MACHEREY-NAGEL

Magnetic bead-based veterinary sample extraction

Bioanalysis

NucleoMag® VET

The versatile high-performer for veterinary diagnostics

- Inhibitor-free viral RNA / DNA and bacterial DNA extraction
- Universal protocol for various sample matrices
- Flexible magnetic bead technology facilitates automation

Extraction of viral RNA / DNA and bacterial DNA from veterinary samples

NucleoMag® VET

Magnetic bead based viral RNA / DNA and bacterial DNA isolation from veterinary samples

Veterinarians use a variety of tools to diagnose infections, monitor disease progression or response to the therapy, and screen apparently healthy animals for the presence of underlying disease. Many of these methods rely on molecular biology detection techniques such as qRT-PCR or sequencing. MACHEREY-NAGEL has developed specific products for the extraction of nucleic acids such as viral RNA / DNA or bacterial DNA. The NucleoMag® VET kit enables rapid and automated nucleic acid purification from virtually all veterinary sample materials. A sample-specific pre-lysis procedure is followed by an universal nucleic acid extraction protocol, allowing to purify multiple sample types in parallel. Based on magnetic bead technology, inhibitors and contaminants are removed to yield highly pure nucleic acids that are ready to use in common downstream applications, such as qRT-PCR or sequencing.

Product at a glance

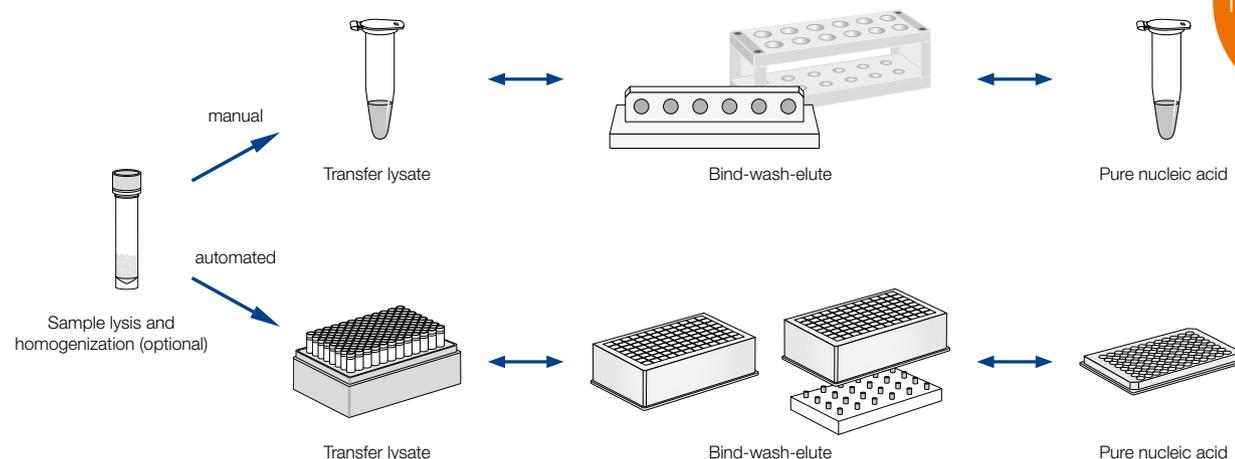|	
Technology	Magnetic beads
Format	Highly reactive superparamagnetic beads
Processing	Manual or automated
Sample materials	200 µL animal whole blood
	5 – 10 mg tissue,
	e. g. ear noches
	200 µL plasma
	200 µL serum
	200 µL milk
	200 µL swab washes
	or other cell-free biological fluids
	Fecal samples
	Chewing cords
	Insects (e. g. honey bees)
	Pollen
Fragment size	300 bp – approx. 50 kbp
Elution volume	50 – 100 µL
Processing time	Depends on sample type or platform

Cited in over 100 peer-reviewed publications

The NucleoMag® VET kit has been cited in more than 100 peer-reviewed publications. The kit has been used in research and molecular diagnostics for a variety of pathogens and specimens relevant to veterinary medicine. Scan / click the QR code to learn more about different applications, e. g.:

- African / classical swine fever virus
- Influenza A virus
- Lumpy skin disease virus
- Foot-and-mouth disease virus
- Schmallenberg virus
- Bluetongue virus

Automated sample extraction made easy!

Are you planning to automate your sample preparation? The automation specialists at MACHEREY-NAGEL can support you with implementing the NucleoMag® VET kit on your robotic platform. Contact us for support or for free and verified scripts, e. g. for KingFisher instruments or other magnetic rod and liquid handler platforms: bio-tech@mn-net.com.

Contact us for automation support!

manual

Transfer lysate Bind-wash-elute Pure nucleic acid

Sample lysis and homogenization (optional)

automated

Transfer lysate Bind-wash-elute Pure nucleic acid

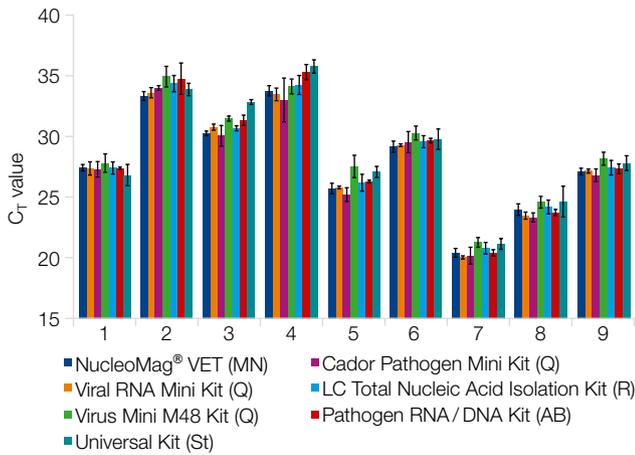## Nucleic acid purification protocol

The NucleoMag® VET kit enables efficient purification of viral RNA / DNA as well as bacterial DNA from common veterinary sample materials. Nucleic acids can be purified either manually or in an automated manner.
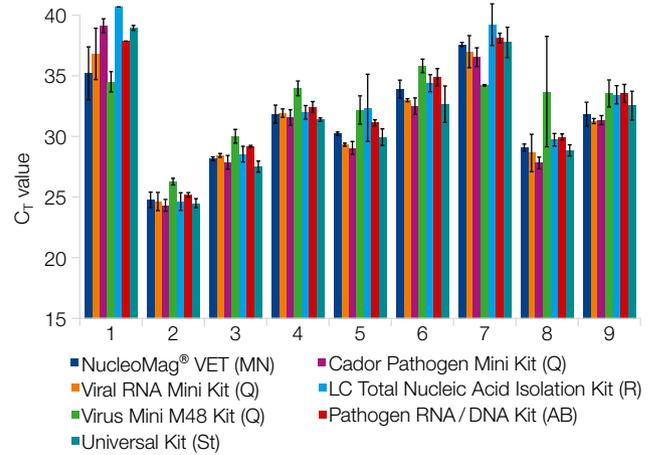
Extraction of viral RNA / DNA and bacterial DNA from veterinary samples
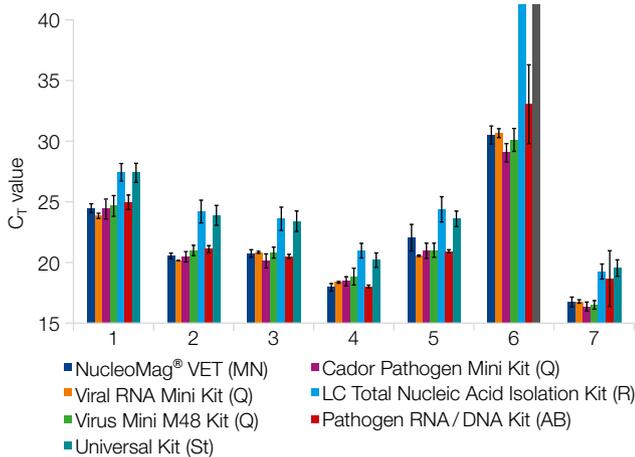
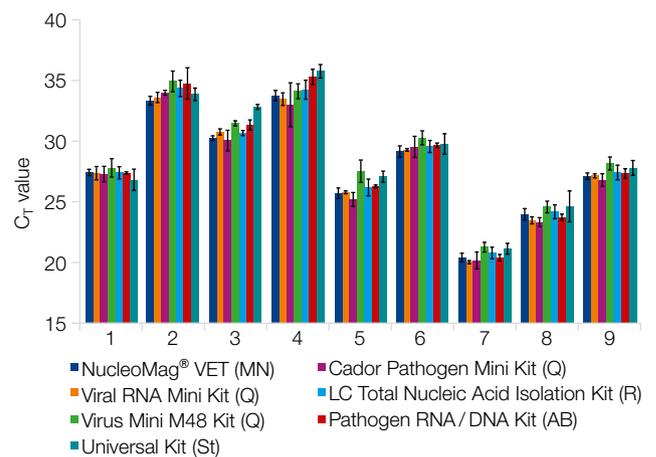## Application data

A: Detection of BTV

Legend:
- ■ NucleoMag® VET (MN)
- ■ Viral RNA Mini Kit (Q)
- ■ Virus Mini M48 Kit (Q)
- ■ Universal Kit (St)
- ■ Cador Pathogen Mini Kit (Q)
- ■ LC Total Nucleic Acid Isolation Kit (R)
- ■ Pathogen RNA / DNA Kit (AB)

B: Detection of CSFV

Legend:
- ■ NucleoMag® VET (MN)
- ■ Viral RNA Mini Kit (Q)
- ■ Virus Mini M48 Kit (Q)
- ■ Universal Kit (St)
- ■ Cador Pathogen Mini Kit (Q)
- ■ LC Total Nucleic Acid Isolation Kit (R)
- ■ Pathogen RNA / DNA Kit (AB)

C: Detection of PCV 2

Legend:
- ■ NucleoMag® VET (MN)
- ■ Viral RNA Mini Kit (Q)
- ■ Virus Mini M48 Kit (Q)
- ■ Universal Kit (St)
- ■ Cador Pathogen Mini Kit (Q)
- ■ LC Total Nucleic Acid Isolation Kit (R)
- ■ Pathogen RNA / DNA Kit (AB)

D: Detection of SBV

Legend:
- ■ NucleoMag® VET (MN)
- ■ Viral RNA Mini Kit (Q)
- ■ Virus Mini M48 Kit (Q)
- ■ Universal Kit (St)
- ■ Cador Pathogen Mini Kit (Q)
- ■ LC Total Nucleic Acid Isolation Kit (R)
- ■ Pathogen RNA / DNA Kit (AB)

Detection of BTV, CSFV, PCV 2, and SBV after DNA or RNA isolation using different extraction kits.
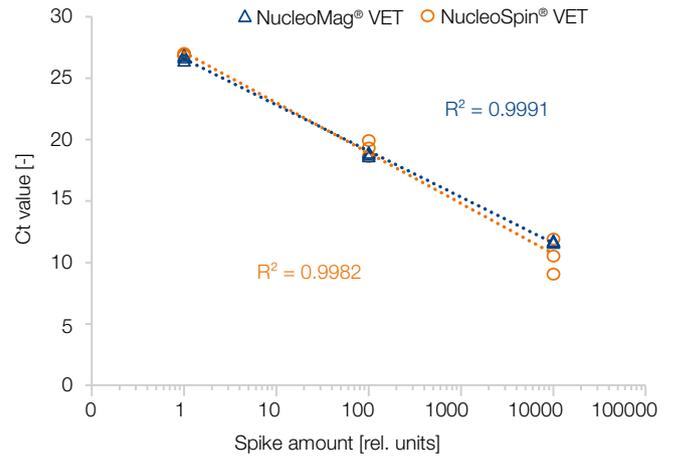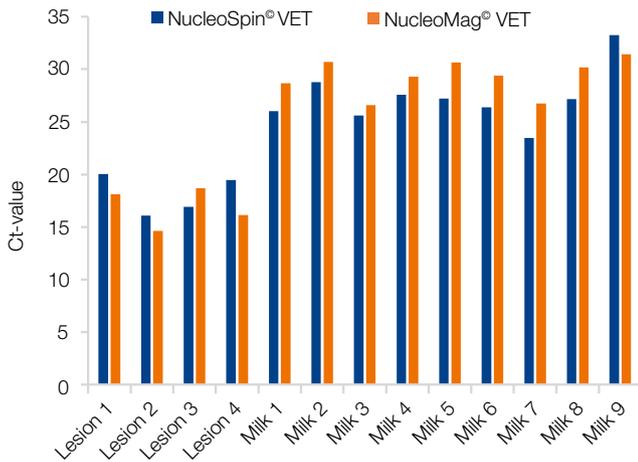
The NucleoMag® VET kit was used to extract viral nucleic acids from bovine blood (A), porcine blood (B), porcine tissue (C) or bovine serum (D). Subsequently, qPCR-analysis was performed to determine the viral titer load in the sample materials: (A) BTV (Bluetongue virus); (B) CSFV (Classical Swine Fever virus), (C) PCV 2 (Porcine Circovirus Type 2); (D) SBV (Schmallenberg virus). Extraction performance was compared to other commercial nucleic acid extraction kits available for isolation of viral RNA and / or DNA. The qRT-PCR data show that DNA or RNA concentration varies on the extraction kit used, which results in a dissimilar detection of BTV, CSFV, PCV 2, and SBV. For the detection of the various viruses in the disparate sample materials, it is shown that DNA or RNA concentration was always high using the NucleoMag® VET compared to the other kits. The obtained Ct values for the viral nucleic acids and sample materials show that the NucleoMag® VET kit is a very consistent and reliable extraction kit, obtaining low Ct values for a reliable virus detection independent from virus type or sample material.

Data was kindly provided by Dr. Hoffmann, Friedrich-Loeffler-institut, Federal Research Institute for Animal Health of Germany.

Ruminants | Swine | Poultry | Equine | Companion animals

Extraction of viral RNA / DNA and bacterial DNA from veterinary samples

Application data

qRT-PCR detection of foot-and-mouth disease virus in bovine milk and skin lesions

To compare manual and automated extraction, the NucleoSpin® VET and the NucleoMag® VET were used to isolate viral RNA from known FMDV-positive samples (foot-and-mouth-disease). The samples were purified using the NucleoSpin® VET kit following the standard protocol procedure and in parallel witht the magnetic bead-based NucleoMag® VET kit (100 µL sample input). Eluates were subsequently analyzed via qRT-PCR using AgPath-ID™ One-Step RT-PCR reagents (ThermoFisher Scientific). The results show that both kits purified the nucleic acid with equally good performance and gave good results in subsequent qRT-PCR analysis, even with difficult samples such as very fatty milk or skin lesions.

Data kindly provided by Hanna Keck and Michael Eschbaumer, Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health of Germany.

Comparable sensitivity and linearity for NucleoMag® VET and NucleoSpin® VET kit for high to low titer samples

Different dilutions MS2-RNA were spiked into extractions of bovine EDTA-plasma simulating low, medium and high titer samples. Nucleic acid purifications were done using the NucleoSpin® VET (manual single spin extraction) and the NucleoMag® VET kit (magnetic bead-based automated extraction) and analyzed via qRT-PCR using the Bioline SensiFAST™ SYBR Lo-ROX One-Step kit. The results show reliable purification of viral nucleic acids from low to high titer samples and comparable sensitivity to extraction using the proven magnetic bead-based NucleoMag® VET kit (MACHEREY-NAGEL).

NucleoMag® VET product features at a glance

- Inhibitor-free viral RNA / DNA and bacterial DNA extraction
- Highest flexibility for various veterinary sample types
- Same standard protocol for all specimen matrices after sample pretreatment
- Easy to automate on magnetic rod or liquid handler systems

Ordering information

Product	Specifications	Preps / Pack of	REF
NucleoMag® VET	Magnetic bead-based kit for isolation of viral nucleic acids and bacterial DNA from veterinary samples; includes magnetic beads, carrier RNA, proteinase K, and buffers	1 x 96 / 4 x 96 / 100 x 96	744200.1 / .4 / .100
NucleoMag® SEP	Magnetic seperator, for use with 96-well plates	1	744900
NucleoMag® SEP Mini	Magnetic seperator, for use with 12 x 1.5 mL or 2 mL reaction tubes	1	744901
Related products			
NucleoSpin® VET	Silica membrane-based single spin kit for isolation of viral nucleic acids and bacterial DNA from veterinary samples; includes NucleoSpin® VET binding columns, collection tubes, liquid proteinase K, carrier RNA, and buffers	10 / 50 / 100	740842.10 / .50 / .250

NucleoMag® and NucleoSpin® are registered trademarks of MACHEREY-NAGEL; AgPath-ID™ is a trademark of Thermo Fisher Scientific; SensiFAST™ is a trademark of Bioline Reagents

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