VATIS UPDATE

Food Processing

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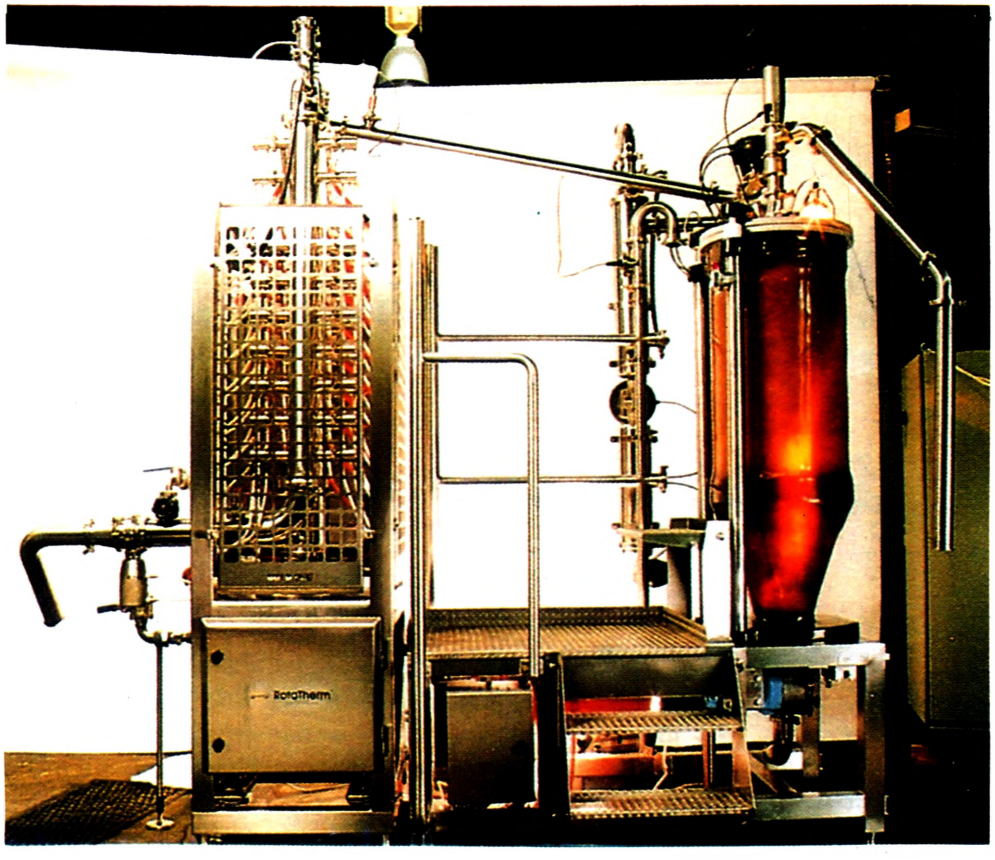
Highlights

- Fresh opportunities for food processing
- Pioneer website on Indian dairy industry
- Fish curry in flexible packs
- Dual-ovenable trays
- Wine filtration
- New slicing machine



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- *APCTT* implements regional and inter-regional projects related to technology transfer.

Cover Photo
Two stage continuous cooking system solves burn-on problem
(Courtesy: Food & Pack, Australia)

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VATIS* Update Food Processing
is published 6 times a year to keep the readers up to date of most of the relevant and latest technological developments and events in the field of Food Processing. The Update is tailored to policy-makers, industries and technology transfer intermediaries.

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IN THE NEWS

International guidelines for organic food

At its latest session on 3 July 1999, the Codex Alimentarius Commission (CAC) adopted the "Guidelines for the Production, Processing, Labelling and Marketing of Organic Food" standards. The wide-ranging guidelines clearly define the nature of organic food production. CAC is a joint body of the Food and Agriculture Organization and the World Health Organization.

CAC will set up three inter-governmental task forces. One will devise standards for foods derived from biotechnology by 2003, while the second will revise fruit juice guidelines that protect consumers and prevent fraudulent practices. The other task force will focus on animal feeding. Also, CAC postponed setting the maximum residue limits for the controversial cow hormone Bovine Somatotropine (BST) for lack of consensus. (UN Newsletter, Vol. 54, No. 27, 10 July 1999)

UNDP grant for hybrid technology

The United Nations Development Programme (UNDP) has allocated about US$3.67 million for the development and large-scale adoption of high-yielding technologies in the rice and spice sectors in India. US$2.55 million has been allotted for the rice hybrid technology programme, with technical assistance provided by the Food and Agriculture Organization (FAO). This programme is designed to establish a research base on systematic seed production and transfer of technology in this sector. In the spices sector, UNDP will provide US$1.12 million for a three-year programme for the development of organic spices. (Processed Food Industry, July 1999)

World's largest food markets

Investigations conducted by Seymour-Cooke has revealed that North America and Western Europe together account for more than 60 per cent of the value of processed foods manufactured worldwide – as stated in two reports "Food Brands in Western Europe" and "Food Brands in North America." These reports cover 40 processed food categories in 18 countries, identifying the market leaders, market sizes and market shares in the food industry.

Germany has traditionally had the most fragmented dairy industry in northern Europe but consolidation is accelerating because of the concentration in the German retail trade. In Switzerland, 1999 has seen the formation of Swiss Dairy Food, with the merger of Toni and Santis. In Italy, Parmalat recently acquired one of its major rivals, Cirio, to give it control of 40 per cent of fresh milk sales. *Contact: Mr. Richard Bowles. Tel: +44 (171) 7049 951; Fax: +44 (171) 2265 298.* (Food and Pack, June 1999)

Irish report gives clean bill for modified foods

According to an independent report by the Food Safety Authority of Ireland, no modified food on sale in either Ireland or the European Union is harmful for humans. Nonetheless, the report emphasizes that blanket approval should not be given for all biotech products. Friends of the Earth have welcomed this report with derision and called it "a miserable, inadequate PR initiative." The Irish government plans to establish two new advisory bodies – the Human Genetics Commission and the Agricultural and Environmental Biotechnology Commission – which will be responsible for examining scientific developments and assess potential risks involved in producing modified crops. (Agbiotech Reporter, June 1999)

Fresh opportunities for food processing

Food processing units in India can now avail of the combined expertise of Jackstone Food Systems and J&E Hall Ltd., the United Kingdom, and Industrial Refrigeration Pvt. Ltd. (IRPL). Jackstone Food Systems is the world's largest food freezing equipment company. It manufactures process equipment for the food, beverage and related industries, apart from executing turnkey projects in the field of dairy, brewery, confectionery and food processing.

IRPL undertakes contracts for refrigeration systems, particularly in the field of food processing. *Contact: Industrial Refrigeration Pvt. Ltd., 901, Maker Chamber V, Nariman Point, Mumbai 400 021, India. Tel: +91 (22) 2041 183/2872 363/2872 379; Fax: +91 (22) 2044 944; E-mail: allstate.finance@gems.vsnl.net.in; Internet: http://IMCnet.org/home/inco.* (Chemical Weekly, 13 July 1999)

New versions of palm oil

Global Palm Products, Malaysia, plans to promote variations of palm oil in India. The latest versions of palm oil, red palm oil and red palmolein, are superior to crude palm oil and are rich sources of vitamin E. They also contain beta-carotene, an antioxidant and precursor of vitamin A. Red palm oil and red palmolein are basically refined palm oils. These products will be supplied through public health programmes aimed at improving vitamin A levels among the people in India. (Indian Food Industry, Vol. 18(2), March-April 1999)

Opportunities for reduced-fat foods

The demand for reduced-fat and low-joule foods is increasing as consumers are more conscious of what they eat. In Australia, a unique fat substitute, termed gelled food product (GFP), is being used to prepare a range of novel reduced-fat small goods.

Food Science Australia conducted strategic research into whey protein utilization to discover properties of the proteins that might enhance their recovery as commercial food ingredients. Studies suggested that the major whey protein, ß-lactoglobulin, has immense potential as a food ingredient, particularly in applications where gelation is important. Gelled Food International realized the benefit of substituting added fat in small goods with the fat-like whey protein gel and joined hands with Food Science Australia to exploit this technology. *Contact: Mr. Geoff Smithers, Food Science Australia; Tel: +61 (3) 9252 6000.* Or *Mr. Ian Barlow, Gelled Food International, Australia; Tel: +61 (3) 9650 5633.* (Food Facts, Autumn/Winter 1999)

New advances in tamper evident packaging

Tronics, Australia, will be featuring new advances in tamper evident packaging security, including the latest technology in PVC sleeve shrinking. The company supplies cost-effective systems that generate and accurately apply labels automatically – pre-printed or printed in real time. A variety of machine models are available for slow to high speed operation which provide excellent graphics capabilities. Tronics plans to present the latest in EAN compliant outer case labelling at FoodPro '99. (Food and Pack, June 1999)

Isoflavones from soya bean

HCS Nutritional Resources, the United States, is a joint venture between Henkel Corp's nutrition and health group and Central Soya Co. It is involved in the research, production and marketing of soya isoflavones for use in functional foods and dietary supplements. Central Soya will provide soya raw materials and market the isoflavones to the functional foods industry. Henkel's nutrition and health group will market the isoflavones in the nutritional supplement industry. (Chemical Weekly, 20 July 1999)

Meat industry award

Food Science Australia (FSA) will provide free research services up to A$25,000 to the winner of a competition it has launched for small and medium enterprises in the meat industry. The award will see the collaboration of FSA staff and the winning firm. The results will be announced by November. (Food Facts, Summer 1998/99)

Food processing complex

A new food processing complex will soon be set up in Kerala, India, on land provided by the Kerala Industrial Infrastructure Development Corporation. This venture will be supported by the government and the site has good access to rail and air services. The complex will be an integrated and self-contained unit with industry specific manufacturing environments conforming to the latest international standards. (Indian Food Packer, March-April 1999)

Increase in production of milk powder

A recent report released by the Centre for Monitoring Indian Economy (CMIE) has revealed that production of major food products – such as milk powder, biscuits and malted food – increased significantly during the financial year 1998-99. During this period, production of milk powder increased by 37.95 per cent to 130,268 tonnes compared with 94,431 tonnes in 1997-98. (Indian Dairyman, July 1999)

Korean policy update

In Korea, a pan-governmental consultative body will soon be formed to supervise the safety of imported food products. This body will consist of officials from related government agencies and civilian food experts. Other measures under consideration include strengthening the inspection system to include screening for newly found harmful substances such as dioxin and other hormone-disrupting chemicals. (CACCI Profile, July 1999)

Pioneer website on Indian dairy industry

The publisher of Dairy India has hosted an exclusive website on the Indian dairy industry. The website, http://www.IndiaDairy.com, provides a low-cost opportunity for Indian organizations to project their capabilities, products and services. A log analysis of the website has averaged 390 hits daily in the first ten weeks of its launch, the largest being from the United States.

Some of the objectives of the 200-page website include:

- Present a fact sheet of the Indian industry;
- Serve as a resource pool for dairy entrepreneurs;
- Focus on new insights and provide analysis and ideas in milk production and processing;
- Provide a Buyer's Guide to leading organizations and specialists;
- Source consultancy services;
- Project facilities for education, research and training in the country; and
- Host home pages of dairy and other related organizations in the public, co-operative and private sectors.

Contact: Dairy India Yearbook, A-25 Priyadarshini Vihar, New Delhi 110 092, India. Tel: +91 (11) 2243 326/2045 681; Fax: +91 (11) 2243 039; E-mail: yearbook@vsnl.com. (Indian Food Industry, Vol. 18(2), March-April 1999)

Database to identify bacteria in food products

Researchers in the United States have launched on the Internet a database on genetic fingerprints of bacteria in food products. The database includes information on food pathogens as well as 'pro-biotic' beneficial bacteria that are used in many health foods. Genetic identification of specific strains of common bacteria such as *Lactobacillus, Bifidobacterium, Lactococcus, Streptococcus* and *Pediococcus* is now feasible on the net.

Assembled from clinical, environmental and food samples, the public database lists more than 989 individual genetic patterns representing a total of over 200 unique genetic families, know as RiboGroups. This database will be very useful to food processors. *Contact: Cornell University, the United States. E-mail: cunews@cornell.edu.* (Beverage and Food World, July-August 1999)

China ProPak '99

The largest packaging and processing trade event in China, ProPak '99, was organized during 14-17 July 1999. Exhibitors reported actual sales of more than 70 per cent of all machinery displayed in this event. The success of ProPak China '99 reflects the priority to increase investment in the packaging and processing industries, in order to stem the tide of export revenue loss owing to inadequate packaging.

Contact: Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, the United Kingdom. Tel: +44 (171) 8622 130; Fax: +44 (171) 8622 001/8622 138; E-mail: china@montnet.com; Internet: http://www.montnet.com.

INVENTIONS/ NEW PRODUCTS

Biodegradable container for dairy products

Autobar Packaging, the United Kingdom, has launched a biodegradable container for dairy products such as yoghurts, cream, etc. The compostable container was developed to meet increasing concerns over packaging waste. It is made from polylactic acid obtained from plants like maize and beetroot.

The polylactic acid container is thermoformed on conventional machinery, with some modifications. It can be decorated on par with materials like polypropylene, polystyrene and polyethylene terephthalate, by dry offset printing, labelling or sleeving. (Chemical Weekly, 20 July 1999)

Fish curry in flexible packs

The Central Institute of Fisheries Technology (CIFT), Cochin, India, has developed a new value-added product – ready-to-serve fish curry in flexible pouches. Flexible pouches do not impart the undesirable taste, to the product, observed in fish curry stored in metal containers. It is a cheaper alternative to the conventional tinplate packaging, since tinplate has to be imported.

The three-layer configuration of flexible pouches can functionally serve as well as metal cans, but without the disadvantages. It is a retortable flexible pouch based on polyester/aluminium foil/cast polypropylene. CIFT has standardized the process for the production of fish curry in these pouches and the curry processed in them has remained unchanged for more than a year, at room temperature. *Contact: Central Institute of Fisheries Technology, Matsyapuri P.O, Cochin 682 029, Kerala, India.* (Fish Technology Newsletter, Vol. IX, No. 4&5, October-March 1999)

Dual-ovenable trays

In the United States, THERMA-TUF® trays manufactured by Lawson Marden Thermaplate Corporation is being used by Wolfgang Puck Food Company for packaging its frozen food. The ovenable trays meet Wolfgang's standards for quality, appearance and versatility. The tray is made from Eastapak® crystallized polyethylene terephthalate (CPET) polyester produced by Eastman Chemical Company.

THERMA-TUF trays are durable and holds up well during the extreme temperature changes encountered as the food is prepared, frozen and heated. The tray is dual-ovenable, i.e. the food can be cooked either in a microwave or a conventional oven. It has a good oxygen barrier and is 100 per cent recyclable. It is now feasible to bake, freeze, ship and sell food products in a single tray, saving on labour and clean-up costs. A survey conducted by a major university has revealed that 90 per cent of consumers prefer dual-ovenable trays to microwave-only trays. *Contact: Mr. David Bartikotsky, Wolfgang Puck Food Company, 1333 Second Street, Santa Monica, CA 90401, the United States. Tel: +1 (310) 6054 388; Fax: +1 (310) 6054 382.* (Popular Plastics and Packaging, July 1999)

Processed lentil

Scientists at the National Dairy Development Board, India, have successfully produced a new variety of lentil, "dal analogue", by combining wheat and soya bean extract. The dal analogue is based exclusively on low-cost oil seed extracts and cereal starches. Though it resembles lentil in all aspects, it is at least 50 per cent cheaper and has more protein. The new dal replacement could supplement dietary needs of low-income groups. A plant with a capacity to produce 1.5 t/h will soon be set up by Anand Regional Cooperative Oilseeds Growers' Union Limited. (Indian Food Packer, March-April 1999)

High-protein, high-calorie nutrition supplements

High-protein, high-calorie snack foods have been developed by the Central Food Technological Research Institute (CFTRI), Mysore, India. They were developed under a project funded by the Department of Biotechnology. Each 100

grams of these ready-to-eat formulations provide 15 grams of protein and 300-450 kcal of energy at a cost of about US$0.125. These products are intended for distribution under the National Nutrition Programme for combating energy deficiency and protein malnutrition among children. (Indian Food Packer, May-June 1999)

Wine filtration

Pall Pharmalab Filtration Pvt. Ltd., Mumbai, India, has designed the OenoClear cartridge to replace traditional sheet filtration technique used for filtering wine. The novel alternative is flexible enough to process white wine after red without leaving residues from the changeover.

Residual yeast is traditionally removed using diatomaceous earth and sheet filters. Some of the drawbacks include product loss, premature blockage and consequent hygiene problems. OenoClear cartridges incorporate a polyaramid filter media that ensures complete yeast removal and is robust enough to allow repeater regeneration *in situ*. It is housed in a hygienic, fully enclosed unit and has been designed to have a long service life. Each system comprises a main filter housing, rinse water filter and steam filter housing, pumps, pipework gauges and valves – all mounted on a stainless steel frame.

A simple cleaning schedule allows processing of white and red wine through the same filters. Product losses are minimized by low hold up volume. Filtration can be semi or fully automated, thereby reducing operator supervision. *Contact: Marketing Division, Pall Pharmalab Filtration Pvt. Ltd., Star Metal Compound, L.B.S. Marg, Vikhroli (W), Mumbai 400 083, India. Tel: +91 (22) 5789 105; Fax: +91 (22) 5789 106.* (Beverage and Food World, July-August 1999)

Vanilla flavour

Prova, France, is a major importer/transformer of vanilla pods. The company supplies individualized products according to aroma specifications by the customer. It has a full range of natural vanilla extracts in powder, liquid and solid forms, offering special technical properties (instant solubility and high aromatic yield) for improving the quality of cocoa mass, biscuit dough and cream fillings. The Provonil range is a subtle blend of natural and synthetic flavourings which offer an alternative to synthetic products such as vanillin. These flavouring agents are produced by encapsulating 'nature identical synthetic molecules' in natural vanilla extract.

Prova has also diversified into other extracts and essences, namely cocoa and a variety of well-balanced coffee flavours. As these are concentrated, the user needs only a little powder and liquid thereby avoiding any taste change. *Contact: Mr. Terri Lipanovic, Salkat New Zealand.* (Food Digest, Vol. 22, No. 2, April-June 1999)

Speciality health foods

New speciality health foods, recognized by the Ministry of Health and Welfare as possessing specific functionality, have been developed in Japan. Nisshin Foods Co. is marketing instant noodles containing "psyllium", a natural dietary fibre that functions as intestinal scavenger. Taishi Foods Co. is selling tofu containing casein phosphopeptide, which is claimed to aid absorption of calcium. Fujikko Co. is selling "nata de coco fibre" containing digestible dextrin as dietary fibre. (Food Digest, Vol. 22, No. 2, April-June 1999)

New pre-mix range

Weston food ingredients range, manufactured by Weston Milling, has been designed to make life easier for bakers. It comprises more than 35 pre-mixes and concentrates including: fruit cake mix, multi cake mix, donut mix, brownie mix, chocolate sponge mix, lamington dips, scone mix, cheesecake mix, delux sponge mix, choux pastry mix, patisserie custard mixes, baked custard mix, vanilla slice mix, muffin mix and pie filling mix. These products have become popular with operators of small bakeries, lunch bars, cafeterias, etc. (Food Digest, Vol. 22, No. 2, April-June 1999)

Solution for burn-on problem

RotaTherm continuous cooking system, developed by Gold Peg, Australia, is a two-stage cooking system which heats products under

pressure to ultra-high temperatures. Though originally designed to cook processed cheese paste, RotaTherm steam fusion cooking technology can also be used to cook meat and vegetable pie fillings, starch-based desserts and all types of sauces and custards.

The product to be cooked is pumped through the RotaTherm using a speed-controlled positive displacement pump. Steam is fused with the product during a single pass through the cooking column to achieve the required set point temperature. The system can handle a wide range of normally difficult to handle products such as gelatinous products, semi-solids, soups, slurries, concentrates, pastes and particulates.

Associated equipment available with RotaTherm include blending and mixing equipment, auger-feed trough pump feeders, vacuum flash cooling systems, control and automation systems and PC-based management reporting. RotaTherm has a state-of-the-art process control and information system that incorporates a PLC and sophisticated control software coupled to a touch screen operator interface with PC-based information handling. (Food and Pack, June 1999)

Mini micro-brewery

In the United Kingdom, a company has developed the world's first mini micro-brewery. The BrewZer, a spherical unit with five legs and a spout, is designed to operate with a special, entirely natural powder of malt, hops and yeast – the first 'just-add-cold-water' beer powder. About 10 pints of premium bitter-type beer at 4.5 per cent alcohol content can be produced by just mixing the powder with water and leaving it for 14 days to ferment. Traditional problems of home-brew kits, such as temperature-taking, transferring, sterilizing and other bothersome steps have been eliminated. (Britain Today, May-June 1999)

Innovative mustard flavour

Palos Verdes International (PVI), is offering natural mustard flavour, volatile oil mustard, steam distilled from mustard seed and mustard meal. The technology used ensures that the volatile flavour is not affected by heat or subject to oxidation. Other by-products include vegetable oil from the seed or meal and the de-flavoured meal. The latter has a protein content of about 40 per cent and can be used as a high-grade animal feed.

PVI product is Australian, made from natural Australian seed using Australian developed technology. The flavour remains unaltered by the extraction process and contains all the minor flavours absent in synthetic flavour. (Food Digest, Vol. 22, No. 2, April-June 1999)

T-shirt technology to test tomato ripeness

In the United Kingdom, researchers have utilized the technology used to print designs on T-shirts to develop a simple and robust device for detecting ripened tomatoes. The hand-held sensor, when inserted into a ripening fruit, measures acidity levels which informs how much starch in the fruit has transformed into sugar. Acidity is a measure of the concentration of positively charged hydrogen ions in a solution; the more the acid, the higher the concentration of ions.

The sensors are produced by screen-printing layers of different substances with specific properties as thin polymer films. Two of these substances act as electrodes and the positively charged hydrogen ions produce a charge between the electrodes that can be measured. The sensors are carefully built, a layer at a time, ensuring that each layer of material used is of the correct thickness, so that measurements are accurate and reproducible.

Using layers of different materials, the makers can produce an array of sensors on a device measuring about the size of a postage stamp. An attractive feature of these sensors is that although they can be designed to measure special properties, they can be manufactured in large numbers thereby making them cheaper. *Contact: Mr. John Atkinson, Thick Film Unit, Department of Mechanical Engineering, University of Southampton, Highfield, Southampton SO17 1BJ, the United Kingdom. Tel: +44 (1703) 592 114/592 116/593 807; Fax: +44 (1703) 593 285; E-mail: newrep@soton.ac.uk; Internet: http://www.soton.ac.uk.* (Spectrum, May-June 1999)

R&D IDEAS

Soya bean product helps prevent calcium loss

Researchers at the Kawasaki Medical School, Japan, are studying 'Natto', a fermented soya bean product rich in vitamin K. Vitamin K is believed to be important for bone formation. Though it is rare for a person to be deficient in this vitamin, studies have suggested that people who ate Natto were less likely to suffer from hip fractures in old age – one of the main symptoms of osteoporosis.

The strong-smelling Natto has 100 times more vitamin K than cheese. Soya products also have a high calcium content. A genetic deficiency makes some people less capable of absorbing calcium. But if such people eat soya products, they will have strong bones and not lose calcium. (PTI Science Service, 1-15 May 1999)

Antioxidants in chocolate identified

Researchers at the University of Scianton, the United States, have identified antioxidants in cocoa and chocolate. They found that cocoa and chocolate contain more polyphenol antioxidants than many common vegetables and fruits. Various flavonoids, a class of polyphenols, are found in abundance in chocolate – specifically procyanidins and oligomeric procyanidins. These flavonoids inhibit LDL cholesterol oxidation, a process thought to be associated with the build-up of plaques in arteries. Cacao liquor, one of the ingredients of chocolate and cocoa, also contain major antioxidants, specifically epicatachin, catechin, clovamide, quercetin and other glucosides. (Chemical Weekly, 20 July 1999)

Food processing using electron beam

Researchers in North Carolina, the United States, have reported that electron beams can be used to sterilize juice boxes instead of hydrogen peroxide (H_2O_2). The new alternative is as effective and economical as H_2O_2. The electron beam is similar in principle to those used in television tubes. Researchers are presently testing a 55 Kiloelectronvolt (KeV) beam, which is more powerful than the electron beam in television sets. An added advantage of using electron beams is that it does not leave behind even trace amounts of harmful oxidants, unlike H_2O_2. (Chemical Weekly, 20 July 1999)

Processing fresh ginger

Researchers at the Regional Research Laboratory (RRL), Thiruvananthapuram, India, have developed a process for extracting ginger oil directly from fresh ginger. At present, ginger oil is obtained from sun-dried ginger. But, one of the drawbacks is that ginger rhizomes normally require 2-3 weeks of drying, during which time 25-30 per cent of the volatile oil is lost.

Ginger powder and ginger condensate are the by-products of the new process. While ginger powder can be utilized for oleoresin extraction, pickling, etc., the juice condensate can be effectively used for preparing ginger flavoured soft drinks. Compared with dry ginger processing, processing fresh ginger offers higher yield and premium quality. RRL is also planning to develop processes for down-stream products such as fractionation of oleoresin for high-value products. (Indian Food Packer, May-June 1999)

Food ingredients from alfalfa

Researchers at the United States Department of Agriculture have developed a new method for extracting lactic acid from alfalfa using a non-chemical process. Lactic acid is commonly used in foods as a flavouring or preservative. In this method, the alfalfa fibre is treated with hot water and hydrolytic enzymes are added along with a *Lactobacillus* bacterium that ferments five- and six-carbon sugars. Leftover fibre from the extraction process can be utilized in other high-value products such as food- and feed-grade proteins.

The cooperative research with the University of Wisconsin has also produced industrially valuable enzymes from transgenic alfalfa, products which range in value from US$1,000 to US$2,000

per acre annually. *Contact: Mr. Richard Koegal. Tel: +1 (608) 2645 149; E-mail: rkoegel@facstaff.wisc.edu.* (Agbiotech Reporter, June 1999)

Ready-to-reconstitute whey-based kinnow juice mix

Indian researchers have developed technology for manufacturing ready-to-reconstitute whey-based kinnow juice mix from vacuum concentrated cheddar cheese whey and reverse osmosis (RO) concentrated kinnow juice mix. Based on sensory evaluation, beverage containing 40 per cent kinnow juice, 53 per cent whey, 7 per cent sugar, 0.05 per cent pectin, 0.15 per cent carboxymethyl cellulose and at a pH of 4.25 was the most acceptable.

The novel ready-to-reconstitute concentrate was prepared by first concentrating whey to 45 per cent total solids (TS) in a vacuum pan, at a vacuum of 625 mmHg and a temperature of 55º-56ºC, followed by lactose crystallization. Kinnow juice was concentrated to 23 per cent TS by employing reverse osmosis. Blending of the whey concentrate and kinnow juice concentrate was achieved with the help of a processing vat at room temperature for 5 minutes with the addition of sugar and stabilizers. When mixed with three parts of water, the concentrate produced a beverage organoleptically similar to that of the ready-to-serve product. (Indian Dairyman, March 1999)

Microwave solutions for the pork industry

In Australia, the Pig Research and Development Corporation (PRDC) has funded a project to develop new methods to reformulate lower-value cuts of pork, such as shoulder. Researchers wanted to make the new products microwaveable. One of these products is the pre-seared steak. The steak is made tender by means of particle size reduction, and a starch-based binder ensures water retention during the microwave cooking process. For the microwaveable steak, pre-searing was the technique selected to provide an acceptable appearance and a char-grilled flavour on cooking.

The team has also developed a pre-cooked roast which can be eaten cold or hot by just re-heating the product in a microwave oven. They injected shoulder meat with brine, tumbled and netted it, and then roasted it at a high temperature to brown it before the joints were cooked in bags. The roasts were moist and tender even after eight weeks chiller storage at 0ºC. They had good appearance and flavour, and were microbiologically acceptable. *Contact: Ms. Aarti Tobin* or *Dean Gutzke, Australia. Tel: +61 (7) 3214 2000* (Food Facts, Autumn/Winter 1999)

Osmotic dehydration for processing fruits

Researchers at the College of Agriculture, Tamil Nadu Agricultural University, India, have designed and developed an osmotic dehydration pilot plant for processing fruits. The plant comprises an osmotic reactor, mixing chamber, pumping system and a drying unit. The plant can process up to 5 kg of fresh fruits per batch.

Fruit slices are immersed in concentrated sucrose syrup in the reactor. Osmotic syrup is prepared in the mixing chamber, which is also used for heating and mixing the osmotic syrup during the process. The pumping system circulates the osmotic syrup into the reactor to maintain uniformity of concentration. Osmosed fruit slices are then dried to a safe moisture content to facilitate storage. The plant can be used for dehydration of a variety of fruits such as banana, papaya, grape, pineapple and mango. (Food Digest, Vol. 22, No. 2, April-June 1999)

New aseptic bag-in-box filling equipment

Southcorp Packaging, Australia, has developed a new aseptic bag-in-box filling equipment. The Mini 16 Filler is the latest addition to its Intasept range. A Mini 16 Filler unit installed at a UHT facility provides the sample integrity that is required for product stability and shelf-life studies. It uses a compact version of the full-scale Intasept production technology to ensure sterility. Intasept's closed transfer and active sterilization process eliminates the risk of airborne contaminants. The filler can handle a wide range of low and high acid products. (Food and Pack, June 1999)

SAFETY/ QUALITY CONTROL

Metal detection

Cintex Ltd., the United Kingdom, is planning to launch "Autosearch 3 PC", a range of metal detectors. The company intends to incorporate PC-based control and data collection technology to mechanical inspection systems. Windows-based graphical interfaces help achieve integration of end-of-line inspection systems. Once metal contamination has been detected, an intralox conveyor automatically delivers the contaminated material into a reject container.

Insight 300 is a compact X-ray system that can detect fragments of contaminants such as stone, bone, metal and certain plastics in a wide range of applications. The system complies with food and pharmaceutical manufacturing standards. *Contact: Cintex Ltd., Trident Industrial Estate, Blackthorne Road, Conbrook Slough, Berkshire SL3 0AX, the United Kingdom. Tel: +44 (1753) 685 261; Fax: +44 (1753) 681 814; Internet: http://www.cintex.co.uk.* (Packaging India, February-March 1999)

Pasteurizing food using carbon dioxide

Researchers at Kyushu University, Japan, have developed a process to completely pasteurize liquid foods by using carbon dioxide (CO_2). The system consists of carbon dioxide and foodstuff feed pumps, a column reactor with a micro-bubbling filter having 10 μm pores, a pressure and flow rate control valve, a CO_2 purge system and a sample receptor. The bubbler facilitates in the liquid a high concentration of CO_2 which penetrates the contaminating bacilli's cells. On releasing the pressure, the expanding gas bursts the microbes' cell membranes.

When soya sauce containing heat-resistant yeast was passed through a 5.8 l reactor, complete pasteurization was achieved after 13 minutes at 35ºC. Though investment costs for the specialized plant is twice that of conventional thermal treatment processes, it can be recovered within a period of about two years. Operating costs for the new process are expected to be one-third that of conventional thermal treatment. (PTI Science Service, 1-15 April 1999)

Aseptic sampling cartridge

NovAseptic Equipment, Sweden, has introduced a new milk sampling concept that ensures hygiene and accuracy. NovaSeptum is a hand-held device that features pre-packed and radiation-sterilized sampling cartridges. Each cartridge has a thin plastic canula for drawing a milk sample out of the system stream or tank. The canula is fully enclosed in a protective plastic jacket which it has to break through when projected into a liquid for testing. Attached to the canula is a tube running to a plastic bag which fills automatically when milk is being sampled. A special clamping tool that seals the sample is provided with this system. *Contact: NovAseptic, Sweden. Tel: +46 (30) 396 075; Fax: +46 (30) 396 079.* (Indian Dairyman, July 1999)

Determination of milk solids

In India, Prof. K.L. Arora and Mr. K.K. Kalra have standardized a method for rapid estimation of milk solids in fermented milk drinks (lassi) using zeal lactometer. A homogeneous sample of lassi is diluted with distilled water in the ratio 1:2 (v/v) and the corrected lactometer reading recorded at 29ºC. Fat content of the undiluted sample is determined by the modified Gerber method using 80 per cent (v/v) sulphuric acid. The sample equation developed for the estimation of milk solids is: percentage of milk solids = 0.05 CLR+1.0 F+6.0. (Indian Dairyman, June 1999)

UV light to kill bacteria

In the United States, Prof. Lagunas-Solar of the University of California, Davis, has developed new technology wherein ultraviolet (UV) light is used to kill pathogens. A major benefit of this method is that it does not alter the nutritional value or taste of food. This property makes it an ideal technique for use in the food industry. It could be applied to destroy *E. coli* in milk, fruits, vegetables and wine. (Indian Dairyman, June 1999)

STANDARDS/ CERTIFICATION

New guidelines for fresh-cut produce

Agriculture Victoria's Institute for Horticultural Development (AVIHD), Australia, has announced new safety guidelines for the fresh-cut produce industry. The guidelines are based on research conducted by the Cooperative Research Centre (CRC) for International Food Manufacture and Packaging Science, and is similar to those developed by the International Fresh-Cut Produce Association.

These guidelines are an industry-led initiative to assist food businesses, which handle this type of products, to develop food safety plans that comply with requirements of the Australia New Zealand Food Authority's proposed food hygiene standards. *Contact: Ms. Anita Chennell, Institute for Horticultural Development, Knoxfield, Australia. Tel: +61 (3) 9210 923.* (Food Safety Hygiene, February 1999)

Latest Indian standards on food and agriculture

IS 1973:1999 – Sugarcane crushers – Specification (third revision), Gr 4.

IS 10048:1999 – Rice grader – Specification (second revision), Gr 3.

IS 14626:1999 – Method for determination of total bromide residues in grains and food commodities fumigated with methyl bromide, Gr 1.

(Standards India, Vol. 13, May 1999)

Labelling dairy products

The 1999 session of the Codex Committee on Food Labelling has approved the labelling sections of eight proposed Codex dairy product standards: for cheese (general), whey cheese, cheese in brine, butter, sweetened and condensed milk, evaporated milk, milk and cream powders, and other milk products (anhydrous milk fat, butter-oil, anhydrous butter-oil, ghee). These international dairy product standards are ready for final approval by the Codex Alimentarius Commission.

The committee also reviewed the Draft General Standard for the use of dairy terms drafted by the Codex Committee on Milk and Milk Products. The draft standard lists definitions and directions for the use of dairy terms and symbols in labelling, advertising and point-of-sale displays. A working group was established to look into labelling of foods derived from biotechnology. Another working group was created to review the Draft Standard on the use of health claims. (Indian Dairyman, July 1999)

New edible oil standard

In India, the government has notified a new order to promote development of the edible oil industry and enforce manufacturing and quality standards. The Vegetable Oil Products (Regulation) Order, 1998, covers the whole of the edible oil industry. It deletes outdated provisions of previous control orders taking into account the present scenario in the edible oil products sector. The new order exempts vanaspati manufacturers from using only ISI marked tins for packaging, but requires them to use prime and good quality tins. Now vanaspati manufacturers can save on expenses accrued for getting the Bureau of Indian Standards' certification for tin plates. The new order also removes discrimination between vanaspati and other sectors of the edible oil industry. (Indian Food Industry, Vol. 18(2), March-April 1999)

Labelling of GM foods

The Australia New Zealand Food Standards Council (ANZFSC) has recommended labelling of all genetically modified (GM) foods and food containing genetically modified ingredients. ANZFSC has asked the Australia New Zealand Food Standards Authority (ANZFA) to provide a definition of GM food that takes into account the fact that many food ingredients, both major and minor, could be made from GM organisms but are not themselves modified. *Contact: Australia New Zealand Food Standards Authority (ANZFA). Tel: +61 (26) 2712 222.* (Food Safety Hygiene, February 1999)

PRESERVATION

Oxygen-scavenging co-polyester extends shelf-life

Amoco Chemicals has developed an oxygen-scavenging co-polyester that can extend the shelf-life of fruit juices, tomato-based products, ready-to-drink tea, etc. Amosorb 3000 is transparent and compatible with polyesters. It absorbs oxygen from all sources – trapped in the head-space when the container is filled, dissolved in the food or beverage, permeating through the container sidewall and closure, and released from the plastic.

Tests performed by the company has shown that a passive EVOH barrier within a polyester-container structure fails to protect products from oxygen residing in the plastic and only slows the ingress of oxygen through the container sidewalls. Amosorb 3000 co-polyester works as one or more layers between two or more layers of polyester. This multilayer system includes a polyester barrier on the outside, the active oxygen absorber as a core layer, and a polyester food-contact layer. (Plastics News, June 1999)

Onion drying floor

In the United Kingdom Ben Burgess and Company has designed and installed an onion drying floor, based on the proven Vent-a-Floor design by Ben Burgess, with the help of Agricultural Development and Advisory Service. It is a cast-in-situ, reinforced concrete, voided drying floor system designed specifically to handle the high volume of air required for efficient high-temperature onion drying.

The floor uses underfloor ducts 460 mm wide which can be adjustable to cater for the specific air volume required by each installation. The forward kit is constructed from galvanized steel sheets and is locked into position by steel slot formers that create slots in the concrete into which ventilation measures are inserted. Smooth air flow is ensured, from the main air tunnel and into the underfloor ducts, by tapering the duct inlets. Structural strength of the air tunnel is enhanced by the legs of the tunnel frames being cast into the main floor. (Wista Rural Technology, May 1999)

Food bio-protectant

Rhodia New Zealand is marketing a new natural bio-protectant product that significantly extends the shelf-life and protects the flavour of fresh and processed foods. MicroGARD is not a preservative in the traditional sense, but an ingredient that uses naturally produced microbial metabolites to protect food from deterioration. It allows food manufacturers to benefit from fermentation-based defence mechanisms without necessarily having fermentation.

MicroGARD works together with all the other hurdles food manufacturers use to minimize the outgrowth of susceptible micro-organisms. It is also ideal for retaining or growing natural product identities. (Food Digest, Vol. 22, No. 2, April-June 1999)

New fumigant for potatoes

A new liquid fumigant developed by United Phosphorous Ltd., the United Kingdom, can increase the shelf-life of potatoes. Oorja is a sprout suppressant that forms a protective layer around potatoes before being kept in cold storage. It protects potatoes from shrinking and sprouting while in cold storage, apart from increasing the sweetness of the commodity. Another beneficial aspect is that lower power would be required for cold storage as the suppressant is effective at lower cold temperatures (10-12ºC). The dosage required to be fogged will be about 30-40 ml for each tonne of potatoes. (Food Digest, Vol. 22, No. 2, April-June 1999)

Portable irradiator

The Centre for Advanced Technology (CAT), Indore, India, has designed a portable microtron-based irradiator that can irradiate potatoes, onions and a range of other agricultural products. The microtron has an electron beam accessory, which has many applications in medicine and research studies. The prototype will be ready for commercial use in the next three years. Such a system would have a capacity to screen 3.5 tonnes/hour of onions and potatoes. (Kaigarika Varthe, May 1999)

MACHINERY/ EQUIPMENT

New slicing machine

Grote International, the United States, has developed a faster and efficient slicer/applicator. The S/A-2530E stainless steel model offers a 10 per cent stroke speed rate increase over traditional systems. It enhances productivity, reduces labour costs, and enhances product freshness by combining slicing and applying in a single, automated operation.

The combined functions eliminate the need for manual pre-slicing and hand placement usually required to keep up with automated sandwich and entree wrapping lines. Food processors have the option to bulk slice, stack, shingle or slice and apply a variety of non-frozen/boneless fish, meat, poultry, fruits and vegetables. *Contact: Ms. Terri Hoover; Tel: +1 (614) 8688 414; Fax: +1 (614) 8631 647.* Or *Grote Company, 1160 Gahanna Parkway, Blacklick, OH 43004, the United States; E-mail: thoover@grotecompany.com; Internet: http://www.grotecompany.com.* (World Poultry-Elsevier, Vol. 15, No. 5, 1999)

New saw with autodrive

Container Machinery Corporation, the United States, has released a new S.E.A.M.® saw with autodrive™ to accurately and efficiently cut double seams. This facilitates a clear image for highly reliable visual inspection and analysis with the auto S.E.A.M.®scan for Windows™ or other seam inspection systems.

The new saw is an adaptation of the company's standard unit with an air-driven solenoid. The autodrive features automatic saw carriage, thereby minimizing operator intervention and providing a uniform and cleaner cut. The operator need only place the can in the saw; closing the lid activates the carriage and the autodrive saw performs its task. The autodrive design controls the feed of the can through the carriage and into the blades. A unique aspect of this system is that it safely produces quality cuts in all types of cans up to 153 mm diameter for image reproduction and viewing. *Contact: Container Machinery Corporation, P.O. Box 780, Rt. 9H, Kinderhook, NY 12106, the United States. Tel: +1 (518) 7586 660; Fax: +1 (518) 7586 956; E-mail: CMC@SEAMscan.com; Internet: http://www.SEAMscan.com.*

Flow-meter filling

Remy of Sidel group has developed flow meter filling machines for filling sensitive products such as milk and dairy products, fruit juices, isotonic drinks, tea, etc. The equipment can fill glass, HDPE and PET bottles at the rate of 5,000 to 30,000 bottles/h. This process offers the added benefit of cleanliness and flexibility. *Contact: Av. de la Patrouille de France, Octeville-sur-mer, B.P. 204-76053, Le Havre Cedex, France. Tel: +33 (2) 3285 8687; Fax: +33 (2) 3285 8100.* (Packaging India, February-March 1999)

New filling equipment

Pcsoft Systems, Mumbai, India, is offering fully automatic form-fill-seal machines for liquid, paste, powder and granular products. The equipment can package 2-1,000 ml or 2-2,000 g of material at the rate of 20-30 packets per minute. They are suitable for low-cost consumer products such as cola, ice candy, lassi, etc. The machine operates mechanically and uses impulse heat sealing. *Contact: Pcsoft Systems, 328/73, Pant Nagar, Ghatkopar (E), Mumbai 400 075, India. Tel: +91 (22) 5135 565; Fax: +91 (22) 5140 454.* (Packaging India, February-March 1999)

Pouch sealing machine

Packaging Appliances and Systems, Chennai, India, has introduced various types of pouch sealing systems. All models of this impulse type electronic pouch sealing machine are suitable for sealing bags of polyethylene (LD, HD, HMHD, LLD), polypropylene, BOPP of various thickness and thin films of PVC (less than 0.1 mm thickness). Nearly 200-300 pouches can be sealed in an hour.

Instant Mini, Instant 250 or Instant 300 are ideal for use in applications where less than 1,000 pouches/day have to be sealed. Handy S-250

and Handy S-300 are heavy-duty hand operated models that can seal more than 1,000 pouches per day. Elegant 600, T-Top 300 or Horizo 300 are used for higher production and thicker pouches. The pneumatic sealers and rotary sealers are used for very high output or specialized packaging. *Contact: Packaging Appliances and Systems, B-15, 2nd Floor, Mugappair Industrial Estate (West), Chennai 600 058, India.* (Indian Food Industry, Vol. 18(2), March-April 1999)

New weighing equipment

Scanvaegt, Germany, will soon launch its latest automatic weighing equipment. All the weighing equipment in their range are capable of handling shock loads, display accurate weighing results and are designed to withstand the rigours of production and cleaning operations.

The Scale Computer Indicator SCI 8564 incorporates a Pentium processor and a large, colour touch screen. It is designed to withstand the often wet and harsh conditions within the food industry, as it is built with a stainless steel cabinet and watertight cable entries. The Scanbatcher 7100 allows the user to control various jobs with the help of a PC and also have immediate access to production information. It has been designed to perform various batching jobs of different products, i.e. for producing or retailing catering packs containing items with user defined accurate target weight and number of items. *Contact: Mr. Ulrich Nielsen, P.O. Pedersens Vej 18, DK 8200, Arhus N, Germany. Tel: +45 (89) 304 444; Fax: +45 (86) 785 810.* (World Poultry-Elsevier, Vol. 15, No. 5, 1999)

New oil expeller

Researchers at the Mechanical Engineering Research and Development Organization (MERDO) in Ludhiana, India, have developed a new oil expeller to extract oil from mustard seeds. The expeller can crush 42 kg/h of mustard seeds, and residual oil in mustard seed cakes is minimized. Oil thus obtained is similar in quality to oil extracted from the traditional expeller.

Moisture content in mustard seeds and the temperature at which they are crushed are critical parameters for getting pungency in oil. These conditions activate the enzyme myrosinase present in mustard seeds which convert the "glucosinolates" in the seeds into allyl iso-thiocyanate – an essential oil responsible for pungency in mustard oil. High temperatures (80-100ºC) used in conventional oil expellers evaporate the allyl iso-thiocyanate, resulting in no pungency. (PTI Science Service, 1-15 August 1999)

Hydro-pneumatic mix machine

The Melbourne hydro-pneumatic shear mixer is a liquid or pneumatic actuated device for mixing liquids and powders into liquids. Typical applications are where diatomaceous earth, flocculants, activated carbons, lime and yeast are used in the food and beverage manufacturing process. The design of this mixer facilitates the process to be carried out in a closed environment, thereby ensuring hygiene and efficient method of mixing liquids into liquids and liquids into powder. (Food Digest, Vol. 22, No. 2, April-June 1999)

Equipment for automatic filling of tins/cans

IPA Flowmatics Pvt. Ltd., Karnataka, India, is offering automatic filling machines for filling expensive liquids – edible oils, paints, lubricant oils, non-corrosive non-forming chemicals, adhesives, etc. – into tins, cans and mini barrels. The machine helps reduce wastage, improve consistency in filling and helps in maintaining cleanliness.

These machines can be custom-built for highly viscous liquids and other special filling requirements. The machines are tested for vibration, temperature, power supply variations, repeatability, linearity, etc. to ensure that the system performs in adverse conditions. Additional features include: programmable set points; password code facility for keyboard settings; fast ADC high-speed sampling technique; multi-loop checking for consistency; auto taring enable/disable by keyboard; and load cell technology for high accuracy. *Contact: IPA Flowmatics Pvt. Ltd., Nagasandra P.O, Hessarghatta Road, Bangalore 560 073, Karnataka, India.* (Indian Food Industry, Vol. 18(2), March-April 1999)

PACKAGING

Fully automatic case packer

Hot Melt and Packaging Systems, Australia, has released a range of carbon packing machines suited to regular slotted cartons, with speeds up to 20 cartons/min. The machine erects a carton from its flat format, folds and seals its bottom flaps, picks and places the product into the carton, finally folding and sealing the top of the carton. The system can pack a wide variety of products and can be installed into any carton packaging line to eliminate both labour costs and potential occupational health and safety problems. *Contact: Festo, Australia. Tel: +61 (8) 8352 1211* or *Mr. Mark Emmett. Tel: +61 (8) 8275 0500; E-mail: mark@hmps.com.au.* (Food and Pack, June 1999)

Flexibility in packaging

For flexibility and high capacity, thermoforming is being adopted by food packagers who have to cater to a variety of packaging styles. Convenience Food Systems from Tiromat PowerPak performs a wide range of functions on one machine. The system offers choice of pack type and size, packaging material, product treatment (MAP, vacuum, air, skin), labelling and printing.

A recent innovation from PowerPak overcomes the logistic problems of the outdated tray over-wrapping packaging method. By pre-forming the top film, the Tiromat operator can pack products above the level of the tray seal surface. This offers the same appearance as a standard over-wrap, but provides the advantages of MAP gas protection and the strength of thermoformed packs. (Food and Pack, June 1999)

Semi-automatic case packaging system

Recopak Machinery, Australia, is offering semi-automatic case packing systems. The stainless steel over-product packer allows product flexibility and offers several advantages over other systems. A 4 m long three-lane product infeed conveyor incorporates a multi-lane line splitter and safety guarding.

Other features of the machinery include the case-handling style which comprises a pneumatically powered side-belt case progressor system, eliminating the need for an operator to push loaded cases from the loading station to the transfer area. The discharge (flap folding) module individually transports each case via a smooth operating flight bar drive that ensures squareness and eliminates crushing of cases. *Contact: Recopak Machinery, Australia. Tel: +61 (3) 5781 0512.* (Food and Pack, June 1999)

Meat packaging

An Australian company specializing in meat packaging products, Ennio Pty. Ltd., has developed a new range of nettings and casings. New ideas and traditional European style meat casing methods have been combined by Ennio to produce packaging that achieves an attractive hand-made "old world" finish while using the latest meat packing machinery technology. Its patented Ennio netted casing provides cured meats and smallgoods a traditional hand-made appearance and yet enables mass, high-speed production on automated machinery.

Ennio netted casing can be used as a shirred stick or in single units fitted directly on to a filler. Netting and casing are filled in a single operation. The netting shrinks with the meat product during cooking or curing, eliminating unattractive sagging or wrinkling of the netting. It is available with fibrous (smoked and clear) and moisture-proof casing and comes in a wide range of sizes and varieties. It can also be used together with fillers with double-clip attachments for emulsion style meat products. The strong netting and casing enable higher pressure fillers to be applied, thereby increasing production rates. Other developments include: Ennion pre-fixed netting (expands to a pre-determined maximum size and is excellent where hams need to fit easily into slicers); Ennio spring-net (allows optimum pressure for better binding and is suitable for roasting, smoking and water cooking); and Ennio clear net (improves yields and sliceability, smoke penetration and peeling). (Food and Pack, June 1999)

RECENT PUBLICATIONS

Spice Science and Technology

This comprehensive guide on spices would be of interest to food scientists, microbiologists and biochemists. Some of the topics covered in this book include: Definition and classification of spices and herbs; spice qualities and specifications; effect of cooking on spice flavours; physiological effects of spice components; etc.

Contact: Marcel Dekker Inc., 270, Madison Avenue, New York, the United States.

Food Flavourings

This second edition reviews the natural sources of flavour ingredients, formulation, manufacture and application of food flavourings. A wide spectrum of industrial examples have been portrayed in this edition. Contents of this book include: Essential oils; Oleoresins, tinctures and extracts; Fruit juices; Synthetic ingredients of food flavourings; Beverage flavourings and their applications; Savoury flavours for snacks and crisps; Dairy flavourings; Thermal process flavours; etc.

Contact: CTI Publications Inc., 2 Oakway Road, Timonium, MD 21093-4247, the United States. Fax: +1 (410) 3082 079; E-mail: sales@ctipubs.com.

Handbook of Milk Powder Manufacture

This book presents multi-dimensional aspects of the dehydration process applied during the manufacture of dried milk products. The book is divided into twelve chapters that cover issues such as: evaporation and membrane filtration, fundamentals of spray drying, components of spray drying installation, types of spray drying installations, etc.

Contact: Niro A/S, Gladsaxevej, 305 DK 2860 Soeborg, Copenhagen, Denmark.

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