

Comparison of Six Methods for Quantification of Lactic Acid Bacteria in Spoiled Sliced Turkey

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INTRODUCTION

Lactic acid bacteria are known to cause spoilage in many food products. Different quantification methods of lactic acid bacteria are used in food industry, and the recovery can vary in different food matrices. A study was conducted to compare methods for quantifying lactic acid bacteria in ready-to-eat, spoiled sliced turkey.

OBJECTIVES

To compare six methods for quantifying lactic acid bacteria in spoiled sliced turkey to optimize recovery and enumeration.

METHODS

- Six quantification methods for lactic acid bacteria shown in the following table were utilized to analyze twelve spoiled sliced turkey samples.
- Confirmation (Gram stain and catalase) and identification (ID by VITEK MS or Gene Sequencing) was performed on the colonies recovered from each sample for each method.
- Additionally, five sliced turkey samples were analyzed by APT with sucrose and 1.6% bromocresol purple (BCP) and 3M LAB Petrifilm™ following the same procedure.

Media	Incubation Conditions	Method reference
De Man, Rogosa and Sharpe agar (MRS) with All Purpose Tween agar (APT) (pH 4.0) overlay	35±1°C / 96±4h	CMMEF 5 TH Edition, Chapter 19.521
Acidified De Man, Rogosa and Sharpe agar (MRS) (pH 5.5)	35±1°C / 72±3h anaerobic	CMMEF 5 TH Edition, Chapter 19.522
APT with sucrose and 0.2% bromocresol purple (BCP) or 1.6% BCP in Part II	25±1°C / 48-72h	CMMEF 5 TH Edition, Chapter 19.528
3M LAB Petrifilm	30±1°C / 48±3h	3M Insert
3M APC Petrifilm	35±1°C / 48±3h	3M Insert
3M APC Petrifilm with MRS broth as diluents	35±1°C / 48±3h anaerobic	CMMEF 5 TH Edition, Chapter 19.571; 3M Insert



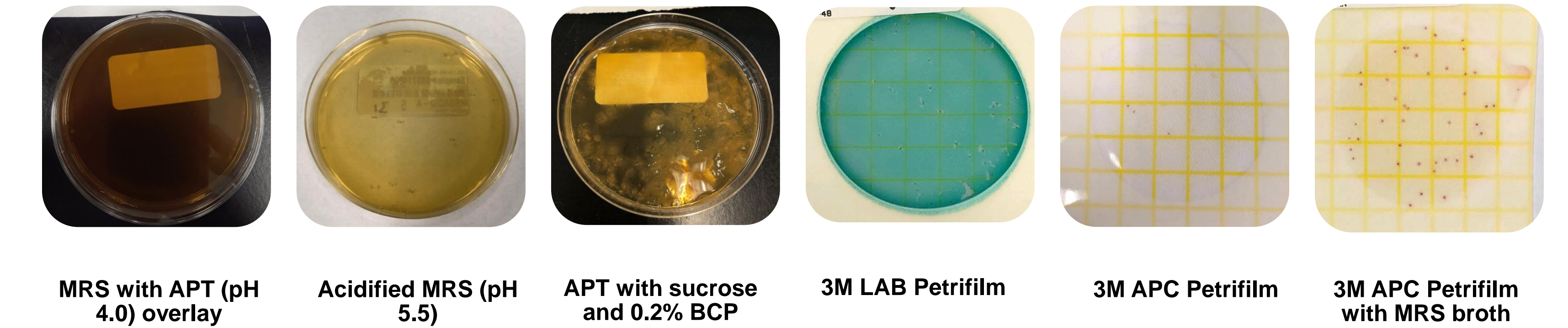
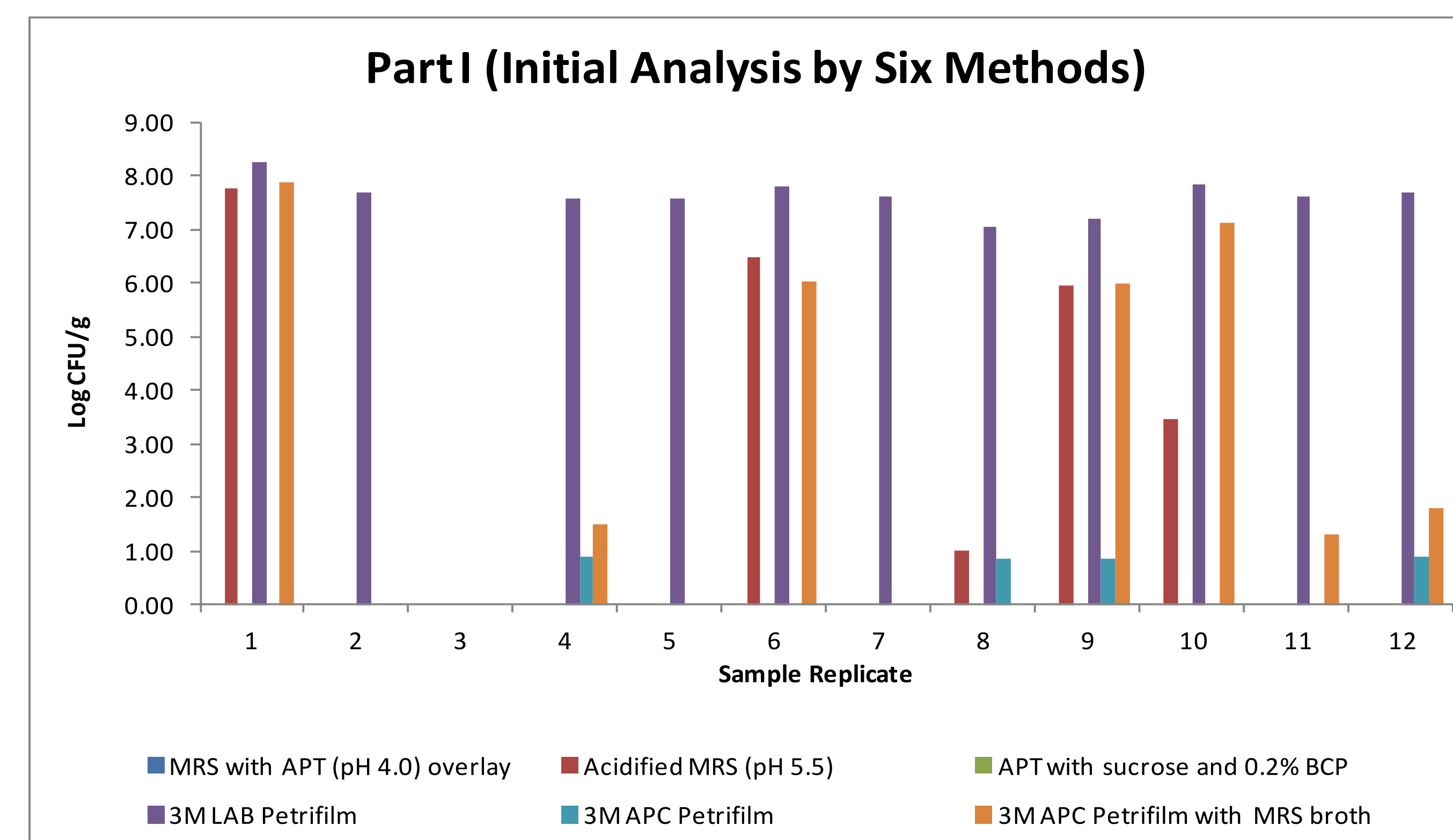
RESULTS

Part I (Initial Analysis by Six Methods)

- Lactic acid bacteria was recovered at high levels when using 3M LAB Petrifilm™ for 11 out of 12 samples analyzed. The remaining 5 methods showed variable counts (log CFU/g).
- Growth was observed on APT with sucrose and 0.2% BCP which however did not show typical colonies as described in the method reference (colonies surrounded by yellow zone). A percentage of 1.6% BCP was used in the additional analysis in Part II.

Replicate	MRS with APT (pH 4.0) overlay 35±1°C 96±4h	Acidified MRS (pH 5.5) anaerobic 35±1°C 120±4h ^a	APT with sucrose and 0.2% BCP 25±1°C 72h	3M LAB Petrifilm 30±1°C 48±3h	3M APC Petrifilm 35±1°C 48±3h	3M APC Petrifilm with MRS broth anaerobic 35±1°C 48±3h
1	<1.00	7.76	NA ^b	8.28	<1.00	7.88
2	<1.00	<1.00	NA	7.7	<1.00	NA
3	<1.00	<1.00	<1.00	<1.00	<1.00	NA
4	<1.00	<1.00	NA	7.58	0.88	1.48
5	<1.00	<1.00	NA	7.59	<1.00	NA
6	<1.00	6.49	NA	7.81	<1.00	6.04
7	<1.00	<1.00	<1.00	7.60	<1.00	<1.00
8	<1.00	1.00	NA	7.04	0.85	NA
9	<1.00	5.95	NA	7.20	0.86	5.98
10	<1.00	3.45	NA	7.86	<1.00	7.11
11	<1.00	<1.00	NA	7.61	<1.00	1.3
12	<1.00	<1.00	NA	7.69	0.89	1.78

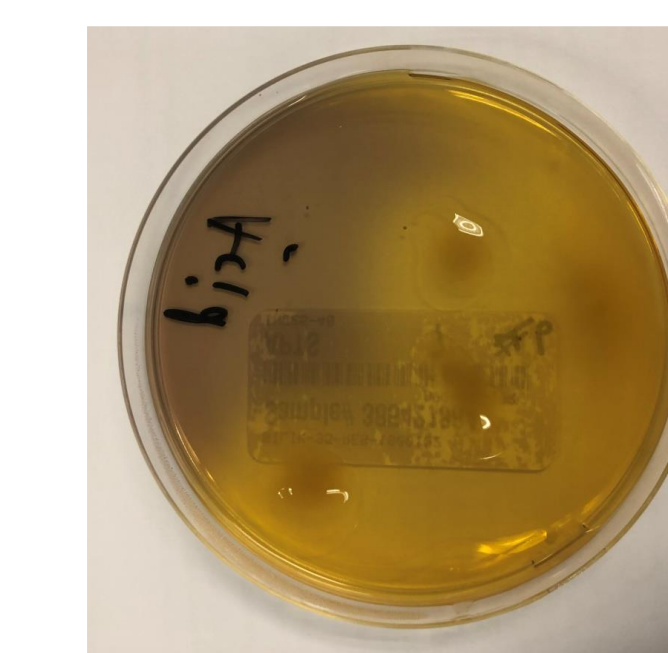
^aPlates were incubated for 72 hours initially and added with another 48 hours incubation due to low recovery.
^bNot applicable.



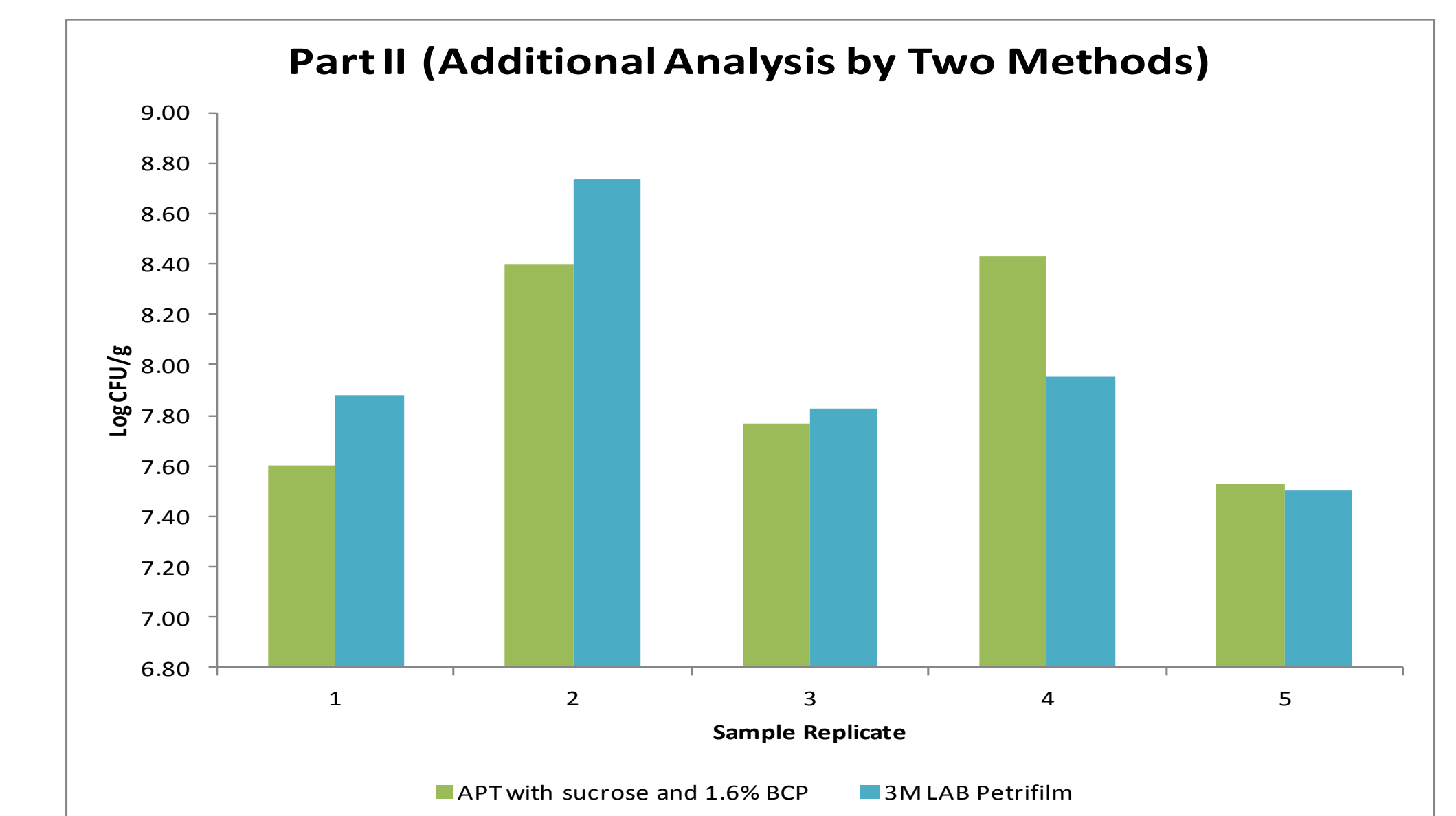
Part II (Additional Analysis by Two Methods)

- Additional analysis showed that lactic acid bacteria was recovered at high levels when using APT with sucrose and 1.6% BCP and 3M LAB Petrifilm™ for all 5 samples.
- A *t*-Test was performed between the two methods and showed that there was no significant difference between two methods with 95% confidence.

Replicate	APT with sucrose and 1.6% BCP 25±1°C 48-72h	3M LAB Petrifilm 30±1°C 48±3h
	1	7.60
2	8.40	8.73
3	7.77	7.83
4	8.43	7.95
5	7.53	7.51



APT with sucrose and 1.6% BCP



CONCLUSIONS

3M LAB Petrifilm™ and APT with sucrose and 1.6% bromocresol purple are preferred methods when quantifying lactic acid bacteria in RTE meats.

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