

PCR Cleanup Kit Comparison:

Yield, Quality and Speed Performance

Galenvs offers PCR purification kits in a range of formats designed to meet different sample size and throughput needs.

The Galenvs *magnetiQ* PCR Clean-Up Kit enables a rapid and efficient method of nucleic acid purification following enzymatic reactions such as PCR or other processes such as restriction digests or ligation reactions. Purification of DNA is achieved through magnetic bead-based capture and subsequent elution into clean buffer.

Comparison of DNA yield and quality from Galenvs kits to DNA was informed against industry leading standard kits from Qiagen and Invitrogen.

Comparison Parameters

For this test, two widely-used PCR purification kits were selected:

- QIAquick PCR Purification Kit, QIAGEN, hereinafter referred to as **Qiagen**
- Invitrogen PureLink™ PCR Purification Kit, ThermoFisher, hereinafter referred to as **Invitrogen**

Compared with:

- *magnetiQ* PCR Clean-Up Kit, Galenvs Sciences, hereinafter referred to as **Galenvs**

To evaluate efficiency of nucleic acid purification, a 1Kb ladder was used as a sample input and suspended in 1X PBS solution supplemented with 0.1% bovine serum albumin (BSA). This emulates a salt solution containing different DNA fragment sizes with spiked protein contaminants in order to better determine purified nucleic acid yield and purity.

Yield and quality were evaluated using spectrophotometric measurements for quantification at A260, as well as salt and organic contamination using A260/A280 and A260/A230 ratios. Gel electrophoresis was also performed to evaluate nucleic acid shearing and quality. All samples were run in triplicate for standard deviation analysis.

Yield

Table 1 shows the spectrophotometry analysis of purified nucleic acids from the 1Kb DNA ladder sample. Compared to the initial input concentration, Galenvs produced the highest percent capture (>98%) and purification of nucleic acids with high purity.

Table 1 – Spectrophotometry analysis of recovered and purified DNA from a starting sample of 1Kb ladder in a solution of PBS/0.1% BSA

	Quantity (ng/ μ L)	A260/A280	A260/A230	Percent Capture
<i>Initial</i>	<i>48.6</i>	<i>1.92</i>	<i>2.00</i>	
Galenvs	47.83 \pm 0.31	1.90 \pm 0.02	1.87 \pm 0.04	98.42 \pm 0.64
Qiagen	44.40 \pm 2.95	1.81 \pm 0.05	2.14 \pm 0.05	91.34 \pm 6.07
Invitrogen	45.90 \pm 0.78	1.91 \pm 0.05	2.13 \pm 0.05	94.44 \pm 1.60

Figure 1 is a graphical representation of the percent capture of Galenvs compared to Invitrogen and Qiagen, as well as purity values. While Galenvs gave the highest recovery and yield, it was also most repeatable in terms of quantity and quality.

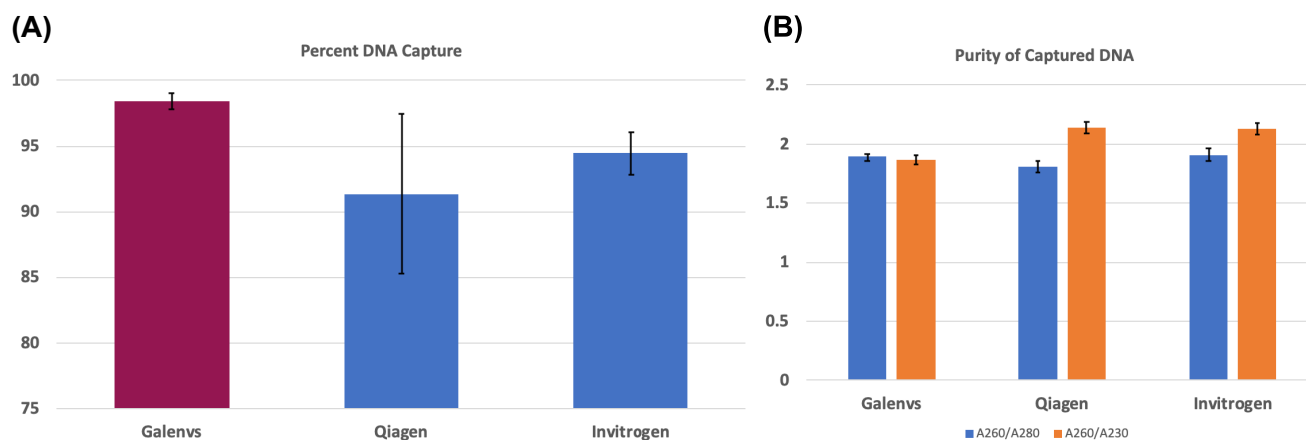


Figure 1 – Percent recovery (A) and purity (B) measurements of purified 1Kb ladder in PBS/0.1% BSA

Quality

Figure 2 shows Gel electrophoresis analysis of recovered and purified DNA from the 1Kb DNA ladder starting solution in PBS/0.1% BSA. Compared to the initial input sample, Galenvs recovered DNA fragments consistently with same band intensities for varying base pair sizes.

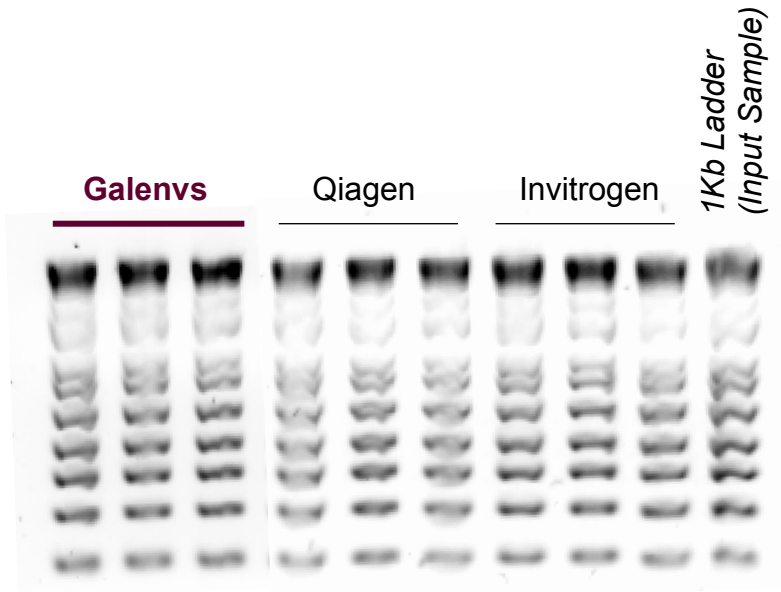


Figure 2 - Gel electrophoresis of recovered and purified DNA fragments of varying sizes

Results

The Galenvs *magnetiQ* PCR Clean-Up Kit alleviates the need for centrifugation steps and separate collection tubes – in contrast to standard column-based kits. In addition, the Galenvs *magnetiQ* PCR Clean-Up capture efficiency is >98% of sample DNA in the size range of 100 bps – 10 kbps. Furthermore, the purified sample can be concentrated in volumes as low as 10 μ L, compared to column-based kits which often necessitate larger elution volumes. The Galenvs *magnetiQ* PCR Clean-Up kit performance demonstrates high purification efficacy at various fragment sizes. Sample processing is completed in less than 10 minutes, yielding high purity and efficient recovery of DNA.

Speed

Functionalized magnetic beads – coupled with machine-learning approaches for protocol development and reagent formulation – are at the core of the Galenvs *magnetiQ* PCR Clean-Up Kit, which contains optimized buffers for DNA binding, washing and elution. Samples are processed manually in under 10 mins, requiring only the use of a magnetic rack and standard pipettes.

- Galenvs *magnetiQ* PCR Clean-Up Kit is most amenable to high-throughput methods, including automation
- Faster and simpler magnetic collection and resuspension steps with Galenvs *magnetiQ* PCR Clean-Up Kit
- Concern for clogging is reduced with Galenvs *magnetiQ* PCR Clean-Up Kit non-filter method
- No organic solvent hazardous waste with Galenvs *magnetiQ* PCR Clean-Up Kit

Galenvs *magnetiQ* PCR Clean-Up Kit

Features

- High DNA recovery and quality of varying sizes
- Short and scalable protocol
- Rapid and cost effective extractions
- Non-toxic chemicals
- Automatable on open systems

Applications

- Next Generation Sequencing (NGS)
- Post-PCR and qPCR gene amplification
- Genomic DNA library preparation
- Copy number variation (CNV) studies

Comparative analysis performed by the
National Research Council of Canada.



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