

Microbiomics *Made Simple™*

ZymoBIOMICS™ Fecal Reference with TruMatrix™ Technology

Enable run-to-run consistency and cross study comparison
for microbiome research

Highlights

- **Real-Life Representation:** a microbiome quality control made from real human fecal material
- **Consistent:** two million uniform preps available to act as a reliable, single point of reference for all microbiome researchers
- **Well-Characterized:** deeply sequenced using targeted, metagenomic, and metatranscriptomic sequencing

Catalog Numbers:
D6323



Scan with your smart-phone camera to
view the online protocol/video.



tech@zymoresearch.com



www.zymoresearch.com



Toll Free: (888) 882-9682

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Product Contents

Product Name	D6323 (10 preps)
ZymoBIOMICS™ Fecal Reference w/ TruMatrix™ Technology	1000 µL

Specifications

- **Biosafety** – This product contains no biohazard as potential pathogens have been fully inactivated.
- **Stability** – Stored in DNA/RNA Shield, which preserves the microbial profile and protects against degradation from freeze-thaw cycles.
- **Source** – The fecal material used in this product was derived from healthy adult donors.
- **Consistency** – All vials are derived from a single, homogenized batch of fecal material to minimize composition variation.
- **Concentration** – 1mL of the product contains about 10 mg feces (wet weight).
- **Total DNA Content** – 1mL of the product contains about 6 µg DNA.¹
- **Total RNA Content** – 1mL of the product contains about 11 µg RNA.²

Storage Temperature – Store the fecal reference material at -20C or -80C.

1 Yield estimated based on extraction with the ZymoBIOMICS™ DNA Miniprep Protocol

2 Yield estimated based on extraction with the ZymoBIOMICS™ DNA/RNA Miniprep Protocol

Product Description

Metagenomic and metatranscriptomic profiling based on Next-Generation Sequencing (NGS) are becoming more and more popular. Such NGS workflows are complicated and are prone to bias or errors without proper quality control. The lack of controls combined with different methodology have led to conflicting study results, calling the validity of many datasets into question and hindering progress in the field. In order to benchmark and improve these measurements, there is an urgent need for reliable, widely used reference that replicates the major challenges encountered in microbiome workflows.

The **ZymoBIOMICS™ Fecal Reference with TruMatrix™ Technology** serves as a gold standard that is used across labs and studies to facilitate data comparison in the microbiomics field. It is made from genuine human fecal material collected from healthy adult donors and homogenized in one large batch using the TruMatrix™ Technology from The BioCollective. The product is derived from one large homogenized suspension, and all aliquots have been demonstrated to have consistent metagenomic and metatranscriptomic profiles (Figure 1). With millions of preps generated from a single source, this fecal reference will be the most characterized fecal sample in the world, acting as a constant, single point of reference for all microbiome researchers.

The product is intended to be processed in your microbiome workflow as a positive control and as an individual sample in parallel to actual samples. The metagenomic and metatranscriptomic (Figure 2) profiles of this product have been deeply sequenced and thoroughly characterized. Links to the full profiles and raw sequencing data are available to download in Appendix A.

To facilitate method comparison and validation, a platform for users to anonymously share and download sequencing results of this product is under development. We encourage all users to submit sequencing data, analysis results and descriptions of applied methodology to microbiomics@zymoresearch.com. The platform will also provide comparison analyses of profiles resulting from different methods, enabling users to determine cross-compatibility of data.

Consistent Profiles Across Runs

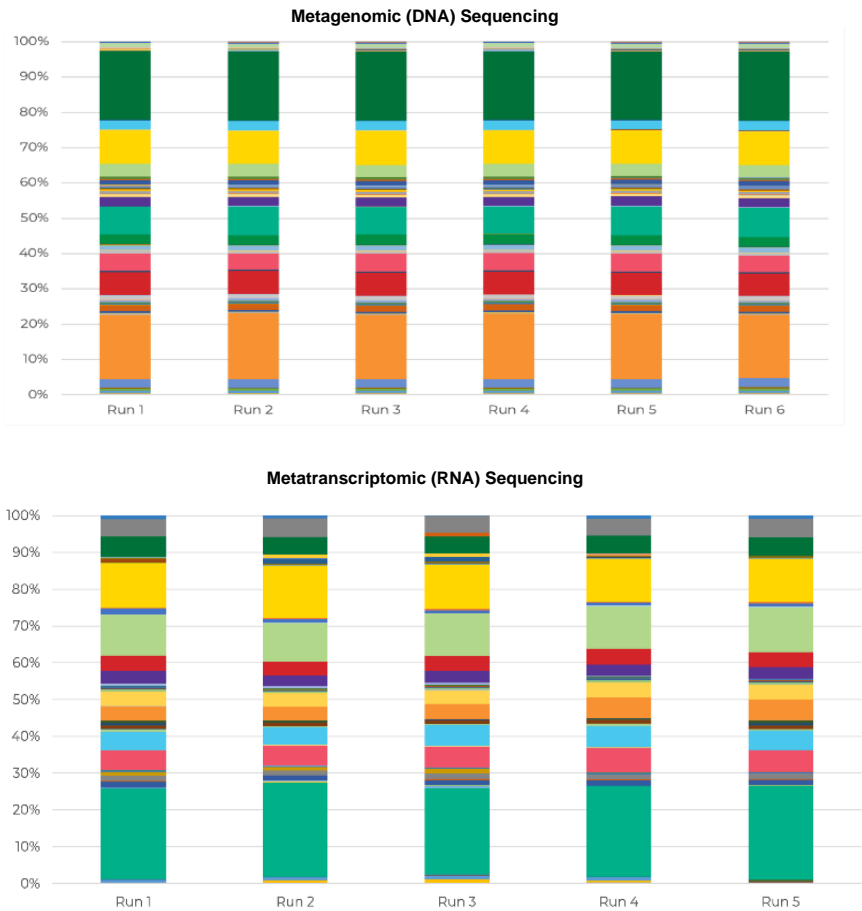
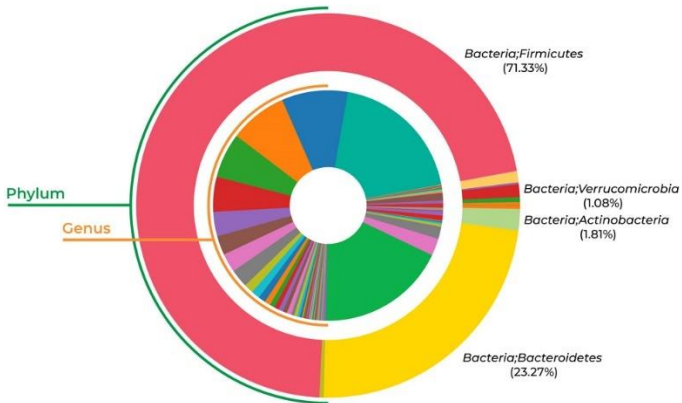


Figure 1: Stability and consistency of taxonomy profiles at the genus-level of the ZymoBIOMICS™ Fecal Reference with TruMatrix™ Technology across different runs of metagenomic and metatranscriptomic sequencing. Workflow description, downloadable raw data, and bioinformatics analyses can be found in Appendix A.

Characterization

Metagenomic (DNA) Profile



Metatranscriptomic (RNA) Profile

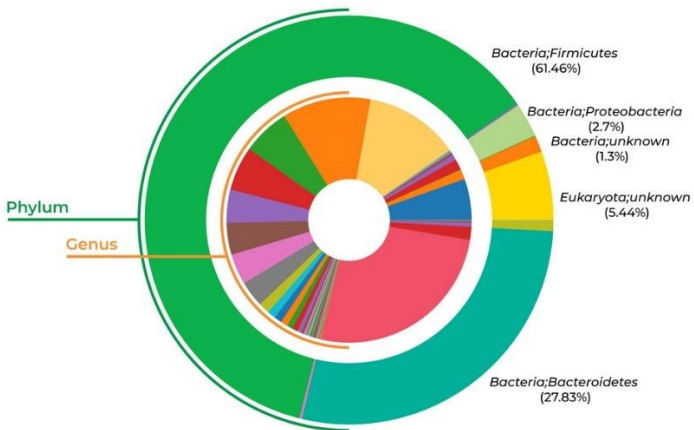


Figure 2: The taxonomy profiles (phylum and genus level) determined by metagenomic sequencing and metatranscriptomic sequencing. Workflow description, downloadable raw data, and bioinformatics analyses can be found in Appendix A.

Protocol

To use:

1. Thaw the microbial standard completely on ice.
2. Mix thoroughly by vortex to ensure sample is homogenous and the material is evenly resuspended.¹
3. Process 100 µL of the product as an individual sample in parallel with other samples (e.g. feces). Please refer to the maximum input recommendations of the extraction method used if higher yields are required.

To minimize bias during DNA or RNA extraction, we recommend using the ZymoBIOMICS™ DNA Miniprep kit (Cat# D4300) or the ZymoBIOMICS™ RNA Miniprep kit (Cat# R2001).

We encourage users to submit their data and contribute to the effort of building a platform for method comparison. (For more information, refer to the Product Description on page 2.) Contact microbiomics@zymoresearch.com to find out how. All information will remain anonymous.

¹ Small particles within the product are normal. Ensure everything is evenly resuspended and that pipetting is performed smoothly.

² The expected yield for one prep (100 µl) of reference material is approximately 0.6 µg. Yields lower than 0.35 µg may suggest inefficient lysis during DNA extraction.

Appendix A: NGS Characterization

Projects	Brief Workflow Description	Bioinformatics Report
Metagenomic profiling	100 µl of the product was extracted using the ZymoBIOMICS™ DNA Miniprep (D4300). The shotgun library was prepared using the Illumina® DNA Prep kit. DNA sequencing was performed on Illumina® NovaSeq®. Bioinformatics analysis was performed using the ZymoBIOMICS™ Metagenomics Service Pipeline, which uses Centrifuge (v1.0.4) for taxonomy identification.	Download
Metagenomic Consistency Testing	Same as above.	Download
Metatranscriptomic Profiling	100 µl of the product was extracted using the ZymoBIOMICS™ RNA Miniprep (R2001). The RNA library was prepared using the Zymo-Seq RiboFree® Total RNA Library Kit (R3003). Sequencing was performed on Illumina® HiSeq™. Bioinformatics analysis was performed using the ZymoBIOMICS™ Metatranscriptomics Service Pipeline, which uses Centrifuge (v1.0.4) for taxonomy identification.	Download
Metatranscriptomic consistency test	Same as above.	Download
16S profiling	100 µl of the product was extracted using the ZymoBIOMICS™ DNA Miniprep (D4300). 16S sequencing library (V3-V4) was prepared using the Quick-16S™ NGS Library Prep Kit (D6400). Sequencing was performed on Illumina® MiSeq™ (2x300bp). Bioinformatics analysis was performed using the ZymoBIOMICS™ 16S Service Pipeline, which uses Dada2 for taxonomy analysis.	Download

Links to download raw sequence data and more detailed method description can be found from [this link](#).

Ordering Information

Product Description	Catalog No.	Size
ZymoBIOMICS™ Fecal Reference with TruMatrix Technology	D6323	10 preps

Related Products

Related Products	Catalog No.	Amount
ZymoBIOMICS™ Microbial Community Standard	D6300	10 preps.
ZymoBIOMICS™ Microbial Community DNA Standard (200ng)	D6305	200 ng
ZymoBIOMICS™ Microbial Community DNA Standard (2000ng)	D6306	2000 ng
ZymoBIOMICS™ Microbial Community Standard II (Log Distribution)	D6310	10 preps.
ZymoBIOMICS™ Microbial Community DNA Standard II (Log Distribution)	D6311	220 ng
ZymoBIOMICS™ Spike-in Control I (High Microbial Load)	D6320 D6320-10	25 preps. 250 preps.
ZymoBIOMICS™ Spike-in Control II (Low Microbial Load)	D6321 D6321-10	25 preps. 250 preps.
ZymoBIOMICS™ HMW DNA Standard	D6322	5000 ng

Complete Your Workflow

- ✓ Collect and transport microbiome samples at ambient temperatures:



DNA/RNA Shield™ and Collection Devices	
1X Reagent #R1100	For sample lysis and stabilization of DNA/RNA
2X Concentrate #R1200	Reagent concentrate (2X) for use with liquids at 1:1 ratio
Fecal Collection Tube #R1101	15 mL container (prefilled with 9 mL DNA/RNA Shield™). Direct collection of up to 1g or 1 mL stool
Collection Tube w/ Swab #R1106	12 x 80 mm screwcap container filled with 1 mL DNA/RNA Shield™ and sterile swab for specimen collection

- ✓ Unbiased and inhibitor-free DNA and RNA extraction (high-throughput and automatable) for microbiome profiling:



ZymoBIOMICS™ DNA and RNA Kits	
DNA Miniprep #D4300	Up to 25 µg DNA
DNA Microprep #D4301	Up to 5 µg DNA
MagBead DNA #D4302	Automatable (Tecan, Hamilton, Kingfisher, etc.)
96-Well DNA #D4309	Spin-plate
DNA/RNA Miniprep Kit #R2002	Up to 100 µg DNA/RNA

- ✓ Streamlined workflows with comprehensive bioinformatics analysis and publication-ready plots and figures:



ZymoBIOMICS™ Services	
16S Targeted Sequencing Service #Q2001	With DNA Extraction
ITS Targeted Sequencing Service #Q2003	With DNA Extraction
Shotgun Metagenomic Sequencing Service #Q2003	With DNA Extraction
Metatranscriptomic Sequencing Service	COMING SOON



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Reagents are routinely tested on a lot-to-lot basis to ensure they provide the highest performance and reliability.

This product is for research use only and should only be used by trained professionals. It is not for use in diagnostic procedures. Some reagents included with this kit are irritants. Wear protective gloves and eye protection. Follow the safety guidelines and rules enacted by your research institution or facility.

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MiSeq™, HiSeq™, and NovaSeq® are trademarks of Illumina, Inc. TruMatrix™ is a trademark of The BioCollective.



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tech@zymoresearch.com



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