BIO ECHO Life Sciences

EchoLUTION

Viral RNA/DNA Swab Kit Plus

CE IVD

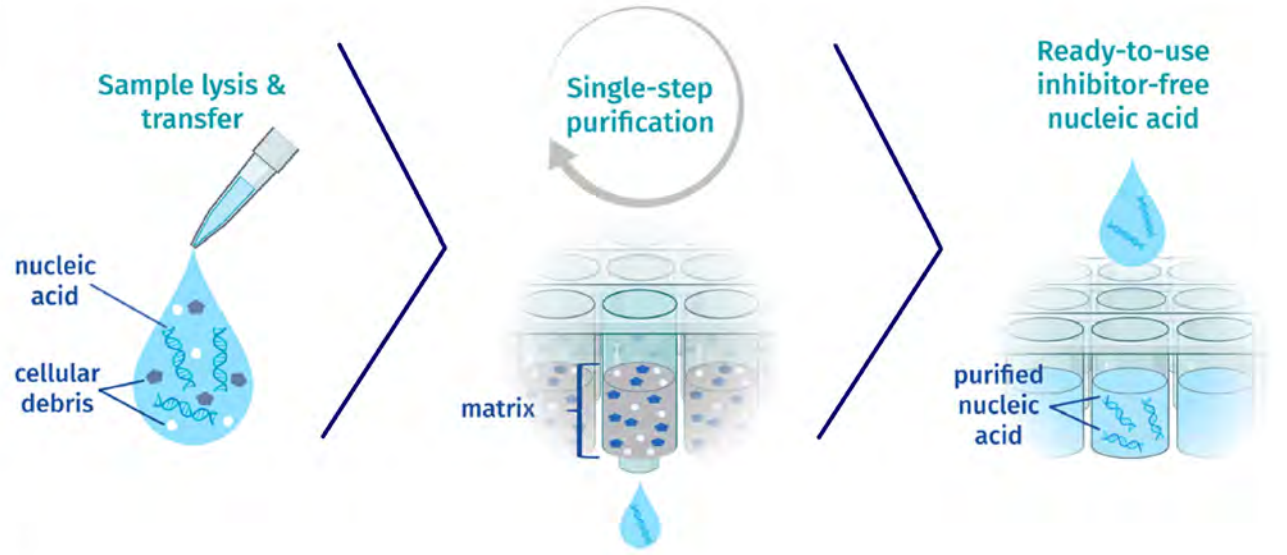
Highly pure nucleic acids in just a few minutes

The Nucleic Acid Experts.

Highly pure nucleic acids in just a few minutes

The EchoLUTION Viral RNA/DNA Swab Kit Plus is designed for reliable extraction of viral RNA and DNA and serves as an accessory for subsequent in vitro diagnostic analysis. The EchoLUTION technology is based on a tailored lysis step without incubation followed by nucleic acid purification in a single centrifugation step. Impurities are held back by the purification matrix while the viral RNA and DNA flows through untouched.

The EchoLUTION Technology



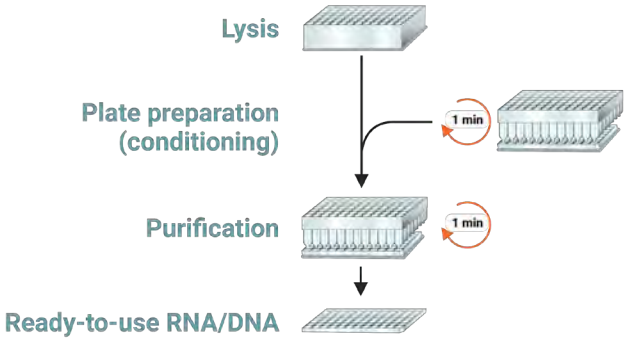
The EchoLUTION Viral RNA/DNA Swab Kit provides:

Convenience and speed	Single-step purification allows complete extraction of 2 x 96 samples within 20 minutes. Appropriate for any lab – from low to high through-put and for manual and automated workflows.
High compatibility	Compatible with nasopharyngeal swabs, oropharyngeal swabs, stool samples, and all types of media such as non-chaotropic and chaotropic medium, PBS, TE buffer, and tris buffer.
Validation	Approved under IVDR, it can be integrated into diagnostic laboratory routines and ensures high-quality standards.
Reliable results	With no organic solvents added and by reliable removal of other inhibitors, kit usage results in high-quality viral RNA or DNA for superior downstream performance.
Sustainability	Up to 70 % less plastic consumption compared to other extraction methods.

The workflow: faster and fewer steps

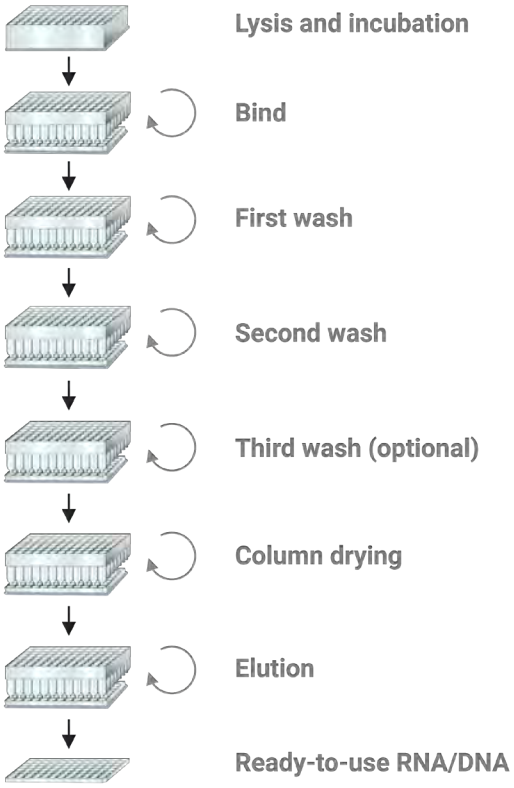
The tailored lysis step works without incubation, and the purified viral RNA or DNA is ready-to-use within 20 minutes (for 2 x 96 samples). The whole workflow can be automated.

EchoLUTION Technology



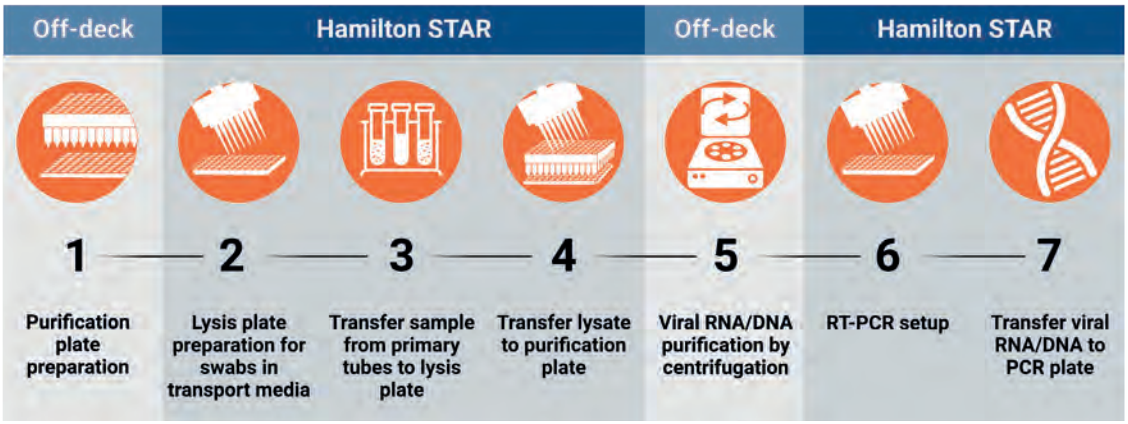
- Only 3 steps needed
- Whole workflow 3 x faster
- Automated protocol available

Bind-Wash-Elute Method



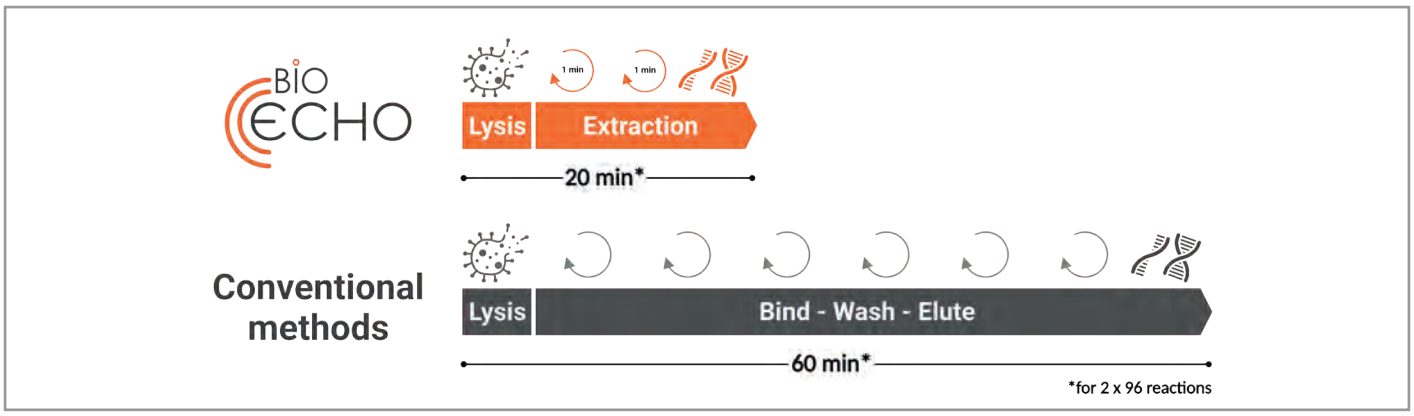
Automated extraction process

The established automated workflow for respiratory swabs on the Hamilton Microlab® STAR™ further reduces hands-on-time and increases precision. It is the fastest solution available on the market for viral nucleic acid extraction since it only takes 1.5 hours for 4 x 96 samples after swab removal and including PCR setup.



The workflow can be automated on several automated liquid-handling systems, contact us for further support.

Considerably faster compared to conventional methods



SARS-CoV-2 and other respiratory viruses

No cross-contamination

A checkerboard experiment revealed that no cross-contamination between wells occurs.

	1	2	3	4	5	6	7	8	9	10	11	12
A	–	19.7	–	20.0	–	19.8	–	19.8	–	19.6	–	19.7
B	19.7	–	19.8	–	20.1	–	19.2	–	19.7	–	20.0	–
C	–	20.1	–	19.7	–	19.1	–	19.5	–	19.7	–	19.7

Table 1. Positive SARS-CoV-2 patient samples (n=18, Cq 19 – 20) and control samples (n=18, medium only) were extracted with the EchoLUTION Viral RNA/DNA Swab Kit Plus. Samples were arranged in a checkerboard pattern and analyzed by RT-qPCR.

BioEcho EchoLUTION:
Reliable performance without cross-contamination

12 % IN GERMANY & 50 % IN AUSTRIA

During the pandemic, up to 12 % and 50 % of SARS-CoV-2 PCR tests performed in Germany and Austria, respectively, used the EchoLUTION Viral RNA/DNA Swab Kit Plus.

High compatibility

A variety of respiratory viruses (RNA, DNA, non-enveloped or enveloped) can be extracted with EchoLUTION (analyzed with qPCR or Luminex NxTAG® technology).

Respiratory pathogens succesfully extracted
SARS-CoV-2 (11 variants)
Influenza (A, A H1, A 2009 H1N1, A H3, B)
Parainfluenza 1 -4
Rhino-/Enterovirus
RSV A, RSV B Adenovirus
Hum. Metapneumovirus
Hum. Bocavirus

BioEcho EchoLUTION:
Proven wide variety of viruses

High precision

An intra- and inter-run test revealed a high precision in RT-qPCR with the EchoLUTION extraction method.

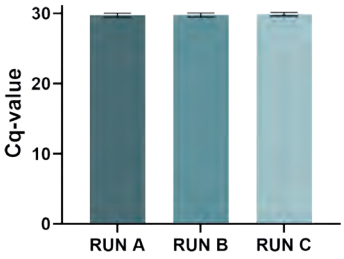


Figure 1. An intra– and inter-run precision test with $1x10^5$ SARS-CoV-2 copies/mL revealed a coefficient of variability (CV) below 1 % indicating a high precision. CV is defined as the ratio of the standard deviation to the mean.

Intra-run			Inter-run
RUN A (CV)	RUN B (CV)	RUN C (CV)	RUN A-C (CV)
0.92 %	0.89 %	0.80 %	0.89 %

BioEcho EchoLUTION:
Reproducible and precise results

Enteropathogenic viruses from stool samples

The EchoLUTION Viral RNA/DNA Swab Kit Plus has been used for the nucleic acid extraction of enteropathogenic viruses from patient samples. The samples were validated via qPCR for clinical diagnosis of adeno-, noro-, rota-, astro-, and sapovirus. Results confirmed same performance as magnetic bead method, while being two times faster.

Robust qPCR efficiency

The efficiency of the (RT)-qPCR was evaluated by performing a 10-fold dilution series experiment using the target assay.

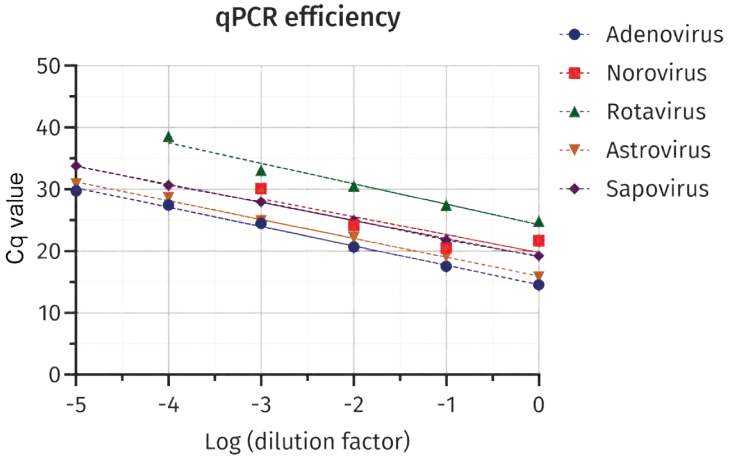


Figure 2. (RT)-qPCR of a dilution series from nucleic acids extracted using the EchoLUTION Viral RNA/DNA Swab Kit Plus. (RT)-qPCR quantification cycle (Cq) values are shown on a logarithmic scale with linear regression.

	EchoLUTION	Magnetic beads
	% Efficiency	
Adenovirus	108	91
Norovirus	121	126
Rotavirus	100	96
Astrovirus	113	96
Sapovirus	120	123

Table 2. The qPCR efficiency (%) has been calculated based on the slope of the log linear regression. Samples isolated with EchoLUTION kit and magnectic bead extraction method from different vendor show comparable qPCR efficiency. Optimal efficiency lies between 90 – 110 %.

BioEcho EchoLUTION:
qPCR efficiency comparable to magnetic bead extraction method.

Equivalent performance to standard extraction method

In order to validate the EchoLUTION technology in comparison to an automated magnetic bead-based extraction method, 168 positive stool samples were stored frozen and used to determine how many samples could be re-detected using qPCR. The number of positive and negative samples detected by both methods are depicted in light green. 162 samples (96.5 %) exhibit the same results with the two methods. Both methods detected 146 samples as positive.

Adenovirus n = 33		EchoLUTION POSITIVE	EchoLUTION NEGATIVE
Magnetic bead	POSITIVE	33	0
	NEGATIVE	0	0

Rotavirus n = 60		EchoLUTION POSITIVE	EchoLUTION NEGATIVE
Magnetic bead	POSITIVE	52	2
	NEGATIVE	0	6

Sapovirus n = 19		EchoLUTION POSITIVE	EchoLUTION NEGATIVE
Magnetic bead	POSITIVE	13	1
	NEGATIVE	0	5

Norovirus n = 38		EchoLUTION POSITIVE	EchoLUTION NEGATIVE
Magnetic bead	POSITIVE	34	0
	NEGATIVE	2	2

Astrovirus n = 18		EchoLUTION POSITIVE	EchoLUTION NEGATIVE
Magnetic bead	POSITIVE	11	0
	NEGATIVE	1	6

BioEcho EchoLUTION:
Same performance as magnetic bead-based extraction.

Ordering information

EchoLUTION Viral RNA/DNA Kits	Reactions	Product no.
EchoLUTION Viral RNA/DNA Swab 48 Kit Plus (2 x 48) – CE-IVD	2 x 48	012-051-002
EchoLUTION Viral RNA/DNA Swab 48 Kit Plus (8 x 48) – CE-IVD	8 x 48	012-051-008
EchoLUTION Viral RNA/DNA Swab 48 Kit Plus (16 x 48) – CE-IVD	16 x 48	012-051-016
EchoLUTION Viral RNA/DNA Swab 96 Kit Plus (2 x 96) – CE-IVD	2 x 96	012-102-002
EchoLUTION Viral RNA/DNA Swab 96 Kit Plus (8 x 96) – CE-IVD	8 x 96	012-102-008
EchoLUTION Viral RNA/DNA Swab 96 Kit Plus (16 x 96) – CE-IVD	16 x 96	012-102-016

> During the pandemic, we sequenced many SARS-CoV-2 samples to gain more insights on the genetic basis of current SARS-CoV-2 variants. Using the EchoLUTION Viral RNA/DNA Swab Kit significantly reduced the time required to extract the SARS-CoV-2 RNA and resulted in high-quality RNA to ensure robust sequencing results.
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