VIRUS METHODOLOGY

***Methods in Environmental Virology.* Edited by Charles P. Gorba and Sagar M. Goyal. Pp. 378. ISBN 0-8247-1829-1. (Marcel Dekker: 1982) $59.50**

The purpose of this book is to "put into one document a concise review of available methodology for studying viruses in the environment." To accomplish this, the editors have assembled an outstanding selection of experts, each of whom discusses viral isolation problems associated with different aspects of the environment. The first three chapters (Rao, Smith and Gorba, and Goyal) are concerned with general topics: introducing the subject, explaining the importance of knowing the type and number of viruses found in water, waste water, food, and aerosols. Although recreational water is not highlighted as a problem area, the topic is discussed. General problems and techniques are then discussed and compared with the intent of bringing a fairly knowledgeable reader up to date. Specific references are provided for pursuing any unresolved questions. In the same manner, Chapter 3 treats the problems associated with the collection and preservation of samples.

Chapters 4 (Goyal and Gerba) and 5 (Farah and Bitton) deal with concentration of viruses using membrane filters and other techniques. Membrane filter techniques are thoroughly described, including the use of cellulose-diatomaceous earth mixtures sometimes referred to as series S, zeta-plus filters. Potable water, sewage, and seawater problems are discussed, as are the general problems associated with viral adsorption and elution. The importance of reconcentration after elution is stressed, and a table comparing methods in terms of efficiency and applicability is presented. Chapter 5 discusses non-membrane techniques in more detail, giving specific techniques and specifying the starting material, ranging from sewage to tap water, after elution from a microporous filter.

The procedures discussed in Chapters 4 and 5 can be and are described in terms of efficiency of isolation and concentration, offering a certain degree of quantitative capability. The techniques described in Chapter 6 (Gerber, soil and aquatic sediment), 7 (Farrah, sludge particles), and 8 (Sobsey, solid waste landfill leachates) all deal with viruses associated with particles and concentrate strictly on detection. Chapter 6 might better be entitled "Detection of virus in soil and marine (rather than "aquatic") sediments" since, as the author points out, freshwater sediments have not been examined. These chapters stress detection and isolation rather than quantification of viruses as does the rest of the book. Thus, detection of viruses and fomites is discussed in Chapter 9 by England, in Chapter 10 by Larkin (foods), and in Chapter 11 by Sobsey (shellfish). In all cases, the authors describe current procedures and provide references for specific details.

Chapters 12 and 13 differ from the above and from one another. Chapter 12 (Spendlove and Fannin) not only discusses methods of characterization of virus aerosols, but also the significance of viruses in the air, methods of aerosolizing, sampling, and virus aerosol models. Chapter 13 (Stagg) provides a discussion of the theory of viral disinfection but does not identify specific procedures or references for disinfection.

The book accomplishes its purpose and provides a well-documented, well-referenced review of virus methodology.

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MICROBES AS CHEMISTS

***Biotechnology: A Comprehensive Treatise in 8 Volumes. Volume 3. Biomass, Microorganisms for Special Applications, Microbial Products I, Energy from Renewable Resources.* Edited by H. J. Rehm and G. Reed. Volume edited by H. Dellweg. pp. 642. ISBN 0-89573-043-X. (Verlag Chemie: 1983) $309.**

The bulk of the third volume in this series covers primary microbial products including single cell protein (SCP), lignocellulose as an alternate feedstock, and microbial technology in the food and agriculture industries. It is with eager anticipation that I went through the volume, particularly since it covers all the traditional fermentation industries that are being impacted by recombinant DNA technology. What is refreshing particularly to U.S. readers is the selection of authors commissioned to write the chapters; they are all very well known authorities in their respective fields, but most of them are European.

Single cell protein production is covered in detail and organized in chapters by substrate: carbohydrates, alkanes, C-1 compounds, and carbon dioxide (algae). Of particular interest was a chapter concluding this section on edible mushrooms by František Zadražil and Klaus Grabbe from the Institut für Bodenbiologie in Braunschweig, West Germany. Mushroom cultivation is discussed, including the cultivation of *Coprinus*. In the SCP chapters, using carbohydrates as a carbon source for the production of Baker's yeast is also discussed. (Interestingly, the word "biomass" is used for SCP, and the term SCP is hardly ever used in this section.)

Since the editors claim that the series is a "comprehensive treatise," I would have expected more in-depth coverage. I really do not think a detailed discussion of how many NADP's were used in forming protein from glucose was justified. Greater attention could have been given to the use of various substrates of historic and current interest in SCP production, such as sulfite liquor derived from the alkaline pulping of wood. Torula yeast was mentioned but not detailed. (Torula yeast, formerly part of the *Torulopis* genus, is now classified as part of *Candida*.) It should have been discussed because it is one of the few SCPs approved by the United States Food and Drug Administration for human consumption. (It was approved because it can be used to ferment sulfite liquors which contain five carbon sugars.) Mention should have been made of recovery