

(Hikal R&D, Bangalore), spoke on his experiences as 'Creative research in the chemical industry – Four decades in retrospect'. This lecture described the interdependence of academia and industry. On the last day of the symposium, J. Santhanalakshmi (Chennai) spoke on artifacts of modifications by surfactants on proteins and polymer.

There were 350 posters presented during the first two days of the symposium. Several young researchers and Ph D students had actively participated in the poster sessions and were seen describing their work enthusiastically to other participants. CRSI announced awards for the six best posters on the last day of the symposium. A chemical education pro-

gramme for school/college teachers, was held on the last day, during which the local college chemistry teachers were presented with best teacher awards.

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## World Congress on Clinical Nutrition\*

There were about 300 delegates representing some 18 countries in the Tenth World Congress on Clinical Nutrition. The theme of the congress was 'Nutrition in the next decade: Nutraceutical/functional food: Product performance in health, disease and safety'. The structure of the congress allowed participants to focus on finding ways to produce adequate food for the rapidly increasing world population, with discussion on various types of products such as those from plant, herb and animal origins, designer foods, pre- and probiotics, conjugated linoleic acid (CLA), etc. World-renowned authorities on these subjects outlined current knowledge on the various products during plenary sessions, followed by concurrent symposia and poster presentations of research and development in these fields. The presentations included production, evidences of performance through nutritional and clinical studies, and safety or possible side effects of these products.

The congress began with a talk by Sudarat Keyuraphan, Minister of Public Health, who dwelt on the subject of food and health. It dealt with herbal and alternative medicines, cautioning against some herbal or health food products. Plant bioflavonoids and polyphenols are being recognized as important nutritional supplements benefiting human health. In tune with this principle of phenolic acids, the first key-

note lecture was delivered by R. R. Watson (College of Public Health and School of Medicine, the University of Arizona, Tucson), who discussed the pycnogenol (French maritime pine bark extract) and plant extract biomodulators for treating hypertension and asthma. Pycnogenol is primarily composed of phenolic acids, derivatives of benzoic and cinnamic acid, and procyanidins with favourable health benefits for the cardiovascular system. Keyuraphan highlighted that pycnogenol reduces platelet activity, lowers high blood pressure, relaxes artery constriction, improved blood circulation, serum levels of low-density lipoprotein (LDL) cholesterol and increases high-density lipoprotein cholesterol. In another keynote lecture, Chanin Charoenpong (Food and Drug Administration, Ministry of Public Health, Thailand) provided an overview of the global food safety, consumer health protection, and fair global food trade practice. He outlined several viable routes for developing food safety policy in Thailand under the slogan 'Safe and Wholesome Food for All in 2004'.

The plenary lectures consisted of several presentations covering diverse areas. M. A. Belury (Ohio State University, USA) reviewed the latest data concerning the role of CLA in energy balance, obesity and metabolism during states of obesity, insulin resistance and type-2 diabetes mellitus. In foods, CLA is prevalent in ruminant dietary sources such as beef, lamb, and dairy products. M. D. W. Varavithya (Mahidol University, Thailand) discussed the role of pre- and probiotics in clinical nutrition. The common probiotic microorganisms consist mostly of strains of bifidobacteria, lactobacilli and streptococcus.

The importance of nutrition to the newborn infant with special emphasis on long-

chain polyunsaturated fatty acids and also benefits of human milk versus formula feeding was the subject discussed by A. J. Sinclair (RMIT University, Melbourne, Australia). P. Subcharoen (Ministry of Public Health, Thailand) spoke on the advancement of modern medicine in the 20th century that has led to the replacement of traditional medicine with allopathic medicine in the national healthcare system. The use of herbal medicine was found mainly in the rural areas of Thailand, where easy access to modern medicine was limited. However, during the past 15 years, the role of herbal medicine as household remedies for treatment of minor diseases and symptoms as well as in the health service system of the country has significantly increased. The reasons for such increased demand, especially for single herbal products are the 'back-to-nature' global trend and the belief of the general public that natural products are safer than chemically synthesized products. Subcharoen's discussion was aimed at understanding alternative medicines such as hydrotherapy and aromatherapy for health and wellbeing. The talk by I. A. Khan (The University of Mississippi, USA) gave an overview of recent progress in traditional medicine. About 80% of the people in developing countries rely on traditional medicine for primary healthcare. The traditional medicines are slowly being integrated into modern medicine in the form of dietary and nutritional supplements. Khan also talked about valid science-based integration, pharmacological and clinical studies that must be conducted on plants lacking such data. Adverse events, including drug-herb interaction must also be monitored in order to promote a safe integration of efficacious herbal medicine into conventional medical practices. A broad range of clinical nutrition in eight

\*A report on the Tenth World Congress on Clinical Nutrition organized by The Prince of Songkla University, International College of Nutrition and National Centre for Genetic Engineering and Biotechnology from 30 November to 3 December 2004 held at one of the almost world-renowned spas and beach resorts, in the natural and relaxed surroundings of Phuket Island, Thailand.

thrust areas was identified as the topics for this congress: legumes and pulses, herbal and botanical products, designer food, clinical and medical aspects, microbial and animal marine products, CLA, clinical and medical aspects, and future nutrition and health.

The session on contributory papers consisted of several presentations covering diverse area. Preeti Tiwari (School of Environmental Science, BSBRAU, Lucknow) gave an overview of the phenolic acids in different preparations of pea. She discussed the primary and secondary metabolites in the daily diet that play an important role in improving human health due to nutraceutical and therapeutic properties. She concluded that it is better to avoid taking water-soaked mature pea seeds because they contains higher amount of oxalic acid, which may be hazardous to human health. S. Acharya (AAFCRC, Lethbridge, Canada) brought out the impressive progress made in the area of nutraceutical value of fenugreek. He pointed out that genetic variability and genotype by environmental interaction will play a significant role when the crop is used by the nutraceutical industry in Canada, where high quality seed production is at present difficult. S. Siriamornpum (Mahasarakham University, Thailand) pointed out that the Thai jute seed oil is a potential edible polyunsaturated fatty acid source, and that the Perilla or Nga-Kee-Mon (*Perilla frutescens*) seed has long been known as a rich source of linolenic acid. P. Swatsitang (Khon Kaen University, Thailand) discussed the antioxidant capacity from large-seeded peanut lines. D. S. Singh (JNKVV, Jabalpur) described the quality of extrudates prepared from Bengal gram broken-sorghum blends using Wenger x-5 extruder. He also talked about the effect of blending ratio of soy flour with regular wheat flour on fracturability of soy-fortified biscuits.

Mandavi Singh (BHU, Varanasi) talked about phenolic-based variability in *Ziziphus mauritiana* pharmacological properties in relation to human health. U. P. Singh (BHU) gave an overview of the recent progress in herbal remedies. He focused on resurgence of interest in garlic. R. W. Gracy (UNTHSC, Texas, USA) dealt with important nutraceuticals in the prevention of a variety of age-related chronic health problems. M. Rajeswari (College of Home Science, Mumbai) provided an overview of the *Solanum nigrum* leaves and fruit extracts that possess antigastric and anti-ulcer activities, and combined effect of

gastric cytoprotection, vitamins, minerals and tannins. K. P. Singh (G.B. Pant University of Agriculture and Technology, Pantnagar) brought out the impressive progress made in the area of phenolic acids in different parts of jackfruit and its importance in human health. J. Zhu (Zhejiang University, China) described the determination of volatile compounds of wild *Patrinia villosa* and their effect on constipation in mice. P. Nandhasri (Thammasat University, Thailand) reviewed the nutraceutical and functional food of Thai 'Yor', *Morinda citrifolia*, 'Noni' juice extract. The Thai 'Yor' juice extract is free from microorganisms and can be safely consumed in the recommended amount of 30 ml/day. P. Chairasart (Naresuan University, Thailand) in his talk highlighted the importance of jasmine rice fortified with up to 10% of anti-cancer herbs; the antioxidant activity of original herbs could be retained partly in the product. C. Hansawasdi (NRENU, Thailand) mentioned that Thai herbs showed the ability to lower blood glucose in animals and humans, and discussed development of potent antidiabetic drugs and health products. N. V. Velikaja (University of Medicine, Ukraine) highlighted that the green tea polyphenols are photoprotective and can be used as pharmacological agents for prevention of solar UV light-induced skin disorders associated with immune suppression and DNA damage. A. K. De (Kolkata University), while emphasizing the spices in health and diseases, stated that the spices which showed antimicrobial properties are cumin, cinnamon, black cumin, clove, onion, ajwain, chilli, garlic, celery, basil, tejpat, nutmeg, small cardamom, caraway, turmeric, black pepper, horse radish, cambodge, mustard, and star anise. He also suggested that most of the spices have methoxy phenol moieties that can act as antioxidants by scavenging free radicals and protect the membrane lipids from damages. L. K. Singh (AAI, Allahabad) referred to the Indian gooseberry (*Phyllanthus emblica*) as a good source of phenolic acids; if incorporated in daily diet, it will improve human health and reduce risk of various chronic diseases. He also pointed out that the presence of vitamin C increases the nutritional balance and digestibility, which may reduce the risk of skin diseases.

T. K. Basu (University of Alberta, Canada), emphasizing the need for functional food industry in the new millennium, stated that functional foods provide business

opportunities for the food industry, new research for academia, possible medical care cost reduction for the government, and food for specialized consumer health uses. J. Sim (University of Alberta, Canada) spoke about NutraGuard™ for celiacs designed in such a way that it not only provides optimal level of essential nutrients along with other life-supporting egg components, but also provides the prophylactic and therapeutic antibodies to the celiac population. L. R. Juneja (Taiyo Kagaku Co, Japan) focused on science and technology-based marketing strategy of egg proteins, antigen-specific yolk immunoglobulins, egg shell and egg-shell membranes. Y. Mine (University of Guelph, Canada) discussed protective and sustained release of egg-yolk antibody for passive immunotherapy. W. Wangcharoen (Maejo University, Chiang Mai) described experimental design for flavouring puffed snacks with selected Thai herbs.

Under 'Products from microbial and animal origins' S. V. Rana (PIMER, Chandigarh) referred to the non-digestive food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon that can improve the host health. N. P. Shah (Victoria University, Australia), through his two talks, illustrated the probiotics for health benefits and bioavailability of isoflavones. His presentation included the bifidobacteria that can chemically change daidzein to equol, which is more estrogenically potent than its precursor. The role of probiotics in cytotoxicity and apoptosis was shown by the work of K. W. Sylvia (DAFNS, Canada). A. Swetwathana (KMUTL, Bangkok) described the bacteriocin-producing lactic acid bacteria isolated from Thai fermented meat in acidic broth and the presence of bile salts for probiotic prospect. R. G. Herrera (University of Veracruz, Mexico) shared his experiences on isolation and characterization of the B-casein-like fraction in milk and baby formulas. While delivering an endowment lecture, B. Maikhunthod (Suranaree University, Thailand) presented the extraction and antioxidant efficacy of carnosine extract from broiler meat. He pointed out that the chicken meat could be a good alternative source of carnosine for use in food products.

Sukhinder K. Cheema (Memorial University, Canada) and F. Esfarjani (NNFTRI, Iran) explained the use of fish oil as a potential therapy for individuals with cardiovas-

cular disease. Fish oil reduces plasma triglyceride levels. She mentioned polymorphisms in the *apoE* gene that may be partly responsible for fish oil-induced hyperlipidemia in FIB hamster. Alice Thienprasert (University of Songkla) highlighted the importance of omega-3 fatty acids supplementation that may reduce latencies between the onset of stimulus and response, which means that the stimulus processing or the discrimination among stimuli in omega-3 fatty acids supplemented group is faster than in control group. A. Plubrukarn (The Prince of Songkla University, Thailand) spoke on the topic of bioactive sesterterpenes from Thai sponge *Brachiaster* sp., which showed potent anti-tubercular and cytotoxic activities. N. Vatanasuchart (Kasetsart University, Bangkok) spoke on nutritional quality improvement of snacks fortified with protein-concentrated fish flour. The profile of fatty acids showed an improved ratio of polyunsaturated to saturated fatty acids and higher linoleic and linolenic acids in the fortified samples.

The session on conjugated linoleic acid dealt with various aspects of human health by C. J. Field and H. Loeppky (University of Alberta, Canada), M. A. Belury (Columbus, USA), S. Banni (DBS, Cittadella Universitaria, Italy), P. Pakdeechanuan (SFT, Suranaree University of Technology, Thailand). Emphasis was laid on CLA ss, a potent anticarcinogen that has been shown to have antiatherogenic and antidiabetic effects as well as to enhance immune function and reduce body fat in animal models. M. O. Shea (University of Texas Health Science Center at San Antonio, USA) dealt with a mixed-isomer CLA supplementation that had a favourable effect on serum insulin and FFA response to oral glucose in non-obese, regularly exercising women.

Atherosclerosis is the major underlying cause of heart disease with oxidative

modification of LDL, an important event contributing to atherogenesis. R. P. Singh (HHRI, Moradabad) presented scientific evidence on the role of CoQ in the treatment of cardiovascular disease, which indicates that treatment with CoQ may be cardioprotective. K. P. Singh (University of Allahabad) stated that the electromagnetic field-exposed water induces significant anxiogenic and depressive behaviour pattern probably by free-radical production, which can be controlled with the application of coenzyme Q10. Deepti Gupta (Allahabad University) explained the role of coenzyme Q10 and fish oil that may be beneficial in the prevention of progressive neuronal degeneration and improvement of behavioural dysfunctions in aging rats. Basu highlighted that cold-FX reduces total colds by 26%, recurrent colds by 56%, symptom score by 31% and duration of cold by 45%. Cold-FX can thus be an effective natural product for the prevention of common cold. D. Li (Zhejiang University, China) gave an overview of the increased serum uric acid concentration that was associated with a cluster of cardiovascular risk factors in Hangzhou populations. The talk by U. F. Yusuf (University Putra Malaysia) dealt with the inhibition of human malignant cell growth by crude water extract of cassava and that commercial linamarin could be a favoured future treatment for a variety of cancers. Z. Gaoli (IMM, China) discussed the role of puerarin that might have a clinically useful value as an alternative to estrogen in ERT for treatment of post-menopausal osteoporosis, with a lower risk of cancer in the reproductive system. S. Bhamarapratil (Department of Industrial Microbiology, Bangkok) highlighted the concept of *Helicobacter pylori*, a Gram-negative bacterium, recognized as the primary etiological agent for development of gastritis, dyspepsia, peptic ulcer as well as gastric and colon cancer. P. S. Mir (University of Alberta, Canada) brought

out the impressive progress made in the area of short duration feed withdrawal on adipogenesis in beef cattle, which can be a successful vehicle for transfer of bio-active lipids of ruminant origin to the consumer. M. Maddah (Rasht, Iran) reviewed the sex difference in the prevalence of obesity, especially central obesity based on studies of Iranian men and women with coronary artery disease. This disease appears in Iranian women much earlier than their counterparts in developed countries. M. Goyal (Rajasthan Agricultural University, Bikaner), in her talk, presented a nutrition profile of NDDM patients residing in an arid region of Rajasthan. She indicated the need for nutritional education regarding strict adherence to modified diet along with other modes of treatment.

The congress concluded with a discussion on 'Nutrition in the next decade: Nutraceutical-functional food: Product performance in health, disease and safety'. This gave the participants a new dimension and insight into the challenges of the nutraceutical and functional food issues in the next decade. Nutraceutical and functional food products are increasingly becoming health products of choice in the next decade. The congress president, while summing up the deliberations, hoped that the awareness generated through this initial discussion would lead to more focused meetings and implementation of emerging ideas.

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