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KIENE, R. P., P. T. VISSCHER, M. D. KELLER, AND G. O. KIRST [eds.].
 1996. **Biological and environmental chemistry of DMSP
 and related sulfonium compounds.** Plenum Press. 426 p.
 US\$144. ISBN 0-306-45306-1.

Volatile sulfur gases, such as hydrogen sulfide, dimethyl sulfide (DMS), carbonyl sulfide, and methane thiol, are produced by a variety of aquatic plants and microorganisms. They are important components of the global sulfur cycle—particularly in the atmosphere, where approximately half of the sulfur pool is made up of materials derived from biological transformations that take place in soils and aquatic systems. Reduced sulfur gases (e.g., DMS) are oxidized in the atmosphere, contributing to atmospheric acidity and ultimately to acid precipitation. DMS also stimulates cloud condensation and thereby influences the temperature of the Earth.

Of all the volatile sulfur gases, DMS has received the most research attention because it accounts for about 90% of biogenic sulfur emissions. The main precursor of DMS is thought to be dimethylsulfoniopropionate (DMSP), which was extracted from red and green algae over 45 years ago (Challenger and Simpson 1948). Interest in the production and fate of DMSP in aquatic ecosystems has grown steadily since the 1970s, when scientists suggested a link between DMS and global climate variation over geologic time scales (Lovelock et al. 1972). It is produced and concentrated within cells to help maintain osmotic balance, and extremely high DMSP production rates are observed in the ocean during some phytoplankton blooms. As phytoplankton die or are grazed by microzooplankton, DMSP is converted to DMS by both bacterial activity and via a membrane-bound algal DMSP lyase enzyme that is found inside or on the cell surface of some phytoplankton cells and that is released when algal cells are lysed. Understanding the biogeochemical role of oceans in cycling of DMSP requires consideration of both its production by phytoplankton and its loss through free enzyme- and bacterially-mediated transformations in seawater and sediments. The complex linkages and feedbacks between DMSP production and potential DMS release to the atmosphere has resulted in a dy-

namic research arena focused on exploring the production, fate, and transformation mechanisms of DMSP.

This book provides a thorough overview of the biogeochemistry of DMSP and other sulfonium compounds. It includes papers originally presented at the “First International Symposium on DMSP and Related Sulfonium Compounds” (Mobile, Alabama, June 1995). The diverse array of DMSP-related topics in this volume can be grouped into seven broad categories: historical overview, methodology, DMSP in phytoplankton and higher plants, DMSP physiology, DMSP in zooplankton and fish, microbial aspects of DMSP cycling, and DMSP biogeochemistry. Coverage of each of these areas is comprehensive and current as of 1995. Overall, the format and content are more than adequate. I found a few copy-editing errors (e.g., figure captions switched on pp. 281 and 282, and incorrectly labeled intermediates in a reaction series on p. 325) and these could confuse someone exploring DMSP biogeochemistry for the first time.

Despite these flaws, I recommend this book strongly. It will be indispensable to anyone working on DMSP and sulfur cycling. Parts of it will also be of interest to those working in the broader fields of biogeochemistry, terrestrial and aquatic ecology, and microbial ecology.

Samantha B. Joye

Department of Marine Sciences
 The University of Georgia
 Athens, Georgia, 30602-3636

References

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