



NucleoMag® VET

Automated magnetic bead based isolation of viral nucleic acids and bacterial DNA from veterinary samples on the MultiEX 032 workstation

Application benefits

Experience fast and secure nucleic acid purification with the NucleoMag® VET kit and the MultiEX 032 system, featuring:

- Verified methods ensuring a reliable automated purification process
- Reliable extraction of DNA and RNA with high recovery and consistency
- Increasing throughput capability, processing up to 32 samples in parallel
- No programming or complex setup required: Verified and pre-installed methods available

Keywords

Veterinary diagnostics, nucleic acid extraction, automation, bacterial DNA, viral RNA, tissue, body fluids, swabs, stool, pathogen detection, disease prevention, pest control, magnetic beads, MultiEx, magnetic rod system, laboratory protocol optimization

Introduction

The molecular detection of pathogens is a key tool in veterinary diagnostics and allows for identification and monitoring of diseases in apparently healthy and sick animals. Methods like qRT-PCR and NGS require reliable isolation of nucleic acids from various veterinary samples. As the demand for fast, reliable and safe purification increases the logical step for modern veterinary diagnostic labs is automated bead based extractions. MACHEREY-NAGEL has developed the NucleoMag® VET kit, which utilizes magnetic beads for the rapid and automation friendly purification of nucleic acids from various sample sources, such as serum, plasma, blood, tissue, feces, swabs, or other cell-free biological fluids. The kit is not only flexible in the sample type but also scalable in sample number. This way it is very well suited to be used with magnetic rod automation workstations like the MultiEx 032. The biological verified and pre-installed scripts make it easy to start automation with the push of a button and obtain high quality DNA and RNA as shown in this application note.

NucleoMag® VET	
Technology	Magnetic beads
Sample material	Animal tissue, blood, cell-free biological fluid, stool, swabs
Target molecules	Viral RNA and DNA
Elution volume	50 – 100 µL
Fragment size	~300 bp – approx. 50 kbp
Sample numbers on MultiEX 032	32 samples with 2 plates and 4 tip combs
Processing time	Approx. 30 min (excluding lysis)



The NucleoMag® VET kit is also available in a pre-filled plate format, for convenient use on the MultiEX 032 to minimize manual handling and potential errors.

MultiEX 032	
Technology	Automated magnetic rod system
Sample number	1 – 32 samples
Deck positions	Two plate positions with four rows of magnetic rods
Capacity	Volume per well: 50 µL to 1000 µL
Size / footprint	349 × 325 × 390 mm (width x depth x height)
Usage	Ready to use verified scripts
Ease of Use	10-inch color touch screen
Contamination control	Built-in UV lamp for disinfection
Advantages	Fast automated processing for high efficiency and reliability

MultiEX 032

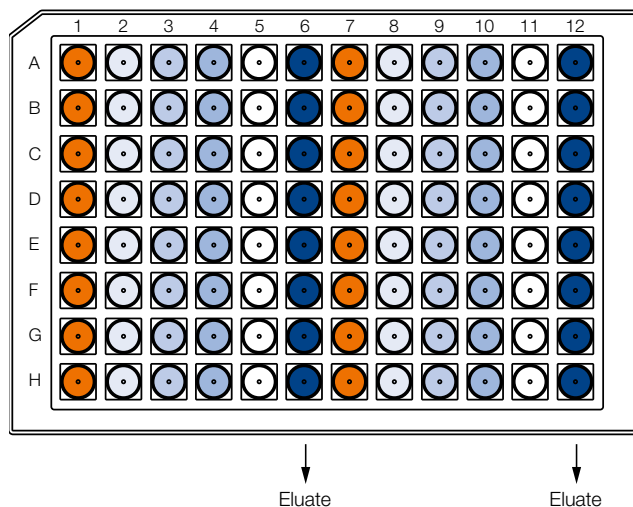
Scripts are pre installed and biologically verified on the MultiEX 032 workstation.

Material and Methods

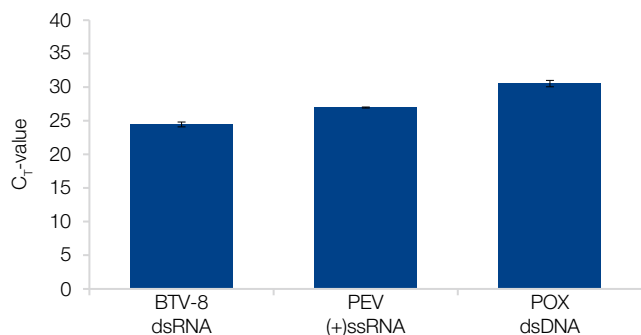
The extraction of viral nucleic acids using the NucleoMag® VET kit starts by lysing the veterinary sample via the addition of Proteinase K and Lysis Buffer VL1 followed by a 15 minute incubation. If solid particles remain within the lysate, it can be cleared via brief centrifugation before transferring cleared lysate to column 1 ● of the 96-well Deep-well Plate. If the prefilled plates are used, the kit is now ready to be placed on the MultiEX 032 for fully automated DNA and RNA purification. For use of the standard NucleoMag® VET kit, the buffers simply need to be filled into the extraction plate according to the plate layout to the right. This includes the addition of 20 µL NucleoMag® B-Beads and 575 µL Binding Buffer VEB to column 1 ●, as well as the distribution of 600 µL Wash Buffers VEW1 to column 2 ●, VEW2 to column 3 ● and 80 % ethanol to column 4 ●. 50 – 100 µL of Elution Buffer VEL is also provided in column 6 ●. The plate is placed in the instrument, the tip combs attached and the protocol selected and started. The MultiEX 032 fully automatically performs the reversible adsorption of DNA and RNA to paramagnetic NucleoMag® B-beads under suitable binding conditions, washing and magnetic separation as well

as drying and elution. Once finished the obtained nucleic acids can directly be used for qRT-PCR analysis.

Plate Layout

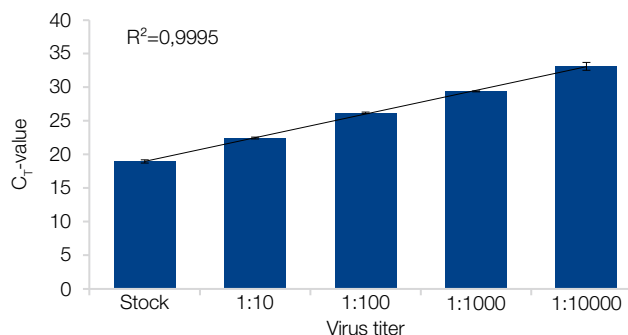


Application Data



Viral nucleic acid isolation from cattle blood

The NucleoMag® VET kit was used on the MultiEX 032 system to isolate nucleic acid of three different viruses from cattle blood stabilized and inactivated with NucleoProtect® VET. To demonstrate the capability of the NucleoMag® VET kit double-stranded RNA of bluetongue virus serotype 8 (BTV-8), single strain RNA of porcine enterovirus (PEV) and double-stranded DNA of vaccinia virus (POX) were all co-isolated and detected via qRT-PCR using the Applied Biosystems™ AgPath-ID™ One-Step RT-PCR Reagents (ThermoFisher) for viral RNA and the QuantiTect Multiplex PCR Kit (Qiagen) for viral DNA on a CFX96 Touch Real-Time PCR System (BioRad).



Reliable recovery of viral RNA across a wide dilution series

Viral RNA extraction on the MultiEX 032 from a 1:10 dilution series of BTV-8 spiked in bovine saliva inactivated with NucleoProtect® VET to showcase the reliable recovery of different virus titer. The qRT-PCR analysis was conducted by using the Applied Biosystems™ AgPath-ID™ One-Step RT-PCR Reagents on a CFX96 Touch Real-Time PCR System (BioRad). The results show a constant and reliable recovery and detection of viral RNA, visible via the very good linear correlation across the entire dilution series from very highly positive samples all the way to very low viral titers. This is further underlined by a near perfect coefficient of determination $R^2 = 0.9995$.

Ordering information

Product	Specifications	Pack of	REF
NucleoMag® VET	Magnetic bead based kit for isolation of viral nucleic acids and bacterial DNA from veterinary samples	96, 384 or 2304 preps	744200.1 / .4 / .24
NucleoMag® VET Prefilled Plates	Prefilled Plates for the isolation of viral RNA/DNA and bacterial DNA from veterinary samples. (Included magnetic rod tips are not compatible, please use MultiEX 032 specific rod covers)	6 plates a 16 preps each	744209
NucleoProtect® VET	Reagent for stabilization, transportation and inactivation of infectious veterinary specimens for molecular diagnostic purposes	500 mL	740750.500
96 Deep-well plates	96-Deep-Well plates for processing of NucleoMag® kits with magnetic rod systems, e.g. MultiEx 032	25 pieces	744955
MultiEX 032	Magnetic rod system for bead based automated nucleic acid purification	1 – 32 samples	*

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*For more detailed information, please reach out to your local distributor