

Plasmid Miniprep Kit Comparison:

Yield, Quality, and Speed Performance

Galenvs offers plasmid miniprep extraction for molecular biology applications using magnetic bead-based reagents optimized through machine learning approaches to ensure consistent high yield and quality.

The Galenvs **magnetiQ Plasmid Miniprep Kit** enables a rapid and efficient method of plasmid extraction and purification without need for RNase supplement. Extraction of plasmid supercoiled DNA is achieved through single-step magnetic bead-based lysis and capture of plasmids from transformed bacteria. The *magnetiQ* Plasmid Miniprep Kit enables highly efficient capture/elution of molecular biology grade plasmids yielding purified solutions with minimal RNA, protein and salt contamination for downstream applications such as transfection, PCR, and sequencing.

Galenvs kit performance was evaluated through yield and quality assessment of plasmid preparations - from transformed DH5a competent *E. Coli* cells - compared to widely used kits from Qiagen and Invitrogen.

Comparison Parameters

Two industry leading kits for plasmid purification were selected:

- QIAprep Spin Miniprep from QIAGEN, hereinafter referred to as **Qiagen**
- Invitrogen PureLink™ Quick Plasmid Miniprep Kit from ThermoFisher, hereinafter referred to as **Invitrogen**

Compared with:

- *magnetiQ* Plasmid Miniprep Kit, Galenvs Sciences, hereinafter referred to as **Galenvs**

To evaluate efficiency of plasmid extraction, a 6 Kbps plasmid vector was inoculated in Miller's LB Broth and used as a sample input. Up to 1 mL of bacteria was pelleted and resuspended in 1X PBS for Galenvs while appropriate resuspension buffers were used in Qiagen and Invitrogen as per manufacturer protocols.

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 plasmid

shearing and quality, in addition to evaluation of contaminating RNA and genomic DNA (gDNA), as well as presence of nicked, linear, and relaxed plasmids. All samples were run in triplicate for standard deviation analysis.

Yield

Table 1 shows the spectrophotometry analysis of purified plasmid preparations from the 1 mL of bacterial culture. Compared to the Qiagen and Invitrogen, Galenvs produced the highest plasmid yield with high purity.

Table 1 – Spectrophotometry analysis of purified plasmid preparation

	Quantity (ng/μL)	A260/A280	A260/A230
Galenvs	148.30 ± 10.49	1.95 ± 0.01	2.32 ± 0.01
Qiagen	92.37 ± 7.20	1.90 ± 0.02	2.24 ± 0.06
Invitrogen	107.13 ± 3.12	1.93 ± 0.02	2.36 ± 0.02

Figure 1 is a graphical representation of plasmid quantity obtained using Galenvs compared to Invitrogen and Qiagen, as well as purity values. While Galenvs does not rely on centrifugation methods used in alkaline lysis, it yielded the highest quantity of extracted plasmid.

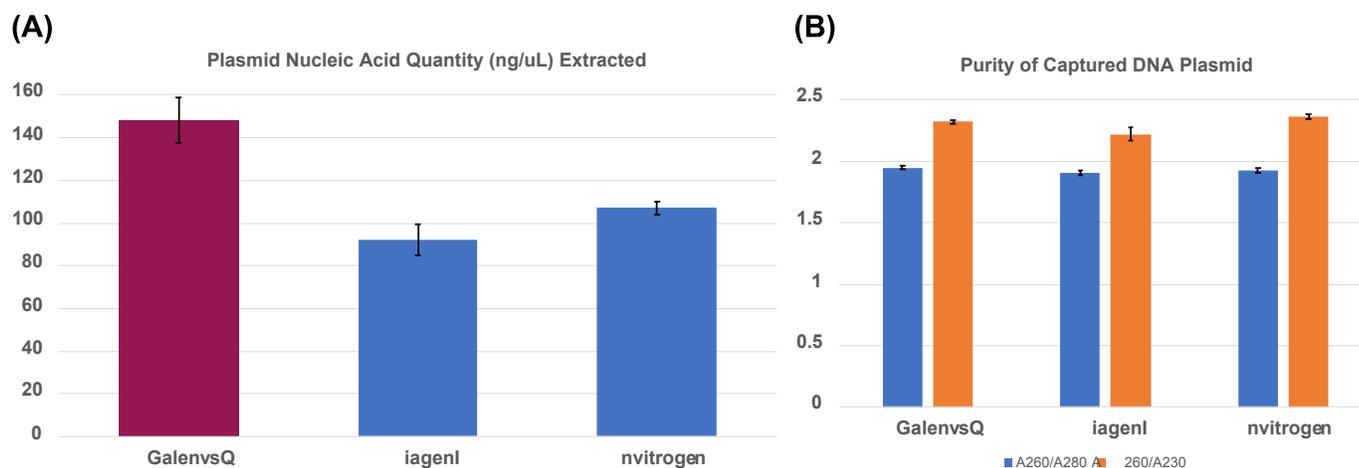


Figure 1 – Plasmid nucleic acid quantity (A) and purity (B) measurements of purified plasmid preparations

Quality

Figure 2 shows Gel electrophoresis analysis of extracted plasmid preparations. Although Galenvs does not require RNase treatment, the obtained plasmid bands were highly pure with no RNA contamination. In addition, Invitrogen and Qiagen showed denatured plasmid contamination below the desired plasmid band.

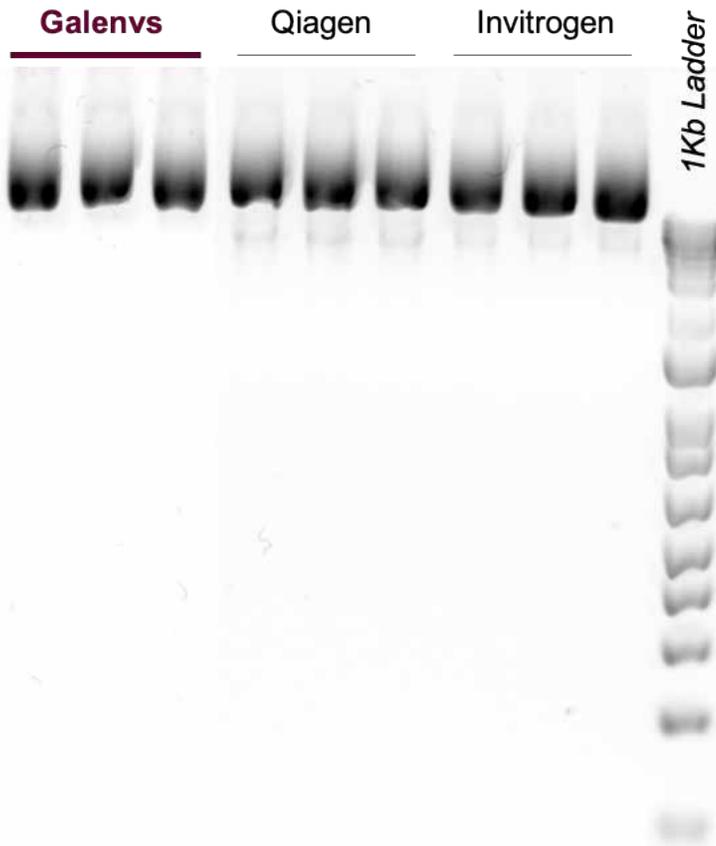


Figure 2 - Gel electrophoresis of purified plasmid preparations of a 6 Kbp vector

Results

The Galenvs *magnetiQ* Plasmid Miniprep Kit alleviates the need for centrifugation steps and separate collection tubes – in contrast to standard column-based kits. In addition, the Galenvs Plasmid Miniprep Kit allows for facile bacterial lysis, plasmid binding, and endotoxin removal only using a standard magnetic rack. Furthermore, the purified plasmid can be concentrated in volumes as low as 25 μ L, compared to column-based kits which often necessitate larger elution volumes. The Galenvs *magnetiQ* Plasmid Miniprep Kit performance demonstrates high yield and pure plasmid extraction for both low and high-copy vectors. Sample processing is completed in less than 20 minutes, yielding high purity and efficient recovery of molecular biology grade plasmids.

Speed

Functionalized magnetic beads – coupled with machine-learning approaches for protocol development and reagent formulation – are at the core of the Galenvs *magnetiQ* Plasmid Miniprep Kit, which contains optimized buffers for bacterial lysis, plasmid binding, as well as specialized washes to ensure endotoxin removal. Samples are processed manually in under 20 mins, requiring only the use of a magnetic rack and standard pipettes.

- Galenvs *magnetiQ* Plasmid Miniprep Kit is most amenable to high-throughput methods, including automation
- Faster and simpler magnetic collection and resuspension steps with Galenvs *magnetiQ* Plasmid Miniprep Kit
- Concern for clogging is reduced with Galenvs *magnetiQ* Plasmid Miniprep Kit non-filter method
- No RNase treatment necessary with Galenvs *magnetiQ* Plasmid Miniprep Kit
- Bacterial lysis and removal of cell debris, proteins, and denatured gDNA is performed with magnetic beads – no need for centrifugation

Galenvs *magnetiQ* Plasmid Miniprep Kit

Features

- High plasmid recovery without RNase
- Short and scalable protocol for both low and high-copy vectors
- Cost effective extractions
- Non-toxic chemicals
- Automatable on open systems

Applications

- Molecular biology
- In Vitro transfection
- PCR, sequencing, cloning

Comparative analysis performed by the

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