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Introduction

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The development of mathematical expressions to describe the behavior of microorganisms has been an integral, though sometimes arcane part of the history of microbiology. While there has been a core of researchers that have provided continual advances in predictive microbiology over the past 100 years, conceptual advances tended to lag behind the rapid development characteristic of many areas of microbiology. However, the field has been stimulated recently by a series of important conceptual breakthroughs, a number of which are highlighted in the presentations that follow. These advances, coupled with the widespread introduction of powerful microcomputers, has led to dramatic advances in predictive microbiology during the past several years. Nowhere has this progress been more evident than in the development and application of computer modeling techniques to food microbiology. As the result of an international research effort, there has been phenomenal progress in the development of practical modeling techniques that can be applied to the food industry. These methods promise to change the way we look at the microbiological safety and quality of foods.

A critical foundation underpinning the recent advances in predictive food microbiology has been the acquisition of sound quantitative data on the behavior of microorganisms in foods and model systems. The enormity of the task has mandated that the research be international in scope; a factor that has strengthened the science, but at times hampered the transfer of these new technologies to the food industry. As a means of overcoming this limitation, the Society for Industrial Microbiology graciously served as host of the first in what will hopefully be a series of international workshops on the 'Application of Predictive Microbiology and Computer Modeling Techniques to the Food Industry.' Held in April, 1992, the workshop included participants from 15 countries, and covered topics that ranged from basic research advances to strategies for industrial applications of the new technologies. The following represents the proceedings from that conference along with invited manuscripts by several of the scientists who volunteered posters at the conference. Additionally we have included abstracts of posters that were volunteered by participants from around the world. We would like to extend our sincere appreciation to each of these participants for sharing the high quality of research that is provided in this publication.

The workshop and these proceedings are the culmination of many months of hard work by a group of dedicated volunteers. We would like particularly to acknowledge the critical contributions by the workshop program advisory committee: M. Cole (Unilever Research), K. L. Dodds (Health & Welfare Canada), W. Garthright (US Food & Drug Administration), M. Griffiths (University of Guelph), T. McMeekin (University of Tasmania), D. A. Ratkowsky (Tasmania Primary Industries Laboratory), T. A. Roberts (AFRC Institute for Food Research), J. L. Smith (USDA Agriculture Research Service), G. Somkuti (USDA Agriculture Research Service), and K. Swanson (Pillsbury/Grand Metropolitan). We are also indebted to the corporations and government agencies that recognized the importance of this new area by graciously providing support, including Armour-Swift-Echkrich Inc., Best Foods of CPC International, Campbell Soup Co, Food Directorate of Health & Welfare Canada, T. J. Lipton Co., Grand Metropolitan/Pillsbury, Malthus Instruments Ltd, Silliker Laboratories, Unilever Research, USDA Agricultural Research Service, and USDA Food Safety & Inspection Service. Their contributions helped facilitate the exchange of scientific ideas that benefit both industry and society. We would like to also recognize the contributions of the scientists listed below who served as manuscript reviewers. Finally, we wish to thank the officers and staff of the Society for Industrial Microbiology, without whom neither the conference nor this publication would have been realized.

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