AccuPower® GreenStar™ qPCR PreMix

BIONEER
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I. Introduction

AccuPower® GreenStar™ qPCR PreMix is a ready-to-use reagent containing all components for real-time PCR reaction, except for target-specific primers. Just an addition of specific primers and target gene into tube provide reproducible results with high sensitivity and specificity. Because all components for PCR reaction with stabilizer are lyophilized in real-time PCR plates or tubes, the stability of the product is extremely extended up to 1 years at -20°C storage, compared to that of other commercially available product.

This product can be used in real-time PCR experiments for the amplification and detection of genomic DNA and cDNA targets, differential gene expression profiling, and Microbial & Viral pathogen detection. This product provides reproducible results with superior specificity, high sensitivity, wide dynamic range and accurate quantification.

II. Principle

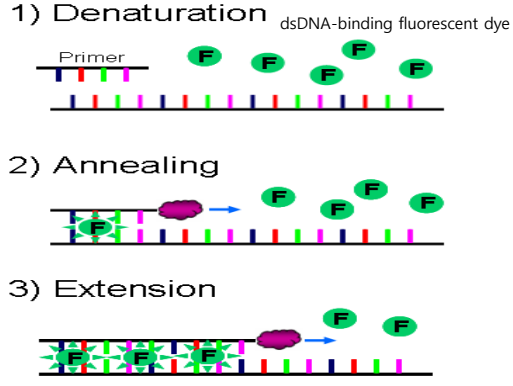
PCR products are detected with dsDNA-binding fluorescent dye in real-time monitoring.

1) PCR (Polymerase Chain Reaction)

PCR is a biochemistry and molecular biology technique for the amplification of target DNA across several orders of magnitudes, generating millions or more copies of target DNA pieces.
There are three major steps at different temperatures in a PCR, which are repeated for 30 or 45 cycles. Double-stranded target DNA is heat-denatured (denaturation step), the two primers complementary to the target segment are annealed at low temperature (annealing step), and the annealed primers are then extended at an intermediate temperature (extension step) with a DNA polymerase. As the target copy number doubles upon each cycle, PCR can thereby amplify DNA fragments up to 10^8-fold in a short period.

2) Fluorescence detection

During the extension phase, more and more dsDNA-binding fluorescent dye will bind to the PCR product, resulting in an increased fluorescence. Consequently, during each subsequent PCR cycle more fluorescence signal will be detected.



III. Content

Cat. No	Size	Descriptions
K-6210	96 tests	*Exicycler*™ 96, 8-well strip, 20 µl reaction
K-6200	96 tests	*Exicycler*™96, 8-well strip, 50 µl reaction
K-6211	96 tests	ABI 7500, 8-well strip, 20 µl reaction
K-6201	96 tests	ABI 7500, 8-well strip, 50 µl reaction
K-6212	96 tests	Opticon®, 8-well strip, 20 µl reaction
K-6202	96 tests	Opticon®, 8-well strip, 50 µl reaction
K-6213	96 tests	*Exicycler*™ 96, 96-well plate, 20 µl reaction
K-6203	96 tests	*Exicycler*™ 96, 96-well plate, 50 µl reaction
K-6214	96 tests	ABI 7500,96-well plate, 20 µl reaction
K-6204	96 tests	ABI 7500,96-well plate, 50 µl reaction

Cat. No	Kit Contents
K-6210 K-6211 K-6212	8-well strip x 12 each DEPC-D.W. 1.2 ml x 2 tubes * ROX dye (50X) 0.2 ml x 1 tube (only in K-6211)
K-6200 K-6201 K-6202	8-well strip x 12 each DEPC-D.W. 1.2 ml x 4 tubes * ROX dye (50X) 0.2 ml x 1 tube (only in K-6201)
K-6213 K-6214	96-well plate x 1 each DEPC-D.W. 1.2 ml x 2 tubes * ROX dye (50X) 0.2 ml x 1 tube (only in K-6214)
K-6203 K-6204	96-well plate x 1 each DEPC-D.W. 1.2 ml x 4 tubes * ROX dye (50X) 0.2 ml x 1 tube (only in K-6204)

* ROX dye is used for normalization of intensity by background subtraction. The use of ROX dye (50X) is recommended for Applied Biosystems 7500 Real-Time PCR System.
* The use of ROX dye is not required for Bioneer *Exicycler*™ 96 and Bio-Rad DNA engine Opticon®, iCycler IQ5 real-time instruments.

IV. Storage

AccuPower® GreenStar™ qPCR PreMix should be stored at -20℃ upon received, and are stable until the expiry date stated on the label.

V. Additionally Required Materials & Devices

- Thermal cycler for real-time PCR (authorized instruments)
- Target-specific primers
- Calibrated micropipette
- Sterilized micropipette tips with filters
- Optical adhesive films for real-time PCR
- High-speed centrifuge with rotors for microtiter plates
- Vortex mixer
- Desktop centrifuge
- Disposable powder-free gloves

VI. General Precautions

- Wear gloves during experiments to prevent contamination.
- Store positive materials, such as samples and control templates, in separated freezer from the freezer for the kit.
- Add templates to the reaction mixture in clean bench or a spatially separated facility

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- Place tubes / plate at room temperature at least 5 min before use.
- Vortex and centrifuge briefly tubes before load tubes into instruments.

VII. Protocol

Recommended protocol for *Exicycler*™ 96 version 3.0 (Bioneer Co.), Applied Biosystems 7500 Real-time PCR System (Applied Biosystems) and DNA Engine Opticon® (formerly, MJ Research; Bio-Rad Inc.)

1. Add following PCR reagents into GreenStar™ qPCR PreMix tube (per reaction)

	20 µl Rxn	50 µl Rxn
PCR F-Primer (10 pmole)	1-2 µl	1-2 µl
PCR R-Primer (10 pmole)	1-2 µl	1-2 µl
Template	5-10 µl	5-10 µl
DEPC-distilled water.	Adjust to 20 µl	Adjust to 50 µl

2. Seal the Optical adhesive film for real-time PCR on tube or plate
3. Completely mix by vigorous vortexing for the resuspension of PreMix pellets.
4. Centrifuge at 3,000 rpm, for 2 min
5. Start Real-time PCR instrument and load it
6. Program the PCR setting

Step	Condition	Cycle
Pre-Denaturation	95°C, 1-5 min	1
Denaturation	95°C, 5-20 sec	40-45
Annealing/Extension	55-60°C, 40-45 sec	
Detection(Scan)		
Melting	-	1

7. After reaction is completed, perform data analysis.

** Users can adjust the protocol considering on their instrument and target DNA sequence to get the optimal results.*

VIII. Experimental Example

1. Target: Envelope gene of West Nile Virus (WNV)
2. Primer: Designed using Primer3 Plus & purchased from Bioneer Co. (SOUTH KOREA)
3. Template: Plasmid DNA containing Envelop gene region of WNV (West Nile Virus)
4. Used reagent composition (per 50 µl reaction)

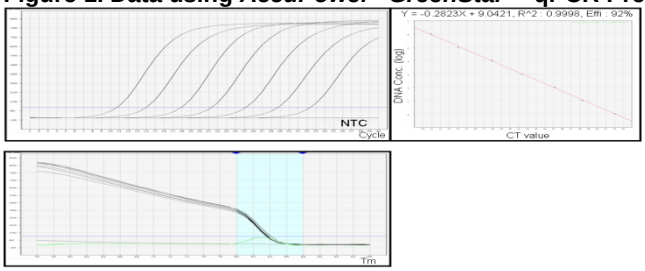
WNV Forward Primer (10 pmole)	2 µl
WNV Reverse Primer (10 pmole)	2 µl
Template(10^9 ~ 10^3 copies / rxn)	5 µl
DEPC-distilled water.	Final 50 µl

5. PCR program settings

Step	Condition	Cycle
Pre-Denaturation	95 °C, 1 min	1
Denaturation	95 °C, 5 sec	40
Annealing/Extension	55 °C, 40 sec	
Detection(Scan)		
Melting	-	1

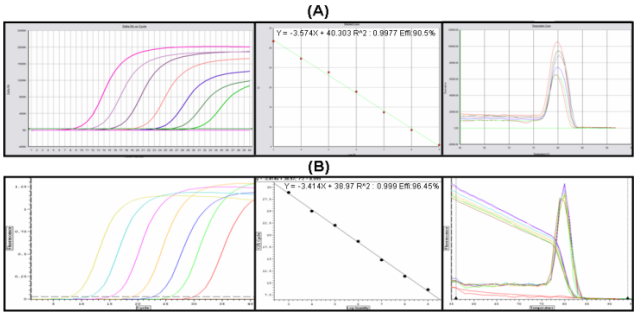
6. Results

Figure 1. Data using *AccuPower® GreenStar*™ qPCR PreMix



AccuPower® GreenStar™ qPCR PreMix provides dynamic range of at least 7 orders of magnitude (10^9 ~ 10^3 copies/reaction).
(A) Amplification curve, (B) Standard curve. (C) Melting curve
All data were obtained using *Exicycler*™ 96 Real-time Quantitative Thermal Block (Bioneer Co.).

Figure 2. Data using various kinds of Real-time PCR Instruments



AccuPower® GreenStar™ qPCR PreMix is applicable to most of commercially available real-time quantitative PCR instruments. WNV primers were added into *GreenStar*™ qPCR PreMix. A series of WNV positive control diluents were tested.
(A) Amplification curve, standard curve and melting curve using ABI 7500 Fast Real-time PCR machine (Applied Biosystems).
(B) Amplification curve, standard curve and melting curve using DNA Engine Opticon® Real-time PCR machine (MJ Research, currently Bio-Rad Inc.).

IX. Related Products

Cat. No.	Product
K-6100 ~ K-6104	*AccuPower® DualStar*™ qPCR PreMix, *Exicycler*™ 96, ABI 7500, Opticon® 8-well strip, 96 tests /pkg
K-6113, K-6114	*AccuPower® DualStar*™ qPCR PreMix, *Exicycler*™ 96, ABI 7500 96-well plate, 96 tests /pkg
K-3032	*AccuPrep*™ Genomic DNA Extraction Kit, 100 extractions
K-3033	*AccuPrep*™ Viral RNA Extraction Kit, 100 extractions
A-2060	*Exicycler*™ 96 Real-Time Quantitative Thermal Block