The International Association for Cereal Science and Technology (ICC), the Spanish Ministry of Environment, Rural Development and Fishery (MMRM), and the Spanish Association for Cereal Science and Technology (AETC) coorganized the XIII ICC Cereal and Bread Congress, “Cereals Worldwide in the 21st Century: Present and Future”—Cerworld 21st, held in Madrid, Spain, June 14–18, 2008. The congress was held in the Meliá Castilla Hotel, and was chaired by Concha Collar, ICC president, Spain, and vice-chaired by Cristina M. Rosell, ICC Spanish National Deputy, Spain.

Every four years ICC offers a neutral and fertile international open forum as its flag event for discussing the latest key topics in cereal science and technology. Cerworld 21st in Madrid was the scene of international debate for hot topics regarding cereals and cereal-based products, and provided opportunities for both young and consolidated professionals to exchange, disseminate, and transfer knowledge about the production and use of safer, healthier, more nutritious, and higher-quality cereals and cereal products in a sustainable and multidisciplinary way. The congress, bringing together tradition and innovation to provide tailor-made cereal science and technology, was structured into eight tracks—seven symposia and eight technical sessions—running in parallel with simultaneous translations from English to Spanish and Spanish to English. In addition, invited and submitted lectures, poster displays, and table-top exhibitions covering the entire field of cereal science and technology shaped the technical program. Particular emphasis was placed on the following hot topics: cereal biotechnology, safety, raw materials, industrial processing, nutrition, health and consumer expectations, analytical tools, ethnic cereal-based foods, and non-food uses of cereals.

This year, the congress attracted about 500 participants from 54 countries from across the six continents. A total of 338 presentations with 112 oral presentations and 226 posters from authors around the globe guaranteed a most enriching international program and have been compiled in the book of abstracts. Ten sponsors, 16 exhibitors, and four endorsing organizations supported Cerworld 21st, including AACC International. Major participating countries included Spain, the United States, France, Italy, Argentina, and Brazil, with the United States contributing the most oral presentations (13), followed by Spain (11), Germany (9), Canada (8), and France (8).

**Opening Ceremony**

The ICC Academy awarded Fellow certificates to the following people: Linda Young, the United Kingdom; Jim Dexter, Canada; David Lineback, U.S.A.; and Pierre Gelinas, Canada. The Clyde H. Bailey Medal went to Barry McCleary, Ireland, and Martha Cuniberti, Argentina, was awarded the Friedrich Schweitzer Medal. The Harald Perten Prize, granted by the Harald Perten Foundation, went ex equo to Concha Collar, Spain, and Cristina Rosell, Spain. The plenary lecture, “Cereals in the Fight Against Hunger: Genetic Resources, Science, and Ethics,” was given by José T. Esquinas-Alcázar, former president of the FAO Committee of Ethics for Food and Agriculture, Spain. Elena Espinosa, Spanish Minister, MMRM, delivered the official opening of the congress, stressing the significance of Spain hosting an international cereal event that largely contributes to the knowledge transfer in cereal science and technology worldwide.

**Track 1—Food Safety and Risk Assessment in the Cereal Supply Chain**

This IUFOST-endorsed symposium, co-chaired by Roland E. Poms, Austria, and Duska Curic, Croatia, covered the following topics: harmonized food safety assessment, analyses of mycotoxins and pesticide residues, acrylamide in cereal products, allergenic compounds in cereal products, advances in analytical techniques, policy and action, risk communication, and the so-
cio-economic impact of new regulations. IUFOST President David R. Lineback, gave the keynote lecture entitled, “Globalization and Food Safety Issues.”

The technical session was run by Meinolf Lindhauer, Germany, and was open for all kinds of known (e.g., mycotoxins, heavy metals, pesticides) and less known (e.g., metabolites of heat treatment) risks and respective avoidance strategies throughout the cereal supply chain, including breeding, cultivation, harvest and post-harvest activities, processing, and sampling and analytics. Graham C. Worden, Canada, gave the key note lecture, “Food Safety from the Farm to the Mill: A Case Study on Canada’s Approach to On-farm Food Safety.” Seven additional oral contributions and 21 poster presentations completed the session.

Track 2—Cereal Biotechnology Worldwide
José María Carrillo, Spain, and Joël Abecassis, France, co-chaired both the symposium and the technical session on Cereal Biotechnology, during which several topics on the latest research to increase the nutritional and the techno-functional properties of cereal grains were presented. The characterization and modification (by traditional and new approaches) of starch, proteins, and other components of cereal grains, and their implication on the end-use quality were discussed. Craig B. Faulds, the United Kingdom, gave a lecture on the “Disassembly of Cereal By-products by Multi-enzymatic Mixtures” and introduced the technical session consisting of five talks and 16 poster presentations. Specific topics examined during this session included recent achievements, new opportunities and future challenges of increased amylose content of novel wheat starches with diverse genetic backgrounds, an invitro system to study starch biosynthesis during wheat grain development, the modification of bread-making quality and silencing of gliadins by RNA of interference, and the evaluation of durum wheat varieties for baking quality.

Track 3—Processing of Cereal Grains and Cereal Products
A current challenge facing cereal technologists is designing innovative, cereal-based products that meet diverse, worldwide consumer demands for healthy, tasty, and convenient foods. This symposium, co-chaired by Okkyung (Okky) Kim Chung, U.S.A., and Beate Kornbrust, Switzerland, focused on new developments and emerging techniques of grain and/or grain-products processing with a particular emphasis on the effect of processing variables on the characteristics and nutritional improvements of final products.

The technical session, co-chaired by Christina M. Rosell and Filip Arnaut (Belgium), provided an overview of current and future trends in the processing of cereal grains, including new processing techniques—methods and equipment—being developed to meet the challenges of cereal grain and ingredient processing for new products, as well as the development of processing aids and food additives to meet new demands on cereal grain products and consumers’ evolving expectations.

Topics deserving special attention throughout the session included: the development of new, dry fractionation processes for ingredients production from wheat bran; the effect of milling conditions and genotype on the yield and composition of oat-milled products; functional and processing properties of wheat flours by the stepwise polishing method; the role of dry-heated prime starch and tailings fractions in wheat flour on the springiness of pancakes; the influence of hydrotheromed bran on physicochemical, rheological, and microstructural characteristics of sangak bread; the influence of legumes on the quality of precooked pasta; the impact of refrigerated storage on yellow alkaline durum noodles; and the basis of good bread making—stabilizing the gas cells.

Track 4—Cereal-based Foods: Nutrition, Health, and Consumer Expectations
The cereal community faces several, nutrition-related challenges: combating malnutrition, enhancing protection against major civilisation diseases (obesity, cardiovascular diseases, type 2 diabetes, and cancer), and doing this through the development of beneficial products that are attractive to consumers, endorsed by food safety and health authorities, and nutritionally evaluated by scientists. This symposium, co-chaired by Jan Willem Van der Kamp, the Netherlands, and Ascensión Marcos, Spain, offered new insights into nutritional research and technological opportunities, while presenting approaches for successfully marketing healthy products.

The technical session, co-chaired by Alberto E. León, Argentina, and Mónika Haros, Spain, covered the following topics: beneficial and harmful dietary cereal factors; specific needs and habits of population groups; cereal involvement in the reduction of incidence in diet-related disorders (e.g., obesity, metabolic syndrome, celiac disease); micronutrients deficiency; and bioavailability of bioactive compounds in cereal-based foods.

Track 5—Analytical Tools for Quality Assessment of Total Cereal Food Chain
This symposium, co-chaired by Alain Le Bail, France, and Wallace Yokoyama, U.S.A., aimed at gathering studies on newly developed techniques or research focused on improving existing techniques to assess the quality of cereals and cereal-based products. “Quality” is a generic keyword; within this symposium,
the word “quality” encompassed any specific properties of raw products (e.g., functional, technological, microbial, concentration of a specific compound or chemical) or of transformed products (e.g., texture, structure, organoleptic).

The technical session was conducted by Stanley Cauvain, the United Kingdom, and Pablo Ribotta, Argentina. The session emphasized the need to understand all processes involved in the conversion of cereals to food if consumers’ expectations are to be met. Also considered were analytical tools for the study of cereal products and processes and their potential applications in delivering high-quality cereal foods. Topics ranged from the application of chromatography to the study of grain protein fractions and their functions, especially considering the rheological properties of intermediates (e.g., dough) and their contribution to dough processing, and the recent applications of non-invasive analytical tools. Nine oral contributions and 37 poster presentations shaped the session.

**Track 6—Current and Future Developments in Cereal Product Formulation**

The formulation of innovative cereal-based foods is key to the future of this industry. Considering health-conscious consumers and the positive nutritional image of cereal foods, this symposium reviewed critical aspects of food product development. These technical presentations explored the functionality of cereal components (e.g., specialty flours, fibres, proteins, endogenous enzymes, sourdough, etc.) and non-cereal additives (e.g., yeast, enzymes, emulsifiers, modified starches, etc.). Peter Weegels, the Netherlands, and Pierre Gélinas, Canada, co-chaired both the symposium and the technical session on cereal product formulation.

The symposium, endorsed by AACC International, was opened by keynote lecturer AACC International President-Elect Mary Ellen Camire with a speech entitled, “Healthful Food Ingredients: Practical Considerations.” Camire was followed by seven invited speakers including: “Let’s Bake Together™” (José Mastenbroek, the Netherlands); “Yeasts and Products Tailored for the Baking Industry” (Pierre Gélinas, Canada); “Innovative Bread Improvers: Facts and Fiction” (Peter Weegels, the Netherlands); “Role of Hydrocolloids in Bakery Products” (Cristina M. Rosell, Spain); “Crispiness Creation and Extension” (Rob J. Hamer, the Netherlands); “How Can Enzymes Help You to Cope with Rising Ingredient Costs?” (Frank T. Rittig, Switzerland); and “Volume, Crumb Softness, and Staling of Wheat Bread as Affected by Polar Lipids” (Peter Koehler, Germany).

The technical session discussed novel aspects in enzyme functionality; effects of different components and (functional) ingredients on dough rheology; bread technological performance and the simulation of breadmaking process with high fibre-enriched doughs; wheat, rye, triticale, and gluten-free formulations; and pseudocereals as raw materials.

**Track 7—Ethnic Cereal-Based Foods Across the Continents**

This session aimed to assess the current and future impact of ethnic cereal-based foods on global eating patterns, especially related to the grain market, convenience foods, and good nutrition. The technical session was co-chaired by John Taylor, South Africa, and Robert Cracknell, Australia. Topics covered by oral presentations dealt with developments in African sorghum beers; wheat and other cereal-based local foods in South America; traditional Turkish cereal-based foods and beverages; wheat and flour requirements for Western ethnic foods and Chinese-stamed bread; buckwheat-based foods; technological performance of durum wheat bread; intake patterns outside of Asia; and the health benefits of noodles.

**Track 8—Special Session: Revisiting Top-demanded Cereal Topics at Cerworld 21st**

This special session, co-chaired by Concha Collar and Helmut Glattes, Austria, revisited selected contributions on topics deserving special attention within the framework of Cerworld 21st. Research on nutrition and health, as well as new developments and emerging techniques in grain and/or grain-products processing using conventional and innovative formulations, were assessed by the latest analytical tools. Particular emphasis was placed on a safer and more sustainable study of quality variables’ influences on the characteristics and nutritional improvements of final products. Innovation in the field of traditional, cereal-based foods, specialty/ethnic cereal goods, and the bio-industrial application of cereal also aroused a great deal of interest at the session.

**Prize Giving**

Cerworld 21st awarded prizes for best posters and best oral presentations, supported and granted by three sponsoring companies, in recognition of high scientific and technical achievement, innovation, and originality among the 226 displayed posters and the 60 submitted oral contributions to the technical sessions. Puratos Great Taste and Wellness Awards went to Priscilla Verjans et al., Katholieke Universiteit Leuven, Belgium, for the poster entitled, “Use of Thermophilic Xylanases for In Situ Production of Arabinofuranosyl-Oligosaccharides with Prebiotic Potential in Bread,” and to Carolina Chaya et al., Universidad Politécnica de Madrid, Spain, for the oral presentation entitled, “Healthier Cereal Products: Breadmaking with Barley Flour.”

Kraft Foods Young Cereals Researcher Awards went to Dimitra Lebesi and Constantina Tzia, National Technical University of Athens, Greece, for their poster entitled, “Development of High-Fibre Cakes with Different Dietary Fibre and Edible Cereal Bran Sources;” and to F.M. Vanin et al., CERMAGREF, Rennes, France, for the poster, “A Study of the Crust Setting and Its Effect on Heat and Mass Transport and Expansion During Bread Baking.” The Baketran Best Student Poster Award went to Emma Lynch, National University of Ireland, Cork, Ireland, for the poster entitled, “Studies on the Spoilage of Breads Produced with Reduced Salt.”

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