APPLICATION NOTE

Reproducible purification of DNA from blood using the BioRobot® EZ1 System

This study shows the reproducible purification of DNA from 48 whole blood samples throughout 8 processing runs using the BioRobot® EZ1 workstation in combination with EZ1 DNA Blood Kits. DNA yields were consistent from run to run and purified DNA performed well in downstream PCR analysis.*

Introduction

Fully automated solutions for nucleic acid purification must provide high levels of reproducibility in terms of sample yield, quality, and performance. Reproducibility is particularly important in large research projects and when heterogeneous samples, such as whole blood, are used.

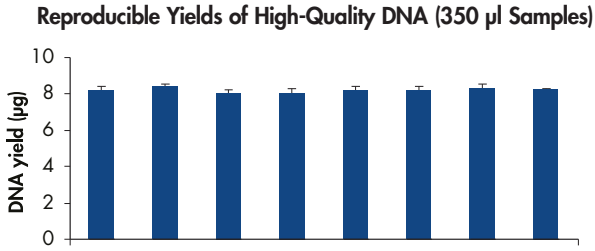

Figure 1A. *Genomic DNA was purified from 48 x 350 µl samples (white-cell count 4.9 x10⁶/ml) of human whole blood using the EZ1 DNA Blood 350 µl Kit. Blood samples were taken from one individual. Average yields from each run of six samples are shown. DNA yield was quantified by absorbance (A_{260}) with background correction. Purified DNA was eluted in 200 µl RNase-free water. Average yield was 8.2 µg (S.D.= 0.23). Average DNA purity (A_{260}/A_{280}) was 1.85 (S.D.=0.01).*

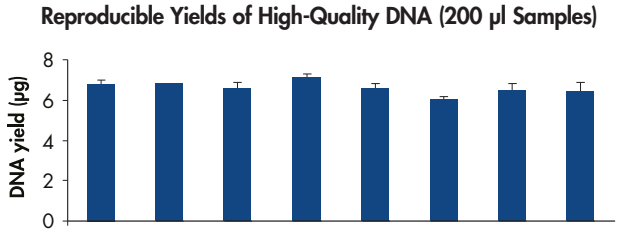

Figure 1B. *Genomic DNA was purified from 48 x 200 µl samples (white-cell count 7.9 x10⁶/ml) of human whole blood using the EZ1 DNA Blood 200 µl Kit. Average yields from each run of six samples are shown. DNA yield was quantified by absorbance (A_{260}) with background correction. Purified DNA was eluted in 200 µl RNase-free water. Average yield was 6.60 µg (S.D.=0.41). Average DNA purity (A_{260}/A_{280}) was 1.79 (S.D.=0.01).*

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Materials and methods

Fully automated purification of DNA was performed on EDTA-preserved whole blood samples of 200 µl (7.9 x 10^6 white cells/ml) and 350 µl (4.9 x 10^6 white cells/ml). EZ1 DNA Blood Kits were used in combination with the BioRobot EZ1 workstation. Purified DNA was eluted in 200 µl RNase-free water. DNA yield was quantified by absorbance (A_{260}) with background correction. Amplification of a 900 bp fragment of the single-copy *MECL-1* gene (proteasome-like subunit) was performed using 5 µl DNA in a 50 µl PCR.

High-Quality DNA from Whole Blood

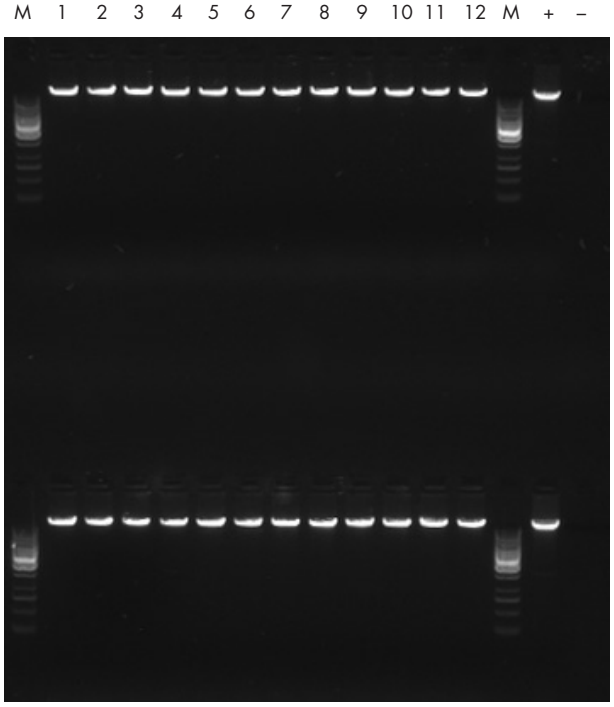

Figure 2. *Upper lanes are from 200 µl blood, lower lanes are from 350 µl blood. Lanes 1–6 and 7–12 are from the first and last processing runs on the BioRobot EZ1 workstation, respectively.* ***M****: 1000 bp DNA ladder (100 ng);* ***+****: positive control;* ***–****: negative control. 2 µl (1%) of each eluate was visualized on the agarose gel.*

Reproducible Performance in Sensitive PCR Analysis

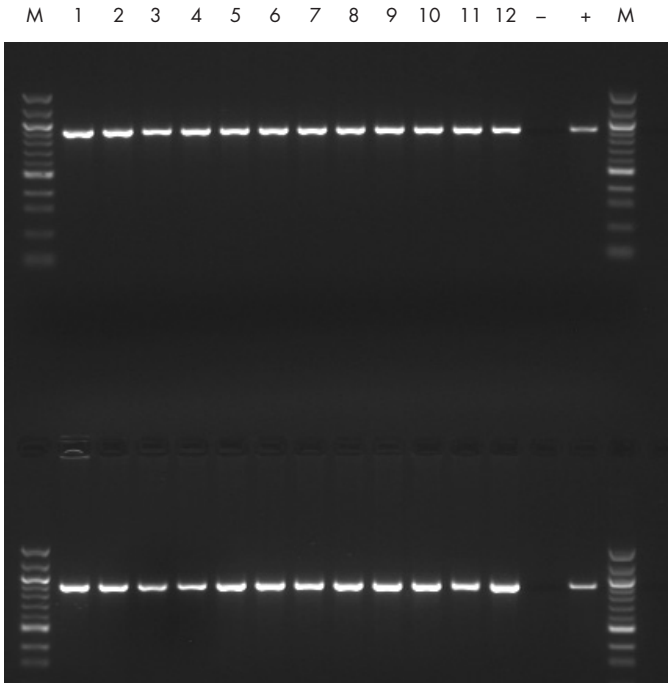

Figure 3. *Amplification of a single-copy gene (*MECL-1*) using template DNA purified from whole blood. Upper and lower lanes are from PCR using template DNA from 200 µl and 350 µl blood samples, respectively. Lanes 1–6 and 7–12 are from the first and last of 8 processing runs on the BioRobot EZ1 workstation, respectively. Blood from the same donor is used in all isolations.* ***M****: 100 bp DNA ladder (100 ng);* ***+****: positive control;* ***–****: negative control. 2 µl (1%) of each PCR was loaded on the agarose gel.*

Results

Average DNA yield was 6.6 µg (S.D.=0.41 µg), for all 200 µl samples, and 8.2 µg (S.D.=0.23 µg) for all 350 µl samples (Figures 1A and 1B). Average DNA purity was consistently high (A_{260}/A_{280}=1.79–1.85). Agarose gel electrophoresis showed consistent high-quality DNA (Figure 2). In addition, clean, strong bands were observed for the single-copy PCR amplification (Figure 3).

Conclusions

These results clearly demonstrate high reproducibility in both yield and quality of DNA purified using the BioRobot EZ1 workstation in combination with the EZ1 DNA Blood Kits.

Purification of DNA from whole blood using the BioRobot EZ1 workstation and the EZ1 DNA Blood Kits results in:

- **Highly reproducible yields** — low standard deviations from 200 µl and 350 µl blood
- **High-quality DNA** — consistently strong, smear-free bands from all 48 samples
- **High-performance in PCR** — strong, clean bands even from single-copy genes

Ordering Information

Product	Contents	Cat. No.
BioRobot EZ1	Robotic workstation for easy, automated purification of nucleic acids	9000705
EZ1 DNA Blood 200 µl Kit (48)	48 Reagent Cartridges (Blood 200 µl), 50 Disposable Tip Holders, 50 Disposable Filter-tips, 50 Sample Tubes (2.0 ml), 50 Elution Tubes (1.5 ml)	951034
EZ1 DNA Blood 350 µl Kit (48)	48 Reagent Cartridges (Blood 350 µl), 50 Disposable Tip Holders, 50 Disposable Filter-tips, 50 Sample Tubes (2.0 ml), 50 Elution Tubes (1.5 ml)	951054
EZ1 DNA Blood Card	Pre-programmed card for BioRobot EZ1 DNA Blood 200 µl and 350 µl Protocols	9015585

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.

Contact QIAGEN today to discover more about standardized purification of DNA from blood.

QIAGEN Robotic Systems are not available in all countries; please inquire.

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