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EPA Science Notes

Oysters: Pollution Markers On the Half-Shell?

Scientists at EPA's Office of Research and Development (ORD) laboratory in Gulf Breeze, FL, are evaluating the potential of oysters as early-warning indicators of environmental problems in coastal waters

The research is based on the fact that oysters, in the routine course of feeding, will ingest and accumulate pollutants from the water around them By examining the mollusks, researchers may be able to identify these contaminants and determine if the substances pose any risk to the local ecosystem

As a first step in their research, the scientists are trying to decide which physiological tests would best indicate adverse effects. In a preliminary study, the researchers conducted 22 assays on 82 oysters from six sites in Tampa Bay, Fla., to assess (1) the specimens' physical and metabolic condition, (2) the presence of parasites and microbes in their systems, (3) genetic abnormalities in their cells, and (4) the status of their immune systems.

Some of the tests found physiological differences among oysters collected at different sites in the bay (such as differing parasite levels and variations in the condition of the digestive glands) This was important for judging the general precision of the tests, even though the preliminary analysis did not attempt to determine whether the differences were due to contaminants at any of the sites, the scientists noted.

Two factors made it difficult to assess some of the results clearly, the study found The researchers said these factors should be considered in any future studies

- Salinity· The salinity of the water differed at the various sites. Water's salt content may affect some metabolic functions in oysters that influence physiological and immunological responses. Therefore, studies should look at oysters from both polluted and unpolluted sites having the same salinity.
- Reproductive cycles: Some differences between oysters may be due to the fact that the oysters are at different stages of the reproductive cycle Researchers should collect oysters at different times of the year so that different reproductive stages are represented

(Contact Raymond G. Wilhour, Acting Director, ORD Environmental Research Laboratory, Gulf Breeze, FL 32561; (904) 934-9213.)

Minimizing Waste: Case Studies

ORD has published a collection of case studies from four programs that help companies and federal agencies find ways to prevent pollution by minimizing hazardous waste from manufacturing processes and other operations.

The programs are funded by ORD's Risk Reduction Engineering Laboratory and provide technical assistance, demonstration projects, and technology transfer through universities, state and local governments, and federal scientists. They are

- The Waste Reduction Innovative Technology Evaluation Program, conducted with the states of California, Connecticut, Illinois, Minnesota, New Jersey, and Washington, and Erie County, NY

- The Waste Minimization Assessments Program, conducted under a cooperative agreement with the New Jersey Department of Environmental Protection and the New Jersey Institute of Technology
- The University-Based Assessments Program for small businesses, conducted with the University City Science Center, Philadelphia, PA.
- The Waste Reduction Evaluations at Federal Sites Program, a cooperative program involving EPA, the Department of Defense, the Department of Energy, and other federal agencies.

Projects discussed in the case studies include these

- A small chemical manufacturer was looking for ways to reduce chemical wastes from the production of acrylic emulsions and other specialty mixtures. Researchers suggested that the company upgrade some of the sensing and control devices on its reactor lines, and install a gas-fired dry-off oven to reduce the volume of sludge hauled offsite.
- A manufacturer of aluminum parts sought advice on reducing toluene wastes from a solvent-based painting process Researchers suggested that the company convert to an electrostatic-powder painting system.
- Researchers assisting an ice-machine manufacturer found that the company discharged 5 million gallons of waste water per year from rinsing steel sheets. Researchers recommended that the company recycle the rinse water instead of discharging it.

In each instance, long-term savings would offset a one-time investment cost for taking the suggested action, the case studies indicate. For example, switching to an electrostatic painting process would cost the aluminum company $147,580, but the change would net $1 million in annual savings from elimination of solvent wastes and the lower cost of powder coatings.

(For further information on the programs, contact Harry Freeman, Risk Reduction Engineering Laboratory, (513) 569-7529 "Pollution Prevention Case Studies Compendium" (EPA/600/R-92/046) is available from the EPA Center for Environmental Research Information, Cincinnati, OH 45268; (513) 569-7562.)

EPA Outlines Framework For Ecological Risk Assessment

EPA has taken a first step in a long-term effort to develop agency-wide risk assessment guidelines for ecological effects.

The agency recently issued "Framework for Ecological Risk Assessment" (EPA/630/R-92/001), a new report that outlines a simple, flexible approach for conducting and assessing ecological risk assessments. The non-mandatory document is intended to foster consistent approaches to ecological risk assessments, identify key issues, and provide a foundation for development of future guidelines.

The report recommends a three-phase approach

- Problem Formulation. A planning process to establish the goals, breadth, and focus of the risk assessment.
- Analysis. Using scientific information to develop profiles of environmental exposures and adverse ecological effects.
- Risk Characterization: Integrating exposure and effects data to describe the expected risk.

The recommendations, which were developed by EPA's Risk Assessment Forum, reflect input from numerous ecologists and ecotoxicologists from EPA, other Federal and state agencies, academia, and industry, including scientists who met in two peer review workshops.

Copies of the document are available from the EPA Center for Environmental Research Information, telephone (513) 569-7562. Also available are two related documents, "Peer Review Workshop on a Framework for Ecological Risk Assessmer (EPA/625/3-91/022) and "Report on the Ecological Risk Assessment Guidelines Strategic Planning Workshop" (EPA/630/R-92/002).

Upcoming Meetings

Workshop Series on Statistical Analysis of Ground-Water Monitoring Data — July 7-8, Seattle, WA, July 28-29, San Francisco, CA Contact. Denise Gaffey, Eastern Research Group Inc, PO Box 1281, Arlington, MA 02174; 617 641-5317

Integrated Solid Waste Management Planning for Rural, County, and Local Governments — July 13-14, Buffalo, NY; July 16-17, Pittsburgh, PA Contact: EA Environmental Technology Group, P.O Box 296, Dept 12, Knoxville, TN 37901; 615 584-9171.

EPA Workshop: Removal, Recovery, Treatment, and Disposal of Arsenic and Mercury — Aug 17-20, Alexandria, VA Contact: SAIC, Technology Transfer Department, 501 Office Center Drive, Suite 420, Fort Washington, PA 19034, 1-800 783-3870 or 215 628-9317.

Fourth Forum on Innovative Hazardous Waste Treatment Technologies: Domestic and International — Nov. 17-19, 1992, San Francisco, CA. Contact. SAIC, Technology Transfer Dept., 501 Office Center Dr., Suite 420, Ft. Washington, PA 19034, 215 542-1200, or FAX 215 542-8567.

New Publications

Environmental Research Laboratory-Athens, GA: 1991 Highlights (600-R-92-016) Contact: Robert Ryans, Athens ERL, College Station Rd., Athens, GA 30613-0801, 706 546-3306.

The following publications are available from the EPA Center for Environmental Research Information, Cincinnati, OH 45268, 513 569-7562.

Reclamation and Development of Contaminated Land: Volume II, European Case Studies (600-R-92-031).

Technical Demonstration Summary: DuPont/Oberlin Microfiltration System, Palmerton, PA (540-S5-90-007).

In-Situ Bioremediation of Contaminated Ground Water (540-S-92-003).

Greenhouse Gases from Small-Scale Combustion in Developing Countries: A Pilot Study in Manila (600-SR-92-005).

Characterizing Heterogeneous Wastes: Methods and Recommendations (600-R-92-033)

ORD Publications Announcement, November 1991-March 1992 (600-N-92-004).

BioTrol Soil Washing System for Treatment of a Wood Preserving Site (540-A5-91-003).