

Enhancing Accuracy in Microbiological Testing: The Role of Pre-enumerated Positive Controls with Petrifilm®

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INTRODUCTION

Accurate microbiological quality control (QC) is essential for ensuring the safety, quality, and regulatory compliance of food, beverage, and environmental products. QC testing verifies that products meet microbiological specifications and are free of objectionable organisms. However, traditional methods often require preparing microbial cultures, performing serial dilutions and manually enumerating colony-forming units (CFU). These processes are labor-intensive, time-consuming, and prone to variability.

Neogen's Petrifilm® has become a widely used alternative to conventional agar plating, offering a compact, ready-to-use platform for microbial enumeration and indicator organism detection. Its convenience and standardization make it ideal for high-throughput labs. However, consistent and reliable results still depend on the use of effective positive controls.

This study evaluates the performance of Microbiologics' EZ-Accu Shot™ pre-enumerated lyophilized pellets as positive controls on various Petrifilm® types. Target organisms included *E. coli*, *S. aureus*, *P. aeruginosa*, *C. albicans*, *A. brasiliensis*, and *Salmonella* spp. By eliminating the need for manual enumeration and dilution, EZ-Accu Shot™ simplifies QC workflows, reduces technician variability, and ensures reproducible results across both specification and presence/absence testing formats.

METHODS

Microbiologics EZ-Accu Shot™ lyophilized pellets were rehydrated according to manufacturer instructions and used as positive controls for Neogen Petrifilm® testing.

The rehydrated pellets were diluted 1:10 in PBS by removing 1 mL for the pellet suspension diluting in 9 mL of PBS. For specification testing, 1 mL of the diluted material was applied to the Petrifilm® film type listed in Table 1. A non-selective agar plate was plated in parallel for each organism/Petrifilm® combination. Incubation conditions are listed in Table 2.

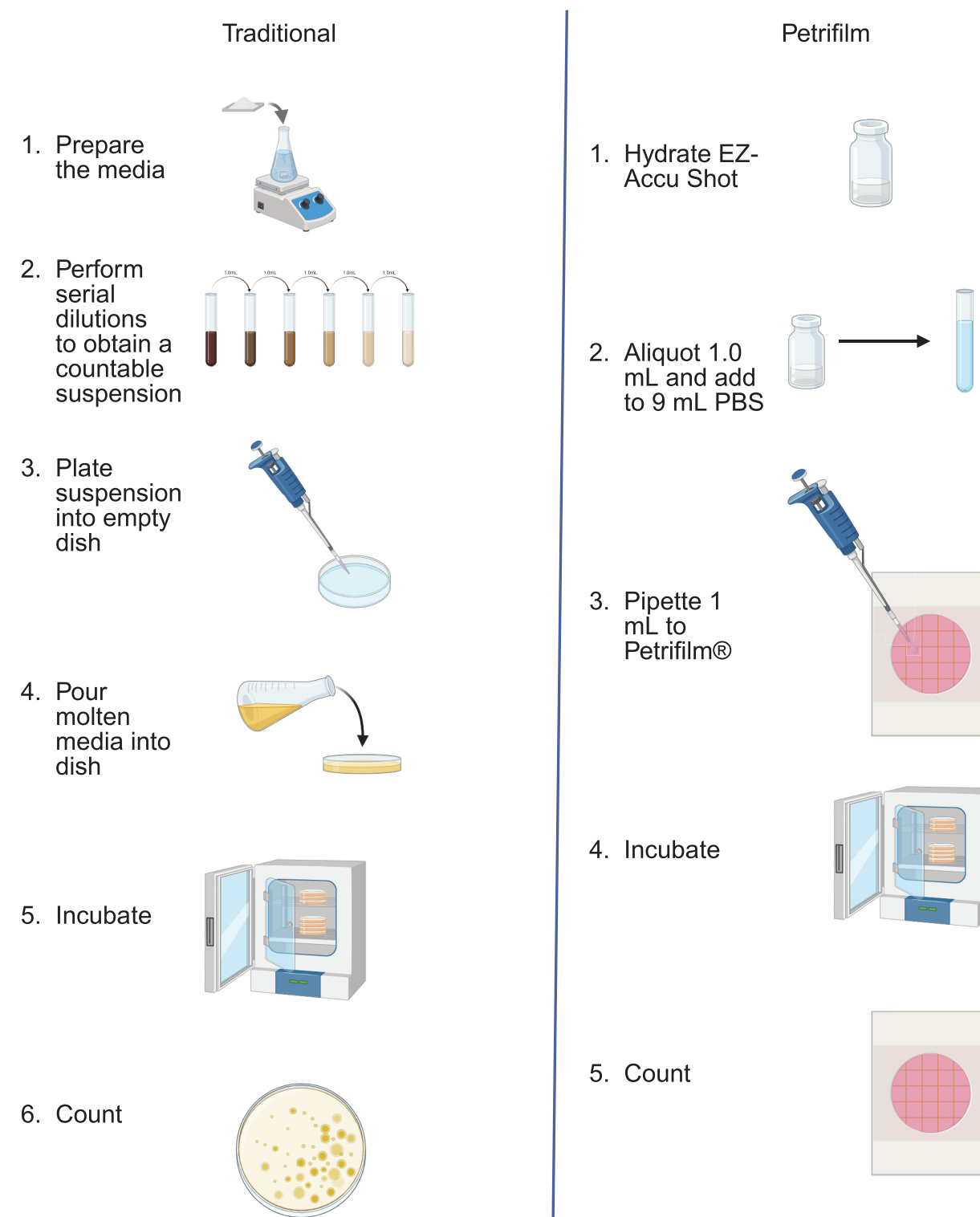
For presence/absence testing of *Salmonella* spp., 0.1 mL of the rehydrated suspension was transferred into 90 mL of Salmonella Enrichment Base (SEB) and incubated at 41.5°C for 18–24 hours before being streaked onto SALX Petrifilm® and confirmed using SALX Confirmation Discs. Each Petrifilm® test was performed in eight replicates, with reference plating methods (e.g., TSA, SDA+C, XLD) run in parallel for comparison

Organism (Strain)	Catalog Number	Petrifilm Type(s)	Traditional Media
<i>Escherichia coli</i> (ATCC 8739)	0483A	RCC, REC, EB	VRBA, VRBGA, TSA
<i>Staphylococcus aureus</i> (ATCC 6538)	0485A	RAC, STX, REC, EB	TSA
<i>Pseudomonas aeruginosa</i> (ATCC 9027)	0484A	RAC, STX	TSA
<i>Bacillus spizizenii</i> (ATCC 6633)	0486A	RAC, RCC	TSA
<i>Candida albicans</i> (ATCC 10231)	0443A	RYM	SDA+C
<i>Aspergillus brasiliensis</i> (ATCC 16404)	0392A	RYM	SDA+C
<i>Salmonella Typhimurium</i> (ATCC 13311)	0421A	SALX	XLD
<i>Salmonella Typhimurium</i> (ATCC 14028)	0363A	SALX	XLD

**For organisms used as the inhibitory control, the Petrifilm Type is highlighted in purple.

Test	Incubation Duration (hours)	Temperature (°C)
Rapid Aerobic Count (RAC)	24	35
Rapid Yeast & Mold (RYM)	48	25
Rapid Coliform (RCC)	24	35
<i>E. coli</i> /Coliform (REC)	24	35
Enterobacteriaceae (EB)	24	35
<i>Staphylococcus</i> (STX)	24	35
<i>Salmonella</i> (SALX)	24	41.5

SAMPLE PROCESSING



RESULTS

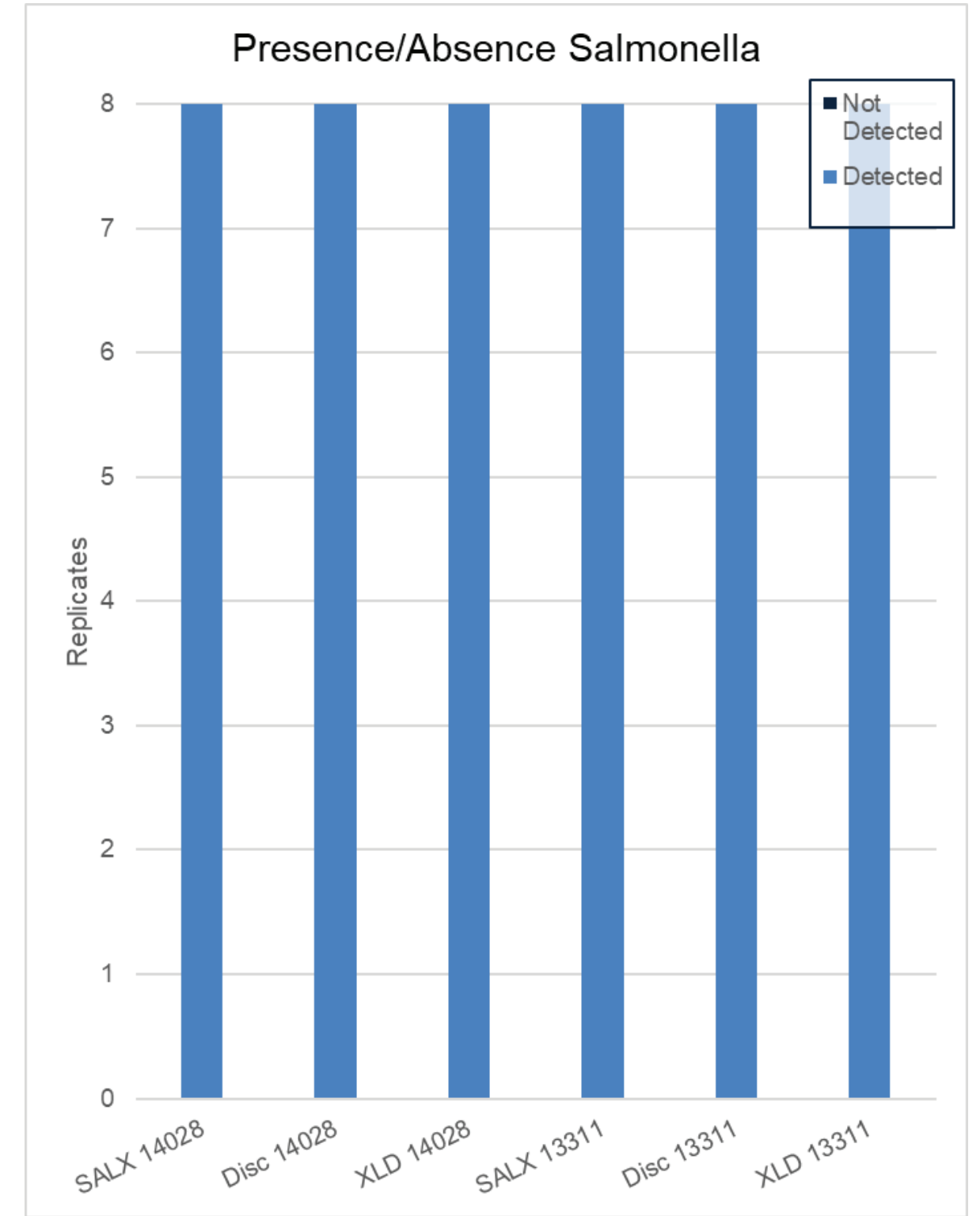


Figure 3. Salmonella testing is presence/absence. This chart shows 100% detection (8/8 replicates) on Petrifilm® (SALX and Disc) and traditional plates (XLD).

RESULTS

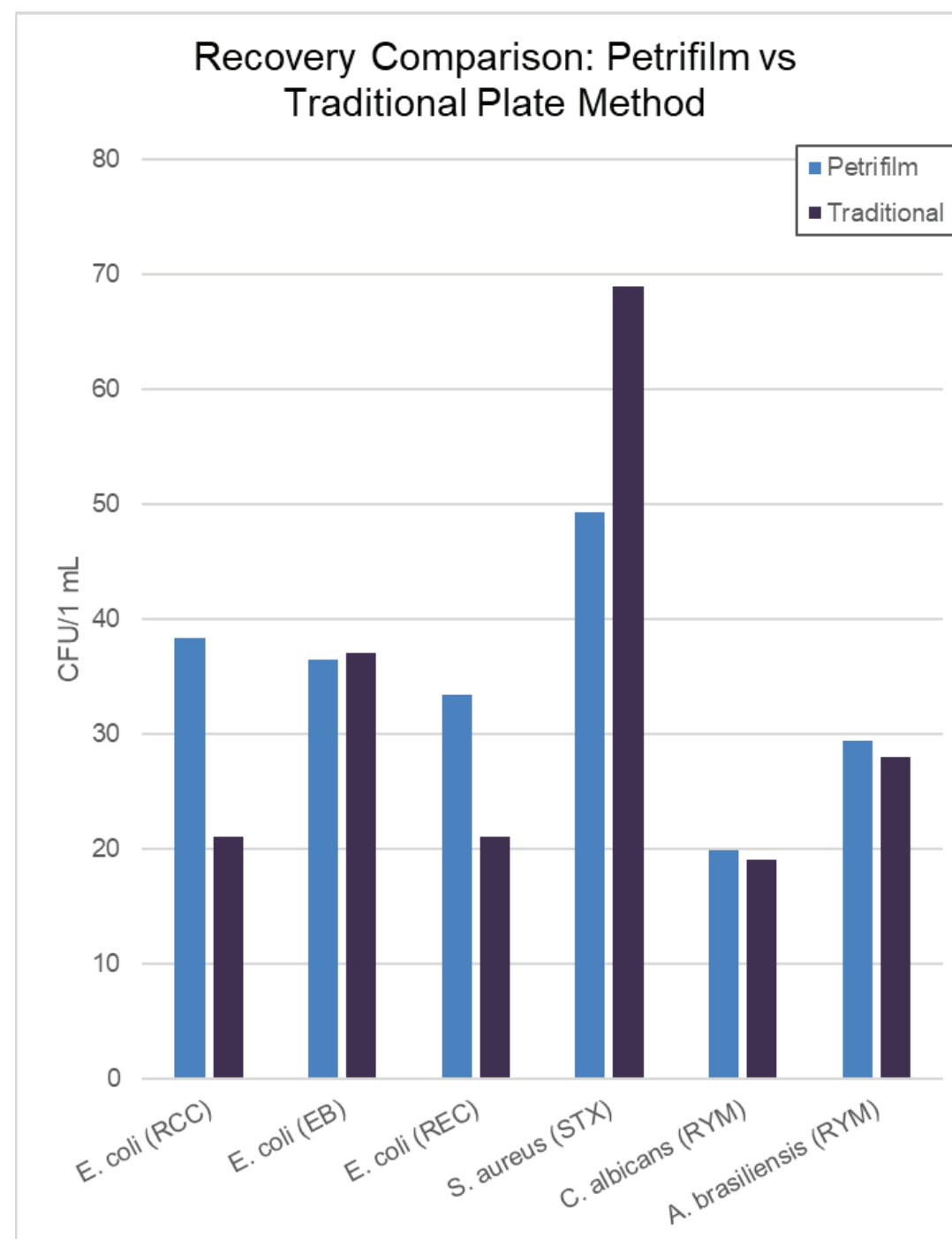


Figure 1. Recovery comparison for selective Petrifilm® types compared to its corresponding traditional plate type. The traditional plate type for each Petrifilm® type is listed in Table 1. For those used as inhibitory controls, no growth was observed and is not shown in this figure.

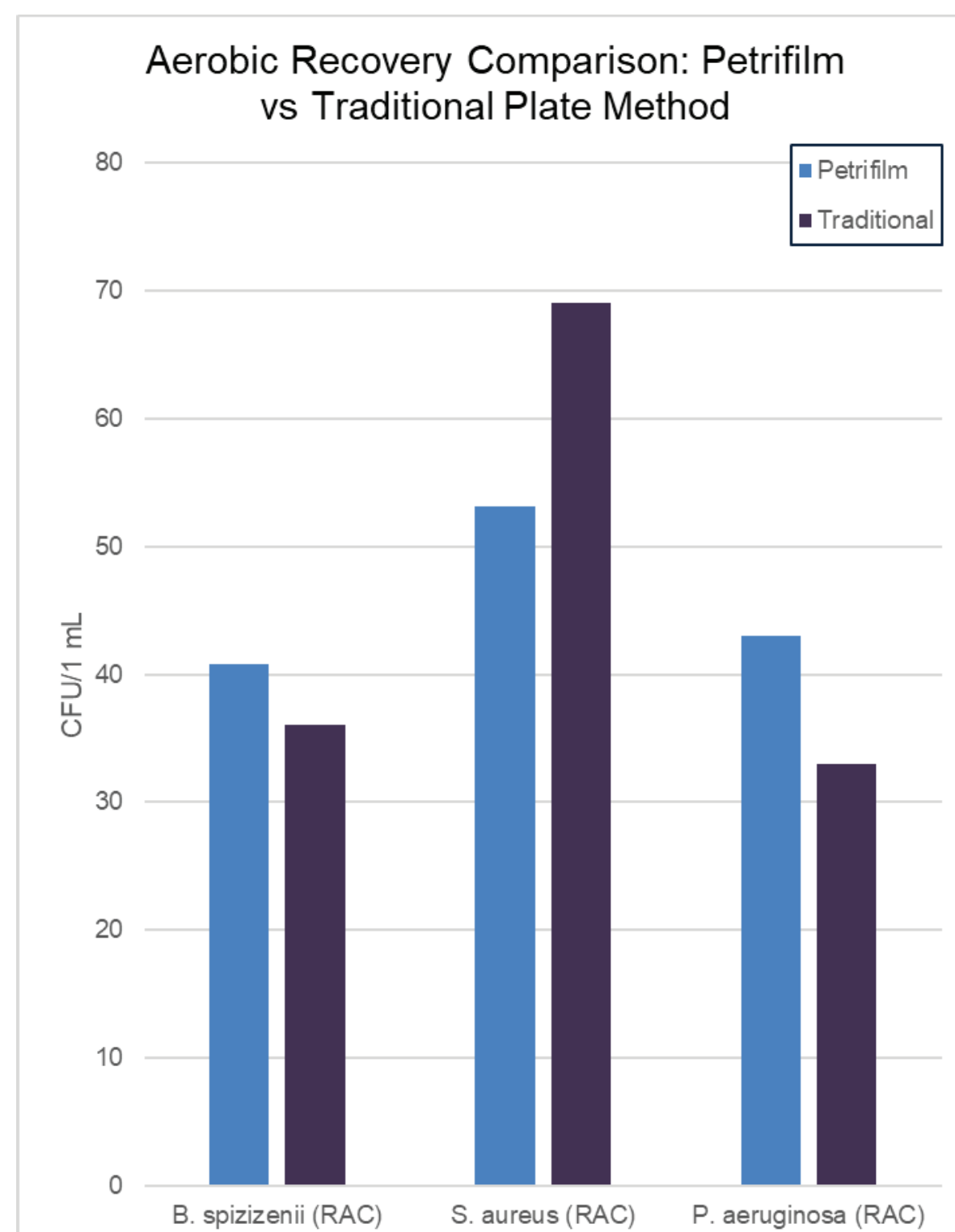


Figure 2. Recovery comparison for aerobic Petrifilm® types compared to its corresponding traditional plate type. The traditional plate type for each Petrifilm® type is listed in Table 1.

CONCLUSION

Microbiologics' EZ-Accu Shot™ positive controls demonstrated reliable performance with Neogen Petrifilm® across both specification and presence/absence testing. All tested organisms, including *E. coli*, *S. aureus*, *P. aeruginosa*, *C. albicans*, *A. brasiliensis*, and *Salmonella* spp., were consistently recovered with no background interference or false results. The pre-enumerated format eliminated the need for manual dilution and enumeration, significantly reducing hands-on preparation time and minimizing variability.

These results support EZ-Accu Shot™ as an effective and efficient tool for laboratories seeking to streamline microbiological quality control processes while maintaining high accuracy and reproducibility. The simplicity, consistency, and compatibility of these controls with Petrifilm® make them well-suited for routine use in food safety and environmental testing workflows.

ACKNOWLEDGEMENTS

We gratefully acknowledge Neogen for conducting the internal testing of EZ-Accu Shot™ positive controls on Petrifilm® and for providing a comprehensive and well-documented data set. Their collaboration and technical expertise were instrumental in supporting the study and ensuring the reliability and depth of the findings presented in this poster.

