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Meeting EPA Requirements: Utilizing Authenticated ATCC® Strain Panels for Food and Water Treatment Validation Methods

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Introduction

Well-characterized microbial reference materials are essential for developing and validating analytical methods in water and agricultural systems, where EPA and FDA frameworks require standardized testing under reproducible and comparable conditions.

Effective method validation depends on:

- Defined panels of relevant pathogens, including *Salmonella enterica* and Shiga toxin–producing *Escherichia coli* (STEC)
- Authenticated reference strains
- Alignment with established regulatory testing frameworks

Inconsistent or non-standardized strain selection can lead to:

- Reduced analytical sensitivity and specificity
- Limited comparability between studies
- Decreased confidence in regulatory outcomes

Methods: Panel Development and Regulatory Alignment

1. Regulatory frameworks (EPA, FDA, ISO) were reviewed to define target organisms and testing applications.
2. Strains were selected based on:
   - Regulatory relevance to foodborne and waterborne pathogens
   - Clinical and environmental significance
   - Representation of key serotypes
3. Authenticated, low-passage reference strains were organized into panels for:
   - Food safety and STEC detection
   - Agricultural water validation
   - Seed sanitization and antimicrobial efficacy testing
4. Panel composition was evaluated to ensure:
   - Coverage of regulatory-relevant pathogens
   - Applicability across multiple testing scenarios
   - Alignment with EPA and ISO validation workflows
5. Regulatory workflows, such as EPA sanitizer efficacy protocols (Figure 1), informed strain selection and panel organization for agricultural water testing applications.

Results: Panel Composition and Coverage

- Panels include regulatory-relevant pathogens, such as STEC *E. coli* and *S. enterica*, representing diverse clinical, food, and environmental sources.
- Panel design provides broad pathogen coverage and cross-application flexibility, supporting consistent use across agricultural water, food safety, and antimicrobial validation workflows.

Table 1: ATCC® Regulatory Panels Supporting Water & Agricultural Testing

ATCC® ID	Serotype	Isolation Source	Big-Six *Escherichia coli* Strains Panel (MP-9™)	EPA Agricultural Water Panel (MP-31™)	EPA Seed Sanitizer Panel (MP-42™)
Escherichia coli					
43895™	O157:H7	Hamburger meat		X	
BAA-2192™	O145:Nonmotile	Stool	X	X	
BAA-2193™	O45:H2	Stool	X	X	
BAA-2196™	O26:H11	Stool	X	X	
BAA-2215™	O103:H11	Unknown	X	X	
BAA-2219™	O121:H19	Stool	X	X	
BAA-2440™	O111	Unknown	X	X	
BAA-3233™	O157:H7	Human stool			X
BAA-3234™	O157:H7	Sprouts			X
BAA-3235™	O104:H4	Human feces			X
BAA-3236™	O121:H19	Lettuce			X
BAA-3237™	O103:H12	Red clover sprout			X
BAA-3238™	O26:H11	Cilantro			X
BAA-3239™	O145	Romaine lettuce			X
Salmonella enterica					
51958™	Mbandaka	Unknown			X
BAA-3136™	Cerro	Water		X	
BAA-3137™	Give	Water		X	
BAA-3138™	Newport	Water		X	
BAA-3139™	Poona	Fresh cucumber		X	
BAA-3140™	Rubislaw	Water		X	
BAA-3141™	Thompson	Water		X	
BAA-3142™	Typhimurium	Unknown		X	
BAA-3240™	Saintpaul	Sprouts			X
BAA-3241™	Cubana	Sprouts			X
BAA-3242™	Newport	Fresh cilantro			X
BAA-3243™	Enteritidis	Fresh spinach			X

- ISO 11133 establishes quality control organisms for culture media used in food and water testing, with ATCC® reference strains—such as *E. coli* (ATCC® 8739™, 25922™), *P. aeruginosa* (ATCC® 27853™, 9027™), and *Enterococcus faecalis* (ATCC® 19433™, 29212™), supporting standardized, reproducible method validation across applications.

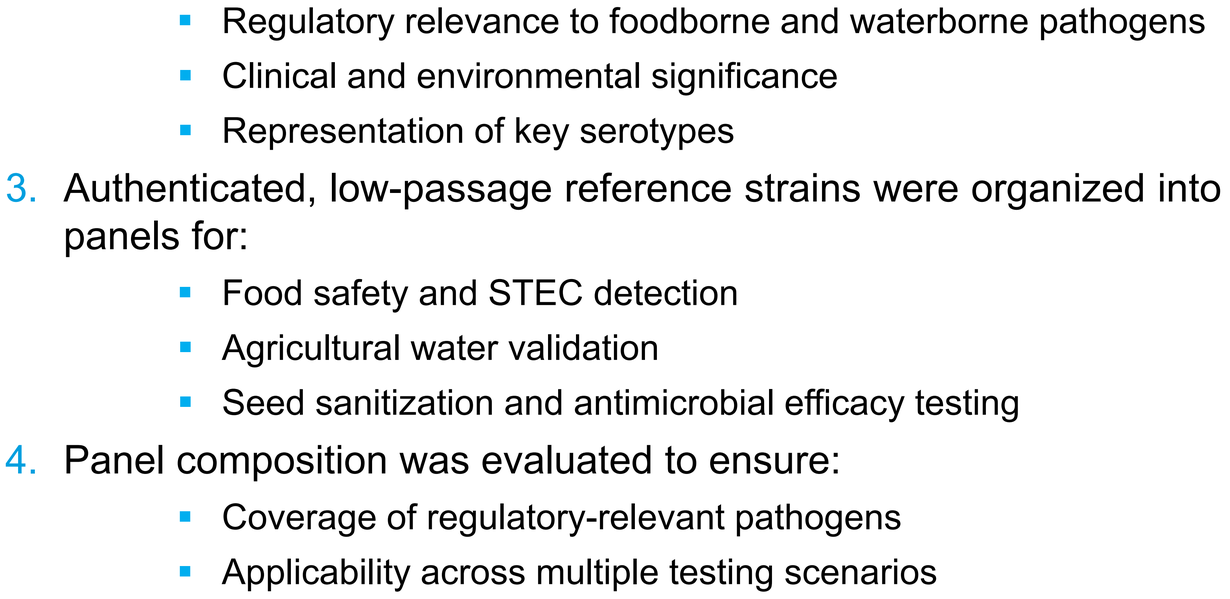

Figure 1: Representative EPA workflow for evaluating antimicrobial efficacy in preharvest agricultural water using standardized microbial challenge organisms (e.g.,, strains included in ATCC® MP-31™). Created with BioRender.com.

Conclusion

Structured, well-characterized ATCC® microbial strain panels aligned with EPA, FDA, and ISO frameworks enable standardized and reproducible method validation in food and water testing. These panels enhance analytical reliability, support regulatory compliance, and provide a consistent foundation for evaluating microbial detection and antimicrobial efficacy across diverse applications.

Explore water testing quality control strains

Explore food testing quality control strains

Learn more about the ATCC Genome Portal

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