

Preface

Systems biology has greatly increased our understanding of many cellular functions and cell–cell interactions. Our awareness of the enormous range of activities performed by microorganisms has been greatly enhanced by major developments in the fields of genomics, proteomics and transcriptomics. However, understanding these functions does not fully describe the global metabolic features of single cells or cell populations (mono-specific or multi-species). Characterization of the metabolome brings us closer to the phenotype of the cell and more closely reflects the activities of microbes in response to environmental stimuli.

Microbial metabolomics is an emerging field that has developed rapidly in recent years. This development has been paralleled and supported by important advances in analytical instrumentation and technologies, in particular chromatographic and mass spectrometric methods, coupled with new and more powerful computational tools.

This book brings together contributions from global experts from diverse areas that have facilitated the exciting advances in microbial metabolomics, with special attention given to the development of relevant hardware and software platforms. Thus, the principles of these technologies will be a major focus of the book.

The main application of metabolomics is likely to be in the field of clinical and veterinary microbiology with a focus on disease-causing microorganisms. However, there is a great potential to apply metabolomics to help better understand complex biological systems that are dominated by multi-species microbial populations exposed to changing growth and nutritional conditions. In particular, environmental (e.g. water and soil), food (e.g. microbial spoilage and food pathogens), agriculture and industrial applications are seen as developing. As such, this book looks at the application metabolomics from clinical, environmental and industrial perspectives.

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Microbial Metabolomics

Applications in Clinical, Environmental, and Industrial
Microbiology

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2016, VII, 321 p. 29 illus., 24 illus. in color., Hardcover

ISBN: 978-3-319-46324-7