

ISOTOPE-BASED TECHNIQUES IN GROUNDWATER ASSESSMENT



Gathering of field
data for groundwater
assessment

Isotopes and chemical techniques are used to identify the origin of groundwater and to assess its vulnerability to pollution.

This information could help water resource managers to implement measures for sustaining and securing good drinking water quality.

ADVANTAGES OF ISOTOPE-BASED TECHNIQUES

- Provide time and space-integrated information at a larger scale
- Can identify pollution and salination sources
- Provide quantitative information in mixing of different water sources and rate of replenishment



Measurement of tritium
content from collected
water samples



Chemical analysis
of collected water samples

For more information on PNRI's studies on air pollution and water resources management, please write or call:

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Nuclear Techniques in Environmental Studies



Nuclear Techniques in Environmental Studies

The Philippine Nuclear Research Institute (PNRI) - Department of Science and Technology exploits the unique advantages of nuclear techniques to protect the environment, among others. PNRI studies in environmental protection include application of nuclear techniques in helping address problems in air pollution, red tide or harmful algal blooms and water resources management.

NUCLEAR TECHNIQUES IN AIR POLLUTION-RELATED STUDIES

PNRI applies nuclear and related analytical techniques for the study of air particulate matter in the PM10 range.



Collection of air particulate samples

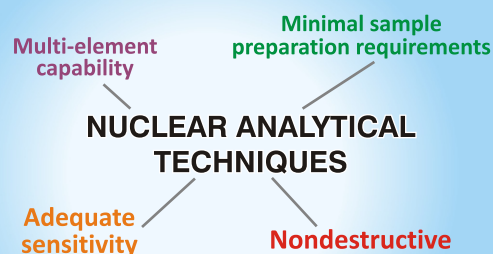
PNRI data for PM10 and PM2.5 can be used as basis for the formulation of local PM10/PM2.5 ambient standards for the protection of public health.



Multi-element analysis of air particulate matter using energy dispersive XRF spectrometry

Results indicated that vehicular emissions and biomass burning significantly contribute to air particulate pollution.

BENEFITS OF NUCLEAR ANALYTICAL TECHNIQUES



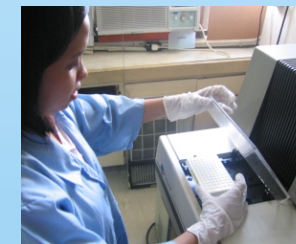
NUCLEAR-BASED TECHNIQUES IN RED TIDE STUDIES

Nuclear-based techniques are used by PNRI in its studies to help in the management of the red tide problem. The radiometric receptor binding assay can be used for measuring the red tide toxins that cause paralytic shellfish poisoning. The lead-210 dating method is useful for determining the historical profile of a site for the occurrence of red tide cysts.



ADVANTAGES OF USING NUCLEAR ASSAY TECHNIQUE IN RED TIDE TOXIN ANALYSIS

- Recognized as the most viable alternative method to the standard mouse bioassay method
- More sensitive than the mouse bioassay method (suitable for clinical samples like blood)
- More samples analyzed at given time
- Reliable for the red tide toxin quantification
- Cheaper cost of analysis for long time monitoring



Sample counting in a microplate liquid scintillation counter

THE LEAD-210 DATING METHOD

The lead-210 dating method is a nuclear technique used at PNRI as a tool in gaining information on geochemical processes affecting the red tide bloom and in proving the history of toxic algae bloom in areas affected by red tide.



Loading of samples in alpha particle counter for lead-210 dating analysis

Algal cell collection for toxicity measurement

