Rapid, Sensitive Detection of Nucleic Acid Sequences in Environmental Samples

Tech ID: 29740 / UC Case 2018-575-0

SUMMARY

UCLA Researchers at the California NanoSystems Institute have developed a methodology that permits PCR-based detection of nucleic acid sequences in soil that does not require the isolation of DNA.

BACKGROUND

Soil is composed of organic compounds, minerals, gases, liquids and countless micro-organisms. These microbes help to maintain soil health but can also have devastating effects on agricultural health and contribute to the spread of infection. Studies on the micro-organisms that reside in soil are hindered by the various components of soil such as clay and humic acids. To analyze these soil samples, researchers typically use commercially-available DNA isolation kits to extract all DNA from soil samples for downstream applications such as rapid polymerase chain reaction (PCR). However, for amplification of specific targets, this method is time-consuming and thus not preferred. Therefore, improved strategies for studying microbial DNA in soil would help to further studies on promoting agricultural growth.

INNOVATION

UCLA researchers have developed a protocol that processes soil samples to be used for PCR amplification without isolation of DNA. This method can be used directly on environmental samples, removing any cleanup steps. Furthermore, this protocol does not require any long incubation steps, significantly reducing the amount of time needed to have samples ready for PCR. The reagents that make up this protocol do not affect sensitivity for PCR of a specific nucleic acid and are overall cheaper than the commercially-available DNA isolation kits.

APPLICATIONS

- Detection of nucleic acid sequences from soil samples
- Detection of nucleic acid sequences from heavily soiled veterinary and clinical samples (testing)

ADVANTAGES

- Does not require DNA isolation step or cleanup
- No recovery step or overnight incubation; saves time
- Cheaper than commercially available DNA isolation kits
- Comparable sensitivity compared to currently available kits

STATE OF DEVELOPMENT

The researchers have demonstrated the detection of *Burkholderia pseudomallei* in soil using this protocol. Validation experiments for using this invention for veterinary and clinical diagnostics are underway.

PATENT STATUS

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Additional Patent Pending