Bioanalysis

MACHEREY-NAGEL

NucleoSpin® eDNA Water

Fast and reliable isolation of environmental DNA

- Fast workflow – pure eDNA in hours instead of days
- Ethylene oxide treated XS column – minimized risk of DNA contamination
- Compatible with diverse types of water, filtration systems and laboratory setups

Environmental DNA purification from water samples

NucleoSpin® eDNA Water

Setting new standards for environmental DNA purification from water samples

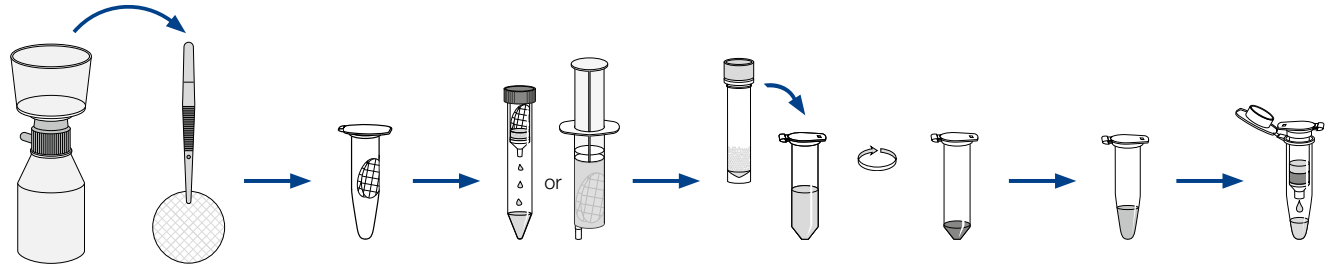
The NucleoSpin® eDNA Water kit enables fast purification of environmental DNA (eDNA) from diverse water samples with reliable results and minimal risk of DNA contamination. The combination of silica matrix with silica membrane columns enables efficient isolation of high quality DNA. NucleoSpin® eDNA Water provides a workflow for eDNA extraction from filters in less than 70 minutes, avoiding long, over-night incubation steps typical of eDNA workflows. Columns are ethylene oxide treated in order to minimize the risk of DNA contamination. NucleoSpin® eDNA is compatible with a variety of filters and filtration systems (not included in the kit), such as conventional bottle top round filters (e.g. 45 mm) as well as cartridge filters (e.g. Sterivex™). Further, an alternative protocol for direct eDNA precipitation circumventing water filtration is provided, enabling isolation of free DNA. These properties make NucleoSpin® eDNA Water ideal for eDNA studies of freshwater and saltwater ecosystems with varying levels of organic and inorganic matter.

The fastest eDNA Kit in the market!

Product at a glance

	NucleoSpin® eDNA Water
Technology	Silica bead suspension, XS column
Processing	Manual, centrifugation
Sample material	Freshwater and saltwater samples; Filters or untreated samples
Water sample volume	Up to several liters of water, depending on water quality and filtration system
DNA fragment size	> 100 bp
Elution volume	100 µL
Preparation time	60–70 min (without filtration / precipitation)
Quality level	EtOX treated columns (EtOX treated round filters are available separately)

Purification workflow



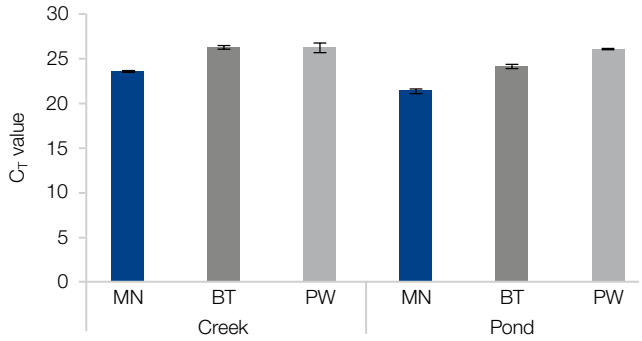
*Filtration device and NucleoSpin Filter / syringe for recovery not included in the kit

From filter to eDNA in under 70 minutes

The NucleoSpin® eDNA Water workflow has been optimized for speed and simplicity without compromizing the quality and purity of the DNA purified. Samples can be obtained either by filtration with round filters – like MACHEREY-NAGEL´s 45 mm Glass Fiber Filters (see ordering information) – or filter cartridges (Sterivex™). DNA is liberated from the filter by a strong lysis buffer. Alternatively, eDNA can be precipitated from < 40 mL of unfiltered water (protocol included; requires additional buffer PREC). NucleoTrap® Bead suspension efficiently binds the DNA, while minimizing carryover of contaminants. Following washing and drying steps, the bead suspension is transfered to a NucleoSpin® XS column, from which pure eDNA is eluted. The purification workflow takes less than 70 min. The full preparation time depends on the sampling and / or filtration setup.

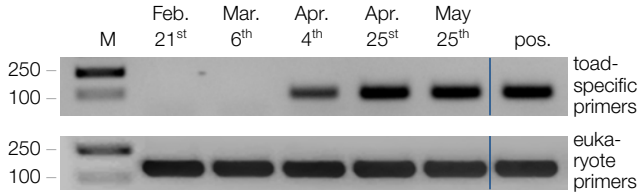
Environmental DNA purification from water samples

Application data



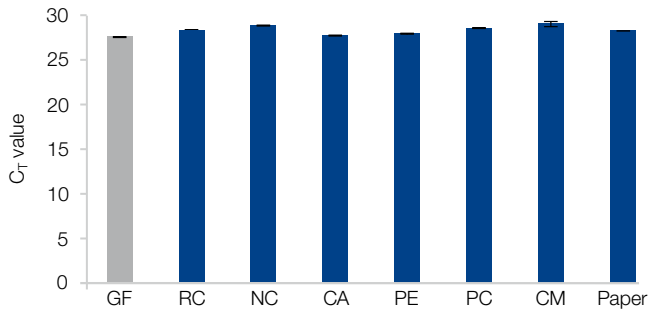
Superior downstream performance

eDNA was purified from running water (creek) and stagnant water (pond) using the NucleoSpin® eDNA Water kit as well as two common competitor kits and analyzed by qPCR for metazoan DNA. The NucleoSpin® eDNA Water kit performeds significantly better (lower Ct value) for both sample types.



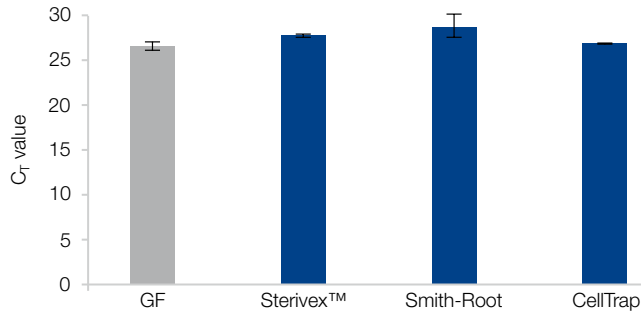
Seasonal traceability of European toad in a freshwater pond

In Germany, European toads become active after hibernation – usually in March – and typically start spawning in April. The presence of toads and / or spawn and tadpoles can be monitored by isolation of eDNA and subsequent PCR analysis. Here, we used the NucleoSpin® eDNA kit in combination with a NucleoSpin® Filter Midi for eDNA isolation. PCR primers were designed to amplify either toad-specific or general eukaryote eDNA.



Consistent performance with diverse round filters

Creek water (0,5 L) was filtered through different types of round filters: regenerated cellulose (RC), cellulose nitrate (NC), cellulose acetate (CA), polyester (PE), polycarbonate (PC) mixed cellulose ester (CM) and paper filter. All show a similar level of efficiency in combination with NucleoSpin® eDNA Water and are comparable to the recommended EO treated Glass Fiber Filter (GF). The glass fiber filter has the best flow-rate and the lowest risk of clogging.

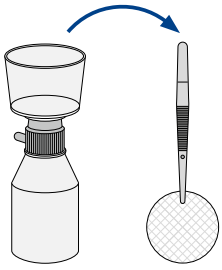


Compatibility with different water filtration systems

Samples of creek water were filtered through a Glass Fiber Filter (GF) as well as several filtration systems commonly used in conjunction with eDNA purification. The NucleoSpin® eDNA Water kit was then used to purify eDNA from each filter unit. The eluates were analyzed by qPCR for metazoan DNA. All filtration systems delivered comparable results.

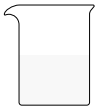
Environmental DNA purification from water samples

Options for sample pre-processing



Filtration and filter transfer*

Filter cartridge (e.g. Sterivex™)*



Direct precipitation from 40 mL water **

* Filtration devices and filters not included

** Requires additional buffer PREC

Ordering information

Product	Specifications	Preps / Pack of	REF
NucleoSpin® eDNA Water	For isolation of eDNA from water - NucleoSpin® eDNA XS Columns, NucleoTrap Suspension, Collection Tubes, buffers	10 / 50	740402.10 / .50
Recommended round filter (for bottle top filtration devices)			
Glass Fiber Filter (45 mm, EO-treated)	Glass fiber round filters, diameter 45 mm, treated with ethylene oxide	50	740564
Accessories for lysate recovery			
NucleoSpin® Filter Midi	Midi filter columns for lysate recovery	50	740607
Disposable 5 mL syringe	For lysate recovery	100	729101
Accessories for direct eDNA precipitation from water			
Buffer PREC	Precipitation buffer for direct precipitation method	50 mL	740568
Optional accessories			
MN Bead Tube Holder 5 mL	For convenient lysis	1	740459
NucleoSpin® Inhibitor Removal	For clean-up of contaminated and discolored DNA eluates - Columns, Collection Tubes (1.5 mL and 2 mL), buffers	10 / 50	740408.10 / 50

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MACHEREY-NAGEL

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