



Food and Agriculture
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World Health
Organization

Food hygiene at 50

A Codex Alimentarius journey from small beginnings
to stories of success



REFLECTIONS BY THE CHAIRPERSON OF THE CODEX COMMITTEE ON FOOD HYGIENE

Since 1964, the Codex Committee on Food Hygiene (CCFH) has been operating according to Codex Alimentarius principles of decision-making, based on science. Its work has been developed in line with global opinion, resulting in products that are not only relevant, but also applicable and practical for the international community. The Committee has been a pioneer and early adopter of key procedural changes, such as co-hosting, applying risk assessment principles, fully using FAO/WHO expert bodies, developing a structured process to adopt new work and instituting mentor/mentee collaboration to translate challenging concepts into field application.

While the CCFH consistently arrives at conclusions built by consensus, the path has had awkward moments. Being science-based and driven to protect public health while facilitating international trade is not an easy task. Commercial, political and perceived interests are always lurking. Luckily, in my 12 years of sitting at the “front table”, CCFH delegates have always saved the day. Sometimes documents needed to mature while science caught up.

I remember a delegate from a European country imploring me to move a document addressing listeriosis to Step 8 so that he could retire (we did, and he did). On another occasion, we were locked at polar positions regarding the use of sanitizing agents.

Through hours of discussion, tremendous skill and wordsmithing (yes, also many informal conversations outside the plenary) we were able to identify common ground.

Success comes from having a positive attitude. I see the CCFH as a living organism where the interplay of delegates, observers and sponsor organizations is facilitated by an expert group of interpreters and translators. The host country sets the stage by making the environment a comfortable and safe place to operate. This “orchestra” is led by knowledgeable Secretariat representatives who maintain order and enforce the rules of procedure.

We are all in this together for a common goal and together we will continue to succeed.

Emilio Esteban, *CCFH Chairperson and Chief Scientist at the Food Safety and Inspection Service, United States Department of Agriculture*



HYGIENE IS AT THE HEART OF CODEX WORK

Whenever I give a presentation that includes an overview of Codex anywhere in the world, I mention food hygiene as the centre of our work. Certainly, there are many other food safety issues but the majority of acute foodborne illnesses are caused by microbiological contamination.

The General Principles of Food Hygiene are a major Codex text and the integration of the “HACCP” system as an annex was an achievement that has done a lot to improve global food safety. Implementation of hygiene measures can also help to reduce the need for antimicrobials, helping to avoid antimicrobial resistance, which is a major public health concern.

It would be nice to state that after 50 sessions the work of the CCFH is “done”. But I fear this is wishful thinking. There are many new developments on the way, which may cause new food hygiene risks.

Climate change and extreme weather events may immediately create sanitary problems. Our wish to make agriculture more sustainable and move towards a circular economy may bring problems because of the reuse of water and food products. New sources of protein, such as lab-grown meat, or more widespread use of insects may mean more guidance is needed to keep products safe. Changing lifestyles and consumer preferences like eating more raw fish and



fresh produce can also bring challenges as can e-commerce and other new distribution channels.

All this makes me think that it will be a long time until the CCFH and its Chairperson can retire! Their excellent work together with that of all experts and delegates attending the meetings and the scientific advice provided by the Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA) need to continue for an indefinite time for the benefit of all.

Thanks to the trail-blazing work of this Committee, hosted by the United States of America and co-hosted by many countries, Codex has made a significant contribution to improving food safety over the last half century.

■ **Tom Heilandt**, *Secretary of the Codex Alimentarius Commission*

1. INCORPORATING HYGIENE MEASURES ACROSS THE FOOD CHAIN

Food frequently passes through the hands of many people before it reaches the end consumer and can become contaminated at any stage. Without efforts to prevent, control or remove contamination, food can make people sick. Whether you are a child at school or an astronaut traveling in space, you do not want to run that risk every time you eat. Fifty-four years ago, the Codex Alimentarius Commission set out to minimize that risk.

After World War II, the expanding food industry and growing global trade led to consideration of quality and equivalence on a more formal basis. The establishment of the Codex Alimentarius was a response to the need for internationally developed standards, beginning with the most basic and fundamental of issues, such as food hygiene. At its first meeting in 1964, the CCFH identified the development of General Principles for Food Hygiene as its primary objective. At its 4th session, the CCFH completed the first version and submitted



1969

General Principles of Food Hygiene

1976

Code of Hygienic Practice for Eggs and Egg Products

1979

Code of Practice for Radiation Processing of Food

Code of Hygienic Practice for Low and Acidified Low Acid Canned Foods

1983

Code of Hygienic Practice for the Processing of Frog Legs

1985

Code of Hygienic Practice for Collecting, Processing and Marketing of Natural Mineral Waters

the General Principles of Food Hygiene for the consideration of the Codex Alimentarius Commission. Among the first of the Codex standards, this text was adopted in 1969, and subsequently became known as RCP1. Since then, the text has been revised on numerous occasions, with the inclusion of “HACCP” being the most significant addition to the document.

Hazard Analysis and Critical Control Points (HACCP)

In the 1960s, NASA, the Pillsbury Company and the United States Army Laboratories collaborated to provide astronauts with safe food for space expeditions. The approach NASA used to test engineering system reliability was applied to food processing. By assessing the hazards and establishing critical control points, problems could be prevented. Whereas until that point, problems were only revealed by end-product testing. This major shift explains the significance of HACCP and Guidelines for its Application that Codex

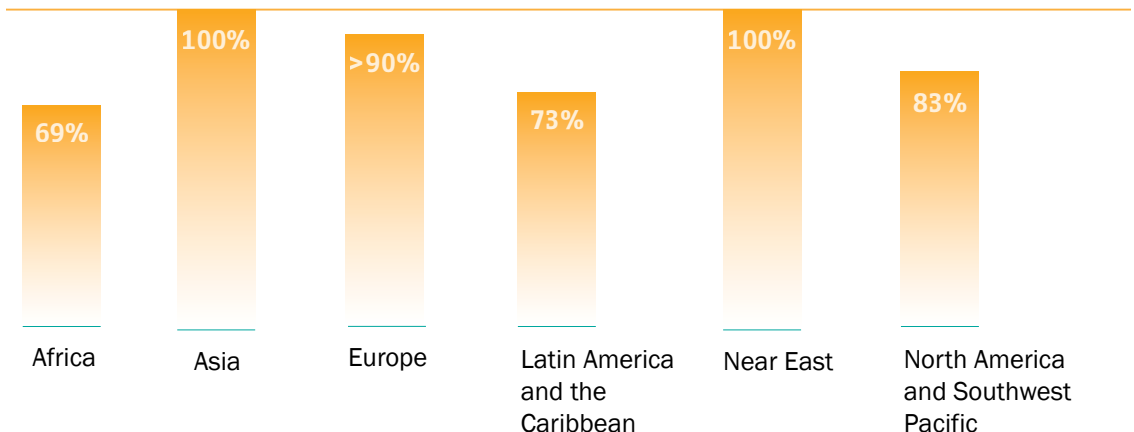
incorporated in the General Principles of Food Hygiene as an annex.

This systematic preventative approach, which Codex has updated several times since its original adoption, is in use across the world today.

The General Principles of Food Hygiene serve as the backbone to all other guidelines and codes of practice developed by the CCFH. In addition, many of the commodity standards developed by the Codex Alimentarius cross-reference this text as a means of ensuring that basic food hygiene measures are adopted in the production, processing and distribution of food commodities.

A survey conducted two years ago on the use of Codex standards showed the uptake of this landmark Codex text. The majority of respondents indicated that their countries had national legislation aligned with the General Principles of Food Hygiene and nearly half of those also required the application of HACCP.

Alignment of national legislation to the General Principles of Food Hygiene by region



Percentage of respondents to a 2016 Codex survey

1993

Code of Hygienic Practice for Precooked and Cooked Foods in Mass Catering

Code of Hygienic Practice for Aseptically Processed and Packaged Low-Acid Foods

1997

Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods

1999

Code of Hygienic Practice for Refrigerated Packaged Foods with Extended Shelf Life

Principles and Guidelines for the Conduct of Microbiological Risk Assessment

2001

Code of Hygienic Practice for the Transport of Food in Bulk and Semi-Packed Food

Code of Hygienic Practice for Bottled/Packaged Drinking Waters (Other than Natural Mineral Waters)

2. UNDERPINNING CODEX STANDARDS WITH A RISK-BASED APPROACH

The development of the Guidelines on the Application of General Principles of Food Hygiene to the Control of *Listeria monocytogenes* in Foods is an epic tale in many ways. First, in terms of time - the issue was initially raised at the 23rd session of the CCFH in 1988 and 20 years went by before the guidelines were finished. The work spanned a very interesting period in the life of Codex – a time when Codex standards were recognized as the benchmark standards for food safety in the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and Codex adopted a risk-based approach to standard setting.

From the outset, a controversial aspect of the *Listeria* work was the issue of “tolerable” risk. In other words, should Codex recommend a zero tolerance approach or was it more appropriate to establish a tolerable level of *Listeria* in foods? In those early years, despite the efforts made through collection



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of more data and consideration of different approaches, no agreement was reached.

After the introduction of the WTO SPS Agreement in 1995, CCFH worked to develop principles and guidelines for Microbiological Risk Management (MRM) and Microbiological Risk Assessment (MRA), and the next challenge was to put these into practice.

In 1999, the CCFH once again tried to complete the work on *Listeria*. Recognizing the impasse that had prevented past progress, the CCFH agreed it was time to put into practice the risk-based approach they were now championing through the MRM¹ and MRA² texts and they requested that FAO and WHO undertake a full risk assessment of *Listeria* in foods. This was new territory for everyone as this was one of the first international microbiological risk assessments to be undertaken. The answers did not emerge overnight. However, as CCFH continued to discuss guidelines for control of *Listeria* in foods and the risk assessment evolved, the basis for a way forward emerged. The risk assessment highlighted the levels of *Listeria* most commonly associated with illness and provided risk assessments for different types

of foods, which enabled the CCFH to identify categories of products for which it would establish different microbiological criteria.

Forging international harmonization however was also complicated by the fact that the passage of time meant that some countries had adopted their own microbiological criteria for *Listeria*, thus adding another dimension to the discussions.

The guidelines for control of *Listeria* were adopted in 2008 and the microbiological criteria in 2009. Another ten years had passed but by being open to new approaches and taking the time to figure out how they could be applied the CCFH reached consensus. Also by focusing on a science-based approach, the Committee was able to establish the microbiological criteria which had seemed impossible for so long.

1 Principles and Guidelines for the Conduct of Microbiological Risk Management (MRM) adopted 1998.

2 Principles and Guidelines for the Conduct of Microbiological Risk Assessment adopted 1999.

2003

Code of Hygienic Practice for Fresh Fruits and Vegetables

2004

Code of Hygienic Practice for Milk and Milk Products

2007

Principles and Guidelines for the Conduct of Microbiological Risk Management (MRM)

Guidelines on the Application of General Principles of Food Hygiene to the Control of *Listeria monocytogenes* in Foods

2008

Guideline for the Validation of Food Safety Control Measures

2010

Guidelines on the Application of General Principles of Food Hygiene to the Control of Pathogenic *Vibrio* Species in Seafood

3. RESPONDING TO EMERGING ISSUES

In 2003 when the CCFH met for the 35th time, a new food safety issue was brought to its attention. A little known pathogen, called *Enterobacter sakazakii*, was on the rise, causing young babies, particularly newborns, to become severely ill. The infections had high mortality rates and severe morbidity. One Codex Member, the United States, prepared a risk profile and brought this information to the Committee.

Taking this new pathogen into consideration together with a request from the Codex Committee on Nutrition and Foods for Special Dietary Purposes to revisit its Code of Hygienic Practice for Powdered formulae and Foods for Special Medicinal Purposes, also because of concerns about pathogens in these foods, CCFH agreed that new work in this area was needed. As little was known about the pathogen, the CCFH asked JEMRA to provide scientific advice on *Enterobacter sakazakii*, particularly in infant formulae. The CCFH established a working group, led by Canada, to consider how they might address this new food safety problem.

In the meantime, JEMRA convened a group of experts to assess the food safety problems caused by *Enterobacter sakazakii* and provide up-to-date scientific advice on how CCFH could proceed. It reported its work to the next session of the CCFH, in 2004, highlighting the extent of the problem and the at risk group

(infants less than one month old, premature babies and those with underlying health problems). With this information, the work of the CCFH began in earnest and an extensive revision of the existing Code of Practice got underway. The Committee asked JEMRA to undertake more detailed risk assessments on how to intervene and minimize the risk of *Enterobacter sakazakii* as well as other pathogens of concern in powdered infant formulae and also to consider the options for and value of microbiological criteria.



Two years later, with new scientific advice and the extensive work by the Canada- led working group, the CCFH was able to make substantial progress, and given the urgency of the issue, submitted the revised code of practice for adoption at Step 5/8. In 2008, the Commission adopted the Code of Hygienic Practice for Powdered Formulae for Infants and Young Children³.



In a matter of four years, the CCFH had completed its work – it had developed the new code of practice and established new microbiological criteria. The focus on this pathogen led to an explosion of research on *Enterobacter sakazakii*, which led to a change in nomenclature. It is now referred to as *Cronobacter* spp. This standard served as the basis for change in regulation and industry practice resulting in a reduction of risk for infants and young children consuming this product.



³ The Codex text notes that while breast milk is internationally recognized as the best source of nutrition for infants, there are instances where it may be insufficient or unavailable.

2011

Guidelines for the Control of *Campylobacter* and *Salmonella* in Chicken Meat

2012

Guidelines on the Application of General Principles of Food Hygiene to the Control of Viruses in Food

2014

Guidelines for the Control of *Taenia saginata* in Meat of Domestic Cattle

2015

Guidelines for the Control of *Trichinella* spp. in Meat of Suidae
Code of Hygienic Practice for Low-Moisture Foods

2016

Guidelines for the Control of Nontyphoidal *Salmonella* spp. in Beef and Pork Meat

Guidelines on the Application of General Principles of Food Hygiene to the Control of Foodborne Parasites

4. COVERING NON-BACTERIAL HAZARDS

Food hygiene is not just about managing bacterial contamination of food. While bacteria tend to be the traditional focus of attention when it comes to microbiological food safety, they are only part of the problem. According to the recent WHO estimates on the global burden on foodborne disease, parasites such as *Taenia solium* and *Toxoplasma gondii* are also notable causes of foodborne disease, particularly in some regions of the world. Improvements in epidemiological and microbiological tools have also highlighted that viruses such as norovirus and hepatitis A virus are significant contributors to foodborne disease.



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Foodborne parasites first came to the attention of the CCFH in 2010 in the context of applying a risk-based approach to the management of two meat-borne parasites - *Trichinella spiralis* and *Cysticercus bovis*. But the Committee also recognized that the risk to consumers from foodborne parasites was broader than this and requested JEMRA to produce a global ranking of foodborne parasites in terms of their risk to human health and impact on international trade. Following this, the CCFH developed Guidelines for the Control of Foodborne Parasites that were adopted in 2016.

The issue of foodborne viruses was first raised at CCFH in the 1990s but there was a lack of data or evidence to proceed and so the work was put on hold. After the turn of the century, this issue came back on the agenda. Improvements in methodology meant that our understanding of viruses was improving and with scientific input from JEMRA the Committee developed Guidelines on the Application of General Principles of Food Hygiene to the Control of Viruses in Food, which were adopted in 2012.

Food hygiene even goes beyond microbiological hazards. From its small beginnings in 1964, the CCFH is expanding to address other critical issues for consumers, where food hygiene measures play an important role in the management of risk, in particular, food allergens.



PROTECTING HEALTH, FACILITATING TRADE

In 1964, nine Codex Alimentarius Commission Member countries and a number of Observer organizations gathered in Washington DC, United States of America to begin building consensus on how to produce food hygienically and, where feasible, set limits for microbial counts in foods. Thanks to the visionary approach of Codex in those early years, knowledge about how to safely prepare and handle food was used to develop standards, providing tools for both national regulatory authorities and the food industry to systematically improve food hygiene. The leaps and bounds made over five decades mean that food can now be safely produced, processed and distributed in greater volumes and over greater distances than ever before.



The Codex Committee on Food Hygiene (CCFH) is one of the ten active general subject committees of the Codex Alimentarius. The Committee, chaired by the United States, drafts basic hygiene-related provisions, including microbiological

specifications that are applicable to all foods. As with all Committees, the texts are proposed to the Codex Alimentarius Commission, which meets annually to adopt the standards.

This publication presents some of the achievements of the CCFH in celebration of its fifty sessions of developing the guidance necessary to ensure the microbiological safety of food. A timeline shows the standards, guidelines and codes of practice that it has created and are in use today. Codex Committees regularly update and revise standards to maintain their relevance and effectiveness.

FOR MORE INFORMATION

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