



QIAGEN® DNA Cleanup Kits

For purification of high-quality DNA for a broad range of downstream applications

QIAGEN's extensive range of cleanup kits sets the standard for DNA purity, recovery, and concentration. QIAGEN offers a wide choice of products for PCR cleanup, gel extraction, enzymatic reaction cleanup and nucleotide removal.

QIAGEN DNA cleanup kits provide:

- A choice of elution volumes
- Fast procedures and easy handling
- High, reproducible recoveries
- Purification of distinct DNA fragment sizes

High-quality DNA from a variety of sample types

QIAquick® and MinElute® Kits utilize a uniquely designed silica membrane that allows elution of DNA in small volumes of low-salt buffer or water. QIAquick Kits are optimized for high binding capacity (10 µg) and elution in 30–50 µl volumes, while MinElute Kits allow elution in as little as 10 µl volumes with a binding capacity of 5 µg. This provides high concentrations of ready-to-use DNA fragments for subsequent use in any downstream application. Unwanted primers and impurities, such as salts, enzymes, unincorporated nucleotides, agarose, ethidium bromide, DMSO, and detergents do not bind to the silica membrane and are effectively removed during the simple wash step.

A wide choice of kit formats

QIAGEN kits offer a choice of spin-column or 96-well plate formats designed to specifically match your throughput needs. In addition, QIAquick and MinElute Kits are available in both manual (vacuum and centrifugation) and fully automated processing options (Figure 1).

QIAquick and MinElute Procedure

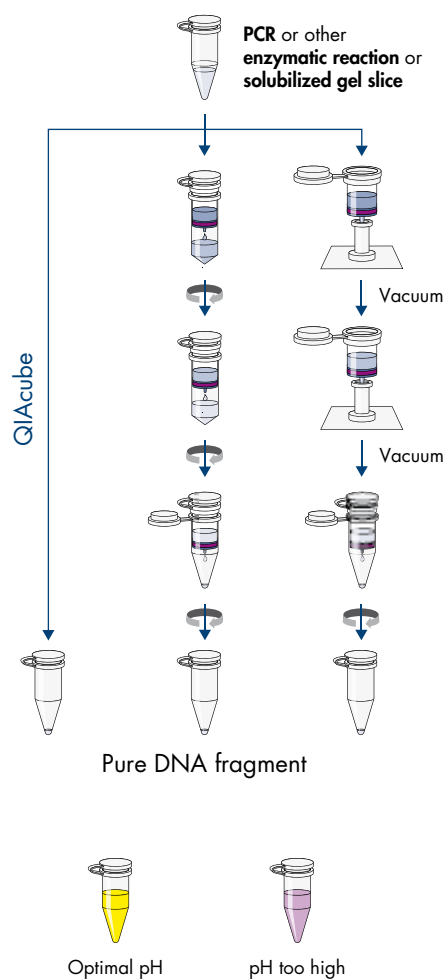


Figure 1. pH indicator dye guarantees optimum DNA yields. A pH-sensitive dye in the binding buffer allows easy visual determination of optimal pH for DNA adsorption (pH ≤7.5).



Figure 2. Complete automation of QIAquick PCR Cleanup and Gel Extraction Kits. QIAcube allows the automation of many QIAGEN spin column procedures.

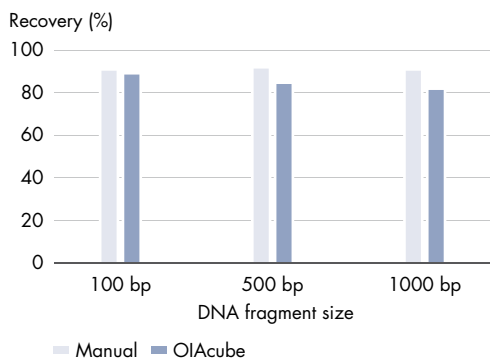


Figure 3. QIAcube enables high recovery of PCR products. PCR products (2 µg in a volume of 100 µl) were purified using the QIAquick PCR Purification Kit with the manual procedure or automated on the QIAcube. Percentage recovery was determined spectrophotometrically. Recovery of PCR products using the QIAcube was comparable to the manual procedure.



Figure 4. Freedom from laborious manual tasks. No manual handling steps required.

Optimized buffers and protocols

QIAGEN buffers are uniquely optimized for each specific cleanup application and promote the selective adsorption of DNA molecules within defined size ranges. In addition, many binding buffers contain a pH indicator to ensure optimum DNA binding conditions and maximum product yield. The simple protocols are based on a rapid bind-wash-elute principle and require minimal user interaction. To enable faster and more convenient sample processing and analysis, all QIAquick and MinElute spin kits are supplied with gel loading dye. GelPilot® DNA Loading Dye contains 3 tracking dyes (xylene cyanol, bromophenol blue, and orange G) to facilitate the optimization of agarose gel run time and prevent smaller DNA fragments from running too far. All QIAquick and MinElute spin-column kits come with bench protocols enabling quick access to the information required. In addition, individually colored bottle caps help prevent accidental use of incorrect reagents.

Fully automated sample purification

The QIAquick PCR Purification Kit and QIAquick Gel Extraction Kit can be fully automated on QIAcube® (Figure 2). The innovative QIAcube uses advanced technology to process QIAGEN spin columns, enabling seamless integration of automated, low-throughput sample prep into the laboratory workflow. Sample preparation using the QIAcube follows the same steps as the manual procedure (i.e., bind, wash, and elute) enabling purification of high-quality DNA (Figure 3).

The standardized, automated purification procedure helps to eliminate human error, providing results that are comparable between experiments and labs, providing more time to focus on downstream analyses.

Walkaway spin-column processing

The fully automated centrifuge, equipped with 12 swing-out buckets, eliminates manual centrifugation steps giving you more time for other tasks. Innovative disposable rotor adapters hold spin columns and collection tubes in the centrifuge and collect wash buffers during centrifugation (Figure 4). Highly pure nucleic acids are eluted into collection tubes, ready to use in sensitive downstream applications. The QIAcube is preinstalled with protocols for purification of plasmid DNA,

genomic DNA, RNA, viral nucleic acids and proteins, plus DNA and RNA cleanup. The range of available protocols is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at www.qiagen.com/MyQIAcube.

PCR cleanup

QIAGEN provides a number of PCR cleanup kits for both low- and high-throughput sample processing. In addition, a choice of manual and fully automated solutions is also available. QIAquick and MinElute PCR Cleanup Kits permit high recoveries of DNA fragments of 70 bp to 10 kb and quantitative removal (>99.5%) of primers up to 40 nucleotides in length. The purification procedure removes primers, nucleotides, enzymes, salts, and other impurities from DNA samples and provides high yields of highly pure, ready-to-use DNA (Table 1 and Figure 5).

Low-throughput PCR purification

QIAquick and MinElute PCR Purification Kits provide spin columns, buffers and collection tubes for silica-membrane-based purification of PCR products. These kits can be processed using a centrifuge or vacuum manifold (e.g., QIAvac 24 Plus) in as little as 5 minutes. In addition, the QIAquick PCR Kit can be fully automated using QIAcube.

High-throughput PCR purification

For high-throughput PCR cleanup we recommend silica-membrane-based QIAquick 96 PCR Purification Kits or the ultrafiltration-based MinElute 96 PCR Purification Kit. These kits utilize a 96-well plate format to offer a range of convenient handling options including vacuum and fully automated processing.

Table 1. High recovery of DNA using the QIAquick PCR Purification Kit

Fragment size	Recovery
100 bp	90%
500 bp	95%
1000 bp	95%
2000 bp	93%
3000 bp	91%

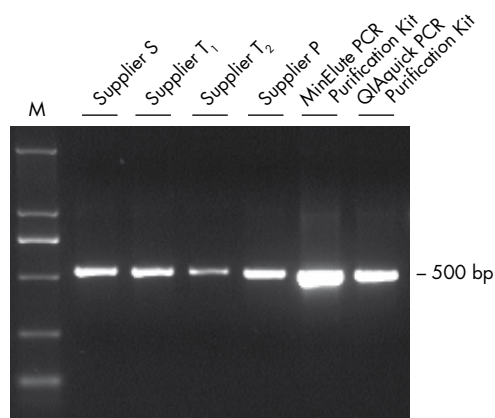


Figure 5. QIAGEN kits deliver pure, highly concentrated DNA. A single PCR was divided into 6 equal aliquots and purified using a number of commercially available cleanup kits following manufacturer's instructions. 2 µl eluate was run on a 1.5% agarose gel. QIAGEN cleanup kits showed the highest DNA concentration. **M:** GelPilot Mid Range Ladder.

Product	Elution volume	DNA fragment size	Handling
QIAquick PCR Purification Kit*	30–50 µl	100 bp–10 kb	Manual (centrifugation or vacuum manifold) or automated (QIAcube)
QIAquick 96 PCR Purification Kits*	60–80 µl	100 bp–10 kb	Manual (QIAvac 96 vacuum manifold) or automated (BioRobot 8000)
MinElute PCR Purification Kit*	10 µl	70 bp–4 kb	Manual (centrifugation or vacuum manifold) or automated (QIAcube)
MinElute 96 UF Purification Kits*	20–30 µl	100 bp–10 kb	Manual (QIAvac Multiwell) or automated (BioRobot 8000 or Universal System)

* These kits are not suitable for cleanup of oligonucleotides.

Table 2. High recovery of DNA using the QIAquick Gel Extraction Kit

Fragment size	Recovery
70 bp	70%
100 bp	80%
500 bp	80%
1.2 kb	75%
2.7 kb	75%
5.5 kb	75%
10.5 kb	60%

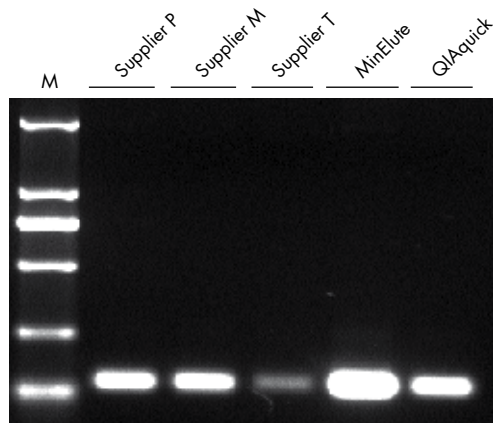
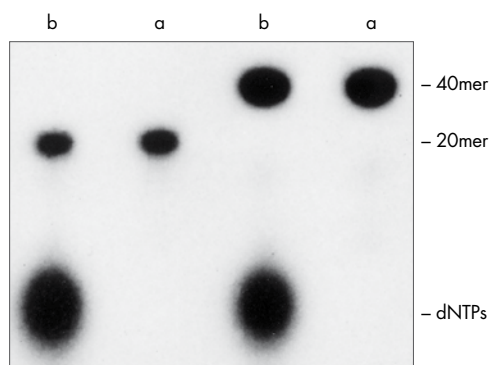


Figure 6. QIAGEN kits deliver highly concentrated DNA from gels. 2 µg of a 120 bp DNA fragment was purified from a 1.5% agarose gel using the QIAquick Gel Extraction Kit (QIAquick) and MinElute Gel Extraction Kit (MinElute) and 3 other commercially available gel extraction products (Supplier M, Supplier P and Supplier T). 2 µl of eluate, purified using the MinElute kit and 4 µl of eluate purified using the other kits was run on an agarose gel. The QIAGEN cleanup kits and in particular the MinElute Gel Extraction Kit delivered more concentrated eluates. **M:** GelPilot Mid Range Ladder.



Gel extraction

QIAGEN gel extraction products enable the extraction and purification of DNA from standard or low-melt agarose gels (up to 400 mg) in TAE or TBE buffer.

QIAquick and MinElute Gel Extraction Kits provide spin columns, buffers, and collection tubes for silica-membrane-based DNA extraction from agarose gel. These kits can be processed using a centrifuge or vacuum manifold (e.g., QIAvac 24 Plus) in just 15 minutes. In addition, the QIAquick Gel Extraction Kit can now be fully automated using QIAcube.

QIAGEN gel extraction kits contain an integrated pH indicator to enable optimum DNA binding conditions and easy visualization of any unsolubilized agarose — ensuring complete solubilization and maximum product yield (Table 2 and Figure 6).

Product	Elution volume	DNA fragment size	Handling
MinElute Gel Extraction Kit*	10 µl	70 bp–4 kb	Manual (centrifugation or vacuum manifold)
QIAquick Gel Extraction Kit*	30–50 µl	70 bp–10 kb	Manual (centrifugation or vacuum manifold) or automated (QIAcube)

* These kits are not suitable for cleanup of oligonucleotides.

Reaction cleanup

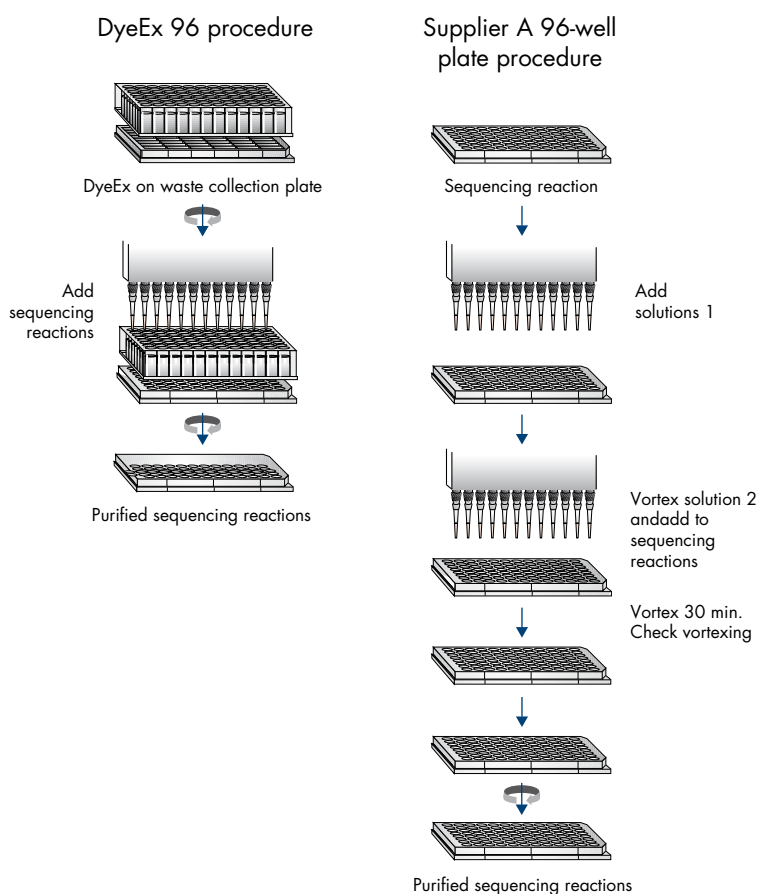
Enzymatic reaction cleanup

The QIAquick Nucleotide Removal Kit and MinElute Reaction Cleanup Kit enable purification of double-stranded DNA from enzymatic reactions, including restriction enzyme digestion, ligation and end labeling. In addition, the QIAquick Nucleotide Removal Kit allows the purification of oligonucleotides (17–40mers) (Figure 7). The simple spin-column-based procedure can be performed in approximately 5 minutes using centrifugation or a vacuum manifold. The MinElute Reaction Cleanup Kit is optimized for DNA purification from all enzymatic reactions (Table 3) and allows removal of enzymes (Figure 8), primers, nucleotides, and salt.

Figure 7. Complete removal of nucleotides from labeled oligos. Polyacrylamide gel analysis of radioactive labeling reactions before **b** and after **a** purification using the QIAquick Nucleotide Removal Kit.

Sequencing reaction cleanup

DyeEx® kits offer fast and efficient removal of unincorporated dye terminators from sequencing reactions (Figure 9). DyeEx kits use a prehydrated gel-filtration matrix in a convenient microspin or high-throughput 96-well plate format. The sequencing reaction is simply loaded onto the DyeEx gel and the column or plate is centrifuged. This fast procedure (7 minutes for the spin column procedure or 18 minutes for 384 samples in 96-well plate format) yields clean DNA, ready for sequencing.



Product	Elution volume	DNA fragment size	Handling
QIAquick Nucleotide Removal Kit*	30–200 µl	Oligonucleotides 17–40mers; DNA 40 bp–10 kb	Manual (centrifugation or vacuum manifold)
MinElute Reaction Cleanup Kit†	10 µl	70 bp–4 kb	Manual (centrifugation or vacuum manifold)
DyeEx 2.0 Spin Kit	Sample volume	n.a	Manual (centrifugation)
DyeEx 96 Kit	Sample volume	n.a	Manual (centrifugation)‡

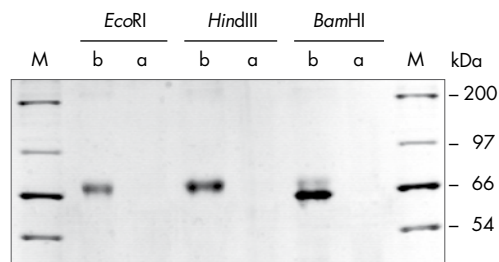


Figure 8. Complete removal of restriction enzymes. SDS-PAGE analysis of samples containing 4 units of the indicated restriction enzyme before **b** and after **a** processing with the MinElute Reaction Cleanup Kit. Proteins were visualized by silver staining. **M**: markers.

Table 3. DNA cleanup from a range of enzymatic reactions

Enzymatic reaction
Alkaline phosphatase
DNase, nuclease digestion
Kinase treatment of DNA fragments
Ligation
Nick translation
Random priming
Restriction digestion
Tailing of DNA fragments

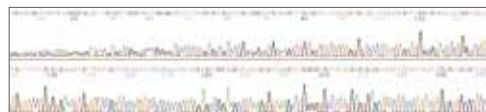


Figure 9. Efficient removal of unincorporated dye terminators. DyeEx kits allow complete removal of unincorporated dye terminators enabling clear and accurate base calling.

* The QIAquick Nucleotide Removal Kit is not suitable for cleanup of synthesized cDNA.

† The MinElute Reaction Cleanup Kit is not suitable for cleanup of PCR products or gel extraction.

‡ Requires use of a table-top centrifuge equipped with a rotor with swing-out buckets, such as the QIAGEN 96-Well Plate Centrifugation system.

n.a: Not applicable

Ordering Information

Product	Contents	Cat. no.
PCR cleanup		
QIAquick PCR Purification Kit (50)*	For purification of 50 PCR reactions: 50 QIAquick Spin Columns, Buffers, Collection Tubes (2 ml)	28104
QIAquick 96 PCR Purification Kit (4)*	For purification of 4 x 96 PCR reactions: 4 QIAquick 96 Plates, Buffers, Collection Microtubes (1.2 ml), Caps	28181
MinElute PCR Purification Kit (50)*	For purification of 50 PCR reactions: 50 MinElute Spin Columns, Buffers, Collection Tubes (2 ml)	28004
MinElute 96 UF PCR Purification Kit (4)*	For purification of 4 x 96 PCR reactions: 4 MinElute 96 UF PCR Purification Plates	28051
Gel extraction		
QIAquick Gel Extraction Kit (50)*	For 50 gel extractions: 50 QIAquick Spin Columns, Buffers, Collection Tubes (2 ml)	28704
MinElute Gel Extraction Kit (50)*	For 50 gel extractions: 50 MinElute Spin Columns, Buffers, Collection Tubes (2 ml)	28604
Enzymatic reaction cleanup		
MinElute Reaction Cleanup Kit (50)*	For 50 DNA purification reactions: 50 MinElute Spin Columns, Buffers, Collection Tubes (2 ml)	28204
QIAquick Nucleotide Removal Kit (50)*	For 50 DNA purification reactions: 50 QIAquick Spin Columns, Buffers, Collection Tubes (2 ml)	28304
Sequencing reaction cleanup		
DyeEx 2.0 Spin Kit (50)*	For cleanup of 50 sequencing reactions: 50 DyeEx Spin Columns, Collection Tubes (2 ml)	63204
DyeEx 96 Kit (4)*†	For cleanup of 4 x 96 sequencing reactions 4 DyeEx 96 Plates; 4 Collection Plates, 48-Well	63181

* Larger kit size available, please inquire.

† Requires use of a table-top centrifuge equipped with a rotor with swing-out buckets, such as the QIAGEN 96-Well Plate Centrifugation system.

For up-to-date licensing information and product-specific disclaimers, see the respective QIAGEN kit handbook or user manual. QIAGEN kit handbooks and user manuals are available at www.qiagen.com or can be requested from QIAGEN Technical Services or your local distributor.

Find out more about QIAGEN DNA cleanup solutions at www.qiagen.com.

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