

## EMERGING POSSIBILITIES FOR NIRS TO CONTRIBUTE TO ENVIRONMENTAL ANALYSIS

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Near-infrared spectroscopy (NIRS) is potentially a powerful and revolutionary technology for environmental analysis. It is supported by a large body of scientific and experiential knowledge. The instrumentation is well-developed, with easy-to-use, highly dependable instruments, but at the same time it is still developing, particularly with the production of more portable and rapid instruments, and more powerful software.

NIRS is used globally in numerous industries for commodity analysis. Yet NIRS is largely unknown in the field of environmental chemistry and monitoring, and is not even routinely used in soil analysis, where the research literature on NIRS extends over four decades. Part of the explanation for the poor visibility of NIRS is the fact that NIRS is not routinely taught in Chemistry programs in universities, where most environmental chemists and environmental technicians are trained.

This presentation examines the unique capabilities of NIRS, such as rapid, real-time analysis; analysis of whole samples; simultaneous analysis of multiple constituents; cost-effectiveness, and portability, as they match needs for analysis in several environmental areas.

Examples of NIRS usage and published and unpublished results will be described for such areas as soil and sediment analysis; water quality monitoring; and nutrient loading in application of manures and sewage sludge (biosolids) to land.

Present barriers to the use of NIRS in environmental analysis will be discussed. It is argued that emerging environmental problems and increasing attention to some traditional problems will enhance the application of NIRS in the future.