

FOOD MICROBIOLOGY AND
HYGIENE, V. 1. 2ND ED.

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FOOD MICROBIOLOGY AND HYGIENE

Second Edition

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HAYES

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SECOND EDITION

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ELSEVIER APPLIED SCIENCE



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Second Edition

PREFACE TO THE SECOND EDITION

The aims of this book remain the same, that is, that it should be of interest to all those people concerned with, or about, food hygiene in the broadest sense.

There was clearly a need for a book of this sort and its success has necessitated a second edition. It will, I hope, answer criticisms that were justifiably made about certain omissions and shortcomings levelled at the earlier edition. The whole book has been thoroughly revised with the introduction of several new sections to various chapters.

During the time that has elapsed since the earlier edition appeared there has been much publicity about newer forms of 'food poisoning'. Thus listeriosis is discussed in some detail whilst the problems of salmonellas in eggs and BSE are also considered. Interest in irradiated foods has waxed and waned but it is rightly included in the relevant chapter. There has been much progress in methodology with the advent of advanced molecular techniques such as gene probes and that of PCR; these are discussed briefly.

I have included sections on HACCP which has come into great prominence in recent years thus answering a specific criticism made of the earlier edition. The chapter on water and waste disposal contains material on Legionnaires' disease and cryptosporidiosis, infections of much concern at the present time. Finally, the chapter on legislation has undergone a major revision with far greater emphasis being placed on EC food hygiene legislation.

I have again received much help from experts in their field whom I acknowledge here; without them this book could not have been written.

Finally, I reiterate that I take full responsibility, as before, for any errors or omissions.

Additional acknowledgements for the second edition

I should again like to acknowledge the invaluable help given to me by many individuals and organisations.

I wish to express my gratitude to: Miss Dorothy Flowerdew and her colleagues at the Leatherhead Food Research Association for once again supplying vital information and advice on national food legislation and microbiological standards on those countries included in this book; Professor L. Wassermann, Ulmer Spatz, Neu-Ulm, Germany, for further help on German food legislation; David Timperley, Campden Food and Drink Research Association, for again devoting so much time in advising me on the intricacies of food equipment design; Dr Tony Baird-Parker, Unilever, for help on HACCP; and Dr Richard Gilbert, Public Health Laboratory Service, for supplying me with food poisoning statistics.

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Pollution Control (M. Shore *et al.*), and the Public Health Laboratory Service for data from PHLS Reports.

Thanks are also due to my departmental colleagues including Kevin Kerr, Jerry Knapp and Richard Lacey who, in their different ways, made contributions to this book. Particular thanks are due to Freddie Webster, not only for her skills on the word processor, but also for her extreme patience with me over a long period of hard work. Finally, I should like to thank my wife, Rita, for her stoicism in carrying out, so conscientiously, the onerous duties of proof-reading.

P. R. Hayes

PREFACE TO THE FIRST EDITION

Books on food hygiene and its various ramifications are scarce and when I was approached by the publishers to write this book I felt that it might answer a need. That need was for a book to be written in a language that was intelligible to all those involved in food hygiene and also, I hoped, to the layman.

My interest in food hygiene goes back many years to when I worked in the food processing industry as a food bacteriologist. I realized then that so many different disciplines with their often divergent viewpoints were involved in this subject and that it was necessary to reconcile these differences to achieve the best results. This is not always as easy as it seems: engineers and microbiologists, architects and chemists, production managers and quality controllers do not talk the same language but they must be made to where food hygiene is concerned.

Being a microbiologist I must confess to some bias. I hope, however, that over the years I have been associated with the food processing industry I have come to appreciate food hygiene objectively and can make suggestions that resolve rather than exacerbate conflicting interests.

The first four chapters deal almost exclusively with microbiological aspects. The basic principles are presented initially so that the following three chapters dealing, respectively, with food poisoning, food spoilage and microbiological examining methods can be more readily understood by the uninitiated. The chapters following consider factory design, construction and more detailed factory layout, and the design of food processing equipment. The chapter on quality assurance and production control includes a review of critical points in selected food processes;

this reflects a recurrent theme of this book, that of practicability—there are many constraints applied in the industrial world which are often not fully appreciated by the theoretician but, so often, the simple modification can be made which improves product quality.

The vitally important area of cleaning and disinfection is covered next as methods and their practical application. The most sophisticated and expensive cleaning methods are vitiated if equipment design, factory layout, etc. are inadequate; these chapters are therefore linked with those preceding. The final three chapters cover the disparate subjects of waste disposal, training and legislation. The last-named topic is reviewed particularly in relation to food hygiene legislation. This clearly cannot be presented in detail but it is useful to compare the philosophies of selected countries on this topic.

The book should have wide interest and is directed towards the myriads of people involved in food hygiene. Included are factory architects, builders, designers of food processing machinery, engineers, senior management in the food industry, microbiologists, hygiene officers, Environmental Health Officers, medical officers, chemists, caterers, educationalists and members of the legal profession.

The material covered is diverse and this book could not have been completed without the generous help of many experts more knowledgeable than I in their particular subjects. However, I am the sole author and take full responsibility for it; any errors or omissions are entirely due to my shortcomings and should not be levelled at those acknowledged elsewhere.

Acknowledgements for the first edition

It is a pleasure to acknowledge the help given to me by colleagues and other individuals, research establishments and firms during the preparation of this book.

Thanks are due to my departmental colleagues for undertaking many of my duties during my absence; I should also like to note the help given by colleagues, Mr J. Lamb and Dr H. G. Muller, in the Procter Department of Food Science.

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P. R. Hayes

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