

research interests of their groups as well as those of their colleagues. There was a question-and-answer session. It is hoped that robust cooperation between US and Indian scientists will emerge from this event.

It is obvious that the discovery of MGs in 1960, quasicrystals in 1984 and BMGs in 1988 has undoubtedly attracted considerable research attention on these

complex metallic alloys because of fundamental interest and the possibility of technological applications. A consensus is slowly emerging as to what alloys can form glasses, the basic structural features, and the mechanics/mechanisms of deformation in them. It is also becoming clear that research will continue in the direction of BMG-based composites for

structural, magnetic and other applications.

N. K. Mukhopadhyay, Department of Metallurgical Engineering, Institute of Technology, Banaras Hindu University, Varanasi 221 005, India.
e-mail: mukhopadhyay_nk@yahoo.co.in

MEETING REPORT

Quality improvement in food processing*

The scenario of the food industry in our country has undergone a sea change during the last couple of decades. People have become enormously quality-conscious in matters related to food, rendering the industry fairly competitive. Indiscriminate use of harmful ingredients, preservatives, processing chemicals, etc. is seriously affecting the quality of food. On the other hand, horizons of food science and technology have expanded. A good number of food-safety regulations are prevalent in the country. These include the Prevention of Food Adulteration Act (Ministry of Health), the Agriculture Produce (Grading and Marketing) Act (Ministry of Rural Development)-AGMARK, laws being operated by Bureau of Indian Standards, a number of mandatory quality control orders under Essential Commodities Act such as FPO, MMPO, Meat Product Order and Vegetables Control Order. These multiple laws need to be harmonized.

It is in this context that a national conference was organized by the Indian Association for Productivity, Quality and Reliability (IAPQR), Kolkata. The conference provided a platform for focused discussions by acknowledged experts in the field from academia, industry, consumer fora and regulatory bodies, from different parts of the country.

S. P. Mukherjee (IAPQR) in his presidential address gave a brief introduction about IAPQR and also mentioned some of its activities. According to him, IAPQR established in 1972 with the primary objective of building-up the necessary human resource in quality personnel of the Indian industry, has since its inception been engaged in the pursuit, propagation and promotion of concepts, methods and practices to enhance productivity in manufacturing and service organizations through the practice of quality and reliability. Training is an area of strength of the Association, Mukherjee added. It offers through contact programmes and correspondence, an integrated two-year course on quality management, affiliated to the University of Burdwan. The Association also organises, from time to time, short-term programmes in quality-related areas and also carries out consultancy assignments on implementation of ISO 9000 Series of Standards (including Revision 2000) in several industries across the country.

Asim K. Duttaroy (University of Oslo, Norway) delivered the keynote address on 'The environmental health: Food and security'. He discussed in great detail the background of public and environmental health, definitions and importance of the food system and strategies to protect it. Core functions of public health, according to him, include assessing public health, promoting sound policies and assuring effectiveness. He defined environmental health as programmes designed to protect the public from hazards which exist or could exist in the physical environment. Environmental links to health concerns like drinking water, food, land, built environment, indoor air and emergencies were also elaborated by Dutta-

roy. Agro-terrorism (terrorism directed against agriculture, livestock, or other food supplies with biological, chemical, physical or radiological weapons), importance of preventing food-borne diseases, potential contaminants in food, strategies for prevention and risk reduction, and hazard analysis critical control points, were also covered in his lecture. Private and public cooperation is required to maintain and strengthen the food system, and core public health measures help ensure safer food, including assessing threats, developing common sense and practical policies, Duttaroy concluded.

In Technical Session I, J. Chakraborty (Central Food Laboratory, Kolkata) spoke on 'Modernization of Indian food safety and standards regulation'. The *Codex Alimentarius*, according to Chakraborty, has relevance to international food trade. With respect to the ever-increasing global market, in particular, the advantages of having universally uniform food standards for the protection of consumers are extremely important. It is not surprising therefore, that both the Agreement on the Application of Sanitary and Phytosanitary measures and Agreement on Technical Barriers to Trade encourage the international harmonization of food standards. As such, *Codex* standards have become the benchmark against which national food measures and regulations are evaluated within the legal parameters of the World Trade Organization (WTO) Agreements. The Prevention of Food Adulteration (PFA) Act, 1954 has laid the basis for a constructive and responsible consumer protection, including assistance to trade in India, according to Chakraborty. India is a signatory to WTO. Thus harmonization of PFA stan-

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dard with that of *Codex* is being followed accordingly, Chakraborty added. He informed the audience that 'The Food Safety and Standards Act 2006' has already been approved and signed by the President of India on 23 August 2006. As a result, consumer safety will be ensured in a better manner through food safety management systems and setting standards based on science and transparency, it will also meet the dynamic requirements of the Indian food trade and industry and international trade.

In Technical Session III, K. Chandrakleha (KSP Mahila University, Tirupati) spoke on 'Impact of radiation processing on nutrient composition of selected health mixes'. Food irradiation envisages a concept of food processing and preservation. Irradiation can be used to pasteurize food without causing changes in its freshness and texture. She further

stated that health-mixes were being developed in the laboratory to provide protein with high biological value, for health promotion and disease prevention. These health-mixes when subjected to irradiation treatment, did not suffer any significant change in their nutrient composition. Hence radiation processing technology would help traders and other users as a modern tool to preserve their precious produce.

In Technical Session IV, Pratap Chakraborty (Jadavpur University) spoke on 'Food safety and quality'. India is the world's second largest producer of food and has the potential to become number one in the course of time with sustained efforts, according to Chakraborty. Regarding food safety, he said that food processed under unsanitary conditions is not considered safe by many importing countries. CGMP (current good manufac-

turing process) helps prevent this problem through appropriate maintenance, cleaning and sanitizing. The purposes of quality control are: (i) protection of nutritional value of constituents, (ii) protection of customers from dangers of contaminated food and ensure that they get the weight and quality of food that they pay for, (iii) prevent cheating by suppliers (e.g. stones in raw materials), damage to equipment and false accusation by middlemen, customers or suppliers, and (iv) to ensure that food laws operating in a country are complied with. Some standard guidelines must be followed according to ISO, CODEX, etc. for maintaining the quality of the product, Chakraborty concluded.

Minakshi De, 35, Garpar Road, Kolkata 700 009, India.
e-mail: amikde@satyam.net.in

MEETING REPORT

Alternatives to the use of animals in research, testing and education*

The words of Mahatma Gandhi that 'the greatness of a nation and its moral progress can be judged by the way its animals are treated', set the stage for the First Indian Congress on Alternatives to the use of Animals in Research, Testing and Education. The Congress witnessed over 400 participants. T. Ramasami (Secretary, Department of Science and Technology) inaugurated the proceedings. The inaugural session had presentations by P. C. K. Nayar (Medical Council of India) on alternatives to the use of animals in medical education and by Vasantha Muthuswamy (Indian Council of Medical Research) on alternatives to the use of animals in medical research. The Con-

gress had three lecture and seven workshop sessions.

The issue of alternatives to the use of animals in research and testing is indeed not new, and in many ways continues to be contentious. The first protests for animal protection began in England during mid-nineteenth century, in which activists opposed all forms of animal research. The protests gained momentum during the seventies, and many believe that the work of Peter Singer entitled *Animal Liberation* in 1975, revived the call for animal protection. A few of the presentations are highlighted here. Alan M. Goldberg (John Hopkins University, Baltimore) spoke on 'The science of alternatives', which detailed the three Rs, i.e. replacement, refinement and reduction of alternative and humane science. While exploring the societal expectations of animal use in science, Goldberg addressed the importance of the three Rs. The Bologna Declaration of 1999 signed by 29 European countries was a watershed event for the issue of animal use and this declaration paved the way to the alternate animal testing protocol, viz. the three Rs. The concept, developed by Russell and Burch advocates that, animal

testing protocols conform to the three Rs. Replacement of animal testing by alternative methods is the most radical of the methods proposed, although a differentiation is made between absolute and relative replacement. Refinement on the other hand, is the subtle approach which advocates the reduction of incidence or severity of distress experienced by laboratory animals. Reduction entails obtaining precise information with animals through the use of well-designed, well-conducted, reliable experiments that do not involve endless repetition of the same tests.

Thomas Hartung (European Centre for the Validation of Alternative Methods (ECVAM), Ispra) presented some of the key initiatives in his presentation entitled 'Europe goes alternative, contributions to reduce animal testing'. ECVAM was created in 1993 following the European Directive 86/609/EEC in 1991, and the institution is a forerunner in furthering alternative approaches to animal testing.

The field of alternative is currently driven by demands made by two major sectors, viz. cosmetics and chemicals. While the 7th Amendment made by the European Commission in 2003 foresees

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