



NucleoMag[®] DNA Microbiome

Automated DNA isolation from soil, feces and biofilm samples on the Opentrons OT-2

Application benefits

The combination of the NucleoMag[®] DNA Microbiome kit with the OT-2 allows to streamline your genomic DNA extraction from soil, stool and biofilm (swab) samples:

- Verified method for fully automated nucleic acid purification workflow
- Patented inhibitor removal technology
- Reliable recovery and yields of genomic DNA
- Processing of up to 48 samples in parallel
- Protocols available in the Opentrons Protocol Library or via MACHEREY-NAGEL technical automation support: automation-bio@mn-net.com

Keywords

Soil, stool, feces, biofilms, metagenomics, bacteria, inhibitor removal, MN Bead tubes, microorganisms, genomic DNA, magnetic beads, Opentrons OT-2

A verified method for DNA isolation from stool, soil and biofilms

Microorganisms colonize, impact, and proliferate every surface or organisms – mostly in the form of complex communities. The microbiome of the soil and biofilms or within and outside of our bodies, has a significant impact on our (ecosystem) health. The goal of microbiome studies is to systematically understand their role, functions and communities and how they interact with their environment and hosts.

The NucleoMag[®] DNA Microbiome kit enables thigh-throughput, automation-friendly isolation of microbial DNA from samples typically used for microbiome studies, including soil, stool or biofilms. The combination of mechanical lysis using bead beating technology and the patent-pending inhibitor removal technology of the NucleoMag[®] DNA Microbiome make this kit the perfect choice for extraction of high-quality DNA for microbiome studies.

In this Application Note we demonstrate automated genomic DNA isolation from soil and biofilms samples using the NucleoMag[®] DNA Microbiome kit on the Opentrons OT-2 equipped with the Opentrons Magnetic Module, with the Single-Channel P1000 and with the 8-Channel P300 Pipettes.

An optimized protocol using the Opentrons OT-2 with the NucleoMag[®] DNA Microbiome kit can be downloaded directly from the Opentrons Protocol Library.

NucleoMag [®] DNA Microbiome	
Technology	Magnetic beads
Application	DNA isolation from stool, soil, feces, and biofilm samples (including swabs)
Sample amount	50–200 mg soil, stool, biofilm (including swabs)
Fragment size	Depending on quality of sample.
Sample number on OT-2	48 samples

Material and Methods

The isolation procedure of the NucleoMag[®] DNA Microbiome kit is based on reversible adsorption of nucleic acids to paramagnetic NucleoMag[®] B-beads under appropriate binding conditions. 200 mg soil or feces samples were homogenized using MN Bead Types Type A. Subsequently, contaminants were precipitated using Buffer MIc and reversible binding of nucleic acids to paramagnetic beads in cleared lysates was enabled by adjustment with Binding Buffer MI2. Subsequent to the magnetic separation, the NucleoMag[®] B-Beads were washed to remove contaminants and salts using wash buffers MI3, MI4, and 70 % ethanol respectively. After air drying, highly pure nucleic acids were eluted in 100 µL low-salt elution buffer MI5.

All liquid handling steps from binding to elution and magnetic bead separations were carried out by the OT-2 and Opentrons Magnetic Module.



For further information on how to bead beat your microbiome sample scan the QR or follow this link: www.mn-net.com/beadtubeoverview



Opentrons OT-2

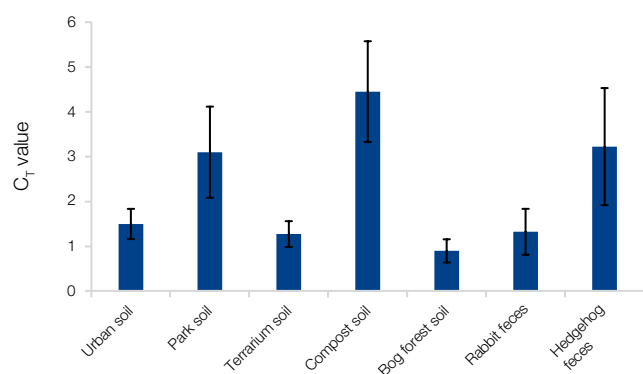
Technology	Automated liquid handling platform equipped with electronic pipettes and Magnetic Module (further modules are available for different applications).
Sample numbers	1 – 96 samples
Deck positions	Configurable platform with 11 deck slots
Pipetting volume	20 – 300 µL (P300 8-Channel Pipette) 100 – 1000 µL (P1000 Single-Channel Pipette) (Further Single-Channel and 8-Channel pipettes with different ranges are available for other applications)

Figure 1:

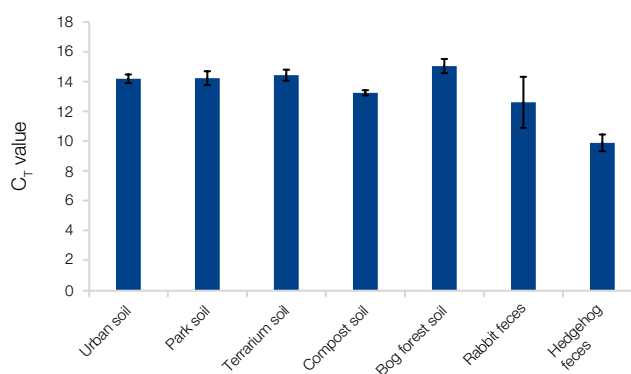
The Opentrons OT-2 is equipped with the Opentrons Magnetic Module and Opentrons GEN2 Pipettes microbial DNA purification from stool, soil and biofilm samples. The Magnetic Module uses high-strength magnetic bars that can be engaged to magnetize magnetic beads, and disengaged to allow magnetic beads to remain in solution.

Application data

A



B



Reliable qPCR performance of purified DNA from soil and feces samples

Stool, soil and biofilm samples were subjected to a mechanical lysis procedure with MN Bead Tubes Type A. DNA was purified from the homogenates using the NucleoMag® DNA Microbiome kit (MN) on the Opentrons OT-2. DNA eluates were photometrically quantified (A) used in a qPCR for the bacterial 16 s rRNA gene detecting both gram +and gram – bacteria using the SensiFAST™ SYBR Lo-ROX qPCR assay from Biorline on a Applied Biosystems® 7500 Real-Time PCR System. The results demonstrate a reliable qPCR-performance of DNA eluates (B).

Ordering information

Product	Specifications	Pack of	REF
NucleoMag® DNA Microbiome	Magnetic bead-based kit for the isolation of genomic DNA from microorganisms in soil, stool and biofilm (swab) samples; including NucleoMag® B-Beads and buffers	1 × 96 preps	744330.1
		4 × 96 preps	744330.4
MN Bead Tubes Type A	2 mL screw cap micro tubes prefilled with 0.6–0.8 mm ceramic beads; recommended for soil, stool and biofilm samples	50	740786.50
MN 96 Bead Plate Type A	Rack of prefilled tube strips (12 strips with 8 tubes each) containing 0.6–0.8 mm ceramic beads; suitable in conjunction with mixer mill; recommended for soil, stool and biofilm samples	4 × 96 preps	740850.4
		24 × 96 preps	740850.24
OT-2 pipetting robot	Automated liquid handling platform with Magnetic Module and electronic pipettes	OT-2 Pipetting Robot	999–00111 *
		Single-Channel P1000 Pipette	999–00004 *
		8-Channel P300 Pipette	999–00006 *
		Magnetic Module	999–00098 *

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* For more detailed information, please visit www.opentrons.com. To contact Opentrons Sales or to schedule a demo, please email info@opentrons.com.