

Report

Fourth International Conference on
Fermented Foods, Health Status and Social Well-being
December 11-12, 2009, Anand Agricultural University, Anand (Gujarat), India

A Report by

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Swedish South Asian Network on Fermented Foods (SASNET-FF) in association with Anand Agricultural University, Anand, National Dairy Development Board, India and Lund University, Sweden organized the Fourth International Conference on Fermented Foods, Health Status and Social Well-being at Anand Agricultural University campus during 11-12 December 2009. In this two days biennial event of the network, 247 delegates participated mainly from India as well as from Sweden, Philippines, Indonesia, Australia and Sri Lanka. Besides inaugural and concluding sessions, the event was conducted in six technical sessions, one panel discussion and an industry forum covering a wide range of themes such as Probiotics and Synbiotics, Clinical Aspects of Fermented Foods, Bioactive Peptides, Safety Issues Associated with Fermented Foods and Regulatory, Ethical, Safety and Marketing Aspects of Fermented Foods.

The conference was formally inaugurated by Shri Dileep Sanghani, Minister of Agriculture and Cooperation, Govt. of Gujarat. The inaugural function began with a welcome speech by Dr BP Shah, Dean, Faculty of Dairy Science while Dr AR Pathak, Director of Research and Dean of PG Studies gave a floral welcome to all dignitaries. Dr. Baboo M Nair, Professor Emeritus, Lund University and Chairman, SASNET-FF, extended warm welcome to guests and delegates. He focused on the genesis of SASNET-FF and the need for research and development in fermented foods for value addition in agro food processing sector giving higher income to the producers.

In his inaugural speech, Shri Dileep Sanghani indicated about the improved status of GDP in the country and emphasized on the need to increase and improve value addition to the agricultural raw materials produced by the farmers which can give them better returns. Development of functional fermented foods has tremendous scope and very bright export market too. He also indicated about the need for research and higher education in food technology and the role of Anand Agricultural University with a niche centre of excellence for development of probiotic food and a plan to start an international master's programme in Food Science and Biotechnology.

Dr. N.V. Belavadi, Senior General Manager of National Dairy Development Board (NDDB), after describing the milk production scenario in last three decades, narrated the importance of National Dairy Plan undertaken by NDDB to increase the milk production in India to a minimum of 180 MT by the year 2020-21. He also talked about the diversity of fermented milk products available in India and the need to locally manufacturing DVS cultures as a means of cost reduction. He pointed out that indigenous fermented milk products, being part of the daily diet of most Indians, were suitable vehicles for delivering probiotics. He opined that in the Indian context, probiotic-derived health benefits should be validated on Indian population.

Dr. AK Srivastava, Director and Vice Chancellor of National Dairy Research Institute, Karnal gave an insight on the current status of India with respect to agriculture, animal husbandry and food production. He emphasized on the need for developing a policy for proper utilization and value addition to milk and other agriculture produce. He stressed that fermented foods with probiotics have immense potential in Indian market and iterated that the process of fermentation was a very good means to increase the shelf life and bioavailability of nutrients.

Prof. MC Varshneya, Vice Chancellor of Anand Agricultural University, in his presidential address emphasized on the role of fermented foods since inception of civilization and the commercial potential of such foods in present times. He appreciated the efforts of the network in creating a platform for scientists to discuss innovations in development of viable fermented foods. On this occasion, the soft and hard copies of the souvenir was also released. the inaugural function concluded with a vote of thanks presented by Dr. JB Prajapati, Coordinator SASNET-FF.

The summary of technical sessions is given below:

Session-I Probiotics & Synbiotics

This session was chaired by Dr. JM Dave and reported by Dr. CD Khedkar. Dr. RK Shah, the first speaker of this session, presented a part of his work conducted under the Niche Area of Excellence Project of ICAR on synbiotics. Dr. Shah presented the results on plain synbiotic dahi with non-nutritive and nutritive sweeteners as well as the results on development of several functional dairy products with inulin as prebiotic. The second speaker in the session was Dr. Kaushik Khamuri from NDDB. He discussed the results of his work on storage related changes in probiotic milk drink packed in HDPE bottles. He concluded that the products developed had satisfactorily high counts of probiotic organisms and were organoleptically acceptable upto 25 days when stored at 5°C.

Session-II Clinical Aspects of Fermented Foods-I

This session was chaired by Prof. Olle Holst and Dr. A. Jana was the rapporteur. Dr. Damitha R. from Industrial Technology Institute, Colombo made a presentation on

'Fermentation as a tool to enhance bioavailability of nutrients from rice based foods'. Considering rice as a staple diet in Sri Lanka, she outlined the use of traditional and recent variants of rice based fermented foods like *Hoggers*, *Thosai*, *Idli* and *Diyabath*. She suggested that fermentation can be used as an effective tool to improve bioavailability of nutrients in cereals. Dr. Ingrid Surono, SEAMEO-TROPMED RCCN, University of Indonesia, highlighted the probiotic function of Indonesian strains from a traditional fermented milk of West Sumatra, *dadih* of. The results of randomized placebo study with a probiotic strain of *E. fecium* IS-27526 indicated that while the serum IgA decreased significantly, the body weight of subjects and faecal LAB increased significantly. She also tested the suitability of biscuit with fish protein concentrate and probiotic cream as a carrier of probiotics.

Session-III Bioactive Peptides

The session chaired by Dr. PA Shankar and Dr. Vijendra Mishra as rapporteur had four speakers. Dr. NP Shah from Victoria University, Australia, presented a talk on the liberation of bioactive peptides in fermented foods. He started with an introduction to the concept of probiotics including organisms used and products commercially available world over and went on to elaborate the concept of bioactive peptides and their role in health management via inhibition of Angiotensin-I Converting Enzyme (ACE). He discussed the results of some experiments conducted on release of bioactive peptides in cheese and yogurt from three potential peptides were identified. Dr. G. Vijayalaxmi from CFTRI Mysore discussed the production of bioactive molecules through fermentation by *Monascus purpureus*, a filamentous fungus. Experimental details of preparation of red mold rice and extraction of statins, and identification of new monocolins were presented. Dr. Lata Ramchandran, Victoria University, Australia in her presentation on antihypertensive effect of low fat yogurt, reported *in vitro* antihypertensive activity of three types of low fat yogurt prepared from skimmed milk. She reported good antihypertensive as well as hypocholesterolemic activity of the products in feeding trials conducted with SHR. Mr. Gerard Bryan from Department of Science and Technology, Philippines reported the ACE-I inhibitory activity of a milk hydrolysate prepared by fermentation with lactic acid bacteria. During his study a method was developed to obtain ACE-I from local source. He reported that fermentation increased inhibitory activity of milk by 63% after 48 h and IC₅₀ was found to be 0.88 mg/ml.

Session IV Nutritional and Microencapsulation Aspects

Prof. Olle Holst chaired and Ms. Sreeja V worked as rapporteur of this session having four speakers. Dr. K Narsaiah from Central Institute of Post Harvest Engineering and Technology, Ludhiana presented the results of encapsulator developed by him for production of alginate microcapsules for microencapsulation of probiotic organisms And suggested that this could be a promising alternative to deliver probiotic organisms and ingredients. Dr. Latha Sabikhi from National Dairy

Research Institute, Karnal presented her work on co-encapsulation of *Lactobacillus acidophilus* LA1 with prebiotics and its survival. The results established the technological feasibility of co-microencapsulating *L. acidophilus* LA1 with alginates and prebiotics. Dr. Bhushan Chaudhary, National Centre for Cell Science, Pune, discussed the innovative use of *Lactobacillus* sp. CD6 for folate production. The strain was found to produce 5-methyl tetrahydrofolate derivatives of folic acid which may serve as a nutraceutical in commercial food and fermented dairy preparations. Dr. Madhumita Barooah from Assam Agricultural University presented the probiotic potential of lactic acid bacteria isolated from *Khorisa*, a traditional fermented bamboo shoot product produced by Assamese people. The isolate showed promising probiotic properties.

Session V Clinical Aspects of Fermented Foods-II

The session was chaired by Dr. Ashoka Vaidya, Director of Kasturba Health Society, Mumbai and Dr. Lata Ramchandran was the Rapporteur. There were four speakers in the session. Dr Ravindra Kumar from Danisco Ltd. gave a presentation on "Probiotic cheese increases the lactobacilli levels in an intestinal simulation model". He discussed about the incorporation of lactobacilli as probiotics in cheese and presented his work regarding lactobacilli in Gouda cheese containing their trademark strains HOWRU *rhamnosus* and *L. acidophilus* NCFM. He indicated that the probiotic cheese microbes survived the passage through the simulated human gastro-intestinal tract; and that the HOWRU cheeses significantly increased the levels of probiotic lactobacilli in the simulated large intestine. Prof. Olle Holst from Lund University, after a brief introduction of Lund University, emphasized on requirement of development of oat based milks in Sweden and discussed the ongoing project that had the long term goal of developing a yogurt like product from oat milk using EPS producing strains of LAB such as *Pediococcus parvulus* and also documenting their physiological effects. He concluded that fermented oat-based product with bifidogenic and antimicrobial properties and acceptable sensory characteristics could be produced. The presentation by Dr. K N Agarwal, a paediatrician and a scientist at Indian National Science Academy focused on his research on Indian dahi as an immunonutrient. He tested the use of berseem leaf concentrate *vs* dahi for controlling diarrhea in protein-energy malnutrition children. His findings showed that immune recovery in malnourished children could be hastened using dahi. Mr. P. Bandhyopadhyay, the Technical Head from Chr. Hansen gave a talk on the health claim validation of probiotics for use in fermented foods through clinical documentation in light of FAO/WHO guidelines. He spoke about the validated strains of Chr. Hansen and raised issues of concern regarding the new EU regulation that is in the process of completion and likely to be in force by 2010-11.

Session-VI Fermented Foods and Safety Issues

Dr. H.K. Desai, Managing Director of Vidya Dairy was the chairman of this session and Dr. R.V. Prasad acted as Rapporteur. Dr. Mir Salahuddin from Sher-E-Kashmir University of Technology, Srinagar, presented various studies related to probiotics in meat products which included strain isolation, their performance in fermented sausages, pathogen control, human studies as well as safety and regulatory considerations. The second presentation was on safety of fermented foods by Dr. Pratima Khandelwal from Brindavan College, Bangalore. She presented details on various safety issues in food supply chain which includes non-microbiological and microbiological food borne hazards, their possible contamination points and the current food safety challenges and role of GMP, GHP, HACCP and relevant regulatory issues. Dr. Rekha Singhal from Institute of Chemical Technology, Mumbai, talked on prebiotics from plant sources. She highlighted the common digestive disorders and the role of large intestine, prebiotic health claims and the properties of non digestive oligosaccharides, the sources of prebiotics, and the opportunities to explore new prebiotics such as germinated barley and other novel prebiotics of plant origin.

After a busy day with six technical sessions, the evening concluded with an excellent cultural programme representing traditional and modern culture of the country, presented by the students of Dairy Science College, AAU.

Panel Discussion

On the second day of the conference, a panel discussion on 'Regulatory, Ethical, Safety and Marketing Aspects of Fermented Foods' was chaired by Dr. NP Shah while Ms. Suja Senan acted as the Rapporteur. Dr Barna Ganguly from Karamsad Medical College was one of the lead speakers who started discussion on ICMR and other guidelines for conducting clinical trials on probiotic foods. She elaborated the challenges in conducting such trials as there is lack of harmonization about product standards and defined regulatory requirements and necessary legal guidelines regarding use of probiotics, particularly in India. The second speaker, Dr GS Prasad from Microbial Type Culture Collection (MTCC), Chandigarh presented the current regulations regarding patenting of microorganisms including the probiotic strains. He informed that MTCC being member of World Federation of Culture Collections, is depository where scientists can deposit their new inventions. Besides the two speakers, the session had Dr. HK Desai, Dr. Baboo M Nair, Dr. JM Dave and Dr. KN Agrawal as the discussants.

Industry Forum

This session was intended for experts from industry to share their experiences with fermented foods. The session was chaired by Shri PR Patel, CEO Dudhsagar Dairy and Dr. PN Thakar former Professor of Dairy Business Management was the rapporteur. Mr. KT Thomas, Sr. GM of Malabar Regional Cooperative Milk

Producers Union Ltd., Kozhikode, mentioned the hurdles faced by the industry in new product development. Mr. Samit Datta, NDDB, Anand, dealt with present status, perception and future perspectives of fermented foods. Ms. Richa Sharma, Chr. Hansen, India, shared the experiences of her company in marketing of probiotics. She informed that by 2014, the world probiotic market is expected to be \$32.6 billion and will be consumer driven. Mr. Ashish Acharya representing GC Hahn, UK in his talk emphasized on stabilization of fermented milks and role of ingredients and technology in developing special quality attributes. Dr. Sunil Patel from Anand Agricultural University presented the genesis of Business Planning and Development cell at AAU, Anand, under NAIP project of ICAR for effective marketing of technologies and products developed by universities. Overall the session generated a lot of interactions and the experience sharing by the industry gave useful input for R & D institutions.

Poster Session and other events

There were poster sessions on both the days of the conference and 20 posters of original research were presented related to fermented foods and probiotics. A talent search program was also organized where the students of AAU participated in slogan writing, poster making and developing advertisements for promotion of fermented foods for public health.

Concluding session

The concluding session was marked with presentations of reports of each session by respective session rapporteurs. The session was chaired by Dr. Baboo M Nair and co-chaired by Dr. JB Prajapati, while Dr Rekha Singhal acted as rapporteur. The winners of best poster and other events were awarded certificates and cash prizes. This was followed by a discussion to formulate the recommendations of the conference.

Recommendations

1. The society at large in India understands the importance of consumption of fermented foods. However, there is a need to create awareness about the scientific developments in this field, especially about probiotics among the masses through workshops and training programs.
2. Indian fermented foods have a tremendous potential for export. However, there is a need to do R & D work to standardize their production and packaging and enhance their shelf-life. The Indian food industry needs to invest more on R & D and prepare value added products for export.
3. A peer review team may be formulated to help the industry or entrepreneurs who are interested to develop and market probiotic foods, which can guide them

and help in finding collaborative partners to take-up clinical trials and help in validation of the products.

4. While the group kept in mind the draft ICMR guidelines for probiotics, it recommends allowing health claims of generic nature too on traditional products.
5. In view of large scale use of probiotics in various foods as adjuncts, additives, health enhancers, the conference strongly recommended inclusion of food scientists/technologists in the committee to ensure that the food related issues are adequately addressed when guidelines for probiotics are finalized and implemented.
6. It was proposed to harmonize the guidelines for probiotics and health claims for all Asian countries.
7. India should encash on its rich biodiversity of microorganism and strengthen research on indigenous probiotic microorganisms.
8. Under Business Planning and Development unit of AAU and SASNET-Fermented Foods, a model company can be formed comprising of farmers, researchers and venture capitalists to produce value added Indian fermented foods for export.
9. While lot of work is going on with milk based fermented foods and probiotics, there is need to pay attention to other fermented foods such as those prepared from meat, fish, fruits, vegetables, cereals, legumes, etc.
10. There is an urgent demand from Indian food industry to develop and make available indigenous dairy cultures and probiotic cultures in DVS form.
