Automated Soil Pore Water Sampling and Nitrate Detection System

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ABSTRACT

Researchers at the University of California, Davis have developed a sophisticated soil nitrate sensing system designed to accurately measure soil pore water nitrate concentrations, enhancing sustainable agriculture and environmental monitoring.

FULL DESCRIPTION

This technology encompasses a comprehensive soil nitrate sensing system that integrates a suction lysimeter, a soil moisture sensor, a spectrometer, and a controller. The system measures soil moisture, acquires soil pore water samples based on this estimation, and uses a spectrometer to accurately measure nitrate concentrations in these samples, facilitating precision agricultural practices and environmental monitoring.

APPLICATIONS

- Agricultural fields for optimized fertilizer application.
- Environmental monitoring to track nitrate movement and prevent pollution of groundwater and surface water sources.
- Advanced research in soil science, agronomy, environmental science, and hydrology.
- Smart farming solutions integrating data analytics for soil management.

FEATURES/BENEFITS

- Accurately estimates and measures soil nitrate levels.
- Integrates a suction lysimeter with multiple probes for water sampling from diverse locations.
- Uses a spectrometer, including UV-Vis, for broad spectrum analysis.
- Minimizes the effects of Dissolved Organic Carbon on nitrate measurements.
- Computer-implemented methods for real-time data processing and analysis.
- Improves accuracy in real-time soil nitrate measurement, crucial for optimal fertilizer application.
- Reduces environmental impact by minimizing fertilizer leaching and pollution.
- Enhances agricultural productivity through precision soil management and fertilizer management.
- Addresses the lack of real-time soil nitrate level monitoring.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

agriculture, environmental monitoring, nitrate measurement, soil suction lysimeter, soil moisture sensor, soil nitrates, spectrometer, suction lysimeter, UV-Vis spectrometer

CATEGORIZED AS

- **Agriculture & Animal Science**
  - Chemicals
  - Devices
- **Biotechnology**
  - Other
- **Environment**

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