INTRODUCTION

The International Association for Cereal Science and Technology: its history and activities

Stanley P. Cauvain, Roland Poms & John Taylor

ICC – International Association for Cereal Science and Technology, Marxergasse, Vienna, Austria.

The International Association for Cereal Chemistry (ICC) was founded in 1955 on the occasion of the 3rd International Bread Congress in Hamburg, Germany. Its original objective was the development of internationally approved and accepted standard testing procedures for cereals and flour. Today the ICC remains committed to the development of standard testing procedures and is foremost in the international organizations working in the cereals field dedicated to international co-operation and to the dissemination of up-to-date scientific and technical knowledge. The association has its headquarters and the General Secretariat located in Vienna, Austria.

The ICC mission statement reads:

> The ICC is the pre-eminent international association in the field of cereal science and technology committed to international co-operation through disseminating information and developing standard methods for the well-being of all people.

In order to achieve our mission:

- We are inspired by the ideals of advancement in cereal science and technology.
- We offer membership to all countries, corporations and institutions.
- We hold responsibility for international co-operation and provide a forum for dialogue and appreciation of new ideas to promote the utilization of cereals.
- We promote domestic and international trade by providing uniform, internationally approved and accepted testing procedures.

Our ultimate objectives are that:

- We want to involve all countries as members.
- We want to work together with all organizations active in cereal science and related fields.
- We want to be connected by means of corporate membership with all relevant companies and institutions.
- We want to attract all the world's cereal scientists and technologists to co-operate with ICC.

The ICC is:

- A non-political, non-profit-making and non-religious organization.
- An independent, internationally recognized organization of experts.
- A neutral forum for all cereal scientists and technologists.
- A publisher of international standard methods and other publications related to cereals.
- An important organizer of national and international events.
- A promoter of international co-operation on a global, regional and national level.
- A mediator between science and technology research and practice.

The continuing international trade of grains and the emergence of new growers and producers require the existence and development of internationally acceptable standard methods for evaluating grains and other crops in terms of their physical, chemical and nutritional properties, as well as their safety (e.g. absence of contaminants and toxicants). With its strong country membership base, the ICC provides unique opportunities for scientists and technologists around the world, whether in industry, research or academia, to collaborate in developing new knowledge on cereal grains, other crops and their products. This is achieved through the conferences, symposia, workshops and working parties that the ICC promotes. Today, many branches of science require even greater international collaboration than before and ICC actively pursues the development of links with cereal and food associations at country, regional and international levels from its Secretariat based in Vienna. An example of this continued international co-operation is the participation and coordinating role of ICC in the MoniQA Network of Excellence described elsewhere in this issue.

A brief history of the ICC and its structure

First called the *International Association for Cereal Chemistry (ICC)* when it was founded in l955 at the 3rd International

Bread Congress in Hamburg. The Association underwent a name change in 1978 to become the International Association for Cereal Science and Technology, which the membership felt better reflected its nature and activities. However, it elected to retain the initials ICC which had by then become the traditional identity of the Association and these initials have remained part of the brand of the Association ever since.

The 3rd International Bread Congress 1955 in Hamburg was not convened for the purpose of founding ICC. Memories of the previous congresses in 1927, Prague, and 1932, Rome, were still alive in the minds of the scientists and technologists who had participated in these events. A decisive factor for the future role of ICC was a group of leading cereal experts of that time; among them Dr. Schweitzer (Austria), Dr. Fuchs and Dr. Pelshenke (Germany), Dr. Hintzer (The Netherlands), Prof. Maes (Belgium), Prof. Buré (France) and Dr. Widhe (Sweden), because it was they who had already agreed before the event that concrete decisions about a cereals association should be made only after the Hamburg Congress. Their intention was to agree suitable modalities for a foundation with representatives from the United States and Canada, Dr. Shellenberger, Dr. Zeleny and Dr. Andersen, to avoid the development of a 'competitive mentality' in the standardization of cereal methods. The initial development of ICC took place quickly and harmoniously. To quote that late Prof. W. Seibel (ICC, 2005) 'The existing chaos and confusion in the field of cereal analytics practically provoked technical agreements. The international flows of trade which were reviving again after the war depended on standardized examination and especially evaluation methods, and also science could only overcome a tangible voicelessness by the creation of a universally valid language'.

The first international meeting of the ICC was set up by Dr. Friedrich Schweitzer and held in Vienna, 5–8 December 1956, with full support from the responsible Austrian authorities. The emblem of the association – a globe adorned with a cereal ear and crossed by the letters ICC – was designed by Dr. Hans Fuchs, former head of laboratory of the milling company near Vienna. His design was adopted unanimously by the first General Assembly of ICC. Later a small, but very reasonable change was made to the emblem on the suggestion of a scientist from Africa – the meridians were reduced to make the letters ICC stand out more clearly (Reigner, 2005) and that is essentially the version used today.

It was 11 years after the 3rd International Bread Congress, in 1966, that Vienna hosted the main ICC Congress. The title was changed to reflect the role of the primary raw materials as well as the baked product and the 4th International Cereal and Bread Congress was opened by the Austrian President. The format established in 1966 set the pattern for the future and the event takes place every four years moving around the world to new venues and with local organizers. Each event has its own 'local' flavour and its own special theme. There have been many and varied locations, each with its own special atmosphere and charm. However, what makes the event so special is the 'family' of participants because that is what each occasion is like – the ICC family coming together and on each occasion welcoming new members and sadly saying 'goodbye' to some.

In addition to the Cereals and Bread Congress the ICC organizes, runs, endorses and supports many cereals-related conferences, meetings, symposia and workshops in different parts of the world working closely with delegates from member countries, corporate members and local representatives to deliver a wide range of topics across the field of cereals, their products and the testing methods which are used. Meetings in the 'home city' of ICC always have a special flavour, not more than when it celebrated its 50th anniversary in 2005. All of the traditions of ICC were observed and many of its famous sons and daughters from around the world were able to join in the celebrations. At the same as looking back at its proud history the Association was also looking forward and organizing itself to meet the business and scientific challenges of the future.

The lists of Presidents and Officers of the ICC are filled with the giants of the cereals world. The first President was Dr. Friedrich Schweitzer, a driving force in establishing the Association who with the help of Mrs. Hiledgard Reigner as the Executive Secretary focussed the first steps of the ICC on its journey. Each President and Secretary General has brought to their respective roles, their own individual style and talents. As the political and science worlds changed so did the needs of the ICC and it was through the talents of many individuals that the Association adapted to the processes of change to remain as valid today as it was when it was first formed. One of the most recent changes has been to re-structure the Association and to introduce a new commercial entity – ICC Services GmbH – to oversee its conference and publishing activities. The current management structure of the ICC is shown in Figure 1.

ICC awards and medals

ICC has a long and proud history of conferring awards on eminent cereals scientists and technologists. Its main scientific award is the Clyde H. Bailey Medal, which is conferred for 'outstanding achievements in cereals science and

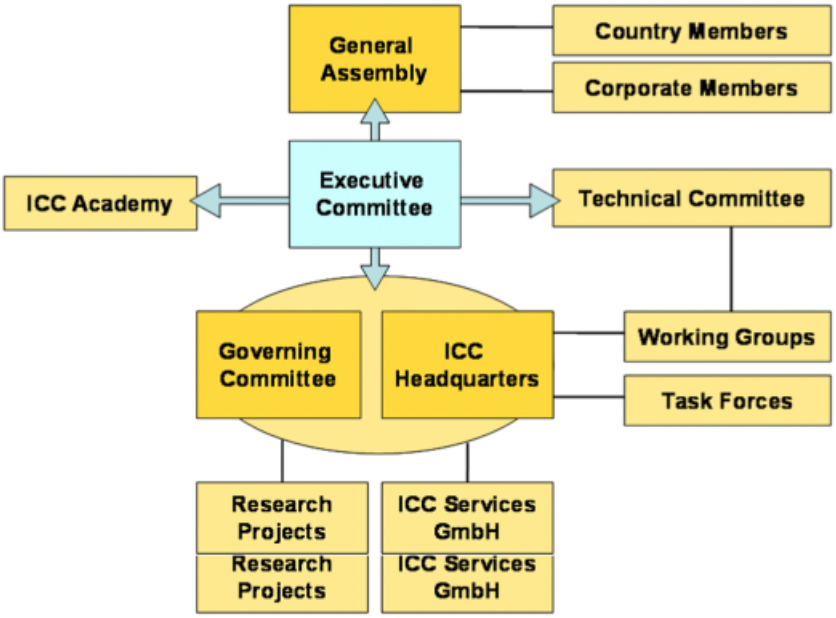

Figure 1 Organizational structure of the ICC.

technology'. The award was created in 1969 to commemorate the work of Dr. Clyde H. Bailey, an Honorary President of ICC from 1958 until his death in 1968. The second major ICC award is the Friedrich Schweitzer Medal conferred on individuals for distinguished service in the furtherance of the aims and ideals of ICC. The award was created in 1989 by the ICC Executive Committee in commemoration of Dr. Schweitzer, the first ICC Secretary General, who had died in 1984. A recent introduction under the umbrella of the Association was the formation of the ICC Academy with the objective of honouring individuals who have made significant contributions to cereal science and the work of the ICC with the title 'Fellow of the ICC Academy'.

ICC also has a long association with the Harald Perten Prize, which is commonly conferred at ICC Cereal and Bread Congress or other appropriate ICC events. The prize is intended to recognize and reward outstanding achievements in science, research, teaching or transmission of knowledge which serve cereal science and technology, primarily recognizing practical applications in the areas of starch, gluten and enzymes. Ing. Harald Perten was among the scientists who participated in the meeting, which established ICC on the occasion of the 3rd International Bread Congress in 1955. ICC owes thanks to Ing. Perten's untiring and unselfish work on a number of standard methods including the 'Falling Number' method which earned him world renown. Inaugurated in 1989 the Harald Perten Foundation based in Switzerland administers the award.

ICC activities

In accordance with its mission to disseminate information and develop standard methods in grain science for the well-being of all people, ICC takes responsibility for a comprehensive range of activities.

Organization and support of meetings

ICC through its network of member countries and corporate members organizes and supports several meetings every year across the world on all aspects involving grain science. These range from workshops, symposia and conferences through to ICC's quadrennial Cereal and Bread Congress. Examples of meetings held in 2008 were Envietech 2008 on renewable energy sources held in Austria, Food Allergen Issues and Testing Symposium in Wisconsin, USA and the ICC Cereal and Bread Congress 'Cereals in the 21st Century: Present and Future', held in Spain. As can be seen from the 2008 examples, the meetings reflect a whole spectrum of topics. However, the focus of ICC is on grain food quality, particularly nutrition and health issues, the safety of grain foods and their evaluation. With respect to the first item on the list, ICC is organizing the 4th International Dietary Fibre Conference in Vienna in July 2009. This conference is highly topical in view of the very high incidence of obesity in many countries and the role that dietary fibre can play in preventing this, and also the current activities of the Codex Alimentarius Commission to define dietary fibre.

Working groups and taskforces

The expert scientists in ICC have traditionally worked together on different topics through Working and Study Groups. The groups develop and evaluate grain testing methods and advise on special problems in the grains world. At one time there were as many as 50 such groups. However, rationalization of many national research institutes and today's more market-driven focus in these institutes has severely curtailed scientists' time. This has lead to a change in the way that ICC addresses special issues. Increasingly these are addressed through taskforces specially set up to focus and act on issues of current concern. The most notable of these is the Mycotoxin and Sampling Taskforce. This taskforce that was established in 2005 has 60 expert members from across the world. The aims of this taskforce are to establish standard and validated methods for the detection of mycotoxins in cereals, and protocols for mycotoxin screening methods, cereal sampling methods and methods for sample preparation.

Healthgrain

With regard to grain nutrition and health issues, ICC is a partner in the EU Healthgrain project (http://www.healthgrain.org) that aims to exploit the bioactivities of European cereal grains for improved nutrition and health benefits. Heathgrain is one of the largest and most comprehensive international collaborative food research projects ever undertaken. The concept originated from an ICC initiative – EC 2002, an EU funded and ICC organized 'Expert Summit' held in Vienna. ICC is involved in the dissemination activities, including organizing and management of the Healthgrain workshops, consortium meetings and workshops and shares the responsibility for its training courses.

Website

ICC communicates to the wider community, in particular through its website http://www.icc.or.at which provides comprehensive information on ICC past, present and future activities, and useful tools including a 'Who is Who?' in grain science and technology and an online dictionary/glossary of grain science terms in seven languages.

Standard methods

ICC methods

Since its foundation in 1955, ICC has published some 100 International Standard Methods, Recommended Methods and Rapid Methods for quality and safety assessment of

Table 1 ICC standard methods, recommendations and rapid methods (as at December 2008)

Standard methods	
101/1	Sampling of grains
102/1	Determination of Besatz of wheat
103/1	Determination of Besatz of rye
104/1	Determination of ash in cereals and cereal products
105/2	Determination of crude protein in cereals and cereal products for food and feed
106/2	Working method for the determination of wet gluten in wheat flour
107/1	Determination of the 'falling number' according to Hagberg–Perten as a measure of the degree of α-amylase activity in grain and flour
108	Colorimetric method for the determination of α-amylase activity
109/1	Determination of moisture content of cereals and cereal products (basic reference method)
110/1	Determination of moisture content of cereals and cereal products (practical method)
111	Chemical assay of nicotinic acid in cereal products
112	Microbiological assay of nicotinic acid in cereal products
113	Determination of crude fibre value
114/1	Method for using the Brabender Extensograph
115/1	Method for using the Brabender Extensograph
116/1	Determination of sedimentation value (ac. to Zeleny) as an approximate measure of baking quality
117	Preparation of test flour from wheat samples for sedimentation test
118	Preparation of test flour from wheat samples for sedimentation test
119	Rapid method for the determination of thiamine in enriched flours and enrichment mixtures
120	Mechanical sampling of grain
121	Method for using the Chopin–Alveograph
122/1	Determination of starch content by calcium chloride dissolution
123/1	Determination of starch content by hydrochloric acid dissolution
125	Method for determining the count of aerobic mesophilic bacteria (plate count method)
126/1	Method for using the Brabender Amylograph
127	Determination of the particle size distribution in flour by the Andreasen pipette method
128/1	Procedure for the determination of starch after enzymatic decomposition
129	Method for determination of the vitreousness of durum wheat
130	Sampling of milling products (semolina, flours, agglomerated flours and by-products)
131	Baking test for wheat flours
132	Determination of saccharose in cereals and cereal products
133	Determination of the germ count of aerobic and facultatively anaerobic, mesophilic bacteria (plate count method) in cereals, cereal products and animal feed
134	Determination of the fungus germ count (plate count method) in cereals, cereal products and animal feed
135	Determination of the water content of whole maize kernels

136	Cereals and cereal products – determination of total fat content
137/1	Mechanical determination of the wet gluten content of wheat flour (glutomatic)
138	Mechanical sampling of milled cereal products
139	Determination of fungus germ count (plate count method)
140	Enzymatic determination of the bran content of cereals
141	Determination of mercury in cereals
143	Wheat identification of varieties by electrophoresis
144	Enumeration of spores of mesophilic bacteria
145	Determination of acidity (according. to Schulerud) for cereals and cereal products
146	Enumeration of yeasts and moulds (spatula method)
147	Enumeration of bacteria (spatula method)
151	Determination of the sedimentation value – SDS test of durum Wheat
152	Determination of the yellow pigment content of durum wheat semolina and flour
153	Determination of total organic matter (TOM) in pasta
154	Determination of cadmium and lead in cereals and cereal products
155	Determination of wet gluten quantity and quality (gluten index according. to Perten) of whole wheat meal and wheat flour (***Triticum aestivum***)
156	Determination of total dietary fibre
157	Ash determination by Conductivity
158	Gluten index method for assessing gluten strength in durum wheat (***Triticum durum***)
159	Determination of protein by near infrared reflectance (NIR) spectroscopy
161	Determination of the 'stirring Number' using the Newport Rapid Visco analyser, as a Measure of the degree of α-amylase activity in grain and Flour
162	Rapid pasting method using the Newport Rapid Visco analyser
164	Measurement of damaged starch by using Megazyme enzymatic kit
165	Determination of Ochratoxin A in Grain and grain products
166	Determination Of β-Glucan In Barley, Oat and rye
167	Determination of crude protein in grain and grain products for food and feed by the dumas combustion principle
169	Method for using the Brabender viscograph
171	Determination of the water absorption capacity of wheat flours and of physical properties of wheat flour dough using the consistograph
172	Flour from wheat (***Triticum aestivum***) – Determination of damaged starch by an Amperometric method using the SDMatic (Draft standard)
173	Whole meal and flour from ***T. aestivum*** – Determination of rheological behaviour as a function of mixing and temperature increase (Draft standard)
174	Determination of germinative energy of sorghum grain (Draft standard)
175	Determination of total defects in sorghum grain (Draft standard)
176	Estimation of sorghum grain endosperm texture (Draft standard)
177	Detection of tannin sorghum grain by the Bleach test (Draft standard)
RECOMMENDATIONS	
201	Test procedure for rapid moisture determination apparatus
202	Procedure for near infrared (NIR) reflectance analysis of ground wheat and milled wheat products
203	Statistical analysis of the results of collaborative studies
204	Determination of pesticide residues in grain by gel permeation Chromatography/Gas-liquid chromatography
206	Microbiology – general guidance for microbiological examination (Basis: ISO Standard 7218)
207	Determination of the particle size of milling products using sieve analysis
RAPID METHODS	
301	Quantitative peroxidase activity assay
302	Quantitative catalase activity assay
303	Simple and specific assay for α-amylase

cereals, cereal-based products and other foods. Table 1 lists the current methods. Many of these methods have been integrated in national and international law and/or have become ISO (International Organization for Standardization)/CEN (European Committee for Standardization) Standards. ICC Standard Methods are an essential tool in improving grain food safety and quality and enhancing consumer trust by supporting better communication between all the involved parties, from the raw material providers through processors and manufacturers right up to the retailer and consumer.

Collaboration on method development and standardization

ICC works closely with many international organizations in order to harmonize method standardization and avoid wasteful duplication. These organizations include CEN, ISO, the Codex Alimentarius Commission, the Food and Agriculture Organization, the World Health Organization, the American Oil Chemists Society, AACC International (formerly the American Association of Cereal Chemists), the International Union of Food Science and Technology and the European Federation of Food Science and Technology. Recently, ICC and AACC International established a Harmonisation Task Force, which is harmonizing and jointly publishing related standard methods. ICC is a partner in the ISEKI-Food networks (http://www.iseki-food.net).

As explained elsewhere in this issue, ICC is also proud to be the co-ordinator of MoniQA, the European Union funded Network of Excellence on monitoring and quality assurance in the food supply chain. Within this project ICC develops validation guidelines and protocols (see Table 2)

Table 2 Harmonized protocols and guidelines with ICC/MoniQA involvement in progress

Organization-sharmonized	Name of Protocol/Guideline
IUPAC/MoniQA	Joint IUPAC/Moniqa protocol For The validation Of qualitative methods
AOAC/MoniQA	Joint AOAC/MoniQA guideline for validation of quantitative ELISA test kits for food allergen detection
ISO IWA	ISO International Workshop Agreement jointly organized by AOCS, ICC, ISO, CEN, and MoniQA on harmonizing protocols for bulk sampling of 'loose' commodities
IAM/MoniQA	Harmonizing the understanding of validation criteria and terminology: Joint IAM (Inter Agency Meeting)/MoniQA training programme for codex alimentarius commission delegates (CCMAS)
ICC/MoniQA	Harmonized ICC/MoniQA method validation programme for rapid methods and test kits

that are of global significance. The intention is for these to become standard procedures for new validation studies and ring trials for analytical methods applicable to crops and foods.

References

ICC (2005). *History of ICC*. ICC, Vienna, Austria.

Reigner (2005) Thoughts and memories. In: *History of ICC*. ICC, Vienna, Austria.