Sara Mortimore • Carol Wallace

HACCP

A Practical Approach

Third Edition

Revisited with a view of food safety risk reduction

Foreword by William H. Sperber

Springer

Foreword

The 1994 and 1998 editions of *HACCP: A Practical Approach* found a ready audience, particularly among food companies and corporations that were engaged in global commerce and wanted to comply with the recommended codes of practice for food safety management as first published by Codex Alimentarius in 1992. Those particular codes were based upon the Hazard Analysis and Critical Control Point (HACCP) system and Good Hygienic Practices (GHP). As discussed below, the latter is one example of a prerequisite program (PRP) that is a necessary part of the foundation for a successful food safety management system. Because HACCP had emerged and evolved as a voluntary effort of the food industry in the United States beginning in 1971, it seemed natural for food companies to independently acquire knowledge about food safety management from authoritative sources, such as the earlier editions of this book.

Considering the global authority of the Codex codes of practice, as empowered through the World Trade Organization, it is disappointing that more than one decade into the twenty-first century the management of food safety is not better incorporated into the mechanics of the global food supply chain. Given the breadth and complexity of the supply chain, which handles vast quantities of food commodities, ingredients, and products, everyone must understand that the success of international food safety efforts depends upon the development and implementation of:

- Effective food safety practices,
- Sound food safety regulations, and
- Effective governmental and intergovernmental food safety organizations.

Only the first of these points—effective food safety practices—has received sufficient and effective attention at this time. The remaining two points have not been effectively addressed by the responsible parties. Therefore, direct participants in the global supply chain must shoulder the responsibility for food safety as described briefly below. It is reasonable to expect that such action can be effective because most of the knowledge of food safety hazards and the means for their

control resides with the scientists, engineers, and managers in the global food industry.

This third edition of *HACCP: A Practical Approach* is an excellent resource to teach and reinforce effective food safety practices. The authors are highly experienced teachers, researchers, and practitioners of the subject matter; they have extensively updated their original material. The content on prerequisite programs has been considerably increased. These include good agricultural practices (GAP), GHPs, good manufacturing practices (GMP), and a newly proposed PRP—good consumer practices (GCP). GAPs and GCPs in particular make the points that food safety is a "farm-to-table" effort and that everyone has a role in food safety. These are especially important considerations in the case of foods that are typically distributed and consumed raw or undercooked.

The matter of food safety regulations is somewhat beyond the direct scope of this book, but it must be mentioned here because it sometimes affects the ability of the food industry to fulfill its responsibilities to produce safe food. Over the course of the past century a number of effective food safety regulations have been implemented worldwide; these greatly assisted the food industry and improved public health. Prominent examples include regulations for the pasteurization of fluid milk and liquid eggs, the sterilization of canned foods, and the chlorination of drinking water. More recent regulations deal with raw meat and poultry products, fresh seafood, juice products, and produce. Although some of these in the USA are purportedly HACCP regulations, they are actually ineffective and hinder the food industry in its efforts to produce safe food. The cause of food safety was well served in 1972 when industry and government scientists in the USA collaborated to write canned foods regulations, which were based upon HACCP principles. In stark contrast, some recent food safety regulations have been drafted and enacted with the principal input of various politicians, lawyers, lobbyists, think tanks, or consumer advocates; persons inexperienced with food production and food safety management. These regulations have further hindered food safety management and public health education by creating the false expectation that foods typically distributed and consumed raw or undercooked can always be pathogen-free. Sometimes we are confronted with an impractical clamor to declare pathogens in raw foods to be treated as adulterants.

A brief consideration of the matter of effective governmental and intergovernmental food safety organizations demonstrates the necessity for the food industry to take direct control of all aspects of the safety of its products and to not wait for more effective governmental actions or regulations. While we must continue to work to have effective governmental organizations for food safety, progress will come with difficulty. There are about 200 countries in the world. It can accurately be claimed that even some developed countries have dysfunctional food safety organizations. While some countries have effective single food safety agencies, many do not. There is also no effective intergovernmental food safety organization; therefore, coordination at the international level has been defaulted to the global food supply chain, particularly to food corporations, which have a global interest in maintaining a supply of safe food. Should an effective intergovernmental food

safety organization be formed, say in the United Nations, it could ideally coordinate its global activities through the single food safety agencies of each member country.

There is room for optimism that effective actions will eventually be taken to provide effective food safety regulations and organizations. In the meantime the food industry must assume the mantle of food safety leadership. HACCP and effective food safety management procedures began more than 40 years ago as independent food industry efforts. To a very large extent, if they are to continue to produce safe food, members of the global food supply chain must maintain this independent mindset that they bear the principal responsibility for food safety. Food producers, processors, distributors, handlers, and consumers must collectively understand and exercise their shared responsibility for food safety. This third edition of *HACCP: A Practical Approach* will be an excellent tool to assist their efforts.

William H. Sperber
Minnetonka, MN.
USA

Acknowledgements

We are indebted to the following people for their valued input into this book:

William. H. Sperber, Cargill Inc. USA; Retired.
Ben Warren, Land O'Lakes, Inc. USA.
Wynn Wiksell, General Mills, Inc. USA.
William Glasse, Ab Agri Ltd. UK.
Tim Oliver, Ab Sustain Ltd. UK.
Simon Williams, Agricultural Industries Confederation. UK.
Gillian Kelleher, Wegmans Food Markets, Inc. USA.
Paul Marra, Wegmans Food Markets, Inc. USA.
Andrew Kerridge, Burger King, UK.
Alison Gardner, Waitrose, UK.
John Holah, Campden BRI, UK.
Erica Sheward, The Better Regulation and Delivery Office,
Department of Business Innovation and Skills, UK

Cartoons

Wynn Roberts and Richard Stromwall

HACCP Case Study Contributors

A.1 Fancy Feeds—Kathy Haines and Anthony Vojta, Land O'Lakes, Inc. USA.
A.2 Flour—Joe Shebuski, Cargill Inc. USA.
A.3 Butter Town—Judy Fraser-Heaps and Jeff Balousek, Land O'Lakes, Inc. USA.
A.4 Burger King—Andrew Kerridge, Burger King.
A.5 Permission to include detail from UCLan HACCP plans—Andrew Coverdale, University of Central Lancashire, UK.

A.6 When having a HACCP plan is not enough—Case study based on the September 2005 Outbreak of *E. coli* O157:H7 in South Wales, UK—Chris Griffith, Cardiff Metropolitan University, UK and Von Holy Consulting, South Africa.
A.7 Learning from Major Incidents—Salmonella in Cadbury's Chocolate 2006—Nick Lowe, Birmingham City Council, UK.

Pathogen Profiles Contributors

Bacterial Pathogens—Bruce Tompkin, Retired (Con Agra) food safety system expert, LaGrange, Illinois, USA.

Toxigenic Fungi—Ailsa Hocking, CSIRO Food and Nutritional Sciences, CSIRO Riverside Life Sciences Centre, 11 Julius Avenue, North Ryde, NSW, 2113, Australia.

Viruses—Gail Greening, ESR (Institute of Environmental Science and Research) Kenepuru Science Centre, New Zealand.

Additional coordination support on Pathogen Profiles—Cathy Moir, CSIRO Food and Nutritional Sciences, CSIRO Riverside Life Sciences Centre, 11 Julius Avenue, North Ryde, NSW, 2113, Australia.

Finally, we remain grateful to the contributors to the first and second editions of *HACCP: A Practical Approach*, many of which remain in this third edition.

About this book

HACCP: A Practical Approach, third edition has been updated to take into account current best practice and new developments in HACCP application since the last edition was published in 1998. This book is intended to be a compendium of up-to-date thinking and best practice approaches to the development, implementation, and maintenance of HACCP programs for food safety management.

Introductory chapters set the scene and update the reader on developments on HACCP over the last 15 years. As with the previous editions, we cover the preliminary stages of HACCP including preparation and planning and system design before moving on to consider food safety hazards and their control. Prerequisite program (PRP) coverage has been significantly expanded in this new edition reflecting their development as key support systems for HACCP. The HACCP plan development and verification and maintenance chapters have also been substantially updated to reflect current practice and a completely new chapter on application within the food supply chain has been added. Appendices provide a new set of case studies of practical HACCP application plus two completely new case studies looking at lessons learned through food safety incident investigation. Pathogen profiles have also been updated by experts to provide an up-to-date summary of pathogen growth and survival characteristics that will be useful to HACCP teams.

Whilst some readers may wish to read the book from cover to cover, we anticipate that many readers will dip into the specific sections, chapters, and appendices at different parts of their food safety journey. The book is written both for those who are developing HACCP systems for the first time and for those who need to update, refresh, and strengthen their existing systems. New materials and new tools to assist the HACCP team have been provided and we have included the current situation on issues that are still undergoing international debate, such as operational PRPs. All tools such as decision trees and record-keeping formats are provided to be of assistance and are not obligatory to successful HACCP. Readers are guided to choose those that are relevant to their situations and which they find are helpful in their HACCP endeavors.

About the Authors

Sara Mortimore is a British citizen but has lived and worked in the USA since 2002. She started her career with Glaxo SmithKline, working as a Research Technologist and then moved to a division of Croda International where she again worked in R&D before transitioning into Quality Assurance. In 1989 she joined Grand Metropolitan Foods which later became Pillsbury and subsequently was incorporated by General Mills Inc. She stayed there for close on 19 years moving through a series of global assignments all in Food Safety and Quality, including Food Safety Manager for GrandMet Foods Europe, Quality Director for Pillsbury Europe, Quality and Regulatory Operations Director for General Mills International and, finally, as a director in Global Sourcing Development. During this time she gained a deep cultural understanding of the attitudes and behaviors of people towards food safety in manufacturing throughout the world.

Sara joined Land O'Lakes in 2008 and is currently Vice President of Product Safety, Quality Assurance and Regulatory Affairs with enterprise-wide responsibility encompassing food, animal feed, and crop protection systems. She is the coauthor of several successful books on HACCP and food safety management.

Carol Wallace is Principal Lecturer, Food Safety Management and Codirector of the International Institute of Nutritional Sciences and Applied Food Safety Studies at the University of Central Lancashire, UK. She is Course Leader for postgraduate food safety and HACCP programs and leads research themes in food safety effectiveness. Having entered the food industry as a microbiology graduate in 1985, she very soon became involved in the early days of HACCP, working in manufacturing with Express Foods Group/GrandMet Foods Europe and in retail at Sainsbury's. She then moved to the consultancy, training, and audit organization, Reading Scientific Services Ltd, where she was General Manager of the Food Safety Consultancy, Training and Assessment Services, including RSSL's *Select QA*, one of the first certification bodies providing audits under the BRC Scheme. These positions allowed her to gain 20 years practical experience of food safety management systems in practice in the UK and international food industry prior to joining academia in 2004. She gained a PhD for her study of factors impacting HACCP effectiveness and continues to work closely with international food companies and organizations for the ongoing improvement of food safety standards.

Contents