Improve Your Microbial QC Testing Efficiency

Nilay Chakraborty, PhD, MBA
BioNexus Foundation Principal Scientist
and Head of Cryobiology
ATCC

Introduction to today's speaker

Nilay Chakraborty, PhD, MBA

BioNexus Foundation Principal Scientist and Head of Cryobiology

ATCC

Dr. Chakraborty specializes in biopreservation and innovative product development. With an engineering background and degrees from Indian Institute of Engineering Science and Technology and University of North Carolina, he pioneered biopreservation and cell-based technologies that focus on innovative delivery formats. During his tenure at the Center for Engineering in Medicine at Harvard Medical School, Massachusetts General Hospital, and Shriners Burns Hospital, he continued research in biopreservation, delivery formats, and cell-based technologies. Previously a tenured Associate Professor at the University of Michigan, Dearborn, he now leads ATCC's efforts in preservation sciences and advanced strategic biological product development.

About ATCC

- Founded in 1925, ATCC® is a non-profit organization with HQ in Manassas, VA, and an R&D and Services center in Gaithersburg, MD
- World's premier biological materials resource and standards development organization
- 5,000 cell lines
- 80,000 microorganisms
- Genomic & synthetic nucleic acids
- Media/reagents

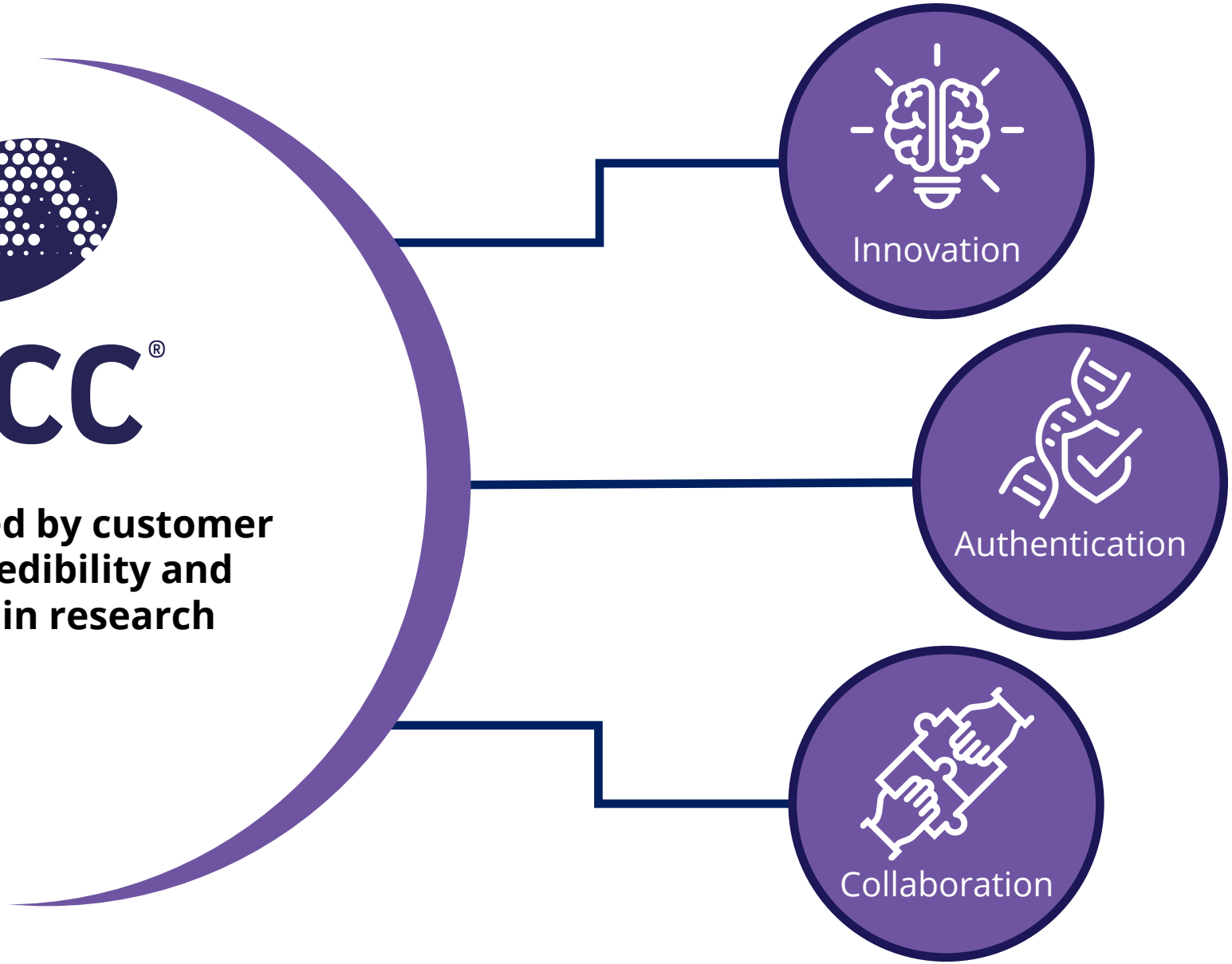
- ATCC® collaborates with and supports the scientific community with industry-standard biological products and innovative solutions
- Growing portfolio of products and services
- Sales and distribution in 150 countries, 20 international distributors
- Talented team of 600+ employees, over one-third with advanced degrees

Enabling scientific progress for nearly 100 years

ATCC®

ATCC®

We are inspired by customer needs for credibility and efficiencies in research



Innovative products for life science research


Biologics production


Cell & gene therapy development

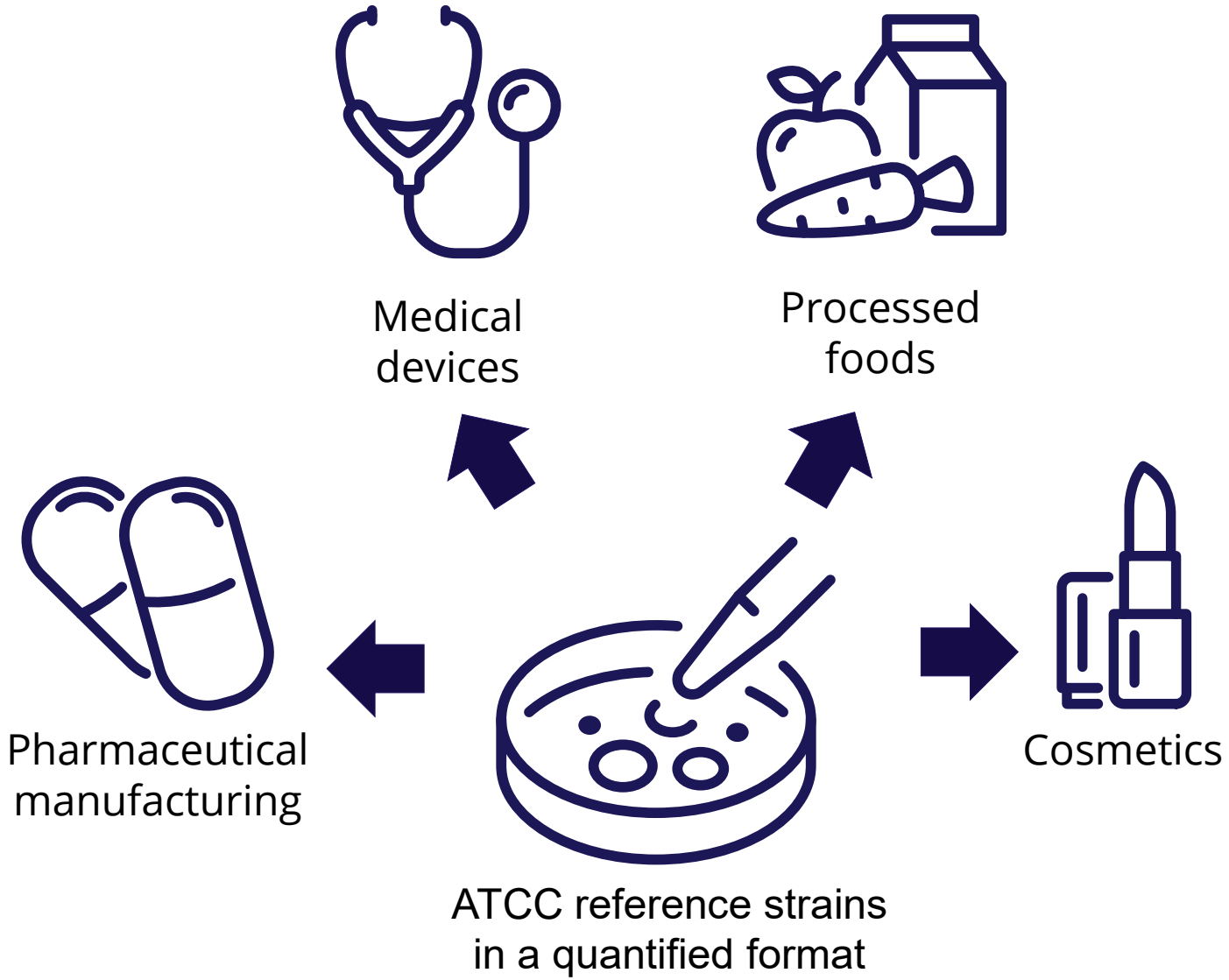

Vaccine development


Quality & safety testing

Comprehensive collection of advanced cell models and microbial reference materials that support biologics production

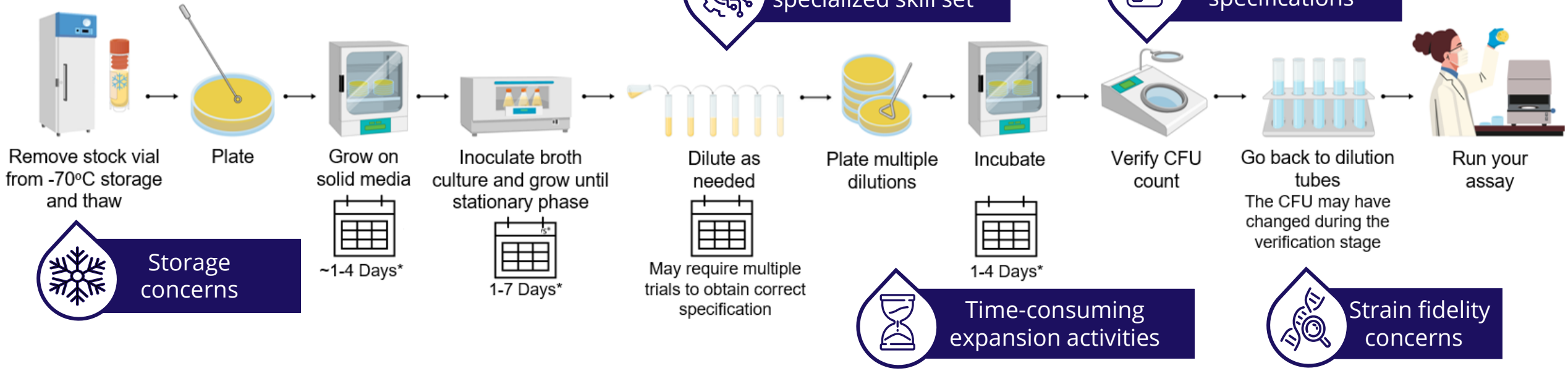
- Bioproduction cell lines and cell lines for enhanced virus production
- Analytical reference materials for residual host cell DNA testing
- Viral reference materials for evaluating the dose and potency of gene therapy products
- Purified polysaccharides and infectious disease strains for vaccine development
- Microbial quality control strains specified in standards and guidelines by organizations and regulatory agencies (USP, EP, ISO, FDA, CLSI, USDA, ASTM, AOAC, WHO)

Microbial QC testing applications



Challenges when using microbial reference strains

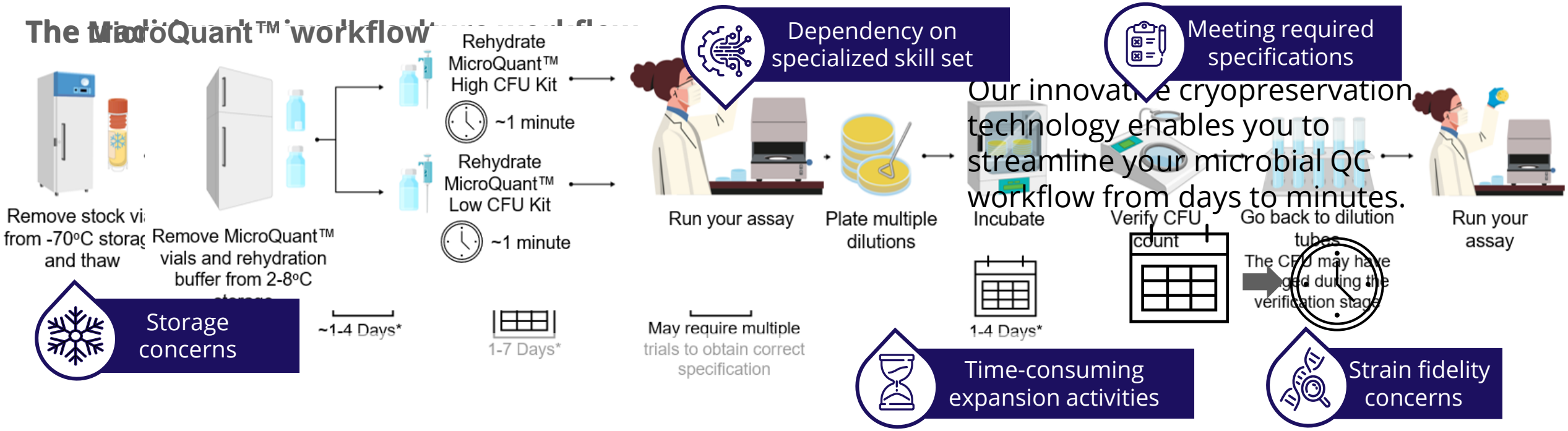
The traditional microbe culture workflow



*Different species require varying incubation times


MicroQuant™
by ATCC®

Simplified workflow using MicroQuant™



Storage concerns

Dependency on specialized skill set

Time-consuming expansion activities

Meeting required specifications

Strain fidelity concerns

Our innovative cryopreservation technology enables you to streamline your microbial QC workflow from days to minutes.

*Different species require varying incubation times

Meeting the challenge through cryobiology

ATCC developed an innovative preservation technique that delivers:

- A stable, pelleted format that rehydrates rapidly and uniformly
- Precise quantitation of biological materials
- Convenient refrigeration storage

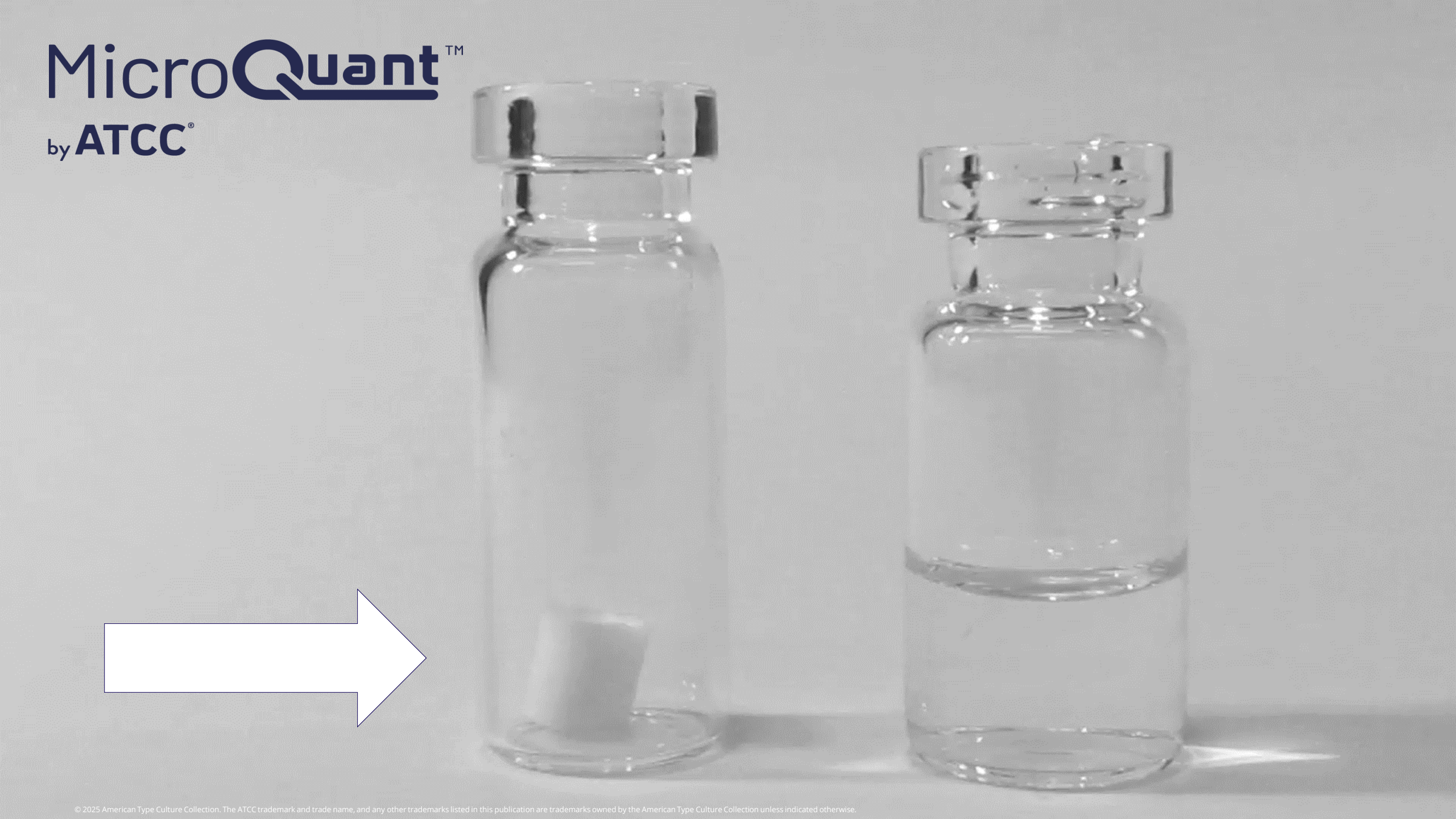
Introducing MicroQuant™ by ATCC®

Precision in every pellet, trust in every test

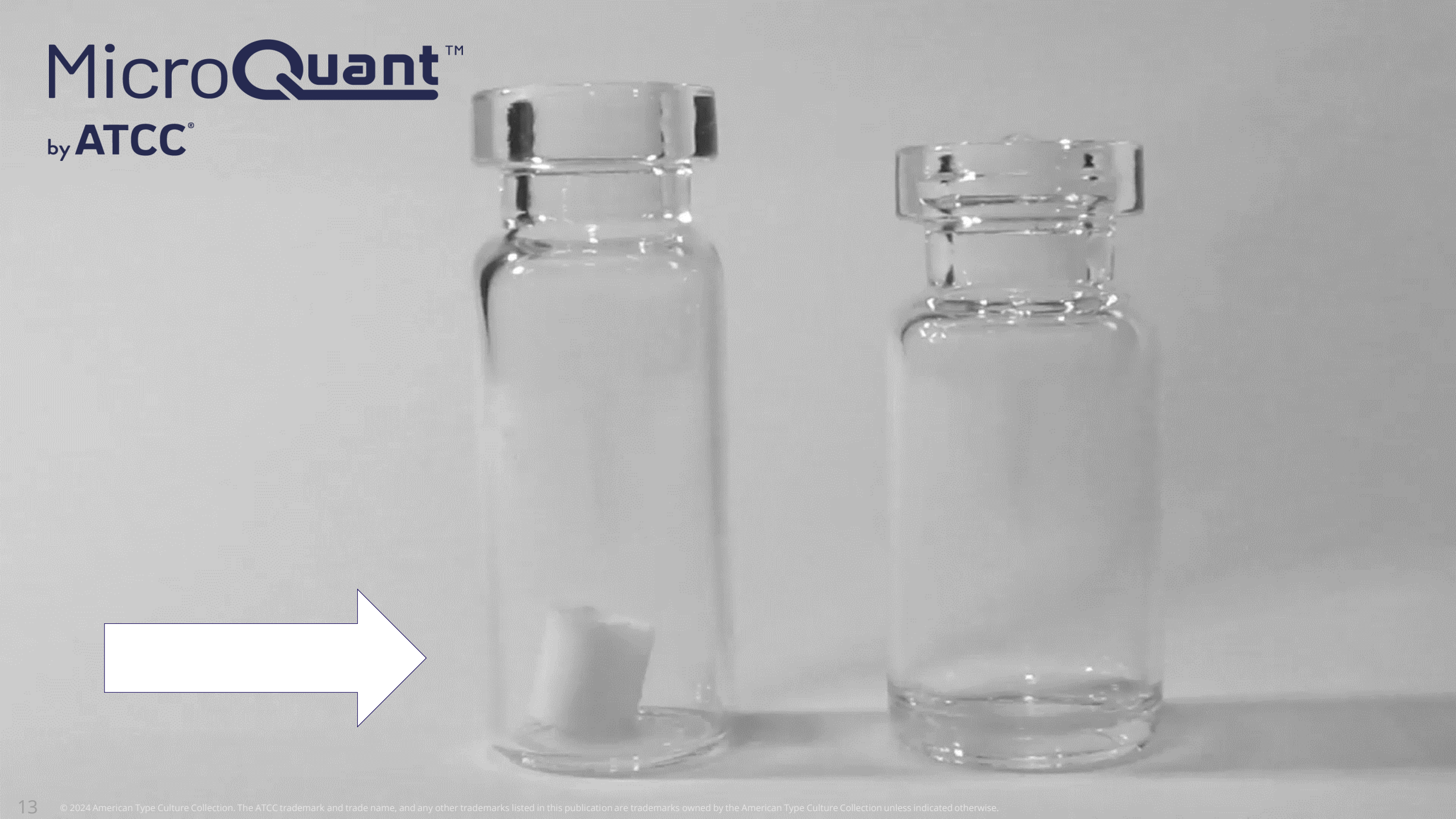
A ready-to-use solution to help you streamline microbial QC testing

- Precisely quantitated in high-titer and low-titer pelleted formats
- Single-use format using an innovative, proprietary preservation technology
- Rapid, uniform rehydration in less than a minute
- Easy to store and ready to use anytime—no need to thaw
- Original ATCC materials manufactured under ISO 17034

MicroQuant™
by ATCC®

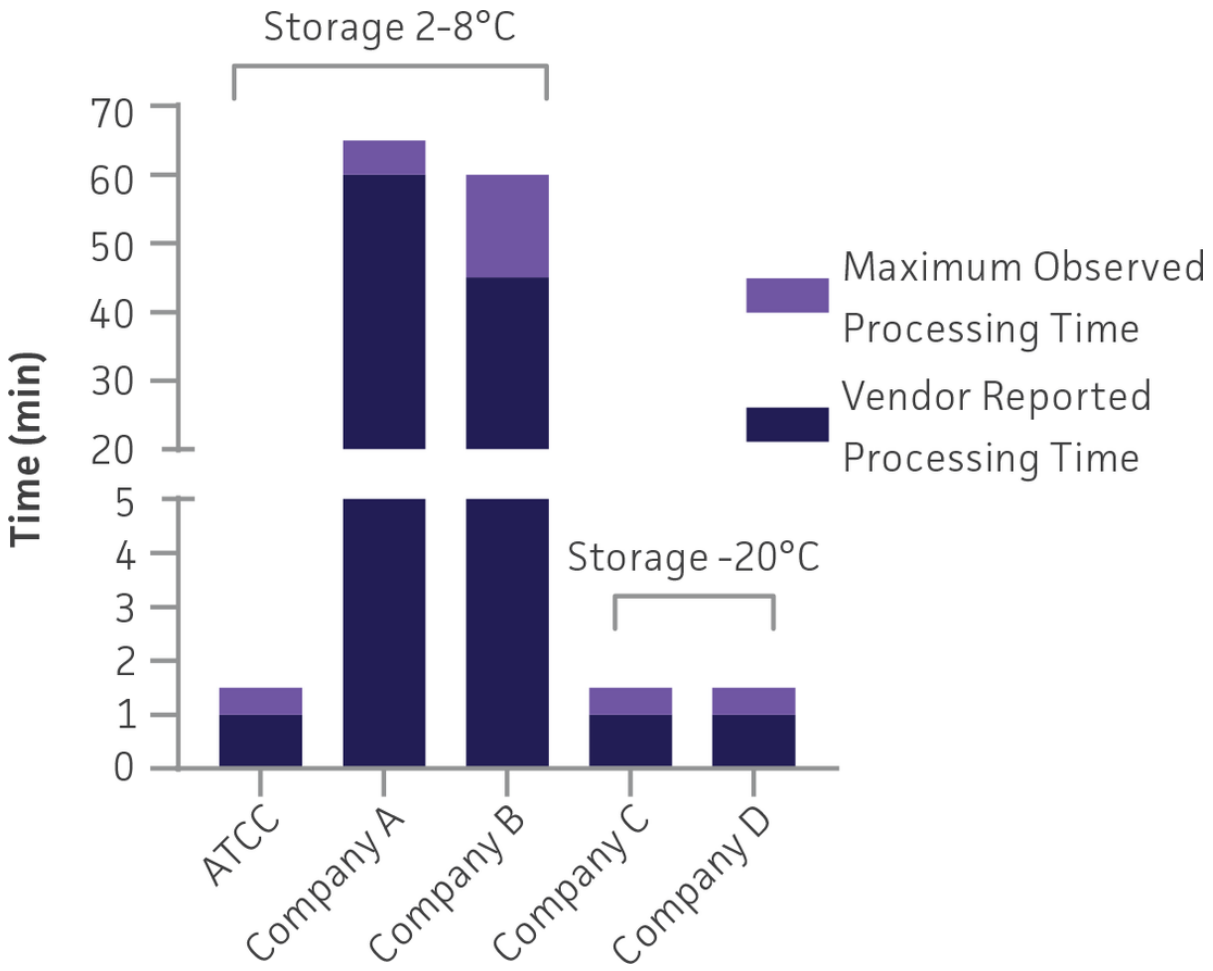


MicroQuant™
by ATCC®



Maximize your resources

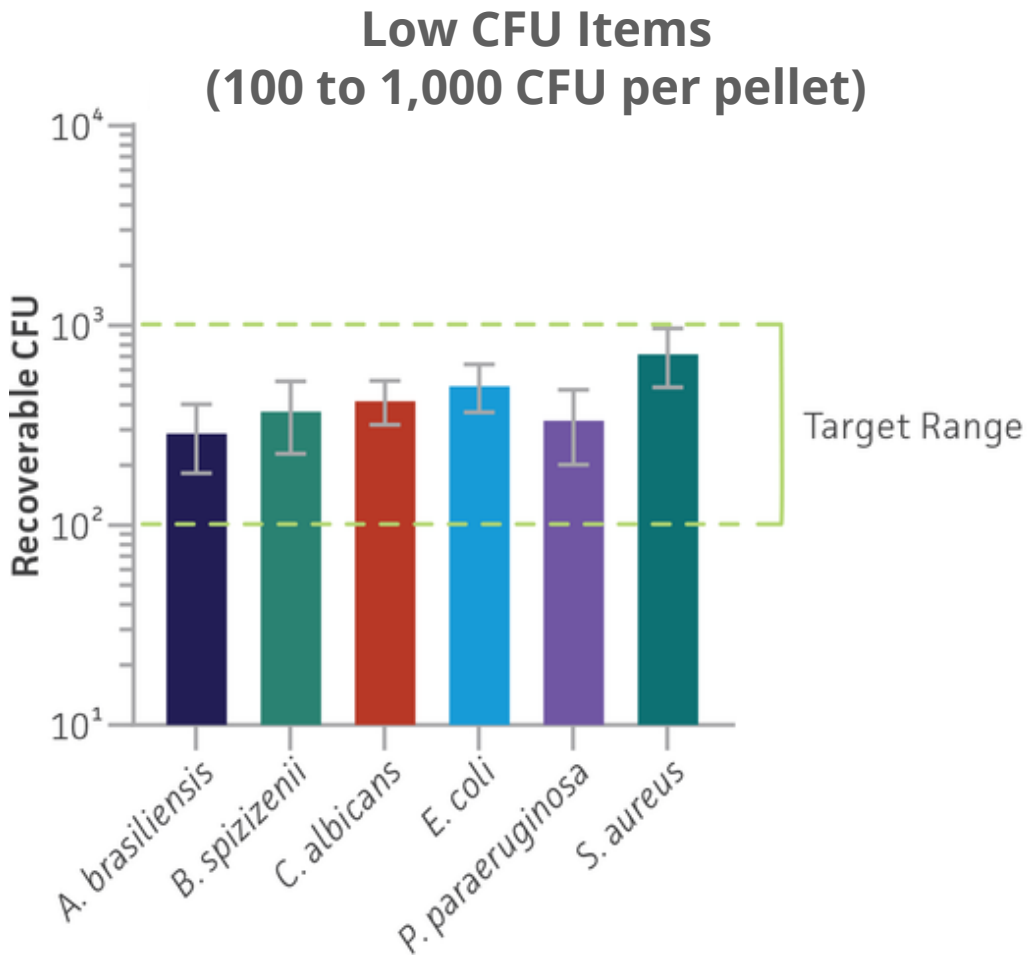
MicroQuant™ is stable at 2-8°C, making it convenient to store and ready to use anytime

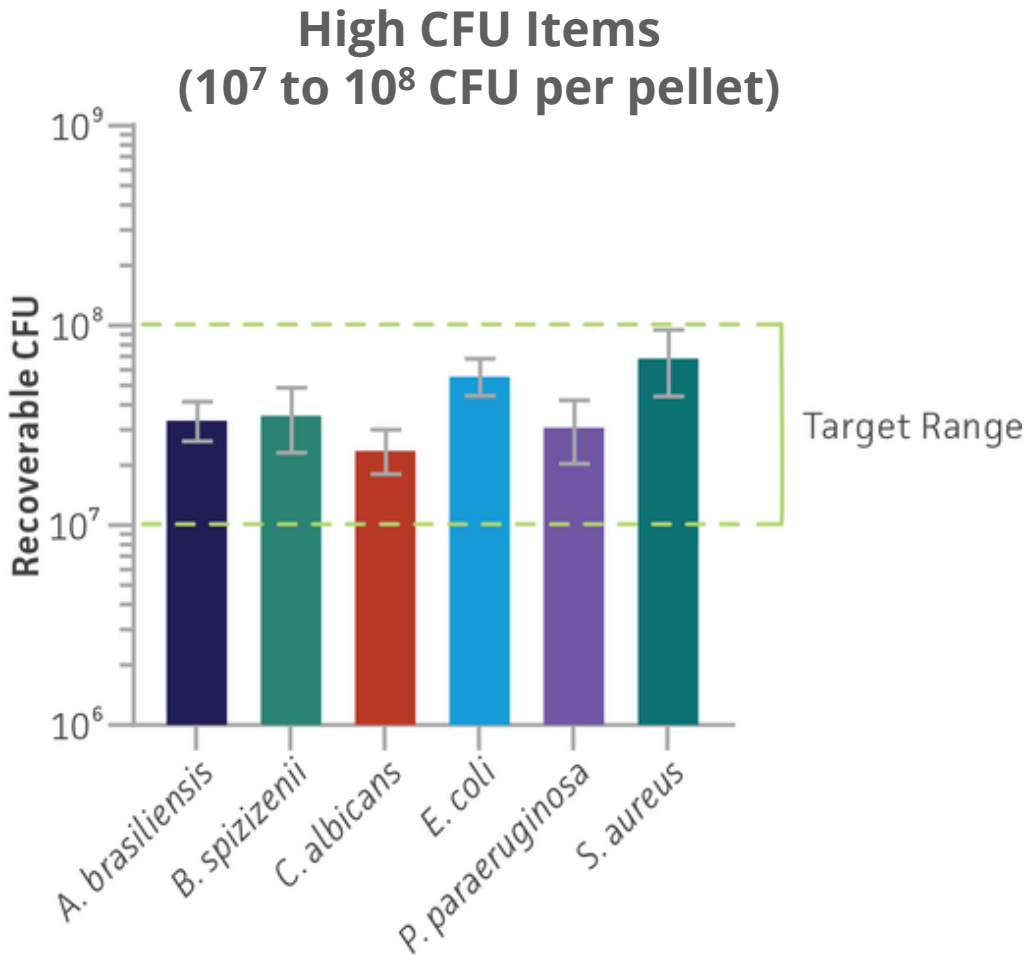


No need to thaw!

Save time and eliminate process complexities

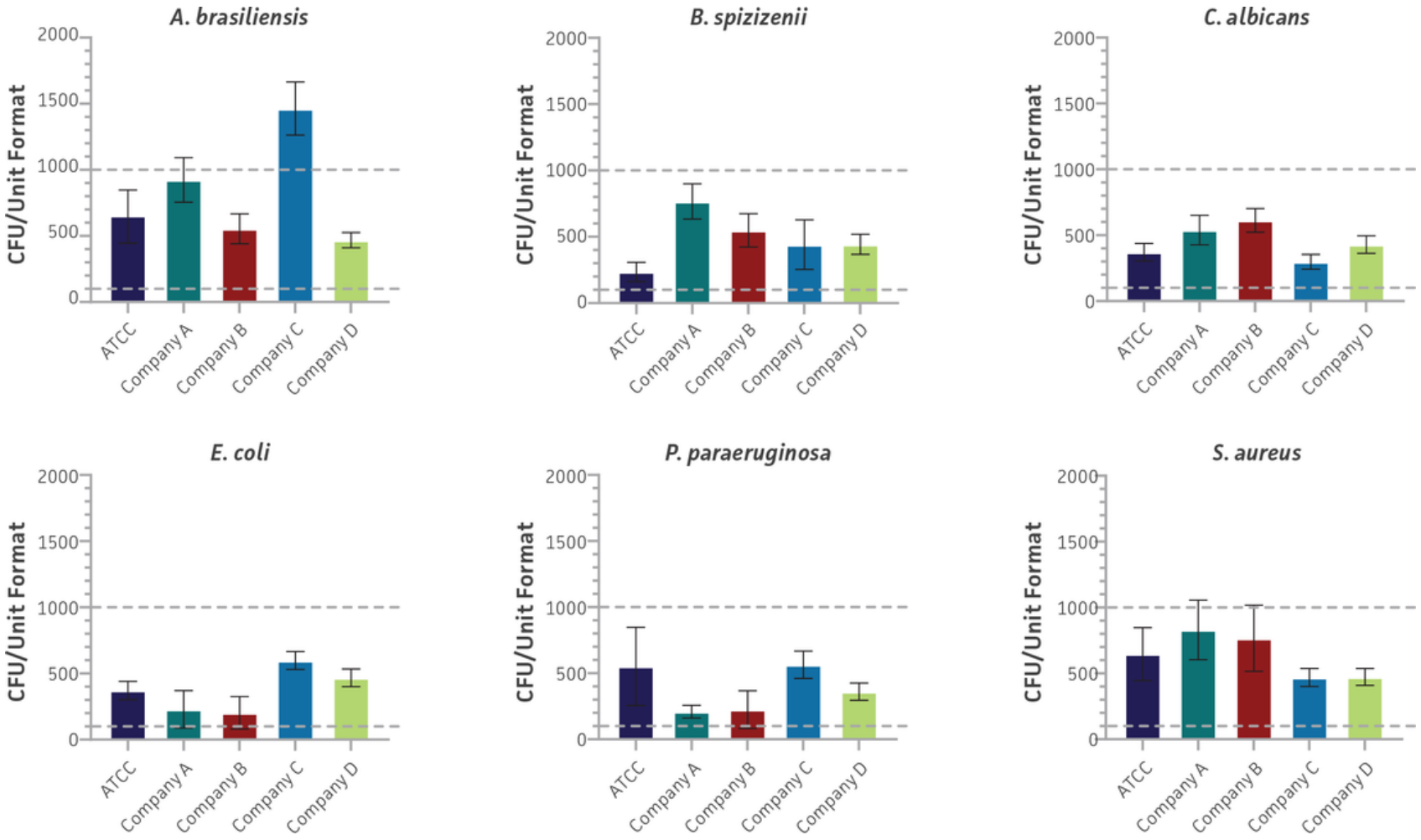
MicroQuant™ is provided as a single-use quantitated pellet that enables fast assay set up and minimizes handling





Rely on consistent, precise quantitation

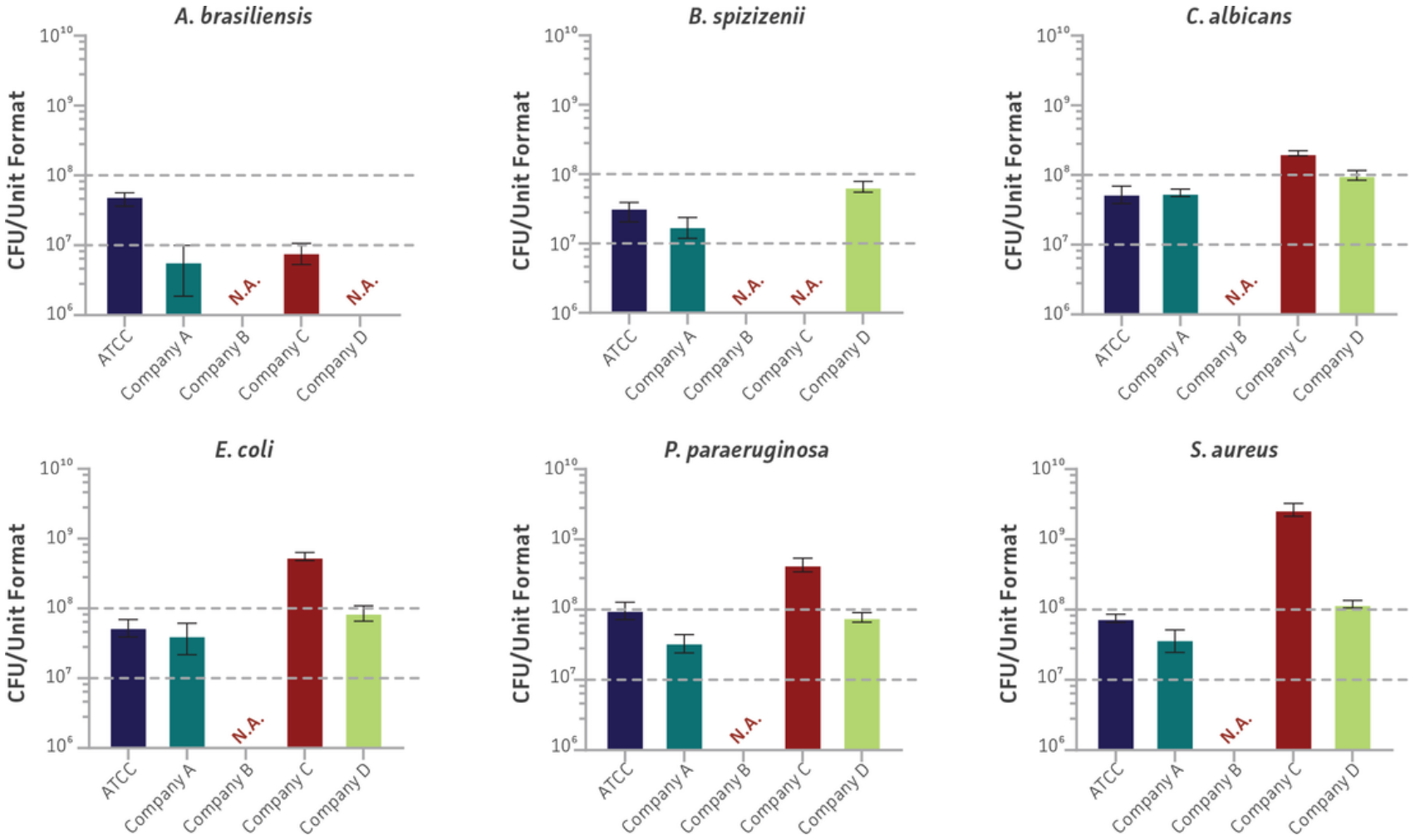
MicroQuant™ - Precise and accurate low CFU pellets for bioburden testing



"Low CFU" means 100 to 1,000 CFU/pellet

Rely on consistent, precise quantitation

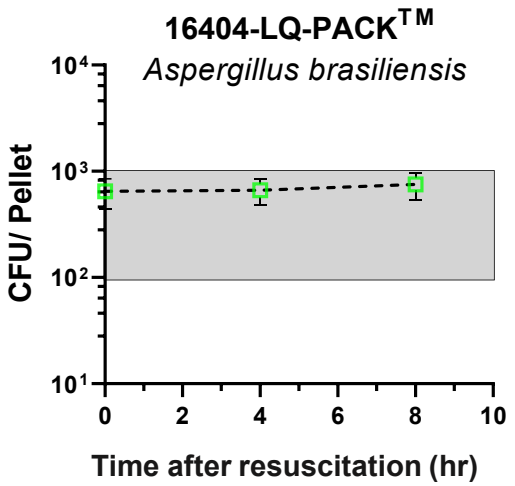
MicroQuant™ - Precise, high CFU pellets for testing under USP <51> guidelines

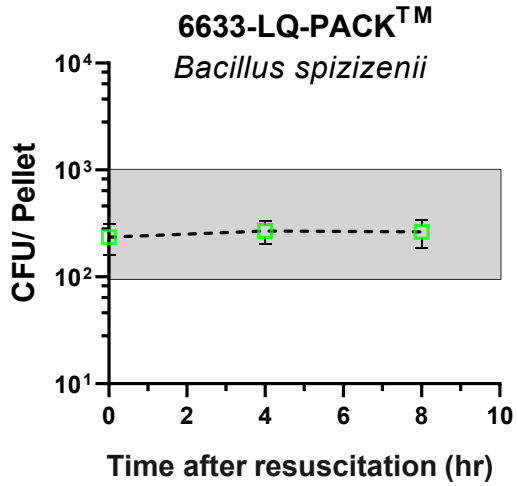


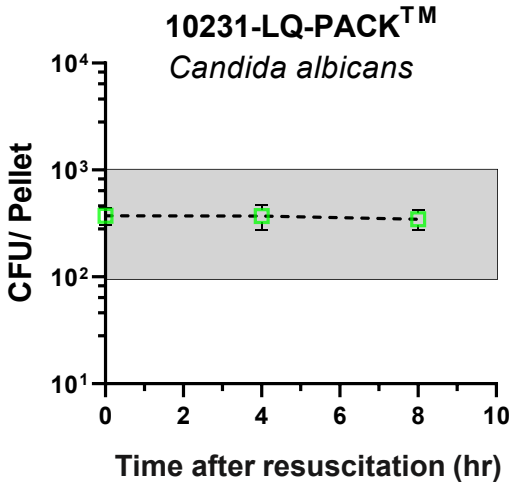
"High CFU" means 10^7 to 10^8 CFU/pellet

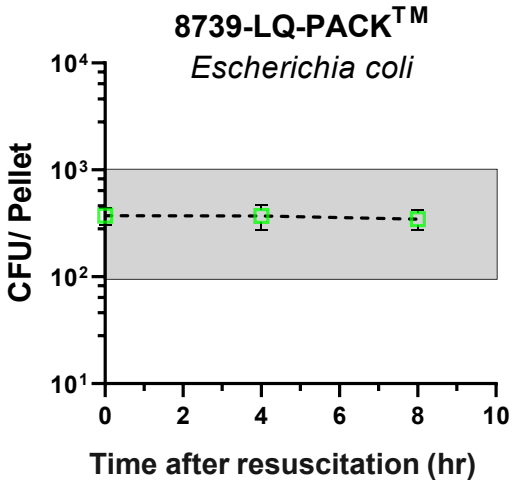
Short-term stability of MicroQuant™

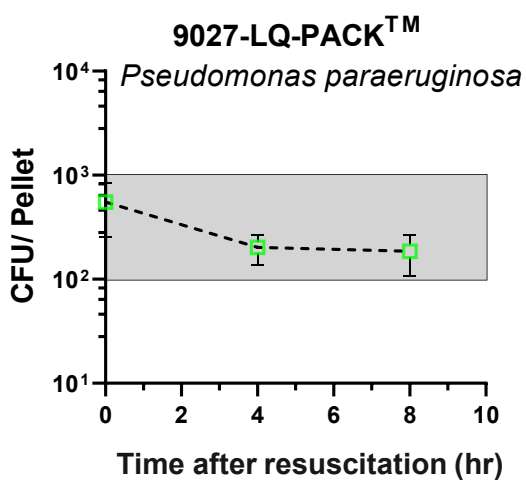
Low titer

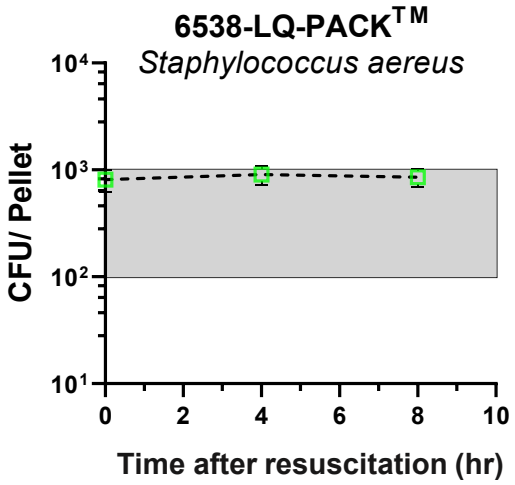






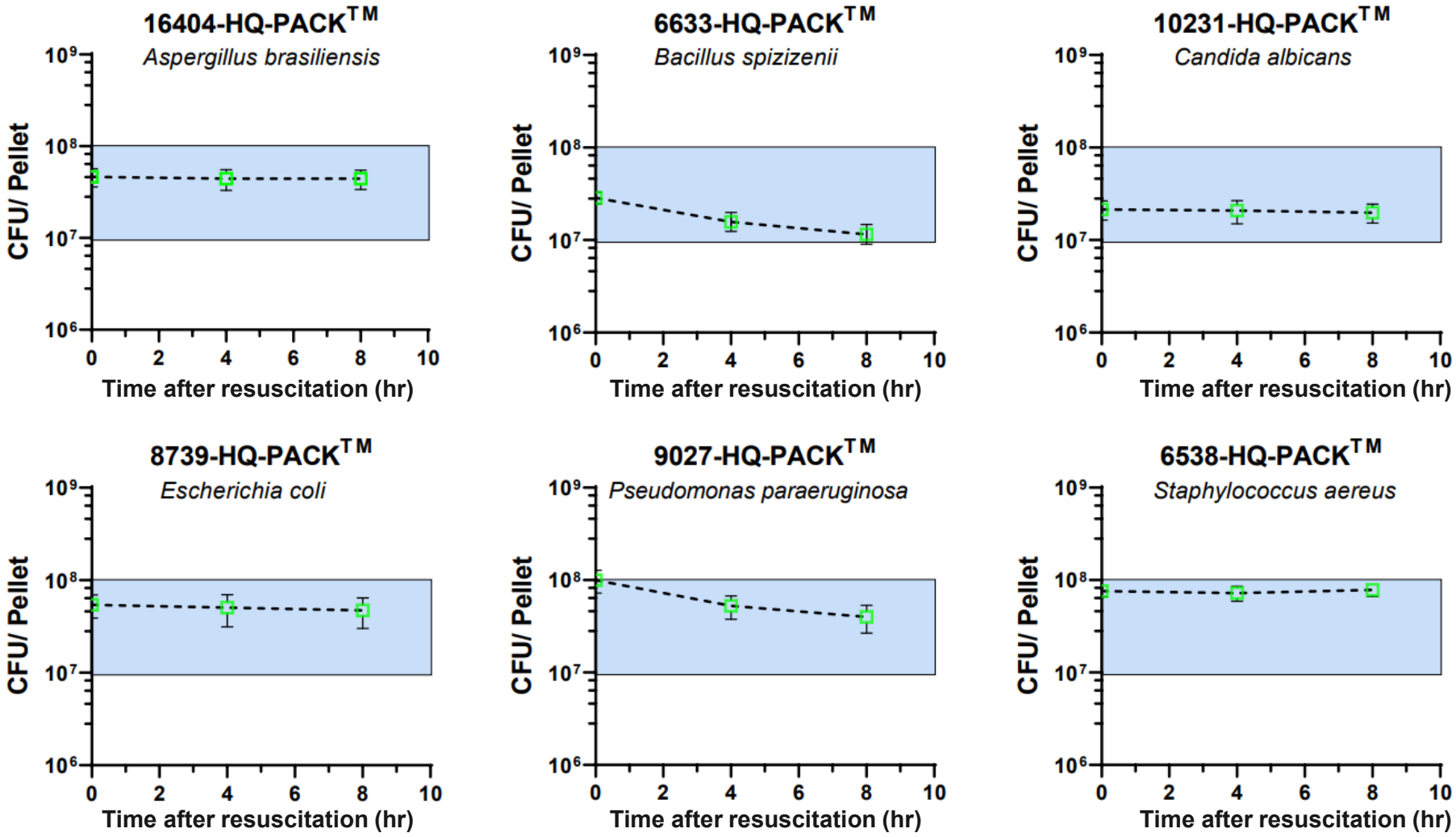






Short-term stability of MicroQuant™

High titer



MicroQuant™ stability compared to similar products

Shelf life (years) of low-titer products

Microbial stains prepared as a single-use control product	Stored at 4°C			Stored at -20°C	
	ATCC (MicroQuant™)	Company A	Company B	Company C*	Company D*
A. brasiliensis	>2	<2	>1	<2	<1
B. spizizenii	~2	<2	>1	2	<2
C. albicans	>1	<2	>1	<2	<2
E. coli	1	<2	<1	2	<2
P. paraeruginosa	1	<2	<1	2	<2
S. aureus	>1	<2	>1	2	<2

*Equivalent products available from Company C and D, respectively.

Company A-D are products from other companies currently available in the market.
ATCC's MicroQuant™ shelf-life is based on a combination of real-time stability studies, accelerated stability studies, and stability modeling.

MicroQuant™ stability compared to similar products

Shelf life (years) of high-titer products

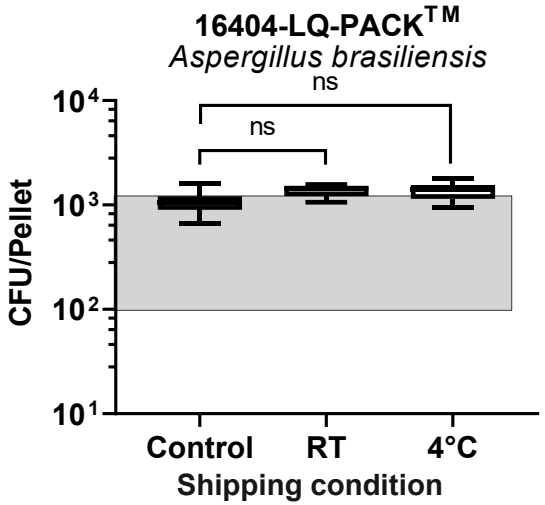
Microbial stains prepared as a single-use control product	Stored at 4°C			Stored at -20°C	
	ATCC (MicroQuant™)	Company A	Company B	Company C*	Company D*
A. brasiliensis	>2	<2	NA	2	NA
B. spizizenii	>2	<2	NA	NA	<2
C. albicans	>1	<2	NA	2	<2
E. coli	>1	2	NA	2	<2
P. paraeruginosa	1	<2	NA	<2	<2
S. aureus	1	<2	NA	<2	<2

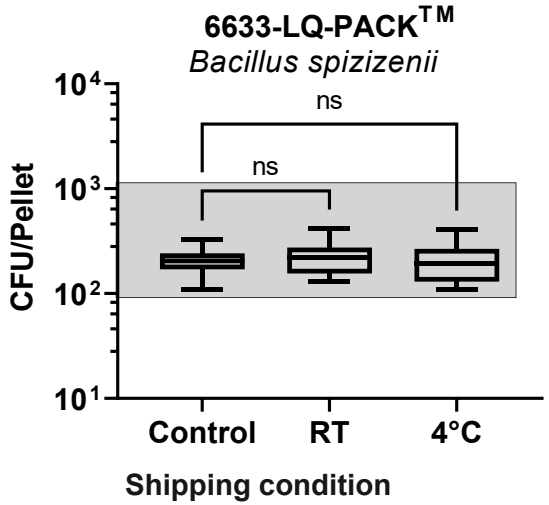
NA – Products were not available from the companies at the time the study was conducted.
*Equivalent products available from Company C and D, respectively.

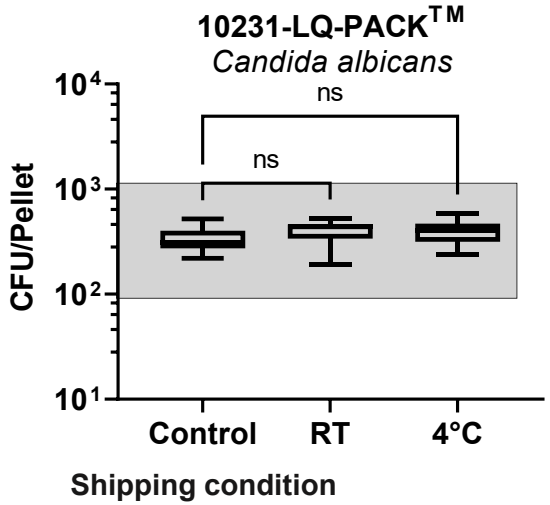
Company A-D are products from other companies currently available in the market.
ATCC's MicroQuant™ shelf-life is based on a combination of real-time stability studies, accelerated stability studies, and stability modeling.

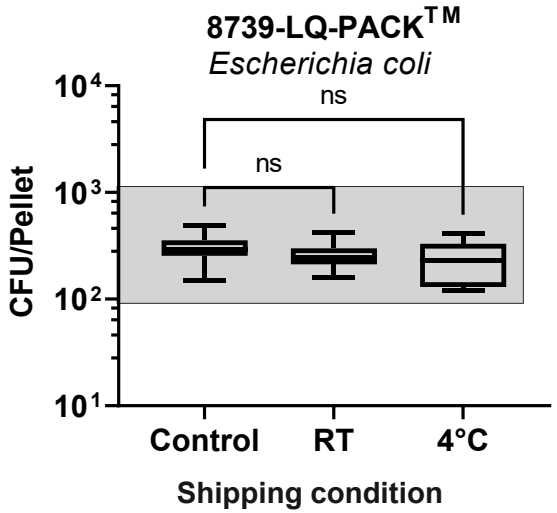
Transportation stability of MicroQuant™

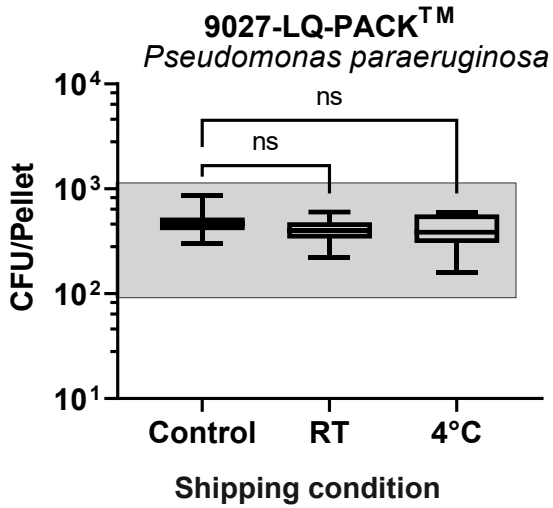
Low titer

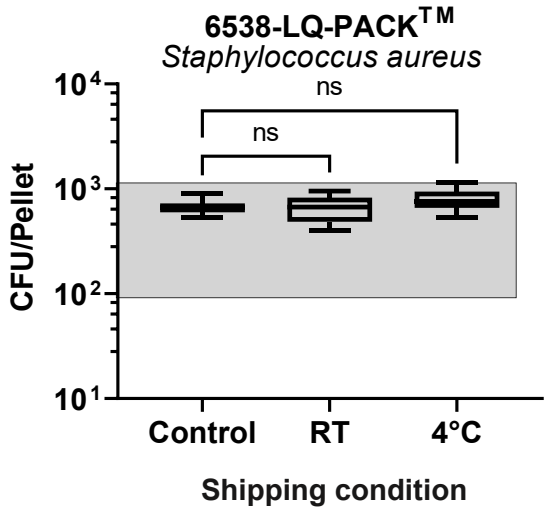






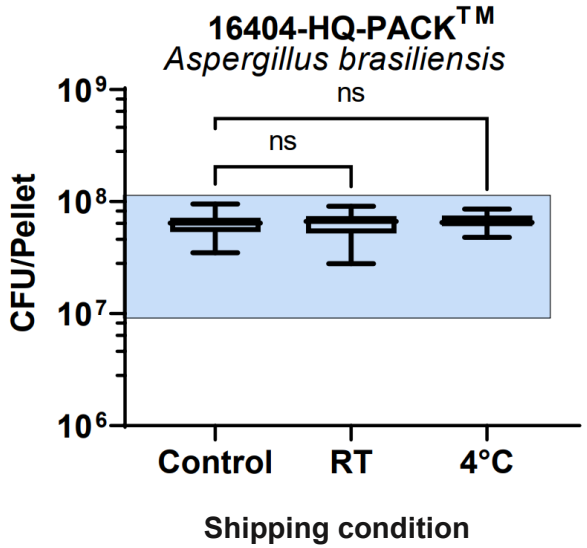


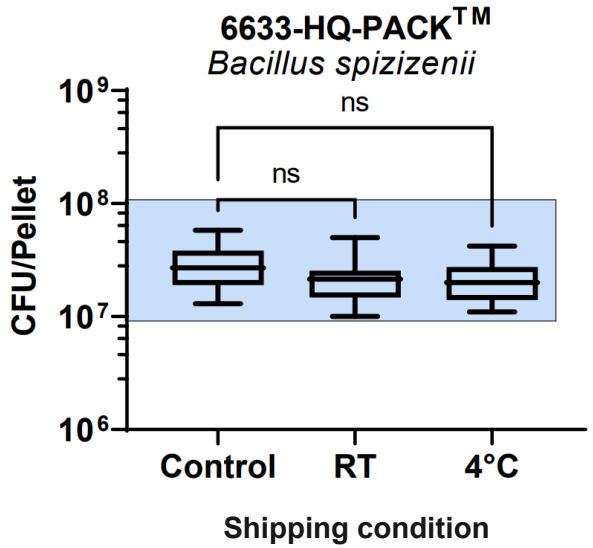


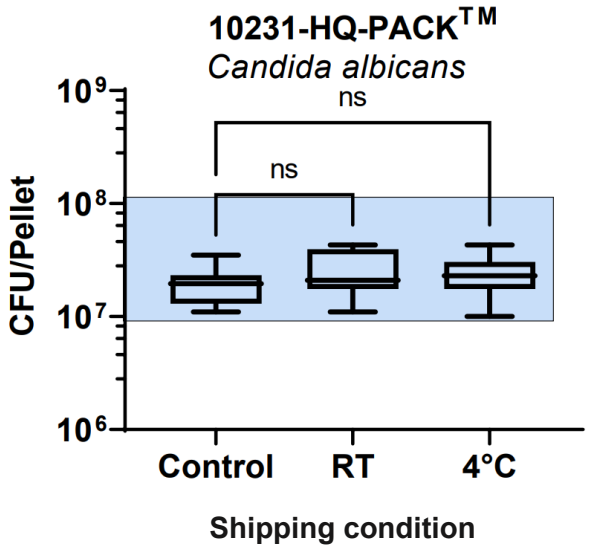


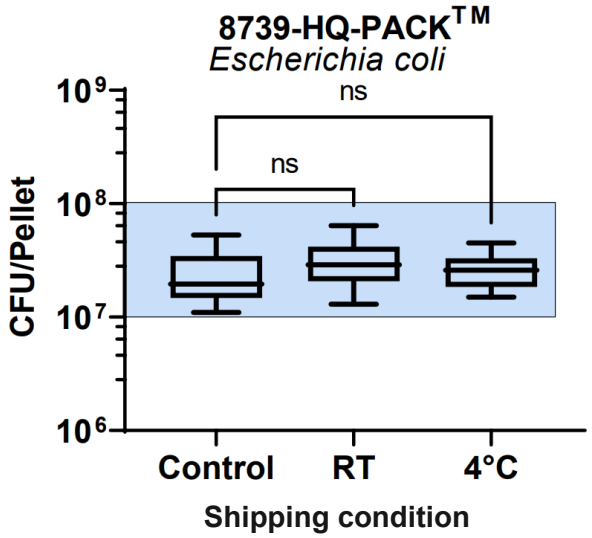
Transportation stability of MicroQuant™

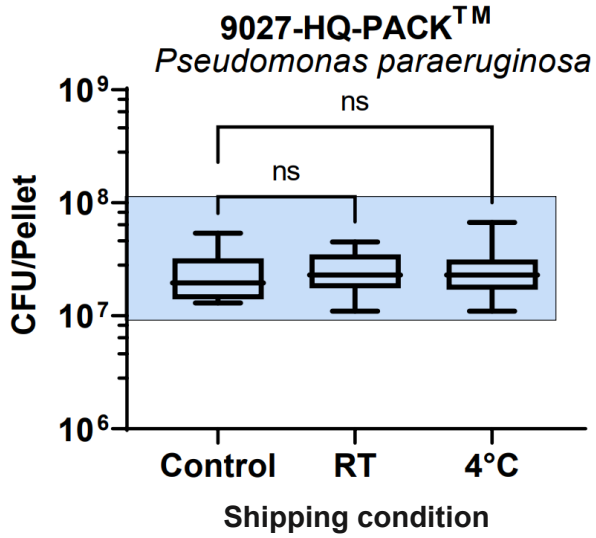
High titer

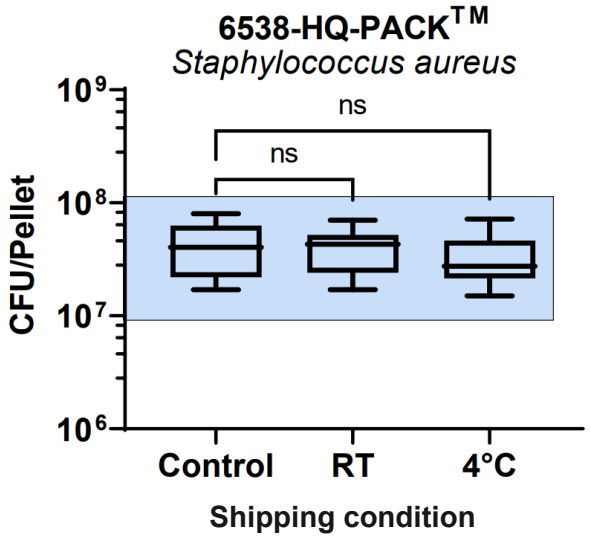












How MicroQuant™ compares to similar products

Features	MicroQuant™	Company A	Company B	Company C	Company D
Processing time ~1 minute	✓			✓	✓
2-8°C refrigeration storage	✓	✓	✓		
Manufactured under ISO 17034	✓	✓	✓	✓	✓
Includes all strains for USP <51> (High CFU format)	✓	✓*		✓*	✓*
Includes all strains for USP <61> (Low CFU format)	✓	✓	✓	✓	✓
Product kit includes rehydration buffer	✓	✓	✓	✓	
Sourced from ATCC	**Passage 0**	✓	✓		

*Some strains were not available for purchase at the time of testing

Authentication of MicroQuant™ strains

- **Phenotypic analysis** – Cell morphology, colony description, viability, and purity.
- **Proteomic analysis** – MALDI-TOF MS
- **Functional testing** – Antimicrobial susceptibility testing, serotyping, virulence detection
- **Genotypic analysis** – Sequencing conserved regions of the genome and whole-genome sequencing
  - We have published the corresponding genomes for 5,000 ATCC microbes on our ATCC® Genome Portal (genomes.atcc.org)

Researchers look to ATCC for a wide range of authentication resources to safeguard reproducibility and meet requirements for funding, publication, and quality control.

ATCC® Genome Portal

A cloud-based platform that enables users to easily browse authenticated and traceable reference genomes and metadata

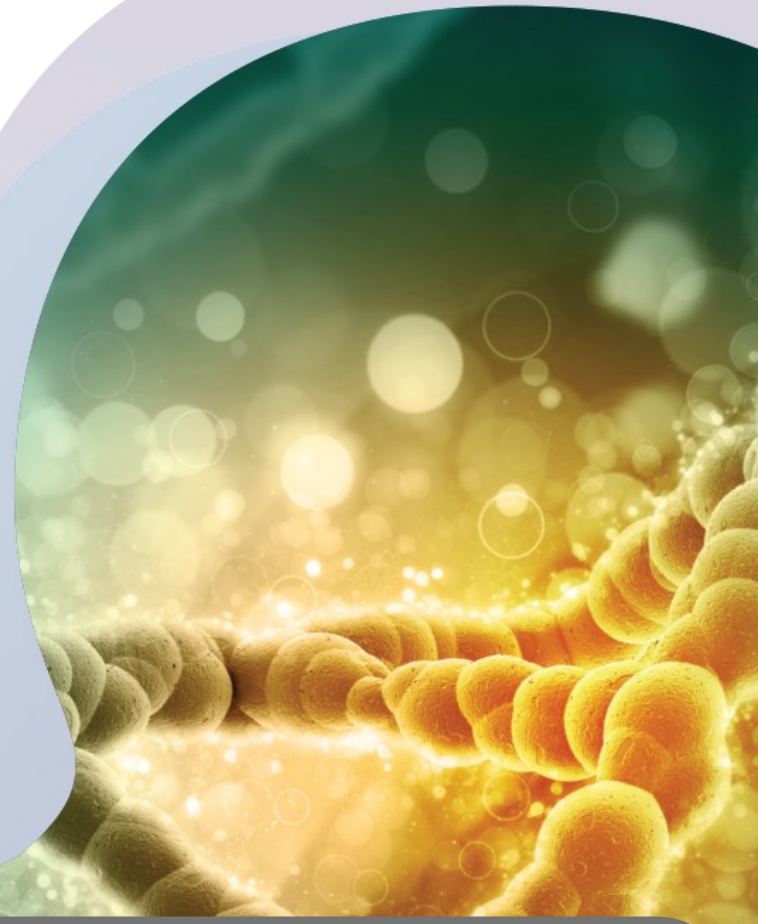
Download whole-genome sequences and annotations from your browser or via our secure API.

Search for nucleotide sequences or genes within genomes.

View genome assembly metadata and quality metrics.

Perform bioinformatics applications with our REST-API.

genomes.atcc.org



5,250 Authenticated Microbial Reference Genomes

4,384 bacteria and archaea
456 viruses
406 fungi
4 protists

New genomes released every quarter!

Powered by ONE CODEX

Explore the MicroQuant™ portfolio

ATCC® No.	Description
10231-LQ-PACK™	MicroQuant™ *Candida albicans*, low CFU
10231-HQ-PACK™	MicroQuant™ *Candida albicans*, high CFU
9027-LQ-PACK™	MicroQuant™ *Pseudomonas paraeruginosa*, low CFU
9027-HQ-PACK™	MicroQuant™ *Pseudomonas paraeruginosa*, high CFU
6538-LQ-PACK™	MicroQuant™ *Staphylococcus aureus* subsp. *aureus*, low CFU
6538-HQ-PACK™	MicroQuant™ *Staphylococcus aureus* subsp. *aureus*, high CFU
16404-LQ-PACK™	MicroQuant™ *Aspergillus brasiliensis*, low CFU
16404-HQ-PACK™	MicroQuant™ *Aspergillus brasiliensis*, high CFU
8739-LQ-PACK™	MicroQuant™ *Escherichia coli*, low CFU
8739-HQ-PACK™	MicroQuant™ *Escherichia coli*, high CFU
6633-LQ-PACK™	MicroQuant™ *Bacillus spizizenii*, low CFU
6633-HQ-PACK™	MicroQuant™ *Bacillus spizizenii*, high CFU

Low CFU = 100 to 1,000 CFU/pellet

High CFU = 10^7 to 10^8 CFU/pellet

Explore the MicroQuant™ portfolio

ATCC® No.	Product Name	Description
MQ-51™	MicroQuant™ Antimicrobial Effectiveness Panel	A panel comprising the five microbial challenge organisms cited in USP <51>. Each component is provided as a pack containing 5 vials of cryopreserved pellets (10^7 to 10^8 CFU per pellet) and 5 vials of rehydration buffer.
MQ-61™	MicroQuant™ Microbial Examination of Nonsterile Products Panel	A panel comprising the five microbial challenge organisms cited in USP <61>. Each component is provided as a pack containing 5 vials of cryopreserved pellets (100 to 1,000 CFU per pellet, supporting 10 assays per pellet) and 5 vials of rehydration buffer.

Application of MicroQuant™

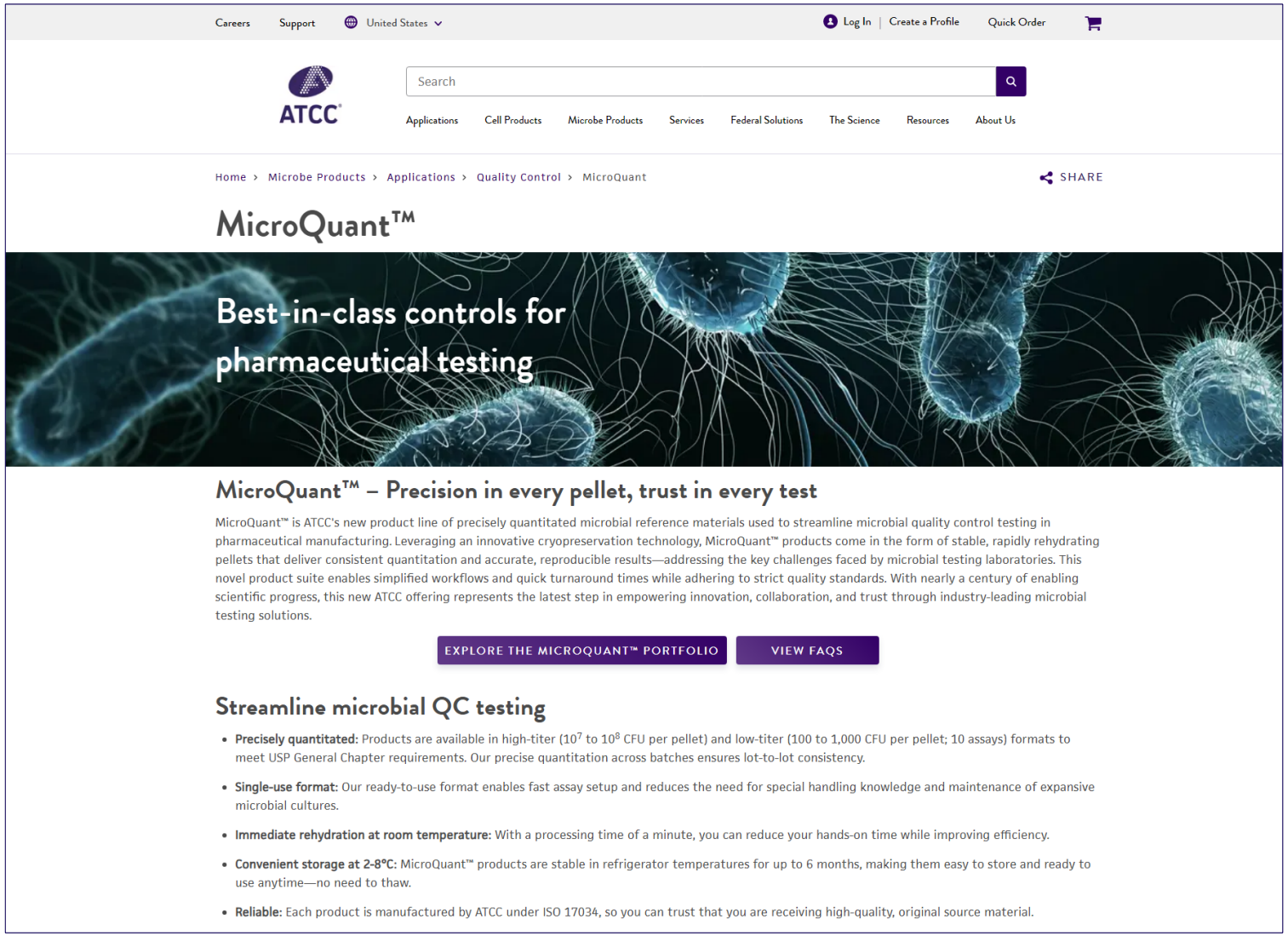
Species	ATCC® No.	Compendial assays*				Other industry uses
		USP <51>	USP <61>	USP <62>	USP <71>	
Aspergillus brasiliensis	16404-HQ-PACK™	✓				Food, media, QC, & pharma testing
	16404-LQ-PACK™		✓		✓	
Bacillus spizizenii	6633-HQ-PACK™					Food, media, QC, & pharma testing
	6633-LQ-PACK™		✓		✓	
Candida albicans	10231-HQ-PACK™	✓				Food, media, QC, & antimicrobial testing
	10231-LQ-PACK™		✓	✓	✓	
Escherichia coli	8739-HQ-PACK™	✓				Water, food, media, QC, & pharma testing
	8739-LQ-PACK™			✓		
Pseudomonas paraeruginosa	9027-HQ-PACK™	✓				Water, media, QC, & pharma testing
	9027-LQ-PACK™		✓	✓	✓	
Staphylococcus aureus	6538-HQ-PACK™	✓				Food, media, QC, & water testing
	6538-LQ-PACK™		✓	✓	✓	

*USP <51>: Antimicrobial Effectiveness Test; USP <61>: Microbial Enumeration Test; USP <62>: Tests for Specified Microorganism; USP <71>: Sterility Testing

Learn more about MicroQuant™

ATCC.org/MicroQuant

- Explore our portfolio
- Get the application note
- Read the blog post



ATCC®

CREDIBLE LEADS TO INCREDIBLE

Thank You

Let’s connect

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BioNexus Foundation Principal Scientist

and Head of Cryobiology

ATCC

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Questions & answer / request a sample

1 Submit Questions

Use the Q&A box in the webinar portal

2 Request Your Sample

Fill out the form using the URL or QR code below:

Type the URL into your search browser
https://go.atcc.org/microquant

Scan the QR code

Please note the following:

- For qualified QC professionals
- Submission of a request does not guarantee fulfillment
- Limited samples