The Ideal Agarose Gel Electrophoresis Solution – Remarkable Stability of the GES Systems

Introduction

Agarose gel electrophoresis has long been established as the technique to separate nucleic acid molecules based on size, charge, and structure. The nucleic acid samples are loaded into wells of an agarose gel, which is submerged in an electrophoresis unit containing buffe. When applying the electric current, due to the net negative charge of the molecules, the molecules migrate towards the anode. Separation is achieved within the gel matrix as larger nucleic acid molecules migrate slowly and remain near the cathode, while smaller molecules experience less resistance within the gel and migrate towards the anode.
Agarose gel systems can be used to separate DNA and RNA for quick screening applications such as PCR amplification detection, enzyme digestion or size determination. The GES systems are the standard agarose gel electrophoresis units that allow users to perform submerged agarose gel electrophoresis in the combination of the ELITE power supply. The direct approach to examine the performance of a horizontal electrophoresis system is to test it with PCR amplification detection. In our previous publication *Excellent Thermal Uniformity Showcase of the SEDI Thermal Cycler*, the single PCR product used in the SEDI thermal cycler testing was also used to show the stability of the GES systems, which are the combination of GES agarose gel electrophoresis unit and ELITE power supply.

Material and methods

Single PCR Product Assay

The plasmid DNA PCR reaction mixes were prepared with the PCR mix for 20 µl reaction volume. For the PCR condition in the 20 µl reaction volume, 0.4 ng of the plasmid DNA pFLAG-mLRH-1, 0.125 µM of primers, 1× PCR mix (Solgent), and ultrapure water were all mixed together to a 1000 ul final mixture solution on the day of use. The final mixture solution was then aliquoted to 28 reaction tubes and placed in the SEDI thermal cycler as illustrated in **Figure 1.** The PCR condition was performed in the SEDI thermal cycler detailed in **Table 1**. The PCR products were separated through 1.5% agarose gel electrophoresis in 1× TAE buffer using the GES agarose gel electrophoresis unit and ELITE 600 power supply and then stained in ethidium bromide. The electrophoresis results were captured by the KETA M imaging system.

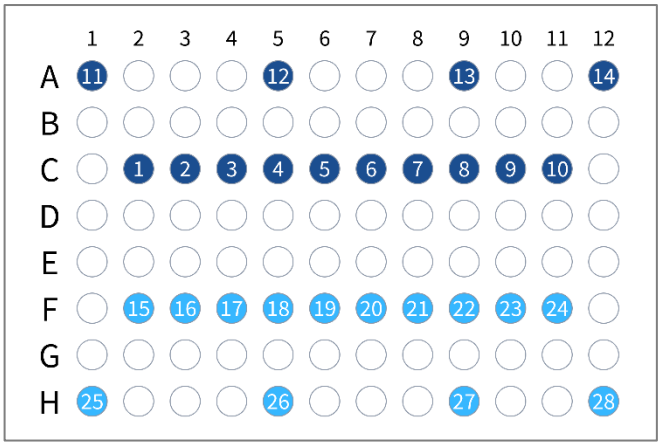

Figure 1 Twenty-eight 20 µl PCR reaction tubes placement in 96-well reaction block

Tabel 1 Standard PCR amplification program for the SEDI thermal cycler

Description	Step	Temperature	Time	
Initial denaturation	Step 1	95 °C	2:00	
Thermal cycling	Step 2	95 °C	0:30	25 cycles
	Step 3	56 °C	0:30	
	Step 4	72 °C	0:30	
Final extension	Step 5	72 °C	5:00	
Storage	Step 6	6 °C		

Results

Agarose gel electrophoresis results

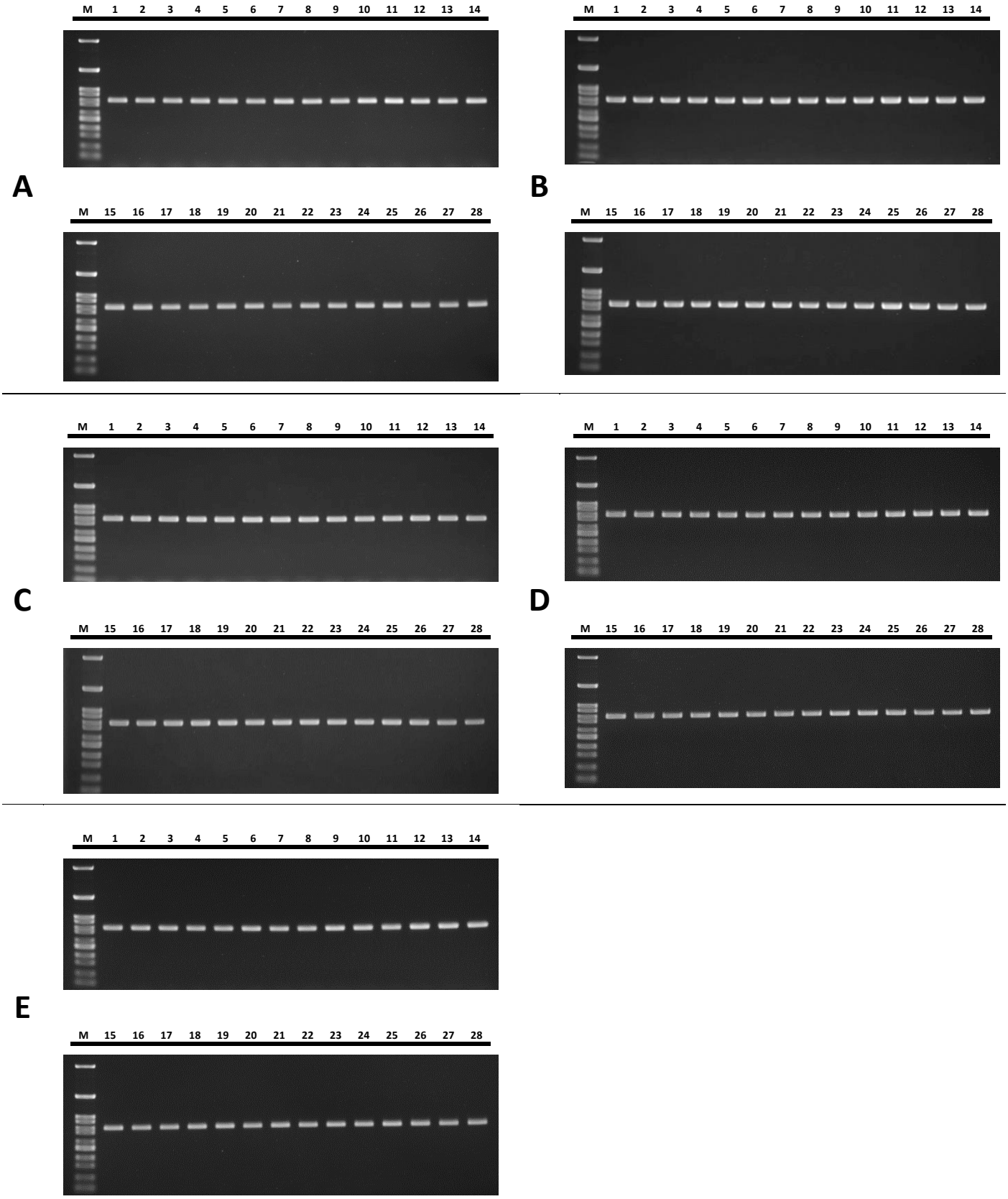

Figure 2 The single PCR product amplification detection from different SEDI thermal cyclers using the GES systems

Discussion

Agarose Gel System Stability

In our routine testing of the SEDI thermal cycler, the GES systems had demonstrated its excellent stability and durability. In group A-E from Figure 2, the electrophoresis results from different SEDI thermal cyclers revealed reproducibility in the agarose gel images. Often times the lanes and bands may be distorted due to the unstable mobility of the nucleic acid molecules in the gel matrix. The ELITE power supplies in the GES systems provide high accuracy and high efficiency of the direct current to the electrophoresis systems. The gel casting tools provided by the GES units offered leakage-free and tear-free Dams-Claws design. As long as the casting tray was leveled, the tools ensured you that the agarose gel would be casted evenly. As a result, the single PCR products will all be sieved through the gel matrix with minimal resistance shift, thus yield clean PCR results as shown here.

Conclusion

The GES agarose gel electrophoresis systems has demonstrated its remarkable stability in our routine PCR amplification detection testing. Thanks to the highly stable ELITE power supply and excellent gel casting tools provided with the GES units, the GES systems have been the number one choice for its remarkable performance.

Ordering information

Catalog no.	Description
1011000	Mini GES Cell complete system, Mini GES cell accompanies with 10 × 7 cm tray, one 10 × 1.0 mm teeth and one 15 × 1.0 mm teeth fixed height comb
1011001	Mini GES Cell complete system, Mini GES cell accompanies with 6.5 × 7 cm tray, one 10 × 1.0 mm teeth and one 15 × 1.0 mm teeth fixed height comb
1011002	GES Cell complete system, GES cell accompanies with 10 × 15 cm tray, one 15 × 1.0 mm teeth and one 20 × 1.0 mm teeth fixed height comb
1011003	GES Cell complete system, GES cell accompanies with 7 × 15 cm tray, one 15 × 1.0 mm teeth and one 20 × 1.0 mm teeth fixed height comb
1011004	GES Cell complete system, GES cell accompanies with 15 × 15 cm tray, one 15 × 1.0 mm teeth and one 20 × 1.0 mm teeth fixed height comb
Accessories	
1012101	UV-transparent tray 6.5 × 7 cm for Mini GES cell
1012102	UV-transparent tray 10 × 7 cm for Mini GES cell
1012103	UV-transparent tray 7 × 15 cm for GES cell
1012104	UV-transparent tray 10 × 15 cm for GES cell
1012105	UV-transparent tray 15 × 15 cm for GES cell
1012201	10 teeth fixed height comb, 0.75 mm thickness for Mini GES cell
1012202	10 teeth fixed height comb, 1.0 mm thickness for Mini GES cell
1012203	10 teeth fixed height comb, 1.5 mm thickness for Mini GES cell
1012204	15 teeth fixed height comb, 0.75 mm thickness for Mini GES cell
1012205	15 teeth fixed height comb, 1.0 mm thickness for Mini GES cell
1012206	15 teeth fixed height comb, 1.5 mm thickness for Mini GES cell
1012207	15 teeth fixed height comb, 0.75 mm thickness for GES cell
1012208	15 teeth fixed height comb, 1.0 mm thickness for GES cell
1012209	15 teeth fixed height comb, 1.5 mm thickness for GES cell
1012210	20 teeth fixed height comb, 0.75 mm thickness for GES cell
1012211	20 teeth fixed height comb, 1.0 mm thickness for GES cell
1012212	20 teeth fixed height comb, 1.5 mm thickness for GES cell

Catalog no.	Description
1001007	Mini ELITE Power Supply, 100-240 VAC/50-60 Hz
1001021	ELITE HC 2.0 Power Supply, 5-200V, 0.01-2.0 A, 100-240 VAC/50-60 Hz
1001023	ELITE HC 2.5 Power Supply, 5-250V, 0.01-2.5 A, 100-240 VAC/50-60 Hz
1001024	ELITE HC 3.0 Power Supply, 2-300V, 0.01-3.0 A, 100-240 VAC/50-60 Hz
1001026	ELITE 300U Power Supply, 1-300V, 1-500 mA, 100-240 VAC/50-60 Hz
1001031	ELITE 600U Power Supply, 5-600V, 1-750 mA, 100-240 VAC/50-60 Hz

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