Training Program for Sweet Makers and Street Food Vendors

The training program for sweet makers and street food vendors was jointly organized by the Department of Animal Husbandry and Dairying and the Centre of Food Science and Technology, Institute of Agricultural Sciences (IAS), Banaras Hindu University (BHU). In this training program, sweet makers from Varanasi and neighboring areas participated and obtained valuable information on food laws in India and good food manufacturing practices across the world. Here is a day-wise summary of the program that took place over a period of three days (January 18–20, 2012).

Day 1: January 18, 2012

Inaugural Session

Dr. D. C. Rai, Professor, Department of Animal Husbandry and Dairying, BHU

Dr. D.C. Rai, Professor and Convener of the function, welcomed all the participants and resource persons. He highlighted the significance of traditional dairy products in the Indian context and stressed on the need to educate sweet makers on the international standards of food processing. He underlined the prospective market of Indian traditional sweets in the international arena and added that there is a need to standardize the various processes involved in sweet making and packaging for promoting export. Dr. Rai gave an overview of the history and different aspects of traditional dairy products in India. He also outlined the objectives of the training program.

Types of Traditional Dairy Products in India and their Marketing Potential

Dr. Alok Jha, Professor & Head, Department of Animal Husbandry and Dairying, IAS, BHU

Dr. Jha provided a brief overview of the Indian dairy industry and the significance of traditional dairy products. He added that since these products enjoy mass appeal, adopt simple manufacturing techniques, incur a relatively low production cost, a low infrastructural cost, low operational overheads and permit value addition with a projected 20% annual growth rate in demand-consumption, there’s a reasonable prospect of their selling well in the international markets. However, the lack of scientifically documented sensory, physio-chemical and microbiological profile analysis limited process standardization for large scale manufacturing. Dr. Jha also added that absence of accepted legal standards, quality assurance systems, manufacturers’ lack of knowledge of GMP (good manufacturing practices), regional specificity of traditional dairy foods, lack of production statistics and lack of packaging equipment and systems acted as major deterrents to internationalization.

He added that after Chinese food, Italian pizza, Mexican food, now Indian food in general and Indian sweets in particular are gaining momentum in the international markets. The North American market, one of the largest consumers of Indian sweets has the potential of gaining a market size of USD 700 million, where about 20 million Indians are a part of the higher income group. Entrepreneurs in Europe, North America, Australia and New Zealand are very enthusiastic in marketing these products and producing suitable equipment required during the manufacturing process. In his lecture he gave several process diagrams for
preparing some important traditional dairy sweets and also provided the audience with a sensory profile of selected Indian dairy products.

**Hazard Analysis and Critical Control Points (HACCP) as Applied on Traditional Dairy Products of India**

Dr. G. S. Rajorhia, Food Safety Consultant and Former Principal Scientist, National Dairy Research Institute, Karnal

Dr. Rajorhia introduced the local traditional sweet makers and street food vendors to the various aspects of HACCP that are used in traditional dairy products in India. He explained 12 steps in sequence relating to HACCP (codex guidelines) and briefed on the physical, chemical, biological and quality hazards in traditional dairy products. Dr. Rajorhia also mentioned the general principles of food hygiene and good manufacturing practices. He concluded his presentation with a quick overview of the benefits of HACCP in food safety systems.

**Chemical Quality Consideration in Milk for Sweet Making**

Dr. Rajan Sharma, Senior Scientist, Dairy Chemistry Division, National Dairy Research Institute, Karnal

Dr. Sharma gave a brief introduction on the chemistry of milk and dairy products and their significance in our daily life. He discussed at great length the chemical parameters to assess the quality of raw milk and outlined the effect of storage temperature on bacterial growth in milk. He also presented various methods to detect acidity in milk and milk cream. He described the Clot-On-Boiling (COB) test to detect the quality of milk, Alcohol Test for judging stability of milk while processing, Alizarin-Alcohol test for detecting percentage of acidity in milk, Methyl Blue Reduction (MBR) test to indirectly estimate the percentage of bacteria in milk. He also described in detail the methods for fat estimation and protein estimation in milk. Dr. Sharma emphasized the need of a testing laboratory adjacent to any large scale milk storage and processing plant which should be equipped with electronic milko-tester, fat- and SNF-measuring facility, total solid apparatus, adulteration detection kit, platform test equipment, pH-meter and butyro-refractometer.

**Day 2: January 19, 2012**

**Basic Principles of Food Preservation**

Dr. S. S. H. Rizvi, International Professor, Department of Food Sciences, Cornell University, USA

Dr. Rizvi acquainted the audience with various food preservation practices and the basic principles that are involved. Stressing on the importance of increasing farm income using preserved food items and enhancing the overall livelihood of the farmers, he suggested utilizing periods of heavy yields in the case of certain fruits and vegetables through processing or value addition and generating comparatively more income by selling the products in off season. He focused on the durability of the edible products and ways to improve their quality. He focused on manufacturing and packaging practices of food products and gave a brief introduction to extrusion technique.
Preventing Chemical Contaminants in Traditional Milk Sweets

Dr. Rajan Sharma, Senior Scientist, Dairy Chemistry Division, National Dairy Research Institute, Karnal

Dr. Sharma delivered an informative lecture on the various practices to be followed to prevent chemical contamination of traditional milk sweets. He mentioned six major types of chemical contaminants in milk viz. adulterants, antibiotic residues, pesticide residues, heavy metal residues, mycotoxins and food additives (colors). He also gave tips on ways to prevent chemical contamination of milk through clean milk production, proper handling of raw milk, use of safe ingredients in milk products, ensuring compliance to HACCP and proper inspection. He emphasized on the use of clean raw materials for preparing traditional sweets which mainly include sweeteners [gur (palm sugar), khandsari (raw sugar), sugar, bura (finely ground sugar)]; grains [rice, maida (finely ground wheat flour), suji (semolina)]; nuts and seeds [(badam (almond), kaaju (cashew), pista (pistachio), copra (dried coconut meat used to extract oil), khaskhas (poppy seeds), akhrot (walnut), kishmish (raisin/current)]; flavoring and coloring agents [gulabjal (rose water), choti elaichi (cardamom), kesar (saffron crocus), cocoa]. He emphasized that sweet makers should pay more attention towards the quality of water they use while preparing sweets. Dr. Sharma also informed that dairy animals are sometimes made to consume rations contaminated with aflatoxins and their feed, at times, are contaminated with substances that lower the quality of milk. He also added that while antibiotic residues in milk are being found these days, to stop the harmful inflow of such harmful toxins therapeutic, prophylactic and growth promotion practices for milch animals are being followed. By following proper withdrawal period of 3–4 days, these practices would lead to the reduction of the percentage of such chemicals in the body of the animals. Dr. Sharma explicated the flow of pesticides in the environment and in the food chain. He also explained the control measures that are necessary to reduce pesticides from entering into our food chain. He provided a list of heavy metals and their hazards on health, synthetic permitted coloring agents and non-permitted colors. Towards the end of the presentation he provided a brief list of preservatives or additives used for preserving traditional milk products.

Development of Low Calorie Traditional Indian Sweets

Dr. Rakhi Singh, Assistant Professor, Center of Food Science and Technology, BHU

Dr. Singh emphasized the important role played by authentic Indian sweets in a typical Indian household and gave a quick overview of increased awareness among the consumers on the low calorie traditional Indian sweets. Stressing on the importance of a healthy and nutritious diet, she pointed out sugar and fat as two important factors for increased calories in traditional sweets. She acquainted the audience with the low fat products, fat replacers and sugar replacers available in the market. Dr. Singh also provided various ways to develop low calorie traditional Indian sweets by using commercial artificial sweeteners and fat replacers.

Developing Business Modules for Promoting Traditional Milk Sweets

Dr. S. S. H. Rizvi, International Professor, Department of Food Sciences, Cornell University, USA

Dr. Rizvi provided the audience with a list of various business modules for promoting traditional milk sweets of India in the international market. He presented the audience with several major business strategies for
starting a large-scale manufacturing unit and provided several ideas to generate employment. Throwing light on both strategy and technology required to start a business he said that while choosing a new business model, market intelligence and demand and consumer acceptability of a product should be kept in mind. Dr. Rizvi briefed the audience on good manufacturing practices for improving product quality. He stressed on the need to develop more nutritive and appealing food products, especially traditional Indian milk products, to harness the potential of traditional Indian sweets in the international market.

**Standard Operating Procedure for Khoa-based burfi (Pilot Plant Exercise)**

Dr. Anil Chauhan, Professor, Center of Food Science and Technology, BHU

The participants were provided with an experience of making khoa (dried whole milk)-based burfi, a traditional Indian dairy product, using standard practices developed at CFST, BHU. Dr. Chauhan also emphasized on improving the protocol to increase the quality of traditional Indian dairy products. He stressed on maintaining clean and hygienic environment in the manufacturing units and threw some light on good manufacturing practices.

**Day 3: January 20, 2012**

**Business Consideration for Developing and Promoting Traditional and Novel Products**

Dr. S. S. H. Rizvi, International Professor, Department of Food Sciences, Cornell University, USA

Dr. Rizvi, briefed the audience on the emerging patterns of food consumption, future trends and consequences. Citing the example of fruits and vegetables, he emphasized on current retail markups in value chain. He listed a number of factors responsible for the transfer of farm products to market. He emphasized on market intelligence, quantity and quality of food items, state-of-the-art technologies, harmonized standards and regulations, infrastructure, trained manpower, science and emerging technology centers and incubators and capital for developing and promoting traditional and novel products. He said that ensuring both quantity and quality at the same time is the weakest link in this chain and this could be ensured through efficient co-operatives, contract farming, manufacturers, small and medium enterprises, etc. He discussed extrusion technology and explained how high pressure processing (cold pasteurization) is better that heat processing in terms of the quality of produce. Dr. Rizvi mentioned six important steps followed during new product development viz. idea generation, market intelligence, competition analysis, product formulation, product testing methods, process development and commercialization.

**Methods for Detection of Adulteration in Milk and Traditional Dairy Products (Laboratory Exercise)**

Dr. Rajan Sharma and Dr. Amrita Poonia, Center of Food Science and Technology, BHU

Dr. Sharma and Dr. Poonia illustrated a number of ways to detect adulteration in milk using urea, detergent, starch, formaldehyde, cane sugar, sodium chloride etc. to the trainees. They demonstrated the different
ways in which one could use the mini kit available at various companies as well as NDRI for detecting milk adulterants. Participants were given firsthand experience to use the mini kit to detect adulteration in milk.

**Food Safety Regulations for Traditional Dairy Products to Promote Exports**

**Dr. G. S. Rajorhia, Food Safety Consultant and Former Principal Scientist, National Dairy Research Institute, Karnal**

Dr. Rajorhia gave a very informative lecture on food safety regulations. Presenting the Food Safety Standards act (FSS) 2006, he informed the audience that Food Safety and Standards Authority of India (FSSAI) was constituted for enforcing this act which started on August 5, 2011. Dr. Rajorhia acquainted the audience with the salient features of the FSS act, scope of the act and the new provisions under the act. He mentioned that animal feed, live animals, produce at farm level, plants prior to harvesting, drugs, medicinal products, cosmetics, narcotics or psychotropic substances are excluded from the act. He briefed them on the location and layout of food establishment, quality of equipment and containers, facilities, food operations and control, management and supervision, food testing facilities, audit documentation and record maintenance, sanitation and maintenance of establishment premises, personal hygiene, product information and consumer awareness trainings. Dr. Rajorhia informed the audience about the additional requirement for milk manufacturing/chilling/storage facilities for catering/food service establishments and briefed them on the regulations that control the process of registration of sweet makers and street food vendors. Giving an overview of the liabilities of the manufacturer, he made a list of the penalties for offences like adulteration and manufacturing unsafe food.

**Processing, Value Addition and Health Benefits of Soybean**

**Dr. D. S. Singh, Professor, Department of Farm Engineering, Institute of Agricultural Sciences, BHU**

Dr. Singh presented the multifarious use of soybean worldwide and its huge potential in the Indian market. Giving a brief introduction of soybean cultivation and its nutritive value, he emphasized on the role of soybean in reducing heart diseases, cancer, osteoporosis, hot flashes and diabetes. He informed the audience of the different products that can be made out of soybean including full-fat soy flour, soy nuts, nuggets (soy bary), soy milk, soy milk powder, tofu and okara. He gave a quick overview to prepare soy milk using SoyaCow and said that soy milk is in no way less nutritive than cow milk. Giving the nutritional quality of soy paneer (tofu), he said that it is much more nutritive and bears good shelf life and is much cheaper than the traditional cow milk paneer in Indian market. Dr. Singh informed the audience that soy milk can be used to manufacture soy butter milk, soy lassi, flavoured milk, ice cream and frozen desserts. He also said that okara can be used as a replacement of khoa in Indian traditional sweets and briefed on the extrusion technology that can be used to prepare various kinds of novel products using soybean.
Safe and Hygienic Manufacturing of Coagulated Traditional Milk Products (Pilot Plant Exercise)

Dr. Anil Chauhan and Dr. D. S. Bunkar, Center of Food Science and Technology, BHU

Dr. Chauhan and Dr. Bunkar illustrated (to the trainees) step-by-step protocol for preparing cow milk paneer in the pilot plant situated at Center of Food Science and Technology. The participants shared their practical knowledge of preparing paneer in their shops. They also enquired about the preparation of soy milk and soy milk paneer (tofu) and received expert advice on improving the quality of milk produce.

Major Outcomes of the Training Program

The training imparted to the sweet makers and street food vendors proved quite useful. The participants showed keen interest in obtaining information regarding the current practices followed as per food safety laws. The participants not only interacted with the faculty but shared their day-to-day issues and got expert advice. The laboratory exercises were quite informative and answered all major queries of the participants. The sweet makers showed keen interest in soy milk processing and extrusion techniques for evolving different kinds of novel food products. The participants were not only curious to know about quality control measures and adulteration control practices; they gained great insights on some of the complicated aspects that were confusing to them. This international program was very beneficial for the participants since the training will not only help them improve the overall quality of their products but produce items that are at par with international standards.