MGIEasy Fast FS Library Prep Set V2.0

Introduction

The MGIEasy Fast FS Library Prep Set V2.0 is a specifically designed rapid library preparation product to convert 1 ng to 1 μg of gDNA into a DNA library for DNBSEQ™ sequencers. The library prep set combines the DNA fragmentation, end-repair and A-tailing into one step and uses a fast purification method, to simplify the experimental process and significantly reduce library construction time. The library prep set has high library construction efficiency and excellent performance in genome coverage uniformity, variation detection precision and sensitivity. The library prep set is compatible with various sample types, including blood, saliva, oral swabs, FFPE, and precious samples with low starting amount, and suitable for applications such as WGS, WES, Microbiome sequencing, and Metagenomics sequencing.

Highlights

✓ Fast library prep workflow

Combine the DNA fragmentation, end-repair and A-tailing into one step to simplify the experimental process and minimize manual operations, significantly reducing library prep time to only 2 h (from gDNA to PCR library).

✓ Stable and highly compatible fragmented performance

High-quality fast frag enzymes and efficient adapter ligation reaction systems, compatible with various sample types and common DNA dissolution buffers with highly consistent insert sizes under the same fragmentation conditions.

✓ Broad DNA input range and various sample types

High library conversion efficiency and flexible library prep workflow supports a broad DNA input range (1 ng - 1 μg) and various sample types, such as blood, saliva, oral swabs, FFPE, and precious samples with low starting amount.

✓ Wide range of applications

Suitable for applications such as WGS, WES, Microbial WGS sequencing, and Metagenomics sequencing.

✓ Higher and flexible throughput

Up to 288 Unique Dual Barcodes enable flexible throughput for 4 - 288 samples multiplexing.

✓ Efficient automatable workflow

Adapt to MGISP-100, MGISP-960, and MGISP-Smart 8, providing flexible, efficient, and automated solutions.

Specification

Assay Time	~ 2 h (from gDNA to PCR library)
Hands-On Time	~ 20 min
Input Quantity	1 ng - 200 ng gDNA for small genomes (e.g. microbial, meta), 25 ng - 1 μg gDNA for large genomes (e.g. human, plant, animal)
Barcode	~288 barcodes
Sample Types	gDNA from blood, saliva, oral swabs, tissue, Microbial gDNA, Meta DNA, FFPE DNA
Compatible Species	Human, Animal, Plant, Microbe
Applications	Human WGS, Plants & Animals WGS, Microbial WGS, Metagenomics sequencing, WES
Sequencers	DNBSEQ-G400, DNBSEQ-G50, DNBSEQ-G99, DNBSEQ-E25, DNBSEQ-T7, DNBSEQ-T10×4, DNBSEQ-T20×2
Sequencing Types	SE100 / PE100 / PE150
Automation Platforms	MGISP-100 (16RXN), MGISP-960 (96RXN, 192RXN), MGISP-Smart 8

Product performance

Fast and flexible library perp workflow

The MGIEasy Fast FS Library Prep Set V2.0 combines the DNA fragmentation, end-repair and A-tailing into one step and uses a fast purification method to simplify the experimental process, minimize manual operations, and significantly reduce library prep time to only 2 h (from gDNA to PCR library).

The MGIEasy Fast FS Library Prep Set V2.0 offers up to 288 unique dual barcodes, enabling flexible throughput for 4 to 288 samples multiplexing. It adapts to two circularization methods, including MGI universal circularization or MGI OneStep DNB making. Fast FS V2.0 combined with the MGI OneStep DNB kit can complete the process from gDNA to DNB in 2.7 h (Fig.1).

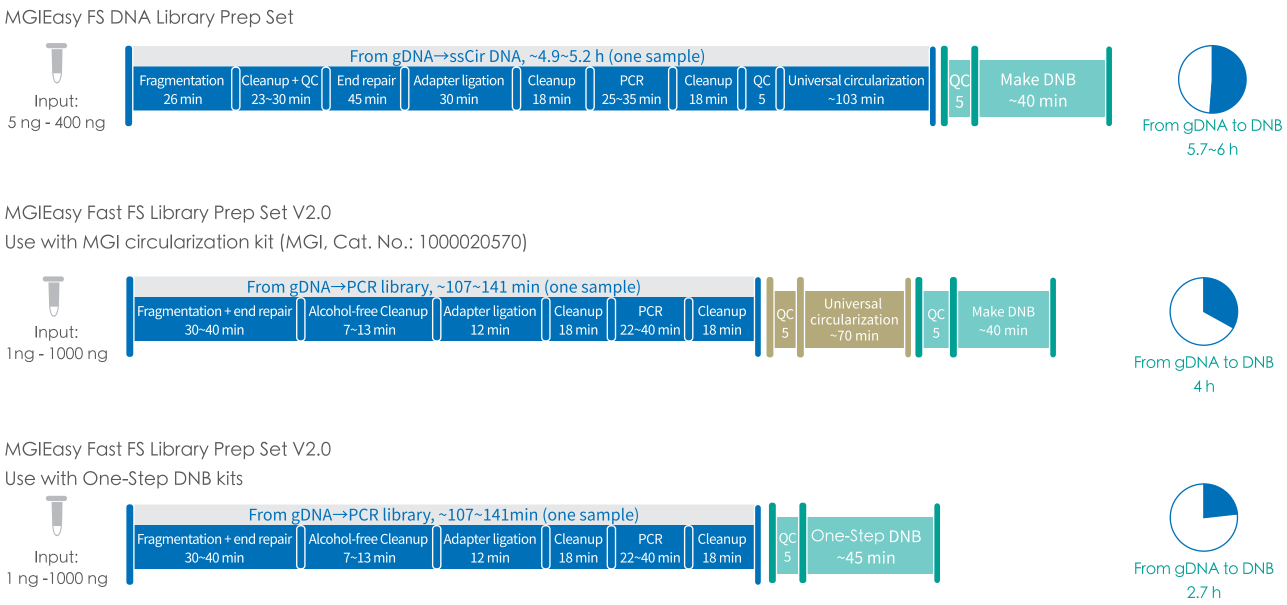

Fig. 1 The whole process from gDNA to DNB under different library preparation methods and circularization methods
Calculate the process time by manually preparing one library once. The MGIEasy Fast FS Library Prep Set V2.0 is compatible with two circularization methods: 1) MGI universal circularization method. The prepared PCR library is circularized using the MGI circularization kit (MGI Cat. No. 1000020570) to obtain single-stranded circular DNA (ssCir DNA), followed by conventional DNB making by using the DNB making reagent in the MGI sequencing reagent set. The process from gDNA to DNB takes about 4 h. 2) MGI OneStep DNB method. Use the MGI OneStep DNB kit (MGI Cat. No. 940-000036-00*) to complete the library circularization and DNB making in one step, directly obtaining DNB. This simplifies the process from the PCR library to DNB and reduces the DNB preparation time. The process from gDNA to DNB takes about 2.7 h.

High efficiency and Flexible Workflow with wide range of DNA input

The MGIEasy Fast FS Library Prep Set V2.0 provides high library conversion efficiency and flexible library prep workflow, supports a broad DNA input range and exhibits excellent quality sequencing data under different input amounts. Libraries were prepared from NA12878 gDNA with starting amount ranging from 25 ng - 1000 ng by using the MGIEasy Fast FS Library Prep Set V2.0 combined with the MGI universal circularization kit (MGI Cat. No. 1000020570) and sequenced on DNBSEQ-T7 with PE150. The results demonstrate that the Fast FS V2.0 has high library construction efficiency and excellent performance in genome coverage uniformity, variation detection precision and sensitivity under different starting amounts (Fig. 2).

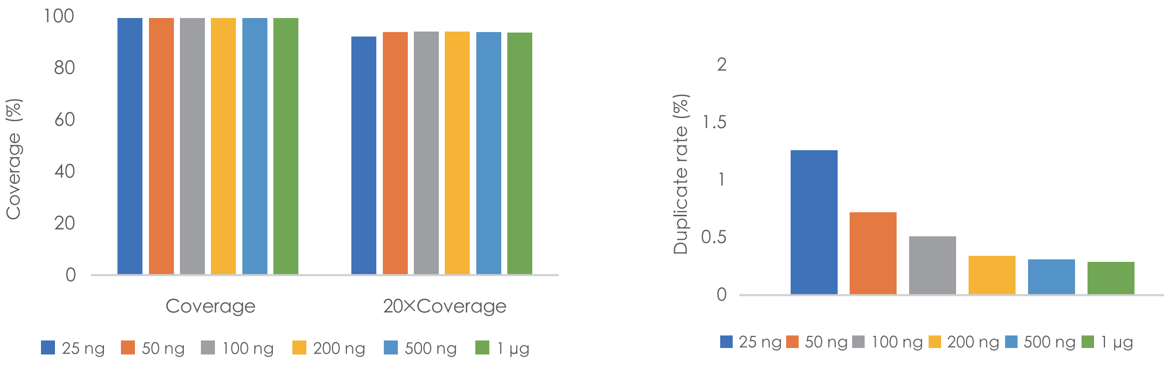

Fig. 2a Genome coverage under different input amounts

Fig. 2b Duplicate rate under different input amounts

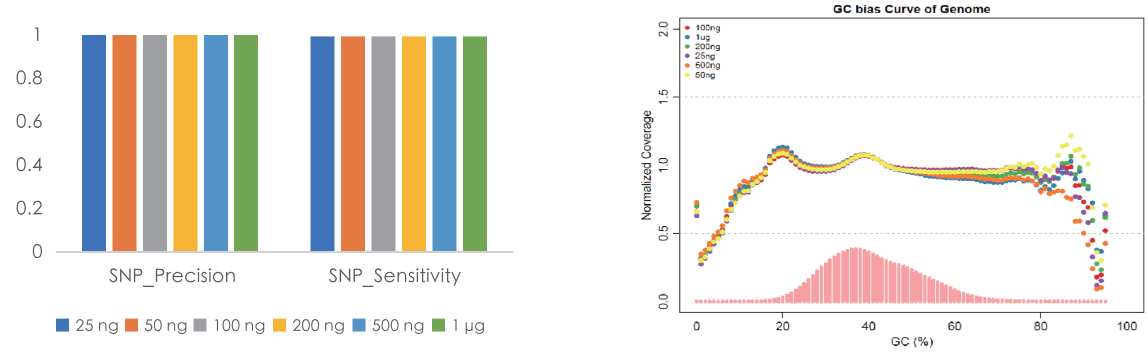

Fig. 2c Mutation detection under different input amounts

Fig. 2d Normalized coverage under different input amounts

Fig. 2 Performances under different input amounts

Compatible various DNA dissolution buffers

The MGIEasy Fast FS Library Prep Set V2.0 uses high-quality fast frag enzymes and efficient adapter ligation reaction systems to provide stable library construction performance. It is compatible with various common DNA dissolution buffers and produces highly consistent insert sizes under the same fragmentation conditions. Using 200 ng NA12878 that dissolved in different DNA dissolution buffers as the test samples, a comparison was performed between different DNA dissolution buffers by preparing the libraries using the MGIEasy Fast FS Library Prep Set V2.0 combined with the MGI OneStep DNB kit V2.0 (MGI Cat. No. 940-000036-00) on MGISP-960 and sequencing on DNBSEQ-G400 with PE150. The results showed that under the same fragmentation condition and library prep workflow, the libraries prepared from gDNA dissolved in different DNA dissolution buffers had consistent insert sizes and exhibit excellent performance, with comparable genome coverage and variation detection capabilities.

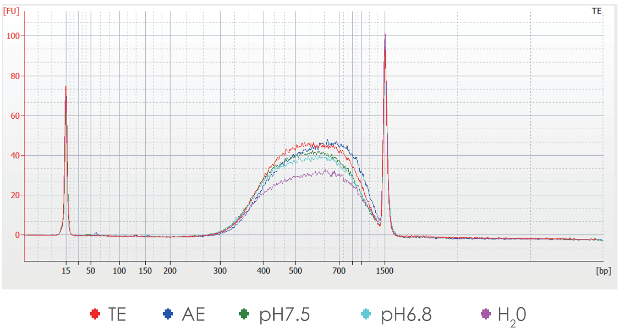

Fig. 3a Consistent insert sizes under different DNA dissolution buffers

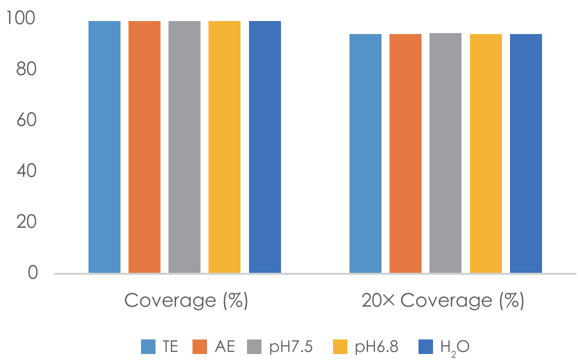

Fig. 3b Genome coverage under different DNA dissolution buffers

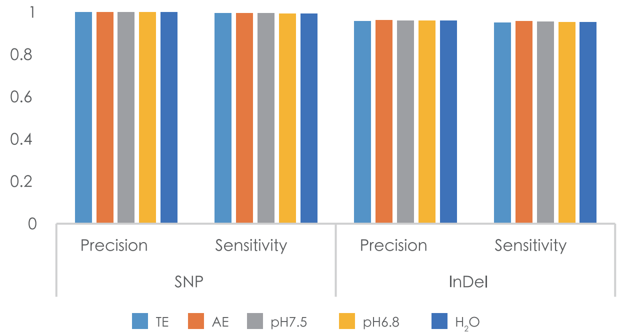

Fig. 3c Mutation detection under different DNA dissolution buffers

Fig. 3 Performances under different DNA dissolution buffers

High uniform genomic coverage across the microbial genome of varying GC content

The MGIEasy Fast FS Library Prep Set V2.0 is compatible with microbial genomes of varying GC content and performs high uniform genomic coverage. Libraries were prepared from bacterial species with a range of low, medium, and high GC content using the MGIEasy Fast FS Library Prep Set V2.0 and MGI OneStep DNB kits on MGISP-100 automated platform and were used to assess coverage performance. The results showed that under different DNA input amounts (1 ng - 200 ng) and different Sequencers, the MGIEasy Fast FS Library Prep Set V2.0 performed high uniform genomic coverage across bacterial species with a range of low (38%, LGC), medium (50%, MGC), and high (68%, HGC) GC content.

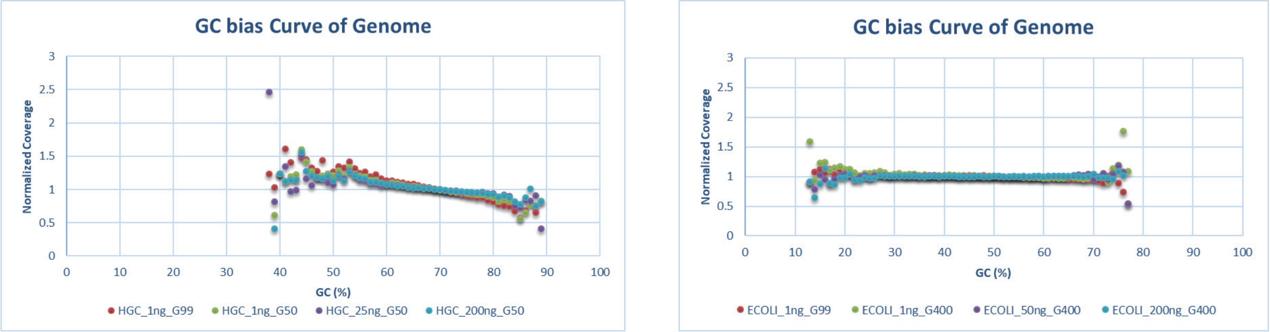

Fig. 4a Normalized coverage of HGC (68%)

Fig. 4b Normalized coverage of MGC (50%)

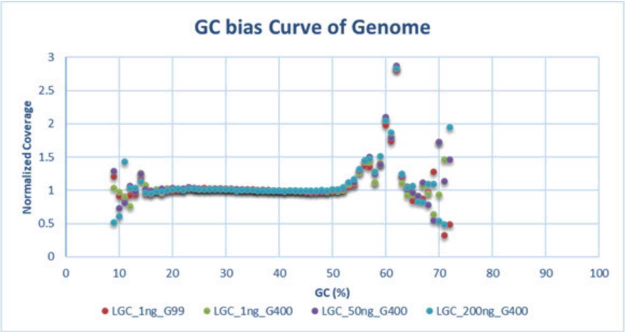

Fig. 4c Normalized coverage of LGC (38%)

Fig. 4 Normalized coverage of three different bacterial species with varying GC content

Libraries were prepared from the gDNA of three different bacterial species with varying GC content HGC (68%), MGC (50%), LGC (38%), with starting amount of 1 ng, 50 ng and 200 ng, by using the MGIEasy Fast FS Library Prep Set V2.0 combined with the MGI OneStep DNB kits. Sequencing was performed on DNBSEQ-G400 PE150, DNBSEQ-G99 PE150 and DNBSEQ-G50 PE150.

Highly concordant bacterial species identification and distribution

To assess the performance of bacterial species identification and distribution under different DNA input amounts using the Meta standard. The result showed that the MGIEasy Fast FS Library Prep Set V2.0 performs highly concordant bacterial species identification and distribution across a wide DNA input range (1 ng - 200 ng) under different sequencing platforms and automated platforms. Even when the DNA input amount is as low as 1 ng, the MGIEasy Fast FS Library Prep Set V2.0 still performs highly concordant bacterial species identification and distribution.

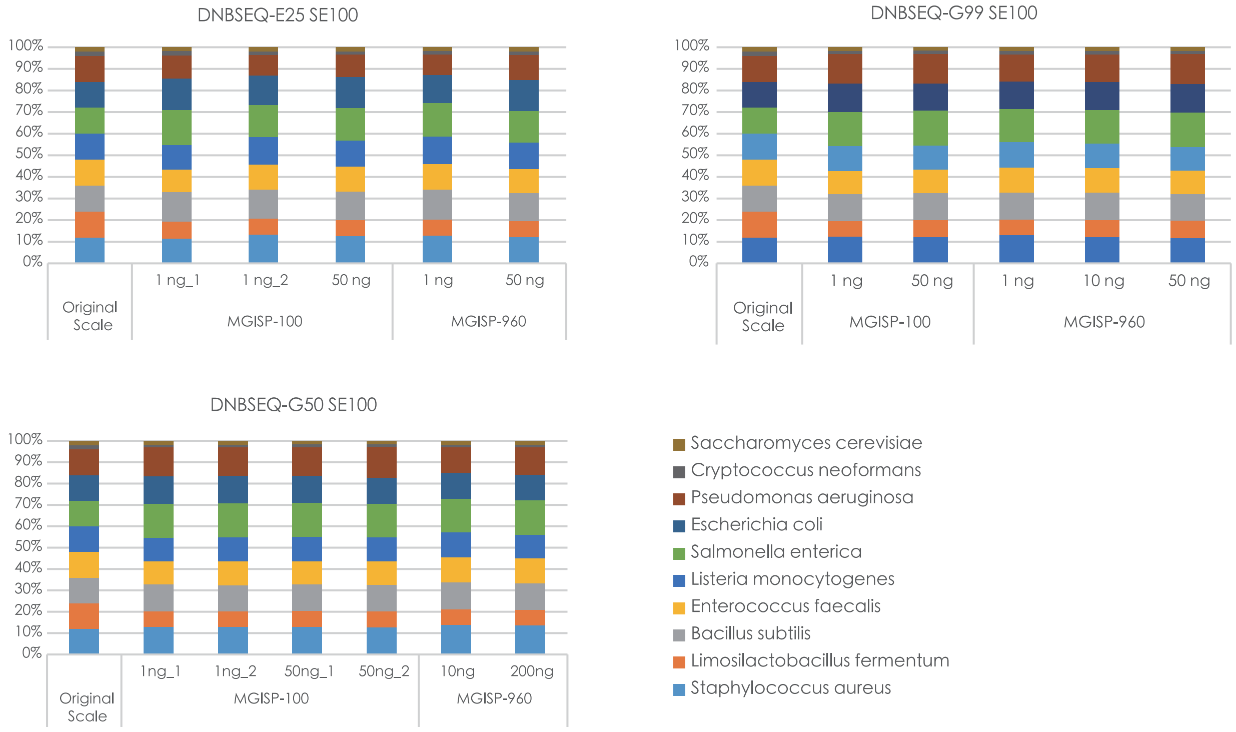

Fig. 5 Highly concordant bacterial species identification and distribution under different DNA input amounts on different sequencing platforms

Meta standard:Mix the Mock DNA containing a known proportion of bacterial species of varying GC content with NA12878 gDNA at a ratio of 1:99. Libraries were prepared from the gDNA from Meta standard ranging from 1 ng - 200 ng using the MGIEasy Fast FS Library Prep Set V2.0 combined with the MGI OneStep DNB kits. Sequencing was performed on DNBSEQ-G50 SE100, DNBSEQ-G99 SE100 and DNBSEQ-E25 PE150. MGI PFI software was used for the bacterial species identification and distribution evaluation.

Summary

The MGIEasy Fast FS Library Prep Set V2.0 provides a fast, flexible, and automatable library preparation workflow that enables to complete libraries preparation only 2 h. This library prep set supports a broad DNA input range (1 ng - 1 μg) and has excellent performances in genome coverage uniformity, variation detection precision and sensitivity. It performs high uniform genomic coverage across the microbial genome of varying GC content and highly concordant bacterial species identification and distribution in metagenome sequencing. It is suitable for various sample types and applicable for a wide range of applications such as WGS, WES, Microbiome sequencing, and Metagenomics sequencing. The MGIEasy Fast FS Library Prep Set V2.0 can help you achieve your research goals faster and more easily.

Ordering Information

Product	Configuration	Cat No.
MGIEasy Fast FS Library Prep Set V2.0	16 RXN	940-001193-00
	96 RXN	940-001194-00
	192 RXN	940-001196-00
MGIEasy Fast FS Library Prep Set C V2.0	96 RXN	940-001831-00
MGIEasy Dual Barcode Circularization Kit	16 RXN	1000020570
DNBSEQ OneStep DNB Make Reagent Kit V2.0 (OS-DB)	4 RXN	940-000036-00
DNBSEQ OneStep DNB Make Reagent Kit (OS-DB)*	4 RXN	1000026466
MGIEasy Dual Barcode Exome Capture Accessory Kit	16 RXN	1000018647
	96 RXN	1000018648

*This kit is recommended for DNBSEQ-G99RS and DNBSEQ-G50RS.

MGI Tech Co., Ltd.
Building 11, Beishan Industrial Zone, Yantian District, Shenzhen, CHINA
MGI-service@mgi-tech.com en.mgi-tech.com +86-4000-688-114

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