

## BOOK REVIEW

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### Review of *Industrial Chemical Exposure: Guidelines for Biological Monitoring*

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**REFERENCE:** Lauwerys, R. R., *Industrial Chemical Exposure: Guidelines for Biological Monitoring*, Biomedical Publications, P.O. Box 495, Davis, CA 95617, 1983, 150 pp., \$16.50, paperback.

Traditionally, industrial hygienists have sought to prevent excessive exposure to chemicals in industry by setting standards for concentrations of chemicals in ambient air. Standards for chemicals in air applied by the American Conference of Governmental Industrial Hygienists include: the maximum allowable concentration (MAC), the threshold limit value (TLV), and the emergency exposure limit (EEL). However, the monitoring of air concentrations only considers exposure by inhalation and is not indicative of the actual uptake or total body burden of chemicals by exposed workers. During the past 20 years numerous procedures have been developed for the analysis of industrial chemicals in biological specimens collected from workers. Such biological monitoring takes into consideration absorption of chemicals by all routes of absorption and differences in individual exposures. The goal of biological monitoring is to detect excessive exposure in workers before the occurrence of detectable adverse health effects.

This small, but highly informative book summarizes current toxicokinetic data relevant to the biological monitoring of industrial chemicals. The book is divided into four chapters. The first chapter introduces the objectives, principles, conditions, and limitations of biological monitoring. The next two chapters consist of monographs of over 80 specific inorganic, organometallic, and organic chemicals of concern to industrial hygienists that are candidates for biological monitoring.

Compounds discussed include: 16 toxic metals (for example, beryllium, cadmium, nickel, and thallium); unsubstituted aliphatic and aromatic hydrocarbons (for example, *n*-hexane, benzene, and styrene); halogenated hydrocarbons (for example, methylchloride and vinyl chloride); pesticides (for example, organochlorine and carbamate pesticides and phenoxy acid herbicides); and glyco derivatives (for example, ethylene and diethylene glycol). The section concerning mutagenic and carcinogenic agents critically reviews recently proposed indirect methods of biological monitoring for these agents such as the determination of alkylated nucleic acids or thioether concentrations in urine. Each section delineates of the present state of the art of the monitoring of each compound, and offers constructive direction for future research.

These monographs are concise, clearly written, and address the topic at hand, which is the concentration of chemicals in biological specimens not associated with adverse health effects.

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Toxic or lethal biologic concentration relationships are generally not presented. Should the reader require more detailed information numerous references are provided. The vast majority of these references are from the recent literature, 1970 to 1982, thus reflecting the rapid growth and current interest in biological monitoring. The final chapter presents two tables which summarize recommendations for the monitoring of each chemical. One table lists chemicals for which biological monitoring may be useful in detecting excessive exposure. The other table lists chemicals for which additional data are required for biological standard concentrations to be useful. For each chemical the tables include: the specimen needed for analysis; the measured analyte (parent compound, metabolite, exzyme, or enzymatic product); the normal analyte values; and tentative maximum permissible values.

This book is a necessary addition to the library of anyone concerned with disposition of xenobiotics and the prevention of their adverse health effects in man. It is of particular value to industrial hygienists, occupational health physicians, toxicologists, and pathologists. At present, data concerning the compounds reviewed in this book and its application to biological monitoring are scattered throughout a diverse range of the scientific literature. The author is to be commended for assembling such data in a concise single source.