

Microbial Ecology of Activated Sludge

Edited by
Robert Seviour and Per Halkjær Nielsen



Publishing
London • New York

Table of contents

Preface	vii
Contributors	xi
1 AN OVERVIEW OF THE MICROBES IN ACTIVATED SLUDGE	1
2 THE ACTIVATED SLUDGE PROCESS	57
3 MICROBIAL COMMUNITIES IN ACTIVATED SLUDGE PLANTS	95
4 PROTOZOA IN ACTIVATED SLUDGE PROCESSES	127
5 FACTORS AFFECTING THE BULKING AND FOAMING FILAMENTOUS BACTERIA IN ACTIVATED SLUDGE	139
6 THE CURRENT TAXONOMIC STATUS OF THE FILAMENTOUS BACTERIA FOUND IN ACTIVATED SLUDGE PLANTS	169
7 MICROBIOLOGY OF BULKING	191
8 FOAMING	215
9 THE MICROBIOLOGY OF NITROGEN REMOVAL	259
10 THE MICROBIOLOGY OF PHOSPHORUS REMOVAL	281
11 METHODS FOR THE EXAMINATION AND CHARACTERIZATION OF THE ACTIVATED SLUDGE COMMUNITY	321
11.1 Microscopy and microscopic examination of activated sludge	322
11.2 Preparation of specimens for microscopy	329
11.3 Stains used for examination of activated sludge samples	331
11.4 Isolation of filamentous bacteria from activated sludge	341
11.5 Collection of data from microscopic analysis and use of worksheets	342
11.6 DNA and RNA extraction	343
11.7 Polymerase chain reaction (PCR) technology	350
11.8 Clone library generation	360
11.9 FISH probes and their design	370
11.10 Microautoradiography (MAR)	393
11.11 Microarrays for studying composition and function of communities	397

11.12	Terminal restriction fragment length polymorphism (T-RFLP)	412
11.13	PCR-DGGE	421
11.14	Stable isotope probing	427
11.15	Flow cytometry	439
11.16	Microsensors	448
12	DESCRIPTIONS OF ACTIVATED SLUDGE ORGANISMS	453
13	COLOUR IMAGE SECTION	489
14	REFERENCE LIST	537
Index	643