MACHEREY-NAGEL

NucleoMag® VET

Automated purification of viral RNA / DNA and microbial DNA from veterinary samples on the HAMILTON NIMBUS® Presto workstation



Introduction

Reliable veterinary sample analysis plays an essential role inanimal and human welfare and strongly depends on product-sof high performance and quality.

There are numerous challenges in nucleic acid extraction from veterinary samples. Due to the large diversity of starting materials, such as whole blood, serum, swabs, tissue, and ear notches, different extraction methods are used. Sample specific lysis conditions are required for an efficient extraction of nucleic acids and for a reliable performance in subsequent downstream applications. In addition, the concentration of target molecules – i.e. pathogen DNA or RNA molecules – is often low in certain sample materials.

Here, we present a solution for automated, high throughput extraction of pathogen nucleic acids from veterinary samples using MACHEREY-NAGELS NucleoMag VET kit on the automated Hamilton NIMBUS Presto workstation.

Your advantages at a glance

- Proven NucleoMag® lysis and purification procedure suitable for diverse veterinary samples
- Automated plate prefilling and plate handling by the Hamilton NIMBUS liquid handling system
- High speed nucleic acid purification by the integrated KingFisher™ Presto instrument
- Continue with downstream application without manual intervention



The NIMBUS Presto workstation combines liquid handling and magnetic rod processing for fully automated, high throughput nucleic acid extractions.

NIMBUS Presto Workstation	
Technology	Automated liquid handling platform (Hamilton NIMBUS) with integrated magnetic rod processing unit (KingFisher™ Presto)
Capacity	1–96 samples (≤ 200 µL sample volume)
Processable volume	50 – 5000 µL
Footprint	L 1359 mm | W 709 mm | H 889 mm

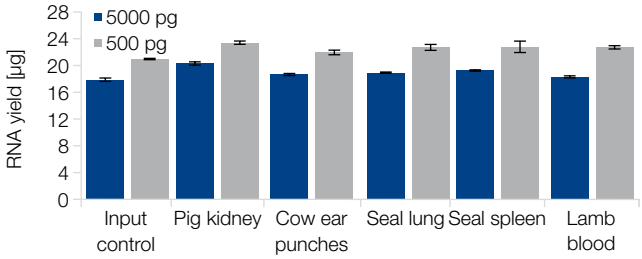
NucleoMag® VET	
Technology	Magnetic beads
Sample material	≤ 200 µL whole blood, serum, plasma ≤ 200 µL swab wash solution ≤ 25 mg tissue (e.g. ear notches) ≤ 200 µL feces
Elution volume	50 – 5000 µL
Fragment size	300 bp–approx. 50 kbp
Preparation time	Approx. 70 min (excl. lysis) / 96 samples

Material and Methods

The NucleoMag® VET kit is designed for diverse veterinary sample material, such as whole blood, swabs, serum or plasma, feces, and tissue. Up to 200 µL of liquid or homogenized sample material (e.g. swab wash solution) is mixed with Proteinase K, Carrier RNA (optional) and Lysis Buffer VL1 prior to lysis incubation. The subsequent isolation is based on reversible adsorption of nucleic acids to paramagnetic beads (NucleoMag® B-Beads). Nucleic acid binding is enabled by addition of Binding Buffer VEB. After magnetic separation and removal of the supernatant, contaminants and salts are removed by three subsequent washing steps. The NucleoMag® B-Beads are air dried before highly pure nucleic acids are finally eluted under low ionic strength conditions in Elution Buffer VEL.

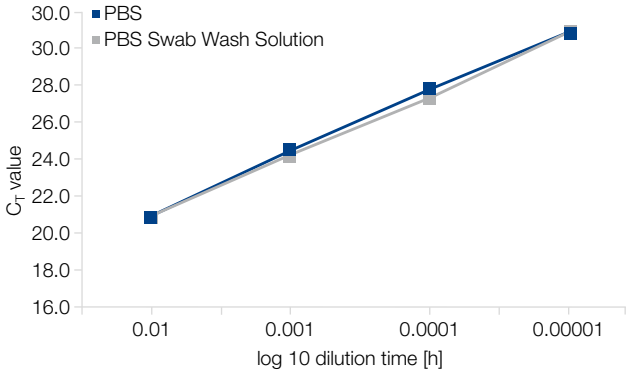
We demonstrate this automated purification workflow for spiked viral RNA and DNA exemplarily. The tailored protocol allows flexible processing of up to 96 samples per run.

Application Data



High sensitivity detection of viral DNA recovered from diverse veterinary samples

Nucleic acids were isolated from diverse animal tissues and blood samples (n = 4 for each sample) and an input control sample (n = 2) using the NucleoMag® kit on the NIMBUS Presto VET workstation. Prior to the isolation T7 bacteriophage DNA was spiked into the sample solutions in two different concentrations (5000 pg and 500 pg). The method provides high sensitivity detection of target DNA for all sample types and concentrations. Analysis was performed with a Taqman® PCR probe for T7 DNA using the SensiFast™ Probe Lo-ROX kit from Bioline on an Applied Biosystems® 7500 Real-Time PCR System.



High sensitivity detection of viral RNA recovered from liquid samples

MS2 bacteriophage RNA was isolated from PBS and swab wash samples (200 µL; n = 3 for each dilution) using the NucleoMag® VET kit on the NIMBUS Presto workstation. RNA was spiked into the sample solution in a dilution series. Analysis was performed with a Taqman® PCR probe for MS2 RNA using the SensiFast™ Probe One-Step Lo-ROX kit from Bioline on an Applied Biosystems® 7500 Real-Time PCR System. The protocol delivers high sensitivity detection of RNA from both sample materials tested.

A rapid, fully automated solution for pathogen nucleic acid extraction from veterinary samples

MACHEREY-NAGEL and Hamilton deliver a tailored solution for your high throughput viral RNA, viral DNA, and microbial DNA extraction needs from various clinical sample materials. We adapted the NucleoMag® VET procedure on the NIMBUS Presto workstation to meet the expectations of the molecular diagnostic market.

Here, we demonstrate the successful use of the NucleoMag® VET kit for isolation of viral RNA and DNA from liquid sample material and downstream qPCR assays.

The powerful combination of the NucleoMag® technology and the NIMBUS Presto workstation has several advantages over standard nucleic acid purification procedures:

- Save hands-on time by using automated plate-prefilling and plate-handling performed by the NIMBUS workstation
- Benefit from the high-speed extraction procedure of the integrated KingFisher™ Presto unit
- Reliable recovery and performance in downstream assays

Ordering information

Product	Specification	Pack of	REF
NucleoMag® VET	Magnetic bead-based kit for the isolation of viral RNA / DNA, and microbial DNA from veterinary samples; including NucleoMag® B-Beads, buffers, Carrier RNA and Proteinase K	1 x 96 preps 4 x 96 preps	744200.1 744200.4
NIMBUS Presto	Automated liquid handling platform with 4 pipetting channels, a CO-RE gripper, barcode scanner and many additional features		Hamilton*

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* For more detailed information, please visit www.hamiltoncompany.com/robotics. To find a Hamilton subsidiary or distributor in your area, please visit www.hamiltoncompany.com/contacts.

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