

and greater risk of illness. G. B. Hamar and colleagues measured blood volatile organic compound (VOC) levels in 100 residents of an industrial area with two National Priorities List sites and a hazardous waste incinerator. They compared the results with test results for 106 individuals from a control area. Of the 31 VOCs tested, only acetone was significantly higher in the blood of residents from the industrial area. Comparison with national reference values also indicated no excess exposure among residents in industrial areas. (*J. Expos. Anal. Environ. Epidemiol.* 1996, 6(2), 247-55)

## MEASUREMENTS

### Capillary electrophoresis

Better analytical techniques are needed to identify and measure environmental contamination with the herbicides paraquat and diquat. Song and Budde reported that capillary electrophoresis-electrospray mass spectrometry (CE-ES) is a sensitive and selective method for determining the presence of these pesticides. The analysis requires a buffer solution and an additional electrolyte. Electrospray mass spectra consist of doubly charged molecular ions, singly charged molecular ions, and singly charged deprotonated ions. The relative intensity of the doubly charged molecular ion as compared with singly charged deprotonated ion depends on the type of additional electrolyte. The method has a linear calibration range from 1 to 50 mg/L with a risk-specific dose of 8%. (*J. Am. Soc. Mass Spectrom.* 1996, 7, 981-86)

### Detecting SU herbicides

The isolation, identification, and quantification of trace amounts of sulfonylurea (SU) herbicides can be difficult because SUs are polar, thermally labile compounds. J. Henion and colleagues report a new method for identifying SUs in soil. The herbicides are extracted by liquid-liquid techniques and analyzed with HPLC tandem MS using a TurboIonSpray interface and the selected reaction monitoring mode of analysis. When conditions are optimized for each of the SUs, detection limits are < 0.05 ppb, with a linear range up to 10 ppb. (*Anal. Chem.* 1996, 68, 3397-3404)

### Sorption of chlorinated guaiacols in sediments

Chlorinated guaiacols are found in effluent from paper mills that use chlorine-based bleaching processes. Understanding their sorption behavior is important because these compounds resist degradation in conventional wastewater treatment and bioconcentrate in the environment. J. L. Gundersen and co-workers investigated sorption of four chlorinated guaiacols in estuarine sediments from the York River, Va. Sediments with higher humic carbon content were better sorbents for the guaiacols. Results indicated that the humic acid content of sediment, along with total organic carbon, is an important factor in controlling the sorption of these compounds. Importantly, in some cases, highly chlorinated, ionized species were sorbed to a greater extent than were non-ionized, less chlorinated ones. (*Environ. Sci. Technol.*, this issue, pp. 188-93)

### DOM in the ocean

Dissolved organic matter (DOM) in the oceans is a major reservoir for carbon. Better analytical methods for determining DOM in the sea will improve understanding of the global carbon cycle. M. I. Abdullah and E. Eek describe an automatic method for determining dissolved organic carbon (DOC) in natural waters. It uses a UV lamp to irradiate a sample passing over titanium dioxide catalyst in a narrow tube. An infrared spectrometer measures the resultant carbon dioxide. Results with the new instrument show that about 5% of DOC in seawater is not measured by conventional (noncatalyzed) photooxidation. The method agrees with results from elemental analysis. (*Wat. Res.* 1996, 30, 1813-22)

### VOCs in aged soils

Cleanup of contaminated soil sites requires accurate measurement of volatile organic compounds (VOCs) to assess the extent of contamination and monitor remediation efforts. C. C. Travis and colleagues report that the EPA-recommended method for measuring VOCs in soil (purge-and-trap followed by GC/MS) may be ineffective for aged soils.

They compared the EPA-approved technique with two alternatives: methanol immersion and hot methanol extraction. The amounts determined via hot methanol extraction ranged from 2 to 75 times more than those identified in the same soil by the purge-and-trap technique. (*Anal. Chem.* 1996, 68, 3431-33)

## MONITORING

### Biomonitoring bees

Honey bees (*Apis mellifera* L.) readily take up fluoride by respiration, ingestion, and absorption. They can be used to monitor fluoride releases from coal combustion, aluminum smelting, and other industrial sources. J. J. Bromenshenk and co-workers used bees as bio-monitors to map the spatial distribution of fluoride across much of the upper Snake River Plain in southeastern Idaho. They analyzed bees from 61 colonies over a three-year period and prepared isopleth maps of the potential fluoride sources within the study area. The results depict the patterns of fluoride release from phosphate fertilizer mills, an aluminum smelter, and other sources. The researchers conclude that bees are valuable self-sustaining monitors for fluoride release and deposition in a semiarid environment. (*J. Environ. Qual.* 1996, 25, 868-77)

### Earthworm probes

Organisms often show behavioral responses to toxic chemicals at lower stress levels than those detected by acute toxicity tests. Several aquatic avoidance tests have used fish to suggest the presence of sublethal levels of toxicants. R. B. Yeardley, Jr., and colleagues report that earthworms exhibit similar responses to toxicants in soils. Earthworms placed in test chambers avoided soils from hazardous waste sites and soils containing reference toxicants. Earthworms did not show avoidance behavior in toxicant-free soil, where they distributed themselves in random fashion. Avoidance behavior was a more sensitive indicator of chemical contamination than acute toxicity. The earthworm avoidance test is also easier to do than acute tests. (*Environ. Toxicol. Chem.* 1996, 15, 1532-37)