Application Note:
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Isolating DNA from Soil Samples

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KEY WORDS

- FastDNA SPIN Kit
- Soil DNA

Abstract

Searching for environmental microorganisms (i.e., organism mining) is a very common process today and there are many commercially available kits for the detection of DNA in soil and water. The readily available kits minimize process preparation time and the need for on-hand reagents and consumables. The end user only needs to provide pipettes and a microcentrifuge. The Thermo Scientific microcentrifuge with 24-place rotor was selected for this application to demonstrate how easy it is to use a soil DNA isolation kit in this Thermo Scientific microcentrifuge.

Figure 1. Thermo Scientific microcentrifuge with 24-place rotor.

Harvested soil samples were isolated following the FastDNA SPIN Kit® instructions step by step. Gel results show clear extracted DNA which will then be subjected to further downstream analysis for identification. Harvested DNA are typically further analyzed to match for known organisms or new organisms.

Materials and Methods

Soil cores were collected from the Cataloochee plot in the Great Smoky Mountains National Park in March 2006. The plot was located and sample areas identified by their GPS coordinates using a hand-held GPS device. A clean metal corer was used to obtain 100 mm long soil cores[1] with minimal disturbance to the site.

Soil cores collected at these sites were held at ambient temperature during transport to the Department of Biology at the Asheville, NC campus of the University of North Carolina (UNCA) and held at ambient temperature until use by microbiology lab students. All samples were used within three days of collection.

1. Samples containing 2.5 g of wet soil were diluted into a 22.5 ml sterile 0.8 % sodium chloride solution and incubated with shaking for 15 minutes; larger particles were allowed to settle out for 2 minutes.
2. Saline above the soil layer was serially diluted using sterile water.
3. 0.1 ml dilutions were plated on solid microbiological media.
4. Plates were incubated at ambient temperature for seven days.
5. Isolated colonies were streaked on fresh plates to obtain pure cultures.
6. Colony and cellular morphologies were recorded for pure cultures.
7. DNA was isolated from pure cultures using a FastDNA SPIN Kit for soil.

   The procedure was followed per the FastDNA SPIN Kit instructions. All centrifugation steps were performed using a Thermo Scientific 24-place microcentrifuge.
8. rDNAs of the resulting DNA samples were amplified by PCR with universal primers.[2]

Results

Post PCR, rDNA isolates were successfully visualized using electrophoresis in 1 % agarose gels (Figure 1). DNA isolates were subjected to further downstream analysis for identification.

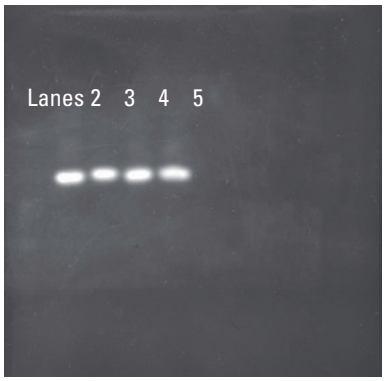

Figure 2. Lanes 2, 3, 4, and 5 are PCR products from DNA samples prepared using the FastDNA SPIN Kit for soil (Qbiogene) and Thermo Scientific 24-place microcentrifuge

Conclusion

The full line of Thermo Scientific microcentrifuges is ideal for today's busy labs using FastDNA SPIN Kits for isolation of rDNAs. These microcentrifuges have simple-to-use user interfaces with easily understood icons and a brightly lit display. Those features plus the snap-on Thermo Scientific ClickSeal biocontainment rotor lid make this line of microcentrifuges a perfect choice for the multi-user lab.

The Thermo Scientific 24-place microcentrifuges are small and quiet, making them easy to place in a busy setting without interfering with valuable bench space or the work process. They are valuable tools for all laboratories.

References

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