

## Sediments used to monitor water quality

M. B. Nilsson and colleagues proposed near-infrared reflectance (NIR) spectroscopy of lake sediments as a rapid, cost-effective method for environmental monitoring of water quality. They evaluated spectra of the top centimeter of sediments in Swedish lakes along with historical measurements of pH, total phosphorus, and total organic carbon. Using partial least-squares regression, the authors developed models predicting each water quality parameter from entire NIR spectra of the sediment. They achieved the best predictions using water quality measurements averaged over the preceding four years. The method could be used for long-term monitoring of lakes, because relatively few sediment samples would be required to establish time-integrated averages of water quality. (*Environ. Sci. Technol.*, this issue, 2586–90)

with time, reflecting the natural fluxes of colloids that have variable metal contents. By using this method, sample collection for field analysis took two days, whereas sample collection for analysis by conventional methods, which require larger samples, would require 31 days. (*Environ. Sci. Technol.* **1996**, 30(7), 2270–77)

## Determining DNA adducts

An important step in carcinogenesis occurs when a chemical or its metabolite modifies DNA, forming a DNA adduct. However, determining these adducts is difficult because the chemical modifies only between one in  $10^6$  and one in  $10^{12}$  bases, leading to very low concentrations. J. P. Barry and colleagues coupled capillary zone electrophoresis (CZE) to negative ion electrospray mass spectrometry (ES-MS). They were able to determine adducts formed between DNA and a benzo[a]pyrene metabolite. They introduced the adducts into the CZE apparatus with a sample stacking technique that allowed a 1000-fold preconcentration. To increase sensitivity and selectivity, the ES-MS was operated to selectively monitor reaction. With this technique they determined adducts as low as 85 pg. When they combined the technique with a solid-phase ex-

traction procedure, they determined concentration levels as low as 4 adducts per  $10^7$  unmodified bases. (*Anal. Chem.* **1996**, 68(8), 1432–38)

## Fewer cleanup procedures

Extensive preconcentration and cleanup techniques, which generate large amounts of waste, are required to determine polycyclic aromatic hydrocarbons (PAH) or polychlorinated dibenzo-*p*-dioxins (PCDD) in serum. S. R. Sirimanne and colleagues found that micelle-mediated extraction can be used with HPLC to determine these compounds without extensive cleanup procedures. They added Triton-X (0.5–12%) and sodium chloride (2.5–5.5 M) to a 0.5- or 5-mL aliquot of serum, which was mixed, heated, and centrifuged with the supernatant decanted. They then removed coextractives from the supernatant by precipitation with acetonitrile and filtration and subjected a 50- $\mu$ L aliquot to HPLC analysis. Using this technique, they recovered 100% of PAH spiked at 250–550 ppb and 97% of PCDD spiked at 3.9–4.4 ppm. (*Anal. Chem.* **1996**, 68(9), 1556–60)

## SOIL

### Single-species tests

J. E. Kammenga and colleagues developed a toxicity test to assess the effect of soil contaminants using a single species. The test was conducted with an artificial soil composed of 70% sand, 20% kaoline clay, 10% *Sphagnum* peat, and the nematode *Plectus acuminatus*. They added cadmium, copper, and pentachlorophenol to the soil, then counted juvenile and adult species of the nematode after three weeks of incubation, using the ratio of juvenile to adult nematodes as a test parameter. The authors concluded that single-species tests could supplement present toxicity tests that use other invertebrates in artificial soil. (*Environ. Toxicol. Chem.* **1996**, 15(5), 722–27)

### Sorption coefficients

In order to conduct accurate fate and transport modeling, sorption of organic compounds to soils must be understood. Typically, sorption coefficients have been determined using batch, column, and centrifuge tech-

## Photodegrading furans in lake waters

The environmental fate of polychlorinated dibenzofurans in aquatic systems is important because these compounds are highly toxic. K. J. Friesen and colleagues studied the aquatic photodegradation of 2,3,7,8-tetrachlorodibenzofuran and 2,3,4,7,8-pentachlorodibenzofuran in a distilled water–acetonitrile solution and in lake water. Results showed that these two compounds had half-lives of 1.2 and 0.19 day, respectively, in lake water and half-lives of 6.3 and 46.2 days, respectively, in the distilled water–acetonitrile system. They attributed the enhanced degradation rates in the lake water to the presence of unknown photosensitizers. Results also showed that photodegradation occurred by way of reductive dechlorination, which produced several less chlorinated dibenzofurans. (*Environ. Sci. Technol.* this issue, 2504–10)

niques in soils with water contents above field capacity. E. A. Rochette and W. C. Koskinen determined the sorption coefficient of atrazine in soils with water contents below field capacity using supercritical fluid extraction with carbon dioxide ( $\text{CO}_2$ ). The density of supercritical fluid  $\text{CO}_2$ , soil water content, and temperature each affected the sorption coefficient. Although the method is rapid, requiring less than two hours, and holds promise for removing organics from aqueous soil phases, the authors call for more studies to determine the method's sensitivity. (*Soil Sci. Soc. Am. J.* **1996**, 60, 453–60)

### Pesticide mobility

Widespread pesticide use has led to concerns about pesticide transport through soils into groundwater. E. L. Kruger and colleagues studied the relative mobilities of atrazine, atrazine degradates, metolachlor, and simazine in a series of 10 soils using soil thin-layer chromatography (STLC). Radiolabeled pesticides were spotted on STLC plates prepared from the different soil types, and the plates were developed with ultrapure water, with the mobility imaged by X-ray film. The pesticides were split into four groups based on mobility. All compounds' mobilities correlated negatively with organic matter con-