BIODEGRADATION

Dioxin, furan digestion

Polychlorodibenzo-*p*-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) have been reported in sewage sludge. It is important to determine how digestion, which can occur in both aerobic or anaerobic processes, affects the concentration of these pollutants. G. Disse and colleagues studied aerobic and anaerobic digestion of three different sewage sludges to determine the fate of PCDDs and PCDFs. Their studies were conducted in 3-L batch reactors with and without potential PCDD/F precursor compounds. Anaerobic processes did not significantly affect PCDD/F concentrations except for 2,3,7,8-TCDF, which showed either formation or degradation, depending on the precursor. Aerobic processes showed significant decreases in many PCDD/F congeners, but showed increased concentrations for 2,3,7,8-TCDD and 2,3,4,7,8-PeCDF. The authors suggested that the increases were caused by dechlorination of the more highly chlorinated congeners. [*Chemosphere* **1995**, *31*(7), 3617–25]

PAH digestion

Because of their relatively high octanol–water partition coefficient, polynuclear aromatic hydrocarbons (PAHs) are easily adsorbed to organic material in wastewater and subsequently transferred to the sludge stream. These sludges often are disposed by land application. W. J. Parker and H. D. Monteith investigated the fate of six typical PAHs during primary and secondary anaerobic sludge digestion. Overall PAH removal through biodegradation ranged from 63 to 84%. Less than 2.5% of influent PAH was present in secondary digester effluent. Biodegradation rate coefficients were measured and reported for most of the PAH studied. [*Water Environ. Res.* **1995**, *67*(7), 1052–59]

HEAVY METALS

Great Lakes trace metals

Despite large inputs from anthropogenic sources of trace metals to the Great Lakes, concentrations of cadmium, lead, and zinc remain low. J. O. Nriagu and colleagues studied an extensive set of trace metal data and evaluated the processes influencing spatial distribution of these elements in Lakes Superior, Erie, and Ontario. Results indicated that trace metal distribution is affected by water depth, suspended particulate concentration, and biological factors. Suspended particulates act as metal scavengers. Bioactive metals, such as zinc, are depleted during summer months. The researchers attribute the uneven distribution of such metals in the lakes to spatial differences in biological processes. Except for chromium, no systematic increases in metal concentrations were observed down the drainage basin from Lake Superior to Lake Ontario. Lead, cadmium, and zinc were retained; dissolved copper, nickel, and chromium were exported into the St. Lawrence River. [*Environ. Sci. Technol.* **1996**, *30*(1), 178–87]

MEASUREMENTS

VOCs at parts per trillion

Analytical methods capable of determining trace levels of contaminants are needed for monitoring groundwater. P. M. Buszka and colleagues developed an analytical method for detecting nine selected volatile organic compounds (VOCs) at the nanogram-per-liter (part-per-trillion) level. The method optimizes purge-and-trap techniques using a 100-mL sample size, a DB-624 megabore capillary column, and a jet separator interface to a mass spectrometer. Eight of the nine compounds had a minimum detectable concentration of <5 ng/L with a relative standard deviation of less than 10%. Analysis of blank samples indicated that, at these trace concentrations, sample contamination must be monitored. The method was demonstrated on groundwater from the Edwards aquifer in Texas near an abandoned landfill. Results found zones both with and without VOC contamination at trace levels. [*Anal. Chem.* **1995**, *67*(20), 3659–67]

In situ concentrators

The bioavailability of organic compounds in aquatic systems often is difficult to assess, especially at very low concentrations. This may be attributable to variations in lipid composition of different species, age and gender differences within a species, or the range of movement of aquatic organisms. G. S. Ellis and colleagues evaluated a semipermeable membrane device consisting of fish lipid or triolein in polyethylene tubing as an in situ passive concentrator of organochlorine contaminants. The device measured reasonably accurate concentration estimates of freely dissolved or bioavailable nonpolar pesticides in river water. However, it did not compare very well with the organochlorine concentrations detected in fish tissue. Results led the authors to conclude that the method has limited use as a screening tool. [*Environ. Toxicol. Chem.* **1995**, *14*(11), 1875–84]

MODELING

Plotting multimedia fate

Information relating to the behavior and fate of organic compounds can be deduced among the evaluation of partition coefficients between air, water, and organic compounds. S. C. Lee and D. Mackay developed a procedure to assess the multimedia fate and behavior of nonpolar organic compounds based on triangular diagrams. Partition coefficients for the relationships among air, water, and any organic media present in the environment can be plotted simulta-