The Handbook of Trace Elements

The worldwide awareness about environmental pollution has generated an intense interest in trace elements. In addition, deficient and toxic concentrations of some of the trace elements in biological systems have been of concern for years. This book deals with 41 elements found in the environment at concentrations <0.1%. The objective in dealing with these elements was to assemble factual information and data on trace elements so that the book could be used as an easy reference. The book is divided into six chapters. The introduction abounds with trace element concentration data presented in tables for situations dealing with the lithosphere, nonpolluted soils, sewage sludge, sewage sludge applied to soil, sensitive crops, ocean and fresh waters, and drinking waters. Biological classification and functionality in plants of many trace elements are briefly discussed. Concentrations of various trace elements in plants as well as a description of toxicity symptoms are provided. A short discussion on how plants adapt to excessive concentrations of trace elements is presented. Trace element concentration data are given for levels that are removed from the soil by plants, in urine, scalp hair, and other human tissues and fluids. Recommended safe and adequate dietary intake for human adults is provided. In addition, data in tabular form are given for maximum tolerable levels of dietary minerals for domestic animals.

Detailed information by element is given in Chapter 2. The information includes atomic number, atomic weight, abundance in lithosphere, common valence state, common mineral forms, total content in soils, soluble content in soils, contents in various waters, and content in humans, animals, and plants and essentiality to living organisms.

A general discussion about the rare earth elements and their relationship with plants, animals, and humans is provided in Chapter 3. Chapter 4 deals with the association of micronutrients in soils and plants. Normal and maximum concentrations of trace elements in different crops are provided in tabular form for easy reading. Information on testing the soil for their micronutrient levels and the analytical procedures tremendously in making comparisons. Also, tables are located close to where they are referred in text, making for easy reading. However, very little is said about the analytical methods by which the data were obtained. The reader should be cautioned against making direct comparisons across some tables, since the methods used to obtain the data may not be the same.

The book is an excellent single source for the collection of descriptive information on trace elements. It can serve as a very useful handbook on this subject.—M. Watson, Research-Extension Analytical Laboratory, The Ohio State University, Wooster, OH 44691

Humic Substances and Organic Matter in Water Environments: Characterization, Transformations and Interactions

While recognized as one of the most important components of soil, research on organic matter has historically been at best. Technological progress has enabled us to begin to characterize this extremely complex and dynamic aspect of soil. The International Humic Substances Society was the lead in developing methods for extracting and characterizing naturally occurring humic substances, defining humic substances, developing a repository of reference materials, and hosting conferences. This book is a collection of papers given at the 7th International Conference of the International Humic Substances Society held on the campus of the University of the West Indies at St. Augustine, Trinidad, during 3 to 8 July 1994. The book is divided into seven sections, and each section is prefaced with a two-page historical and developmental section. Each section gives a brief description of the papers contained within.

Section 1 begins with papers describing conceptual methods of extraction and characterizing humic substances from soil and water. Papers discussing electric focusing, use of resins, and gel electrophoresis for characterizing humic substances are included. Characterization descriptions include UV, visible, infrared spectroscopy, $^{13}$C- NMR spectroscopy, viscometry, analytical pyrolysis, gas chromatography, and high performance liquid chromatography techniques. Section 2 discusses applications of various plant residues to humic substances. Methods employed in this section include U, I, and X-ray studies of humic residues as well as degradation of humic residues conducted in situ. Section 3 is a collection of papers that discuss the effects of land management on the composition and properties of humic substances. The source soils and management practices range from forest to agriculture to urban. The environmental effects range from acid rain to pollution.