

PREFACE

Quorum sensing is a relatively new field introduced to the scientific world in the early 1990s. This phenomenon can be defined as bacterial communication and regulation of their group behavior through the use of a wide range of chemical signals. This topic has gained a lot of importance in the scientific community because of its ability to regulate several functions such as virulence factor, biofilm formation, exopolysaccharide production, antibiotic production, plasmid conjugal transfer, and pigmentation among others. Recently, quorum sensing has gained the attention of many scientists and it is becoming an important issue for many application areas having significant importance in health care, agriculture, and the environment. The signaling molecules involved in quorum sensing occur at very low concentrations but accumulate until a threshold concentration is reached for a collective bacteria behavior to be observed. These signaling molecules require very sensitive analytical methods/techniques for their identification and quantification.

Due to the importance of the quorum-sensing topic, this comprehensive book has been prepared. This book is aimed at providing important information for all scientists working on quorum sensing and mainly on quorum quenching in membrane bioreactors, and the qualitative and quantitative determination of quorum-sensing signals. This book is divided into seven chapters, with each focused on a specific topic to cover diverse perspectives of the main topic. The subtopics presented in the book include water chemistry and properties, definition of quorum sensing with its accompanied main effects, different ways of inhibiting quorum sensing or in other terms quorum quenching, membrane bioreactor technology for wastewater treatment, removal of specific contaminants, and microextraction techniques for sensitive determination of analytes. Thus, this book can be viewed as a combination of two main fields of science such as analytical chemistry and environmental engineering. With quorum sensing as the focal topic of this book, the history, current trends, and future prospects have been covered in four chapters.

Editors took the responsibility of writing three chapters of the book and the other chapters were contributed by expert scientists in their respective fields. Chapters of the book are presented in an orderly manner, but each chapter is written to be independent from the others.

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