar to those used traditionally, and usable in industrial plants.

The BIOCOPAC consortium comprises four research centres, four SMEs, and three large enterprises from the Czech Republic, France, Italy, Greece, Liechtenstein and Spain. The collaboration between industrial groups dealing with waste treatment and tomato transformation, and lacquer and metal can producers will ensure the project’s results fit with industry’s needs. The project has been funded under the “Research for the benefit of SMEs” theme of the EU’s Seventh Framework Programme (FP7). Contact: BIOCOPAC, Viale F. Tanara 31/a, I-43100 Parma, Italy. Tel: +39-0521-795-217; Fax: +39-0521-795-216; E-mail: angela.montanari@ssica.it.

Source: http://www.cordis.europa.eu

Extending shelf life by packaging containing garlic molecules

The Technological Institute of Plastics (AIMPLAS), Spain, has coordinated the European research project PLA4FOOD, which has made it possible to develop a new generation of food packaging materials that combine biodegradable and active properties, as well as natural extracts such as encapsulated garlic molecules that release their antioxidant, antimicrobial and antifungal properties in a controlled manner when in contact with food items.

The packaging obtained with this project can be rigid (trays) or flexible (film for bags), and in both cases they present three layers. The active natural additives are only in the inner layer; the one in contact with food. In the case of iceberg lettuce, for example, it has been observed that oxidation in the cut area takes around 15% more time to appear than with regular packaging. In all cases, once the products’ shelf life expired, these were still firm and suitable for consumption, while vegetables in regular packaging were wet and soft, with moulds appearing on tomatoes and microorganisms on all food items.

The outer layer incorporates moisture absorbers, which are of paramount importance in the case of salads, as the product will retain its best appearance as long as it remains dry. Lastly, every layer contains plasticizer additives that are also biodegradable and which improve the material’s properties for their industrial processing. To be precise, they have increased the flexibility of conventional polylactic acid by around 30%. In addition to all this, the multi-layer structure makes it possible to use additives only in the layer where they are
Innovative packaging solutions for food and industrial products

MULTIVAC, Germany, the packaging specialist will showcase a wide range of innovations, covering all aspects of the packaging of food and industrial products, including a new entry-level model among the thermoforming packaging machines and new technologies for process and automation equipment at Interpack, 8-14 May, 2014.

As regards the sector of thermoforming packaging solutions, MULTIVAC will show its automated R 245 packaging solution, which is equipped with a die change system for ensuring very short conversion times and a high degree of flexibility. The MULTIVAC portfolio of exhibition machines is rounded off with the R 145 as the smallest model, which can be fully configured, and with a new entry-level model. For the traysealers, MULTIVAC will show T 300 entry-level model for automatic packing in trays is equipped with a denester and a conveyor belt labeler. The T 700 will be integrated in an automated packaging line with automatic infeed. The T 600 is equipped with a filler for packing ready meals and convenience products in multi-compartment trays and for the chamber machine sector, MULTIVAC will present its complete product range of small-chamber and large-chamber models, as well as double-chamber machines and chamber belt machines.

Another focus of MULTIVAC’s presence at the exhibition will be solutions for packing non-food products, whereby different requirements of the retail trade, such as for example anti-theft security, are taken into consideration. Contact: MULTIVAC, Sepp Haggenmüller, GmbH & Co. KG, Valeska Haux, Bahnhofstr. 4, D-87787 Wolfertschwenden, Germany. Tel: +49-833-460-134-66; E-mail: valeska.haux@multivac.de.

Packaging may extend shelf life of eggs

A team at the University of Bologna, Italy, has been testing the use of modified atmosphere packaging – sometimes called controlled atmosphere packaging, which involves creating an atmosphere around a food product to control chemical, enzymatic or microbiological reactions, reduce deterioration and extend product life. Their research indicates that it may be effective in prolonging the life of eggs. The scientists, led by Frederique Pasquali, looked into the effectiveness of different types of modified atmosphere packaging, using various mixtures of gas and air. They concluded that the use of carbon dioxide could be effective in reducing bacteria levels and prolonging egg life both in transit and on the shelf. They recommend that further work be carried out to perfect the technique.

Food spoilage is an entirely natural process. Oxygen in the air can cause oxidation. Microbes such as bacteria, yeasts and mould can feed and grow on food, causing it to go bad. Measures to slow down these processes include refrigeration, pickling, curing with salt or the use of artificial preservatives. One technique that avoids the use of artificial preservatives is modified atmosphere packaging. Frederique Pasquali’s team found that, in general, temperature played a more important role than the gases in influencing the survival of the bacteria in the eggs. “In particular, the lowest microbial loads were registered at four degrees centigrade on storage temperature to avoid the spoilage bacteria, whereas 37 degrees centigrade was the best survival temperature to control psychrotrophic micro-organism L. monocytogenes development regardless of the gas used,” the scientists said in their report of the research.

Source: http://www.theranger.co.uk

Packaging film tested on mushroom packs

Sirane Ltd., the United Kingdom, has conducted trial of a packaging film on mushrooms which can extend their shelf life by 11 days. The mushrooms were packed in standard expanded polystyrene trays and stretch-wrapped in Sirane Flex Resolve film using an Omori machine. The mushrooms showed no browning or condensation in the time frame, according to a news release.

Simon Balderson, managing director, said that “The film is suitable for all types of vegetables, including salads as well as many types of fresh fruit.” The company doesn’t promise identical results for all commodities and customers, but it does claim positive findings for strawberries, green beans, salads and potatoes. “What we suggest is that customers try the film in their own food chain, in their own set of conditions, and see what results can be achieved,” sales director Jeremy Haydn-Davies said.

Source: http://www.thepacker.com
Advanced X-ray systems for food packaging

Peco Controls Corporation and InspX LLC, the United States, launched their newest package inspection systems at the Midwest Food Processors Association Expo 2013 in Milwaukee, the United States. Featured products included the InspX ScanTrac Solo rigid container inspection system as well as the Peco Controls FillTrac fill level monitor and VacTrac dud detector.

The InspX ScanTrac Solo is among the most advanced rigid container X-Ray inspection systems available. The Solo is a single beam system designed for inspecting plastic and metal rigid containers up to 7 inches wide and 12 inches high. The Solo supports robust foreign contaminant inspection, fill level and check weighing capabilities and is available with both 0.8mm and 0.4mm detector arrays. The VacTrac from Peco Controls Corporation offers a cost effective dud detection system for cans. The VacTrac is exceptionally easy to use and performs at speeds up to 2000 containers per minute. Contact: Peco InspX, 48041 Fremont Boulevard, Fremont, CA-94538 USA. Tel: +1-877-722-6875.

Source: http://www.newsday.com

Electrolysed water system

Research from Australia, has shown eWater solutions are effective against major bacteria including listeria, salmonella, E. coli, staph as well as viruses and moulds. Developers and architects of hospitals, aged and child care facilities, government infrastructure, educational facilities and restaurants are discovering the benefits that come from specifying electrolysed water as part of a product kitchen design and as a general on-site cleaning and sanitising system.

Using only tap water, electricity and table salt, eWater Systems are able to produce effective sanitizing and cleansing solutions that are more economical, sustainable and safer than other packaged chemical alternatives. By using electrolysis – a similar principle used in salt water pools – eWater produces solutions that can reduce the cost of traditional cleaning and sanitizing chemicals by 70%.

Benchmarking and life cycle analysis undertaken by Royal Melbourne Institute of Technology (RMIT), Australia, showed that eWater clearly outperformed other packaged cleaners tested on environmental factors including energy usage, waste generation, toxicity of constituents and environment ecology. Risks associated with handling caustic and other packaged chemicals as well as the need for disposal of harmful toxins into waterways is also eliminated.

Source: http://www.infolink.com.au

Countryside inventor created automatic coconut-shelling device

Le Tan Ky, chairman of the Viet-Gap co-operative in the southern province of Ben Tre, Viet Nam, has invented an automatic coconut-shelling device which can cut open a coconut in 30 seconds. A machine costs VND15 million, much cheaper than those imported from foreign countries,” says Ky. These machines have proved their worth by making production more efficient and replacing traditional methods which were unsafe and slow. “I dropped out of school for military service, and then I left the army to continue my studies. I had the opportunity to try various jobs in many places. In 2009, I decided to return to my homeland to get involved in the sale of pomelos and coconuts to buyers in HCM City,” says Ky.

As things settled down, Ky started to receive more and more orders, but he was unable to process them quickly enough because everything was done by hand. The dilemma pushed him to invent a coconut sheller. After days of pondering and experimenting with different ideas, Ky finally completed his machine. At the end of 2011, his coconut sheller was finally finished. The machine is 1.2m high with two knives. The coconut is placed on six fixed pointed heads, and with two sharp twists, the shell falls off. The main advantage is the speed of the machine.

The birth of the device has enabled his workshops to overcome the shortage of workers and handle more orders. Ky has also registered to copyright his invention, and he’s excited by the interest he has received. “Domestic entrepreneurs have made deals to export green coconuts which bring high profits, but that means a lot of hard work. I hope this machine will speed up the process, but I still think a few adjustments are needed to make it work more effectively,” says Sang.

Source: http://english.vietnamnet.vn
Food Flavors & Flavor Enhancers

Food Flavors & Flavor Enhancers – Market, Technical & Regulatory Insights is the second in the series of additive market reports produced in partnership between Leatherhead Food Research and Mintel. The aim of this report is to examine demand for and usage of flavors and flavor enhancers by the global food and drinks industry. The main objectives of the report are to:

- Provide an introduction to food flavors and flavor enhancers and their purpose;
- Give an overview of the global market for food flavors and flavor enhancers; and
- Outline the use of food flavors and flavor enhancers in consumer packaged goods.

Guide to food regulations in China

The Guide to Food Regulations in China contains 135 pages and is intended to help companies selling products in the Chinese market as well as exporters, importers, distributors and other food companies with an interest in selling foods in China, to develop a basic understanding of the main statutory instruments applicable and controls applied by the national authorities. The guide covers:

- Structure of food legislation;
- Authorities responsible for legislation-making, controls and enforcement; and
- Information about the use of four categories of additives in foodstuffs.

The book is an easy-to-use publication which provides valuable information, in English, derived from Chinese standards/documents, most of which are only available in Chinese.

For the above two books, contact: Leatherhead Food Research, Tel: +44-137-237-6761; Fax: +44-137-238-6228; E-mail: help@leatherheadfood.com

Introduction to food process engineering

A basic introduction to the principles of food process engineering, this text covers the physical properties of food, traditional fluid mechanics, and heat transfer via conduction, convection, and radiation. It examines transport phenomena, momentum, energy and mass balances, as well as a new topic: macroscopic balances. Developed as a textbook for introductory courses in food engineering and food science programs, most chapters provide references and exercises to further understanding.

Contact: CRC Press, Tel: +44-123-540-0524; Fax: +44-123-540-0525; E-mail: book.orders@tandf.co.uk
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