

MACHEREY-NAGEL

# Microbiome guide

Bioanalysis



- Efficient mechanical disruption with bead beating
- Individual or combined isolation kits for challenging samples like stool or soil available
- Patented inhibitor removal technology enabling sensitive downstream analyses like 16S gene sequencing

**MACHEREY-NAGEL**

[www.mn-net.com](http://www.mn-net.com)





# Microbiome introduction

## Isolation of DNA from soil, stool, air, water, and biofilms

The microbiome is composed of the genetic material of a microbial community inside or on the surface of the human body. As the microbiome directly impacts the health condition or environmental changes it is a crucial focus of current research.

Although microbiome analysis is a very popular field of modern research, sample complexity and diversity is a major challenge to overcome. As a result, specialized kits are needed to ensure effective sample lysis and inhibitor removal for soil, stool, biofilm, air and water samples.

## Choose MACHEREY-NAGEL for your microbiome studies

MACHEREY-NAGEL offers solutions for microbiome studies in all common formats, from single spin columns or anion exchange technology to magnetic beads and high throughput options.

All our kits either contain MN bead tubes for efficient lysis or can be combined with other bead beating options for mechanical sample disruption.

Our advanced kits for inhibitor-rich samples including stool, soil, water, or biofilm provide several steps to eliminate contamination or PCR inhibition, ensuring that the extracted nucleic acids perform optimally in downstream applications. MACHEREY-NAGEL kits are an ideal choice for your microbiome research.

## Icon annotation

 Mini spin column for microcentrifuge tubes (1.5 mL or 2 mL)	 Mini spin columns in 8-well strip format	 Midi column for gravity flow	 Superparamagnetic beads to be used in individual test tubes
 Superparamagnetic beads	 Mini spin columns in 96-well plate format	 Superparamagnetic beads to be used in 96-well plate format	 Mini spin column for microcentrifuge tubes (1.5 mL or 2 mL)

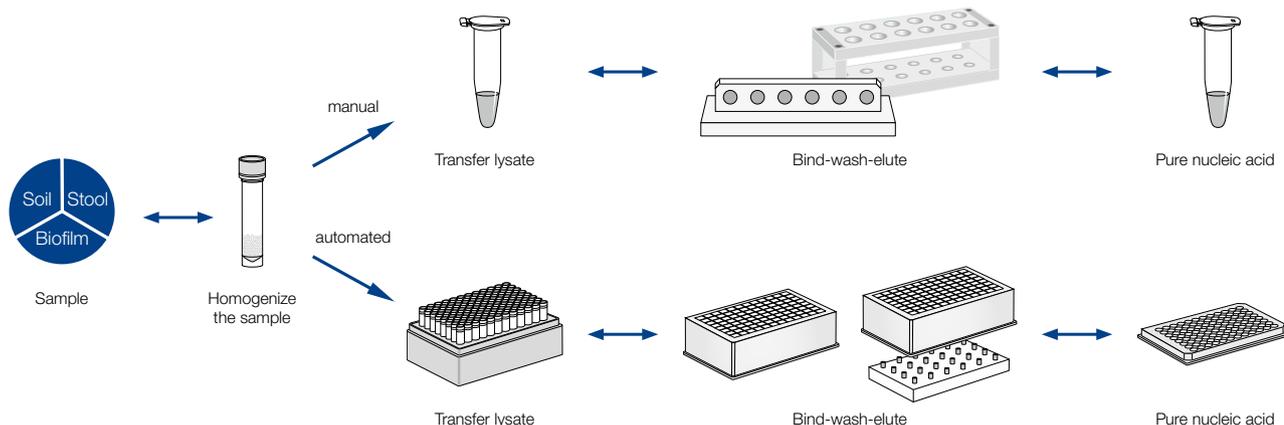
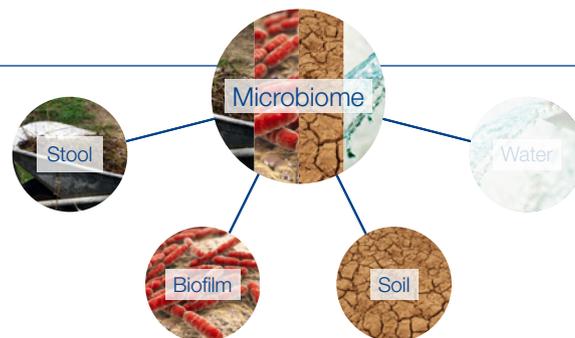
Product	Sample material	Scale	Technology	Page
NucleoMag® DNA Microbiome	Soil Stool Biofilms	Single 96-well	NucleoMag®	4
NucleoSpin® Soil	Soil	Mini 8-well 96-well	NucleoSpin®	6
NucleoBond® RNA Soil	Soil	Mini Midi	NucleoBond®	8
NucleoSpin® DNA Stool	Stool	Mini 96-well	NucleoSpin®	10
NucleoSpin® RNA Stool	Stool	Mini	NucleoSpin®	12
NucleoMag® DNA / RNA Water kit	Filtered water Air	Single 96-well	NucleoMag®	14
NucleoSpin® Soil	Filtered water	Mini	NucleoSpin®	16
MN Bead Tubes A	Soil	Mini	Bead Tubes	18
MN Bead Tubes E	Stool Biofilms Filtered water Air	96-well Bulk		18

# Genomic DNA from microbiome samples

## NucleoMag® DNA Microbiome

Magnetic bead based kit for the isolation of genomic DNA from micro-organisms in soil, stool, and biofilm (swab) samples.

### Product workflow overview



### Product at a glance



NucleoMag® DNA Microbiome

Technology	Magnetic bead technology
Handling	Magnetic separation
Processing	Manual, or automated
Sample amount	50–200 mg
Sample material	Stool, soil, biofilm samples (incl. swabs)
Typical yield	Depending on amount and quality of sample
Typical binding capacity	50–200 µL

### Application data

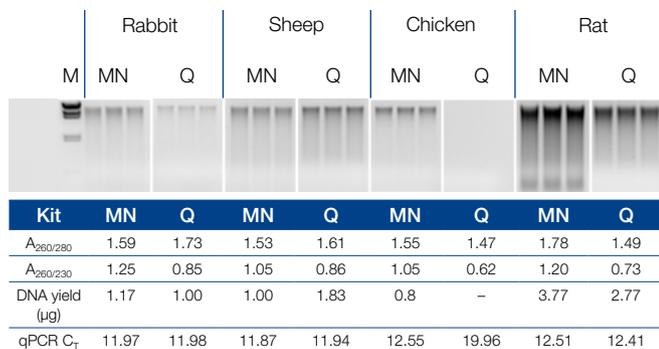
M	Potting soil		Heathland soil		Bog forest soil		Arable soil	
	MN	Kit O	MN	Kit O	MN	Kit O	MN	Kit O
Kit	MN	O	MN	O	MN	O	MN	O
$A_{260/280}$	1.65	1.40	1.53	1.37	1.85	1.71	1.68	1.74
$A_{260/230}$	1.18	1.00	1.32	0.90	1.76	1.11	1.30	1.08
DNA yield (µg)	0.96	0.55	4.15	0.50	4.75	0.40	1.35	0.40
qPCR $C_T$ (1:10 dil)	18.08	18.23	15.22	18.76	15.91	18.78	17.54	19.22

M	Pine forest soil		Strawberry soil		Mixed forest soil		River sediment	
	MN	Kit O	MN	Kit O	MN	Kit O	MN	Kit O
Kit	MN	O	MN	O	MN	O	MN	O
$A_{260/280}$	1.73	1.73	1.81	1.68	1.65	1.55	1.71	1.66
$A_{260/230}$	1.38	1.24	1.53	1.16	1.10	0.95	1.45	1.19
DNA yield (µg)	1.20	0.70	1.45	0.55	0.50	0.30	1.30	0.50
qPCR $C_T$ (1:10 dil)	17.68	17.81	16.76	17.74	18.53	19.63	16.59	17.97

#### Efficient isolation of DNA from soil microorganisms

Soil 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) and a competitor kit (O) according to the manufacturers' instructions. DNA yield and purity were measured photometrically. DNA eluates were diluted 1:10 and used in a qPCR for the bacterial 16S rRNA gene. The NucleoMag® DNA Microbiome kit procedure resulted in higher yields, better purities, and superior qPCR performance for all soil samples tested.

# Genomic DNA from microbiome samples

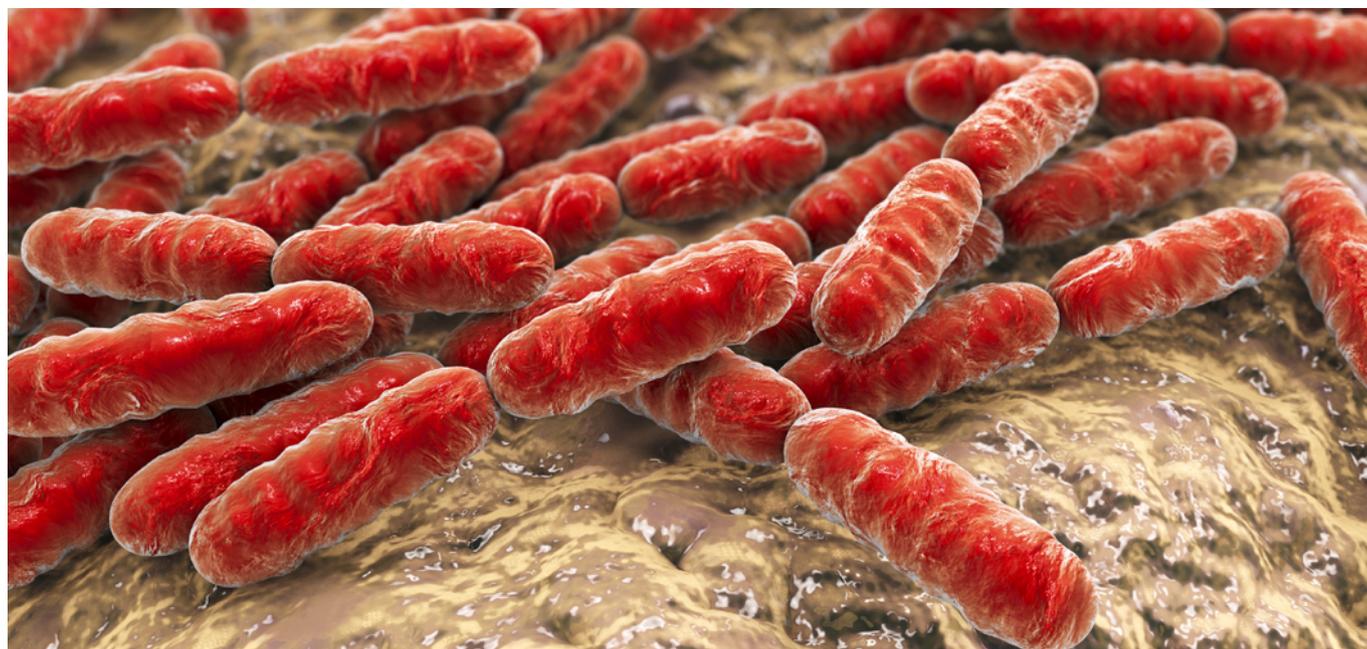


## Efficient isolation of DNA from fecal samples

Fecal samples from different animals (rabbit, sheep, chicken, rat) 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) and a competitor kit (Q) according to the manufactures' instructions. DNA yield, and purity were measured photometrically. DNA eluates were used in a qPCR for the bacterial 16s rRNA gene. DNA eluates obtained with NucleoMag® DNA Microbiome show a superior purity for all fecal sample types. The yield is comparable (sheep) or better (rabbit, chicken, rat) than with the competitor kit. The qPCR performance is comparable (rabbit, sheep, rat) or better (chicken) than with the competitor kit.

## Ordering information

Product	Specifications	Preps	REF
NucleoMag® DNA Microbiome	Magnetic bead based kit for the purification of nucleic acids from micro-organism in soil, stool and biofilm; contains NucleoMag® B-Beads, buffers.	1 × 96 4 × 96	744330.1 744330.4
MN Bead Tubes Type A	2 mL screw cap tubes prefilled with 0.6–0.8 mm ceramic beads; recommended for soil, stool, and biofilm samples.	50	740786.50
MN Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Beads Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459
NucleoMag® SEP Mini	Magnetic separator, for use with 12 × 1.5 mL or 2 mL reaction tubes	1	744901
NucleoMag® SEP	Magnetic separator, for use with 96-well plates	1	744900

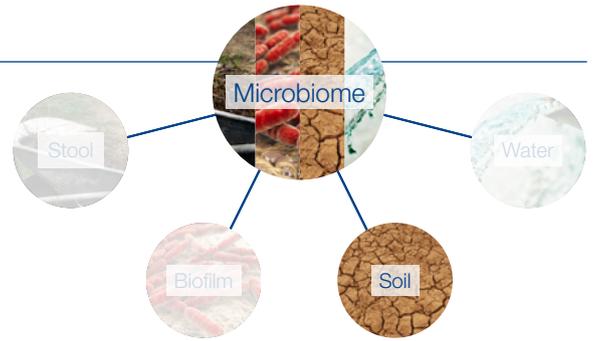


# DNA from soil

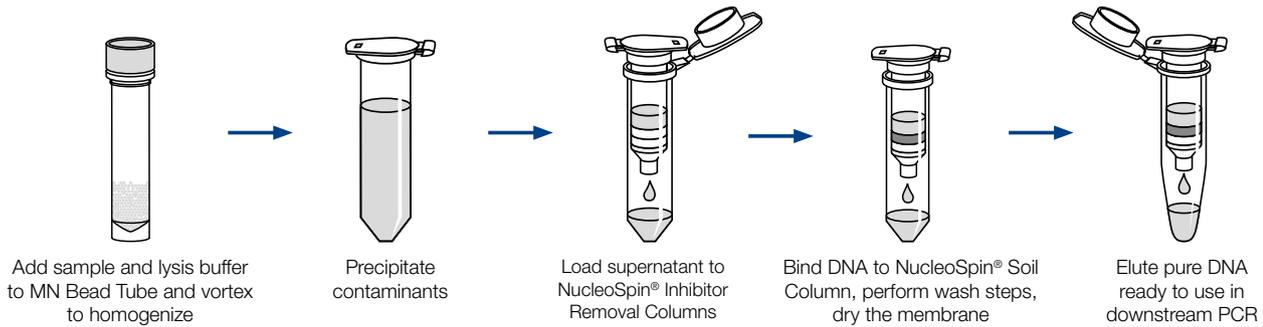
## NucleoSpin® Soil

The NucleoSpin® Soil kit is used to isolate genomic DNA from micro-organisms found in soil, sludge, and sediment samples.

Humic compounds and other PCR inhibitors commonly found in soil and sediment samples are removed by the specialized buffer chemistry and the NucleoSpin® Inhibitor Removal Column.



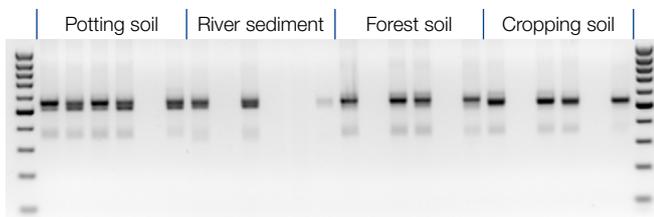
## Product workflow overview



## Product at a glance

	 <b>NucleoSpin® Soil</b>	 <b>NucleoSpin® 8 Soil</b>	 <b>NucleoSpin® 96 Soil</b>
Technology	Silica membrane technology	Silica membrane technology	Silica membrane technology
Format	Mini Spin column	8-well strip	96-well plate
Sample material	< 500 mg Sediment, Sludge, Soil	< 500mg Sediment, Sludge, Soil	< 500 mg Sediment, Sludge, Soil
Fragment size	50 bp–approx. 50 kbp	50 bp–approx. 50 kbp	50 bp–approx. 50 kbp
Typical yield	2–10 µg (500 mg soil)	2–10 µg (500 mg soil)	2–10 µg (500 mg soil)
Elution volume	30–100 µL	100–200 µL	100–200 µL
Preparation time	90 min/10 preps	150 min/6 strips	150 min/plate
Binding capacity	50 µg	50 µg	50 µg

## Application data



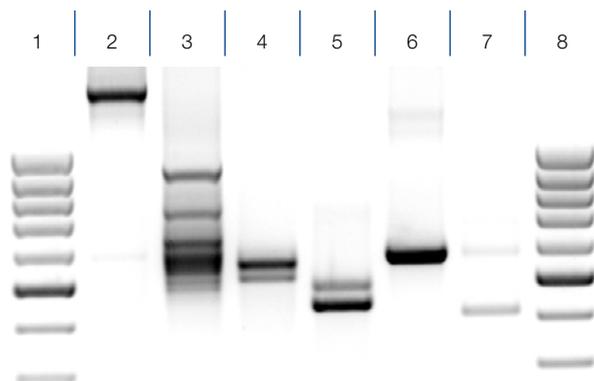
Lane 1: NucleoSpin® Soil (SL1)  
 Lane 2: NucleoSpin® Soil (SL1 + SX)  
 Lane 3: NucleoSpin® Soil (SL2)  
 Lane 4: NucleoSpin® Soil (SL2 + SX)  
 Lane 5: Competitor MP lane 6: Competitor MO

### Complete removal of PCR inhibitors – PCR results even from undiluted eluates!

DNA was purified with NucleoSpin® Soil using Lysis Buffer SL1 and Lysis Buffer SL2 with and without Enhancer SX as well as with kits from competitor MP, and MO. 2 µL of undiluted eluate was used as PCR template with fungi specific internal transcribed spacer (ITS) primers. Competitor MP failed to yield DNA pure enough to be used undiluted. DNA yield and inhibitor concentration were both low for competitor MO, but the PCR from river sediment samples was still strongly inhibited. With NucleoSpin® Soil there were at least two conditions for each soil type yielding plenty of DNA, and the PCR was successful with undiluted DNA

# DNA from soil

## Application data



### Efficient lysis system, even for difficult-to-lyse microorganisms

Total DNA from 400 mg crop soil was purified with NucleoSpin® Soil using Lysis Buffer SL2 in combination with Enhancer SX. 2 µL of undiluted eluates were analyzed in PCR using primers for the indicated targets.

Lane 1: 1 kbp DNA Ladder (Fermentas)

Lane 2: Prokaryotes (16S rRNA gene)

Lane 3: Eucaryotes (ITS)

Lane 4: Fungi (ITS)

Lane 5: Fungi (β-Tubulin)

Lane 6: Algae, protozoae, fungi (18S rRNA)

Lane 7: Gram<sup>+</sup> (*B. subtilis*, *cerA*)

Lane 8: 1 kbp DNA ladder (Fermentas)

## References

- Stevens et al., Human gut microbiome changes during a 10 week Randomised Control Trial for micronutrient supplementation in children with attention deficit hyperactivity disorder. *Nature Scientific Reports*, volume 9, 10128 (2019).
- Hirota et al., Triclosan-induced alteration of gut microbiome and aggravation of asthmatic airway response in aeroallergen-sensitized mice. *Allergy*, volume 74, issue 5, 2019.

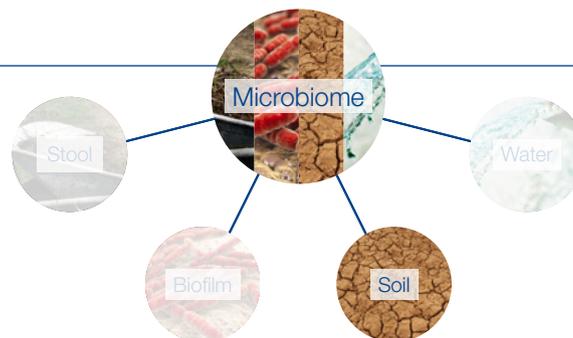
## Ordering information

Product	Specification	Preps	REF
NucleoSpin® Soil	Mini spin kit for isolation of total DNA from diverse soil types, MN Bead Tubes Type A included.	50 250	740780.50 740780.250
NucleoSpin® 8 Soil	Isolation of total DNA from diverse soil types in flexible 8-well strip format.	12 x 8	740779
NucleoSpin® 96 Soil	96-well kit for DNA from soil, isolation of total DNA from diverse soil types in proven 96-well plate format.	2 x 96 4 x 96	740787.2 740787.4
DNA Set for NucleoBond® RNA Soil Mini	Set for parallel DNA isolation from soil samples with NucleoBond® RNA Soil Mini, NucleoSpin® DNA Columns included.	50	740143.50
NucleoBond® RNA Soil Mini kit for RNA from soil	Easy handling and superior speed for metagenomic soil analysis, MN Bead Tubes Type A included.	50	740142.50
DNA Set for NucleoBond® RNA Soil	Set for parallel DNA isolation from soil samples with NucleoBond RNA Soil, NucleoSpin® Finisher included.	20	740141.20
NucleoBond® RNA Soil Midi kit for RNA from soil	Easy handling and superior speed for metagenomic soil analysis, MN Bead Tubes Type A included.	20	740140.20
MN Bead Tubes Type A	2 mL screw cap tubes prefilled with 0.6–0.8 mm ceramic beads; recommended for soil, stool, and biofilm samples.	50	740786.50
MN Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 x 96 4 x 96 24 x 96	740850.1 740850.4 740850.24
MN Beads Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

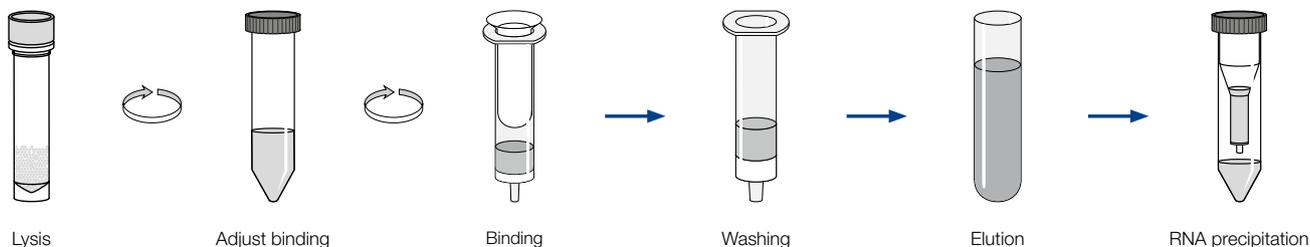
# RNA from soil

## NucleoBond® RNA Soil

NucleoBond® RNA Soil kit enables efficient isolation of high quality RNA and DNA (requires DNA Set for NucleoBond® RNA Soil, see ordering information) from any kind of soil or sediment sample. Most soils contain relatively low amounts of RNA compared to DNA. Therefore we designed our new kit with our proven NucleoBond® technology to enable purification of nucleic acids from a high amount of sample input.



## Product workflow overview



## Product at a glance



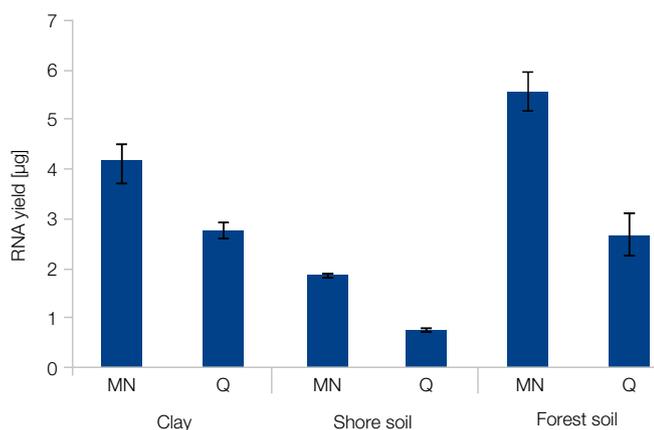
### NucleoBond® RNA Soil Mini



### NucleoBond® RNA Soil Midi

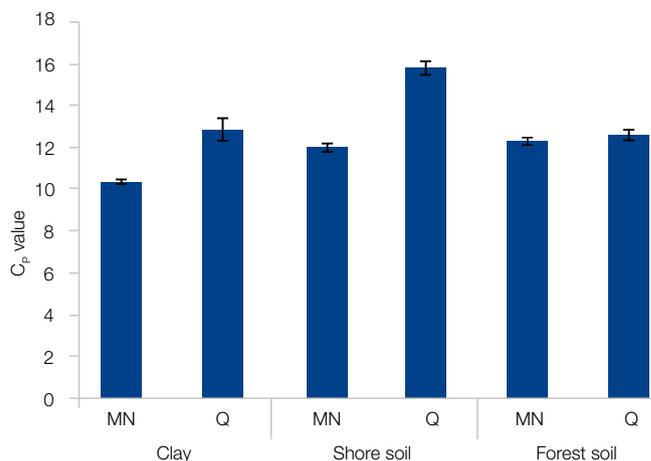
Technology	Anion exchange chromatography technology combined with MN Bead Tubes Type A	Anion exchange chromatography technology combined with MN Bead Tubes Type A
Sample material	0.25–0.5 g	< 2 g
Fragment size	> 100 nt	> 100 nt
Typical yield	0.25–2.5 µg	1–10 µg
A <sub>260</sub> /A <sub>280</sub>	1.5–2.0	1.7–2.1
Elution volume	100 µL	100 µL
Preparation time	60 min/12 preps	60 min/6 preps
Binding capacity	30 µg	600 µg

## Application data



### High RNA yields with NucleoBond® RNA Soil

Different soil samples (clay, shore soil, forest soil) were purified in duplicates according to the standard procedure. For comparison, the samples were applied to a competitor kit from Q. RNA was eluted in 100 µL and the yield was determined photometrically.



### Amplifiable RNA for perfect results with NucleoBond® RNA Soil kit

Duplicates of different soil samples (clay, shore soil, forest soil) were purified in duplicates according to the standard procedure from MN, and Q. 4 µL of eluate was applied to the RT-PCR (amplicon: 466 bp). All MN samples showed lower CP values compared with Q samples, indicating higher RNA yield.

# RNA from soil

## Ordering information

Product	Specifications	Preps	REF
NucleoBond® RNA Soil *	Easy handling and superior speed for metagenomic soil analysis, MN Bead Tubes Type A included.	20	740140.20
DNA Set for NucleoBond® RNA Soil	Set for parallel DNA isolation from soil samples with NucleoBond® RNA Soil, NucleoSpin Finisher included.	20	740141.20
NucleoBond® RNA Soil Mini *	Easy handling and superior speed for metagenomic soil analysis, MN Bead Tubes Type A included.	10 50	740142.10 740142.50
DNA Set for NucleoBond® RNA Soil Mini	Set for parallel DNA isolation from soil samples with NucleoBond® RNA Soil Mini, NucleoSpin DNA Columns included.	10 50	740143.10 740143.50
MN Bead Tubes Type A	2 mL screw cap tubes prefilled with 0.6–0.8 mm ceramic beads; recommended for soil, stool, and biofilm samples.	50	740786.50
MN Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Beads Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

\* For isolation of DNA, DNA Set for NucleoBond® RNA Soil is required.

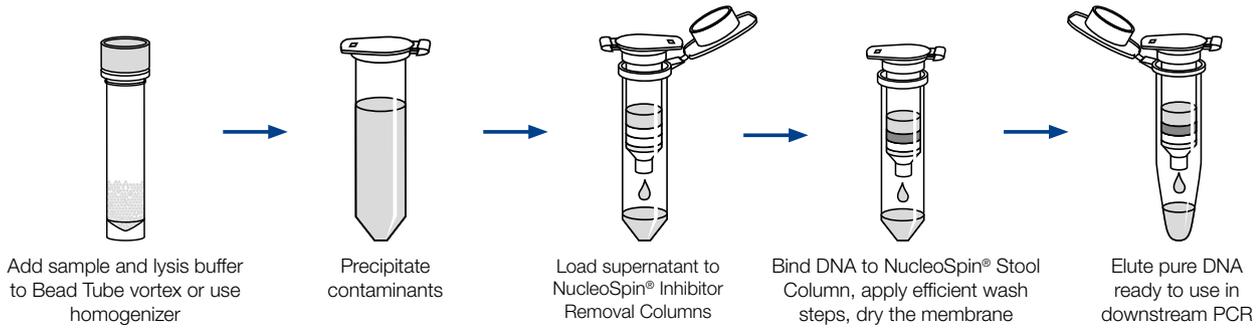
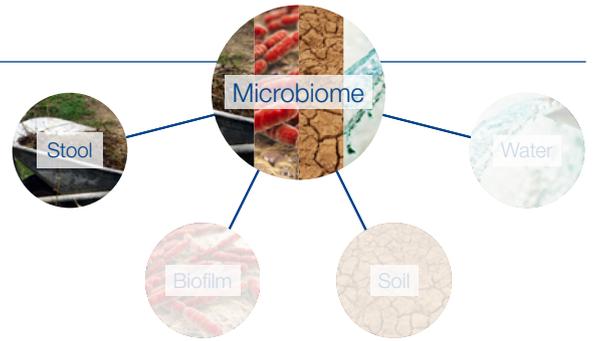


# DNA from stool

## NucleoSpin® DNA Stool

The NucleoSpin® DNA Stool kit is designed for the efficient isolation of both microbial and host genomic DNA from fresh and frozen stool samples.

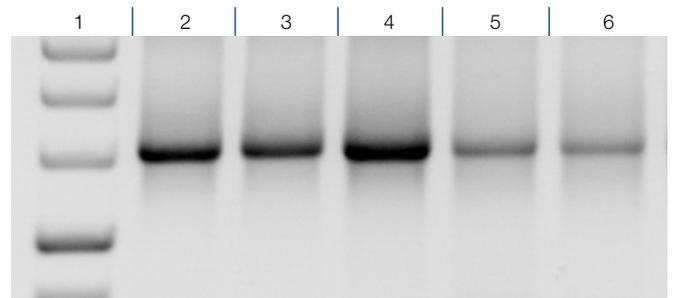
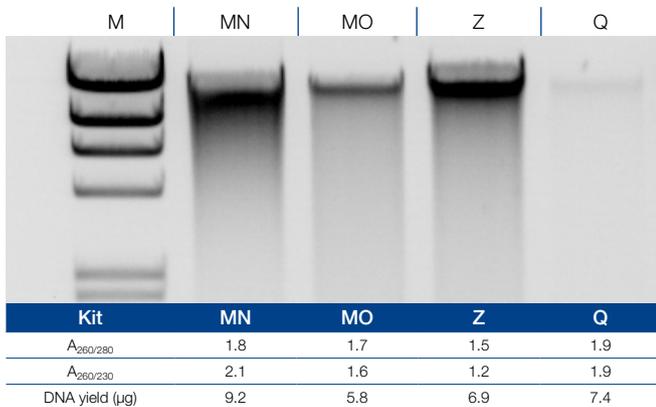
### Product workflow overview



### Product at a glance

	 <b>NucleoSpin® DNA Stool</b>	 <b>NucleoSpin® 96 DNA Stool</b>
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 100–200 mg animal stool (depending on species of origin)	100–200 mg human stool; < 100–200 mg animal stool (depending on species of origin)
Fragment size	200 bp – approx. 50 kbp	50 bp – approx. 50 kbp
Typical yield	2–10 µg	3–15 µg (varies by sample and disruption device)
A <sub>260</sub> /A <sub>280</sub>	1.7–1.9	1.6–1.8
Elution volume	30–100 µL	100–200 µl
Preparation time	60 min/10 preps	90 min/48 samples (automated use)
Binding capacity	50 µg	50 µg

### Application data



Lane 1: GeneRuler™ 1kb Ladder (Thermo)  
 Lane 2: Feline  
 Lane 3: Sheep  
 Lane 4: Rabbit  
 Lane 5: Mouse  
 Lane 6: Human

#### High genomic DNA yield, and purity from human stool samples

DNA was isolated from human stool samples with the NucleoSpin® DNA Stool kit (MN) and with competitor products (MO, Z, Q). The DNA was extracted according to manufacturers' protocols, and 5% of the eluate was subjected to gel electrophoresis. DNA yield and quality of the samples were assessed by means of UV absorption measurement. The genomic DNA isolated with the NucleoSpin® DNA Stool kit showed superior yield, and quality.

#### Efficient removal of PCR inhibitors from various sample sources

DNA was isolated from human, and animal feces samples with the NucleoSpin® DNA Stool kit. 5 µL of undiluted eluate served as template for the amplification of a 1.5 kb fragment from the bacterial 16S rRNA gene in an endpoint-PCR (35 cycles). The DNA extracted with the NucleoSpin® DNA Stool kit works undiluted in a PCR reaction, indicating the successful removal of PCR inhibitors.

# DNA from stool

## References

- Adamczyk et al. Plant roots increase both decomposition, and stable, organic matter formation in boreal forest soil. *Nature Communications*, volume 10, 3982 (2019).
- Goncalves et al. Microbiota stimulation generates LCMV-specific memory CD8<sup>+</sup> T cells in SPF mice, and determines their TCR repertoire during LCMV infection. *Molecular Immunology*, volume 124, pages 125–141 (2020).

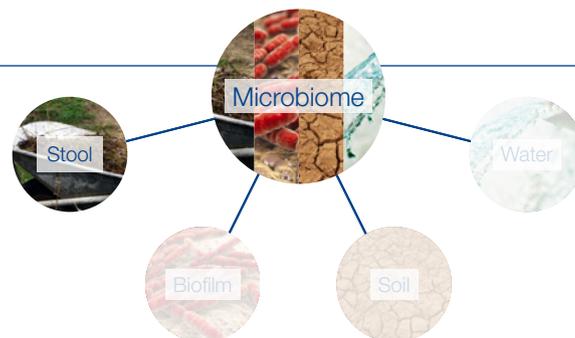
## Ordering information

Product	Specifications	Preps	REF
NucleoSpin® DNA Stool	Mini spin kit for isolation of DNA from stool samples, MN Bead Tubes Type A included.	50 250	740472.50 740742.250
NucleoSpin® 96 DNA Stool	Isolation of total DNA from stool samples in 96-well plate format, MN Bead Tubes Type A included.	1 × 96 4 × 96	740473.1 740473.4
NucleoSpin® 96 DNA Stool Core Kit	Isolation of total DNA from stool samples in 96-well plate format; Buffers, and NucleoSpin® Stool Filterplate / Bindingplate included. MN Washplate, and Square-well Block, Tube stripes have to be purchased separately.	4 × 96 24 × 96	740457.4 740457.24
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 Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Beads Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

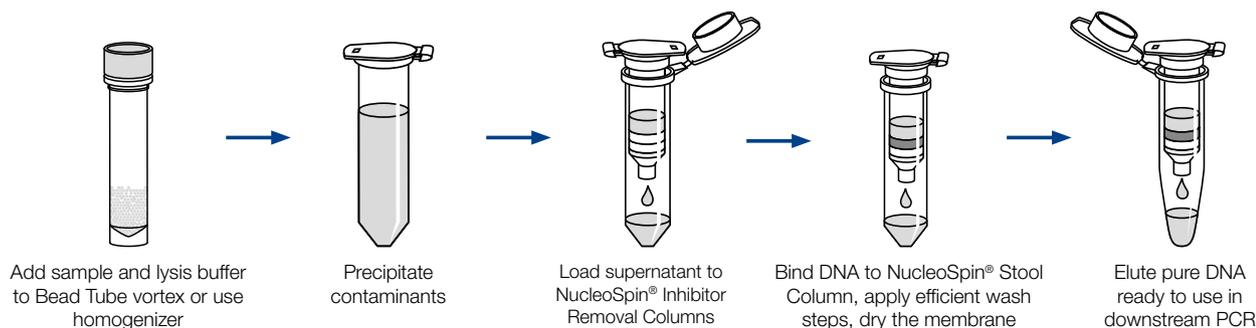
# RNA from stool

## NucleoSpin® RNA Stool

NucleoSpin® RNA Stool kit enables efficient isolation of high quality RNA from any kind of stool sample. The kit combines NucleoZOL and a specific lysis buffer for a chemical disruption of stool samples. The containing microbes are also disrupted with a mechanical lysis using the included MN Bead Tubes Type A.



## Product workflow overview

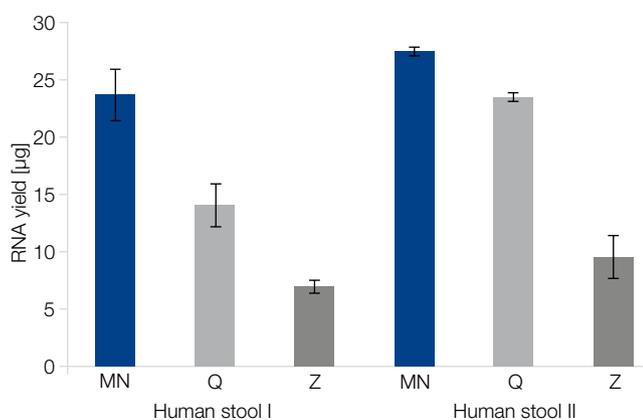


## Product at a glance



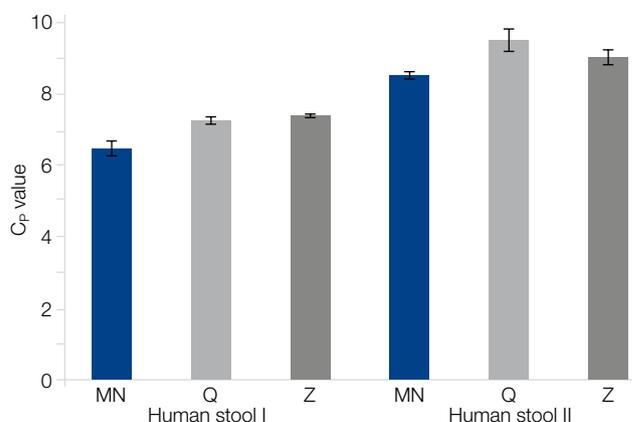
Technology	Silica membrane technology combined with MN Bead Tubes Type A
Sample material	~ 200 mg fresh, or frozen stool samples
Fragment size	≥ 18 nt
Typical yield	10–30 µg
$A_{260}/A_{280}$	1.9–2.1
Elution volume	100 µL
Preparation time	70 min/10 preps
Binding capacity	200 µg

## Application data



### Highest yield with NucleoSpin® RNA Stool

Two human stool samples (250 mg; MN only 200 mg) were processed in triplicates following the standard protocols including the DNase digestion step. The Q protocol was performed including the optional phenol based lysis step. Each eluate was used for UV spectroscopy to determine RNA yield. The NucleoSpin® RNA Stool showed the highest RNA yield for the human stool samples.



### NucleoSpin® RNA Stool shows best performance in qPCR

The NucleoSpin® RNA Stool samples as well as the Q samples were eluted with 100 µL, the Z eluate was adjusted to 100 µL to get comparable RNA concentrations in the eluate. 1 µL of eluate was used for qRT-PCR performed on a Roche® LightCycler® using the SensiFAST™ SYBR® No-Rox One Step Kit (amplicon size 466 bp). NucleoSpin® RNA Stool showed a better performance in the qRT-PCR compared to the two competitor kits.

## RNA from stool

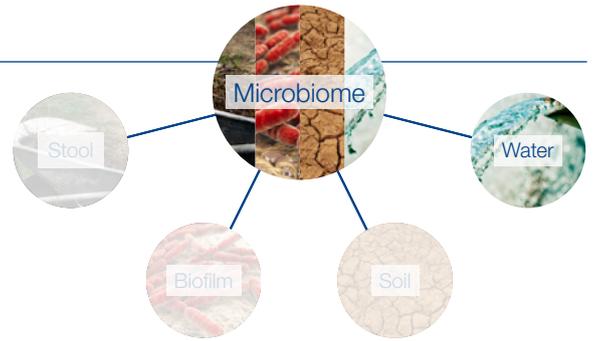
### Ordering information

Product	Specifications	Preps	REF
NucleoSpin® RNA Stool	Fast isolation of total RNA from various stool specimen, MN Bead Tubes Type A included.	10 50	740130.10 740130.50
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 Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Bead Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

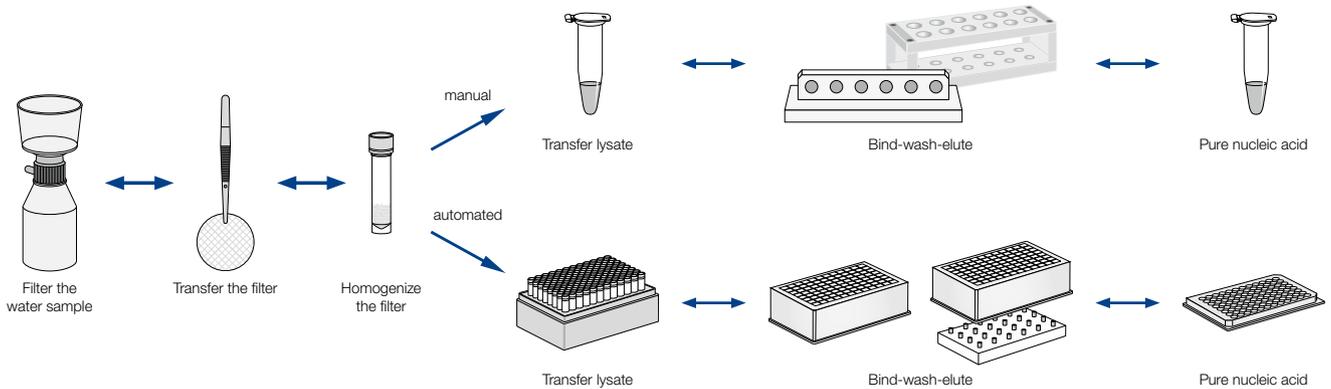
# DNA/RNA from water and air samples

## NucleoMag® DNA/RNA Water kit

NucleoMag® DNA/RNA Water enables manual or automated detection of either DNA, RNA, or both in parallel from a range of water samples, including wastewater, spanning from turbid to clear, as well as from air filters. Simultaneous detection of DNA and RNA in the same sample enables fast and accurate determination of presence of total microbes (through DNA) and living microorganisms (through RNA).



## Product workflow overview



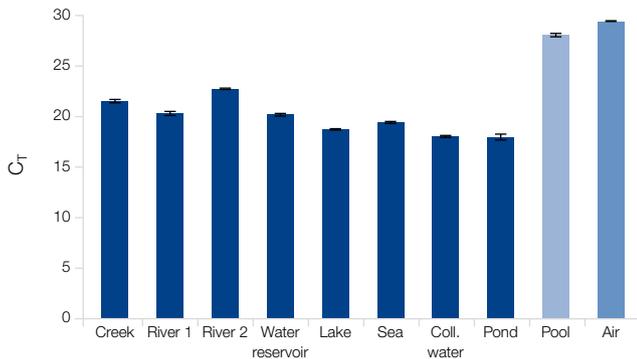
## Product at a glance



NucleoMag® DNA/RNA Water

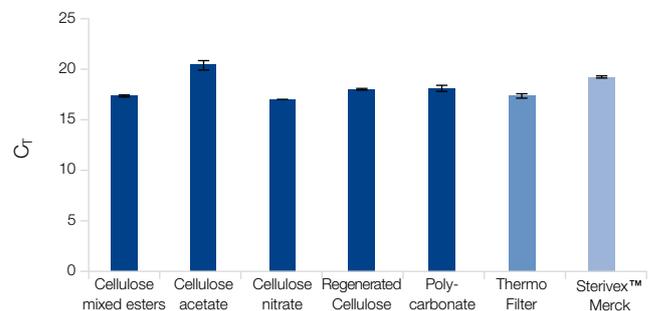
Technology	Magnetic bead technology
Format	Highly reactive superparamagnetic beads
Processing	Manual, or automated
Sample material	Filtered water or air
Fragment size	300 bp – approx. 50 kbp
Maximum amount of starting material	10–1000 mL/preparation
Elution volume	50–250 µL
Preparation time	40–120 min/96 preps (excl. lysis)

## Application data



### Efficient detection for different water, and air samples

Various water samples, and an air sample were filtered, and the extracted DNA was analyzed by PCR. Microbial DNA could be efficiently measured for all of the samples, demonstrating the versatility of the NucleoMag® DNA/RNA Water kit.



### Compatibility with different filtration systems

A qPCR was performed with nucleic acids isolated from round filters, and a filtration cartridge system, demonstrating reliable results across different filtration systems.

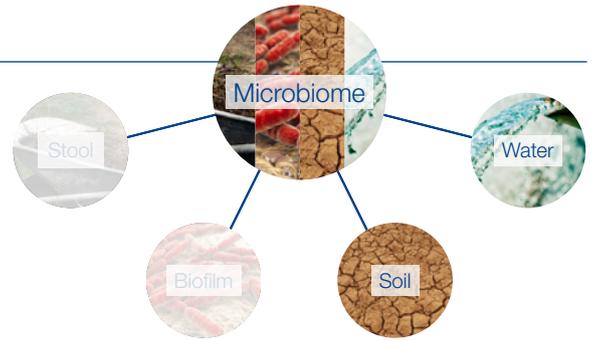
## DNA / RNA from water, and air samples

### Ordering information

Product	Specifications	Pack of	REF
NucleoMag® DNA / RNA Water	Flexible magnetic bead based isolation of DNA and RNA from filtered water and air samples.	1 × 96 4 × 96	744220.1 744220.4
MN Bead Tubes Type A	2 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740786.50
MN Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Bead Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459
NucleoMag® SEP Mini	Magnetic separator, for use with 12 × 1.5 mL or 2 mL reaction tubes.	1	744901
NucleoMag® SEP	Magnetic separator, for use with 96-well plates.	1	744900



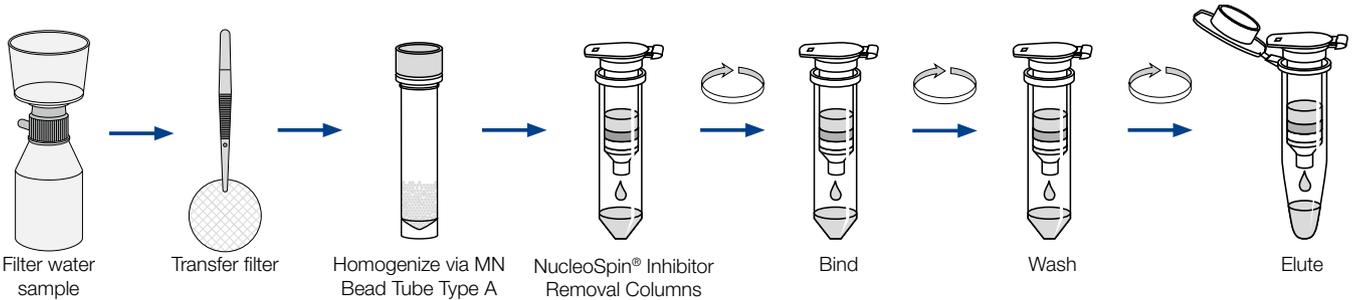
# DNA from water samples



## NucleoSpin® Soil

NucleoSpin® Soil kit is well suited for DNA extraction from water samples. A combination of mechanical lysis with MN Bead Tubes Type A and the right lysis buffer chemistry allows reliable isolation of high-quality DNA even from hard to lyse microorganisms present in water. The superior NucleoSpin® Soil inhibitor removal technology eliminates PCR Inhibitors like humic acids.

### Product workflow overview

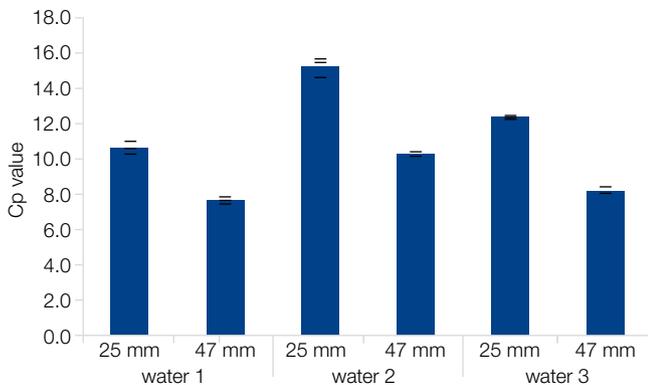


### Product at a glance



Technology	Silica membrane technology
Format	Mini Spin column
Processing	100 mL to 10 L of water, depending on the filtration capacity of the used filter
Sample material	Filtered water, filter
Fragment size	50 bp – approx. 50 kbp
Typical yield	1–10 µg
Elution volume	50–100 µL
Preparation time	90 min/10 preps (excl. filtration steps)

### Application data



#### Efficient DNA isolation from water filters

A qPCR was performed with nucleic acids isolated from round filters demonstrating reliable results across different filtration systems.

## DNA from water samples

### Ordering information

Product	Specification	Preps	REF
NucleoSpin® Soil	Mini spin kit for isolation of total DNA from diverse soil types, MN Bead Tubes Type A included.	50 250	740780.50 740780.250
NucleoSpin® 8 Soil	8-well kit for DNA from soil, Isolation of total DNA from diverse soil types in flexible 8-well strip format.	96	740779
NucleoSpin® 96 Soil	96-well kit for DNA from soil, isolation of total DNA from diverse soil types in proven 96-well plate format.	2 × 96 4 × 96	740787.2 740787.4
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 Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Bead Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tubes Type E	2 mL tubes with 3 mm steel beads, and 40–400 µm glass beads; for homogenization of bacteria within insects, or tissue samples.	50	740815.50
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

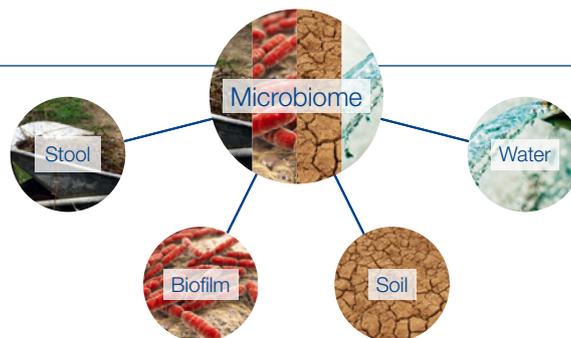
# Sample homogenisation with bead beating

## MN Bead Tubes and MN Bead Plates

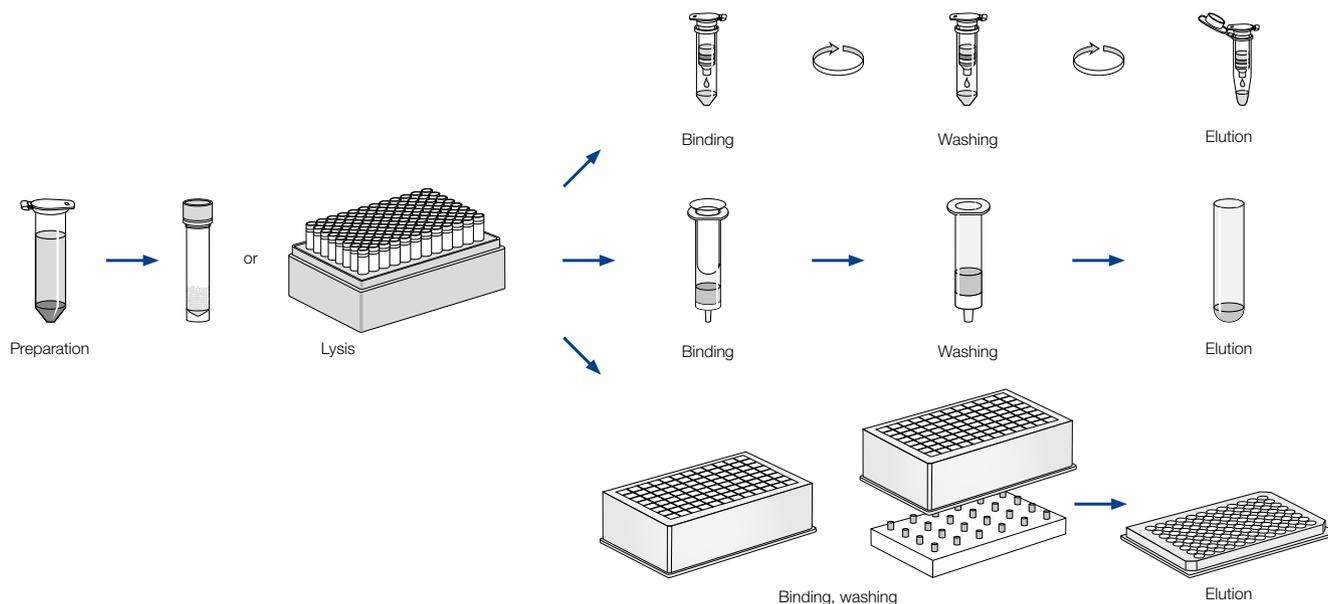
Microbiome related sample matrices such as stool, soil, biofilm, and water are very complex and need disruption via bead beating to achieve complete lysis. Bead beating is an essential step for mechanical homogenization of difficult sample materials. We have developed a series of bead types, each suited for a different kind of sample material. In addition we have included them in our kits to ensure a thorough and uniform sample lysis. Especially microbiome, water, soil, or stool sample matrices are very complex and do need additional disruption via bead.

For high-throughput we also offer a 96-well format of our bead tubes, the MN Bead Plates. The MN Bead Plates provide a very convenient way of sample lysis and will free up your time.

The bead beating procedure can be combined with all available nucleic acid isolation technologies from silica membrane over magnetic beads to anion exchange.



## Product workflow overview



## Ordering information

Product	Specifications	Pack of	REF
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 Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Beads Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	400 g	740786.B.250
MN Bead Tubes Type E	2 mL tubes with 3 mm steel beads, and 40–400 µm glass beads; for homogenization of bacteria within insects, or tissue samples..	50	740815.50
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

# Microbiome product ordering information

## Product Overview

Product	Specifications	Preps	REF
NucleoMag® DNA Microbiome	Magnetic bead based kit for the purification of nucleic acids from microorganism in soil, stool and biofilm samples; contains NucleoMag® B-Beads, buffers.	1 × 96 4 × 96	744330.1 744330.4
NucleoSpin® Soil	Mini spin kit for isolation of total DNA from diverse soil types, MN Bead Tubes Type A included.	50 250	740780.50 740780.250
NucleoSpin® 8 Soil	DNA isolation from diverse soil types in a flexible 8-well strip format, MN Bead Tubes Type A included.	12 × 8	740779
NucleoSpin® 96 Soil	Isolation of DNA from diverse soil types in a 96 well plate format, MN Bead Tubes Type A included.	2 × 96 4 × 96	740787.2 740787.4
NucleoBond® RNA Soil	Easy handling and superior speed for metagenomic soil analysis, MN Bead Tubes Type A included.	20	740140.20
DNA Set for NucleoBond® RNA Soil	Set for parallel DNA isolation from soil samples with NucleoBond® RNA Soil, NucleoSpin® Finisher included.	20	740141.20
NucleoBond® RNA Soil Mini	Easy handling and superior speed for metagenomic soil analysis, MN Bead Tubes Type A included.	50	740142.50
DNA Set for NucleoBond® RNA Soil Mini	Set for parallel DNA isolation from soil samples with NucleoBond® RNA Soil Mini, NucleoSpin® DNA Columns included.	50	740143.50
NucleoSpin® DNA Stool	Mini spin kit for isolation of DNA from stool samples, MN Bead Tubes Type A included.	50 250	740472.50 740472.250
NucleoSpin® RNA Stool, Mini kit for RNA from stool	Fast isolation of total RNA from various stool specimen, MN Bead Tubes Type A included	50	740130.50
NucleoSpin® 96 DNA Stool	Isolation of total DNA from stool samples in 96-well plate format, MN Bead Tubes Type A included.	1 × 96 4 × 96	740473.1 740473.4
NucleoSpin® 96 DNA Stool Core Kit, 96-well kit for DNA from stool	Isolation of total DNA from stool samples in 96-well plate format.	4 × 96 24 × 96	740457.4 740457.24
NucleoMag® DNA/RNA Water	Flexible magnetic bead based isolation of DNA and RNA from filtered water and air samples.	1 × 96 4 × 96	744220.1 744220.4
MN Bead Tubes Type A	2 mL screw cap tubes prefilled with 0.6–0.8 mm ceramic beads; recommended for soil, stool, and biofilm samples.	50	740786.50
MN Bead Tubes Type A 5 mL	5 mL tubes with 0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, and stool.	50	740799.50
MN 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 suitable mixer mill; recommended for soil, stool, and biofilm samples.	1 × 96 4 × 96 24 × 96	740850.1 740850.4 740850.24
MN Bead Type A (Bulk)	0.6–0.8 mm ceramic beads; for homogenization of soil, sediments, biofilm and stool.	400 g	740786.B.250
MN Bead Tubes Type E	2 mL tubes with 3 mm steel beads and 40–400 µm glass beads; for homogenization of bacteria within insects, or tissue samples.	50	740815.50
MN Bead Tube Holder	Rubber-foam adapter for processing MN Bead Tubes with Vortex-Genie 2.	1	740469
MN Bead Tube Holder 5 mL	Rubber-foam adapter for processing MN Bead Tubes 5 mL with Vortex-Genie 2.	1	740459

### Trademarks:

NucleoSpin® and NucleoMag® are registered trademarks of MACHEREY-NAGEL GmbH & Co. KG

Nutella is a registered trademark of Ferrero S. p. A.

Oreo is a registered trademark of Intercontinental Great Brands LLC (USA)

Vortex-Genie is a registered trademark of Scientific Industries, Inc.

Lightcycler is a registered trademark of Roche Diagnostics GmbH (Germany)

SensiFast is a trademark of Bioline Reagents Ltd. (USA)

SYBR is a registered trademark of Molecular Probes Ltd. (USA)

KingFisher is a registered trademark of ThermoFisher Scientific Inc (USA)

[www.mn-net.com](http://www.mn-net.com)

**MACHEREY-NAGEL**



Management  
System  
EN ISO 13485:2016  
ISO 9001:2015  
[www.tuv.com](http://www.tuv.com)  
ID 900008338

MACHEREY-NAGEL GmbH & Co. KG  
Valenciener Str. 11  
52355 Düren · Germany

DE	Tel.: +49 24 21 969-0	<a href="mailto:info@mn-net.com">info@mn-net.com</a>
CH	Tel.: +41 62 388 55 00	<a href="mailto:sales-ch@mn-net.com">sales-ch@mn-net.com</a>
FR	Tel.: +33 388 68 22 68	<a href="mailto:sales-fr@mn-net.com">sales-fr@mn-net.com</a>
US	Tel.: +1 888 321 62 24	<a href="mailto:sales-us@mn-net.com">sales-us@mn-net.com</a>