
Contents

Chapter 1

Microbiology and Biogeochemistry of Halophilic Microorganisms –

An Overview..... 1

A. Oren

Section I Diversity and Ecology

Chapter 2

Diversity of Members of the Family *Halobacteriaceae*..... 13

M. Kamekura

Chapter 3

Contribution of Molecular Techniques to the Study of Microbial

Diversity in Hypersaline Environments 27

F. Rodríguez-Valera, S.G. Acinas, and J. Anton

Chapter 4

The Microbial Ecology of Solar Salt Plants..... 39

C.D. Litchfield, A. Irby, and R. H. Vreeland

Chapter 5

Considerations for Microbiological Sampling of Crystals from

Ancient Salt Formations..... 53

R.H. Vreeland and D.W. Powers

Chapter 6

Poikilotrophic Response of Microorganisms to Shifting Alkalinity,

Salinity, Temperature and Water Potential..... 75

A.A. Gorbushina and W.E. Krumbein

Section II Biogeochemistry

Chapter 7

- Hypersaline Depositional Environments and their Relation to Oil Generation 89
Z. Aizenshtat, I. Miloslavski, D. Aschengrau, and A. Oren

Chapter 8

- Field Evidence for ^{13}C Depletion Due to Atmospheric CO_2 Invasion in Hypersaline Microbial Mats 188
N. Gazit-Yaari, B. Lazar, and J. Erez

Section III The Dead Sea

Chapter 9

- The Dead Sea — A Terminal Lake in the Dead Sea Rift: A Short Overview 121
I. Gavrieli, M. Beyth, and Y. Yechieli

Chapter 10

- The Rise and Decline of a Bloom of Halophilic Algae and Archaea in the Dead Sea: 1992–1995 129
A. Oren

Chapter 11

- Studies on the Microbiota of the Dead Sea — 50 Years Later 139
A. Ventosa, D.R. Arahal, and B.E. Volcani

Chapter 12

- Radiotracer Studies of Bacterial Methanogenesis in Sediments from the Dead Sea and Solar Lake (Sinai) 149
M.M. DiPasquale, A. Oren, Y. Cohen, and R.S. Oremland

Section IV Ion Metabolism and Osmotic Regulation

Chapter 13

- The Molecular Mechanism of Regulation of the Na^+/H^+ Antiporter of *Escherichia Coli*, a Paradigm for an Adaptation to Na^+ and N^+ 163
E. Padan

Chapter 14

- The Biochemistry and Genetics of the Synthesis of Osmoprotective Compounds in Cyanobacteria 177
M. Hagemann, A. Schoor, S. Mikkat, U. Effmert, E. Zuther, K. Marin, S. Fulda, J. Vinnemeier, A. Kunert, C. Milkowski, C. Probst, and N. Erdmann

Chapter 15

- Compatible Solutes: Ectoine Production and Gene Expression 187
E.A. Galinski and P. Louis

Chapter 16

- New Insights into the Extreme Salt Tolerance of the Unicellular Green Alga *Dunaliella* 203
I. Gokhman, M. Fisher, U. Pick, and A. Zamir

Section V Biochemistry and Molecular Biology

Chapter 17

- What is Halophilic and What is Archaeal? 217
D.J. Kushner

Chapter 18

- Molecular Interactions in Extreme Halophiles — The Solvation-Stabilization Hypothesis for Halophilic Proteins 227
C. Ebel, P. Faou, B. Franzetti, B. Kernel, D. Madern, M. Pascu, C. Pfister, S. Richard, and G. Zaccai

Chapter 19

- New Insights into the Molecular Enzymology of Pyruvate Metabolism in the Halophilic Archaea 239
M.J. Danson, K.A. Jolley, D.G. Maddocks, M.L. Dyall-Smith, and D.W. Hough

Chapter 20

- Regulation of Gene Expression in *Halobacterium Salinarum*: The *arcrACB* Gene Cluster and the TATA Box-Binding Protein 249
J. Soppa, P. Vatter, A. zur Mühlen, T. Link, and A. Ruepp

Chapter 21

- Cloning, Sequence and Heterologous Expression of *bgaH*, a
Beta-Galactosidase Gene of "*Haloferax alicantei*" 265
M. Holmes and M.L. Dyall-Smith

Chapter 22

- What Do Extreme Halophiles Tell Us About the Evolution of the
Proton-Translocating ATPases? 273
L.I. Hochstein and R. Bogomolni

Chapter 23

- Comparative Analysis of the Halobacterial Gas Vesicle Gene Clusters 281
F. Pfeifer, A. Mayr, S. Offner, and R. Röder

Chapter 24

- Halocins: Protein Antibiotics from Hypersaline Environments 295
R.F. Shand, L.B. Price, and E.M. O'Connor

Section VI Genetics and Genomics

Chapter 25

- Evolutionary Origins of the Haloarchaeal Genome 309
R.L. Charlebois

Chapter 26

- Expression of Ribosomal RNA Operons in Halophilic Archaea 319
P.P. Dennis

Chapter 27

- A Model for the Genetic Exchange System of the Extremely
Halophilic Archaeon *Haloferax volcanii* 331
R. Ortenberg, R. Rechlet, and M. Mevarech

- Index 339