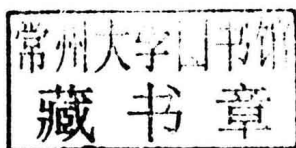


# Biofilms in the food and beverage industries

Edited by Pina M. Fratamico, Bassam A. Annous  
and Nereus W. Gunther IV

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**Pina M. Fratamico, Bassam A. Annous and**  
**Nereus W. Gunther IV**



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## **Biofilms in the food and beverage industries**

## Related titles:

*Foodborne pathogens: Hazards, risk analysis and control Second edition*  
(ISBN 978-1-84569-362-6)

Effective control of pathogens continues to be of great importance to the food industry. The first edition of *Foodborne pathogens* quickly established itself as an essential guide for all those involved in the management of microbiological hazards at any stage in the food production chain. This major new edition strengthens that reputation, with extensively revised and expanded coverage, including more than ten new chapters. Chapters in Part I cover pathogen detection, microbial modelling, the risk assessment procedure, pathogen control in primary production, hygienic design and sanitation, among other topics. Parts II and III then review the management of key bacterial and non-bacterial foodborne pathogens.

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# Preface

Normally, the presence of biofilms on food and on food contact surfaces negatively impacts food quality and safety. Compared to non-attached cells, biofilm-associated bacteria are more resistant to inactivation by antimicrobial compounds and biocides, as well as to physical and chemical stresses. Through the use of sophisticated imaging techniques and molecular analysis methods, great advances have been made in understanding the dynamics of biofilm formation and the influence of environmental factors and cell-to-cell signaling processes in modulating biofilm development. A clearer understanding of the conditions and factors that promote biofilm formation by spoilage and pathogenic bacteria will help in the development of novel control strategies to enhance food safety and quality.

The purpose of this book is to provide a comprehensive reference covering a variety of aspects of microbial biofilms. The chapters in Part I of the book present an introduction on biofilm formation and related problems for the food and beverage industry. Other chapters focus on the ecology and characteristics of biofilms, molecular mechanisms of biofilm formation, and methods for imaging, sampling, and quantifying biofilms. There is also a chapter describing a centralized database that will assist researchers who are studying biofilms and the role of quorum sensing, as well as methods to control biofilms by modulating quorum sensing processes. Part II has chapters on biofilm formation by specific organisms, including spoilage microorganisms, spore formers, *Listeria*, *Salmonella*, and Gram-positive bacteria. The third part has chapters on prevention of biofilms and on methods for their inactivation and removal. The final section focuses on issues related to biofilms in various food commodities, including red meats, dairy products, produce, fish, poultry, and beer and also includes a chapter on industrial applications of biofilms.

We, the editors, hope that this book will serve as a valuable reference source for research scientists in the food industry, academia, and government, graduate students, regulatory agencies, and individuals interested in learning more about biofilms. We also anticipate that the information presented in the various chapters written by a distinguished international group of scientists will stimulate ideas for interdisciplinary research efforts.

We gratefully acknowledge the assistance of Dr James L. Smith in reviewing the chapters, and we also extend heartfelt thanks to the authors of the various chapters in this book for contributing their time, knowledge, and expertise to this endeavor. It has been a pleasure working with such a fine group of professionals.

*Pina M. Fratamico, Bassam A. Annous, and Nereus W. Gunther IV*

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