

**Session 5**  
***Biotechnology, Bioengineering,  
and the Solution  
of Environmental Problems***

## **Introduction to Session 5**

### **Biotechnology, Bioengineering, and the Solution of Environmental Problems**

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Realization that the earth is ultimately a closed ecosystem has forced careful examination of anthropogenic insults to the environment. The results of environmental insults can be seen on both small and large scales. Examples include localized inconveniences, such as foul odors, serious health hazards for living organisms (including humans), contaminated water supplies, "acid rain," "ozone holes," and global warming. Many of these insults result from the way in which we dispose of our wastes. Restoration and preservation of the environment has reached an unprecedented degree of urgency. Many technologies have emerged from a variety of industries and scientific disciplines to provide safe and effective means to mitigate the effects of hazardous and nonhazardous waste in the environment. Bioremediation is one of the most versatile and unobtrusive of these technologies.

Biological treatment of wastes can provide permanent solutions to environmental problems. In addition, changing technological and economic factors suggest that bioremediation may become the most cost-effective approach for dealing with organic pollutants in a variety of situations. Industry has long used bioremediation and will use this method more in the future. One business-forecasting company predicts 45% growth yearly in biotechnology-based pollution-control products and services (from \$5 million in 1990 to \$200 million by 2000 (1). The success of bioremediation in the Exxon Valdez oil-spill cleanup and the publicity generated by that incident will spur even more interest (2).

New technology will increase both the role and the capabilities of bioremediation in environmental cleanup. Recent developments reported in this session address a variety of pertinent aspects of biological pollution control and waste remediation. The issues presented include the risks

associated with the introduction of microorganisms to affect biodegradation, laboratory assessment of the biodegradation of organic compounds, and field implementation of actual treatment processes.

## REFERENCES

1. Consulting Resources Corporation (March, 1990), *Biotechnology . . . What's in Store for the 1990's?*
2. Crawford, M. (1990), Bacteria effective in Alaska cleanup. *Science* **247**, 1537.