

# Evaluation of Easy Plate™ EB Performance, a Novel Ready-to-Use Culture Medium for Detecting *Enterobacteriaceae*

Kentaro Takenaka<sup>1</sup>, Natsuki Okochi<sup>1</sup>, Takeo Suzuki<sup>1</sup> and Tetsuya Mori<sup>2</sup>

(1)Kikkoman Corporation, (2)Incorporated Foundation Tokyo Kenbikyo-in

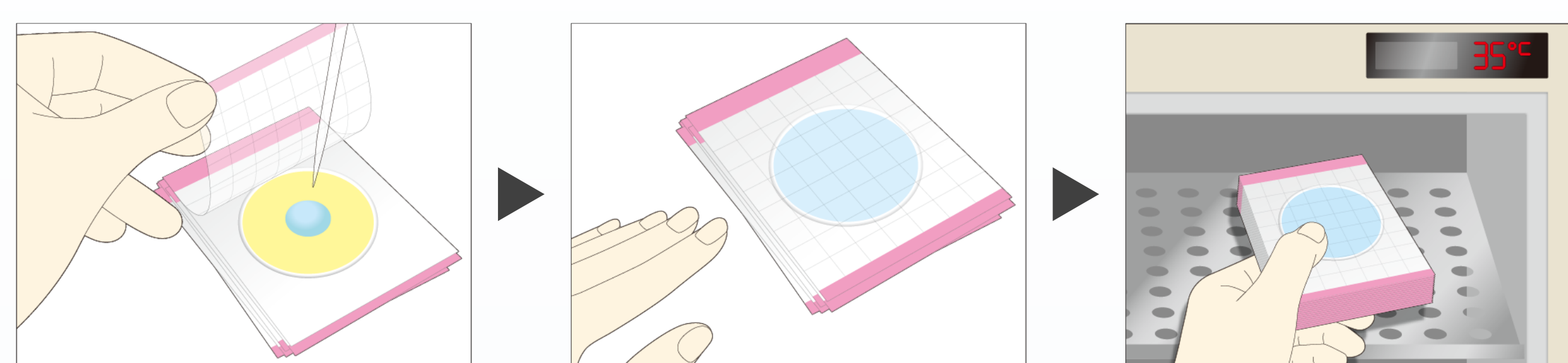


## INTRODUCTION

**Easy Plate** is a Ready-to-Use (RTU) medium marketed as Medi·Ca since 2014 and rebranded by Kikkoman Biochemifa Company in 2021. Compared to conventional plate media, RTU medium offers various advantages, including faster time to results, ease of use, and sustainability. The Easy Plate line now includes five varieties: AC, CC, EC, SA, and YM-R, with the addition of an EB for *Enterobacteriaceae*. In **Easy Plate EB (E-EB)**, *Enterobacteriaceae* form distinct red colonies in 24±1 hours.



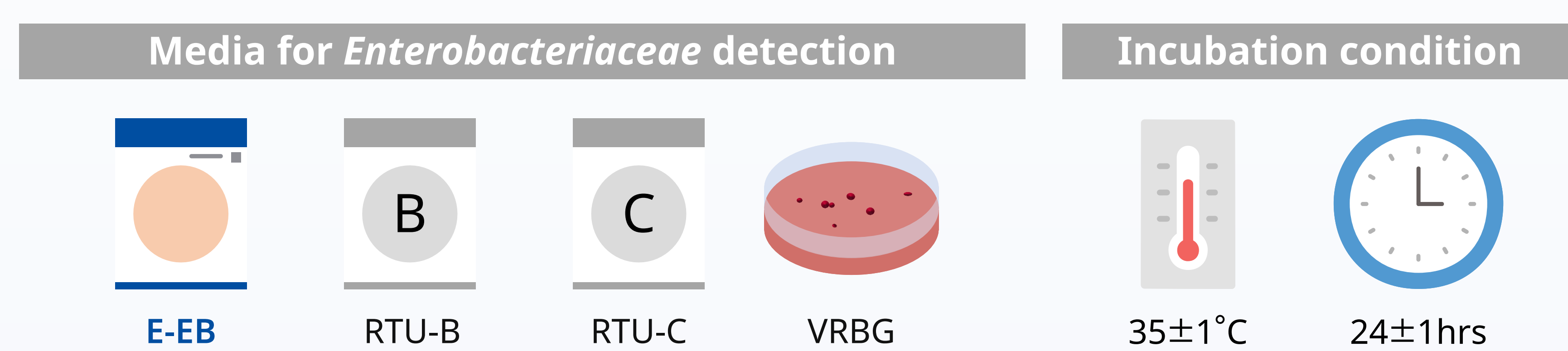
Easy Plate EB (E-EB)



How to use Easy Plate

## PURPOSE

In this study, the performance of E-EB was evaluated by comparing it with three commercially available *Enterobacteriaceae* media in Japan: RTU media B (RTU-B) and C (RTU-C) and VRBG agar medium (VRBG).



## METHODS

### Inclusivity and Exclusivity

A total of 44 *Enterobacteriaceae* strains were included in the inclusivity study and a total of 19 non-target strains were included in the exclusivity study. The strains were cultured in Tryptic Soy Broth (TSB) at 35±1°C for 24±1hrs respectively, each culture was serially diluted by phosphate buffered saline (PBS).

Inclusivity (44)		Exclusivity (19)	
<i>Coliform</i>		Gram negative	
<i>Citrobacter</i>	1	<i>Aeromonas</i>	3
<i>Enterobacter</i>	1	<i>Alcaligenes</i>	1
<i>Escherichia</i>	5	<i>Pseudomonas</i>	3
<i>Klebsiella</i>	3	Gram positive	
<i>Kluyvera</i>	1	<i>Bacillus</i>	2
<i>Lelliottia</i>	1	<i>Corynebacterium</i>	1
<i>Rahnella</i>	2	<i>Enterococcus</i>	7
<i>Raoultella</i>	1	<i>Staphylococcus</i>	1
Non-coliform <i>Enterobacteriaceae</i>		<i>Stenotrophomonas</i>	1
<i>Proteus</i>	2		
<i>Salmonella</i>	22		
<i>Serratia</i>	3		
<i>Shigella</i>	1		
<i>Yersinia</i>	1		

### Relative trueness study

A correlation analysis was conducted using 62 food matrices, such as meat, poultry, seafood, vegetables, dairy and prepared foods. When there were significant differences in bacterial counts between media, some colonies were collected and identified using MALDI TOF/MS.

Category of matrices	Kikkoman	Tokyo Kenbikyo-in	Sum
Chocolate, bakery products and confectionary	1	0	1
Dairy (raw and processed) and egg products	1	3	4
Dried cereals, fruits, nuts, seeds and vegetables	0	2	2
Fresh produces and fruits	5	11	16
Multi-component foods or meal Components	6	3	9
Raw and ready-to-cook fish and seafoods (unprocessed)	2	1	3
Raw meat and ready-to-cook meat products (except poultry)	4	15	19
Raw poultry and ready-to-cook poultry products	1	2	3
Ready-to-eat, ready-to-reheat fishery products	0	5	5
	20	42	62

## RESULTS and DISCUSSIONS

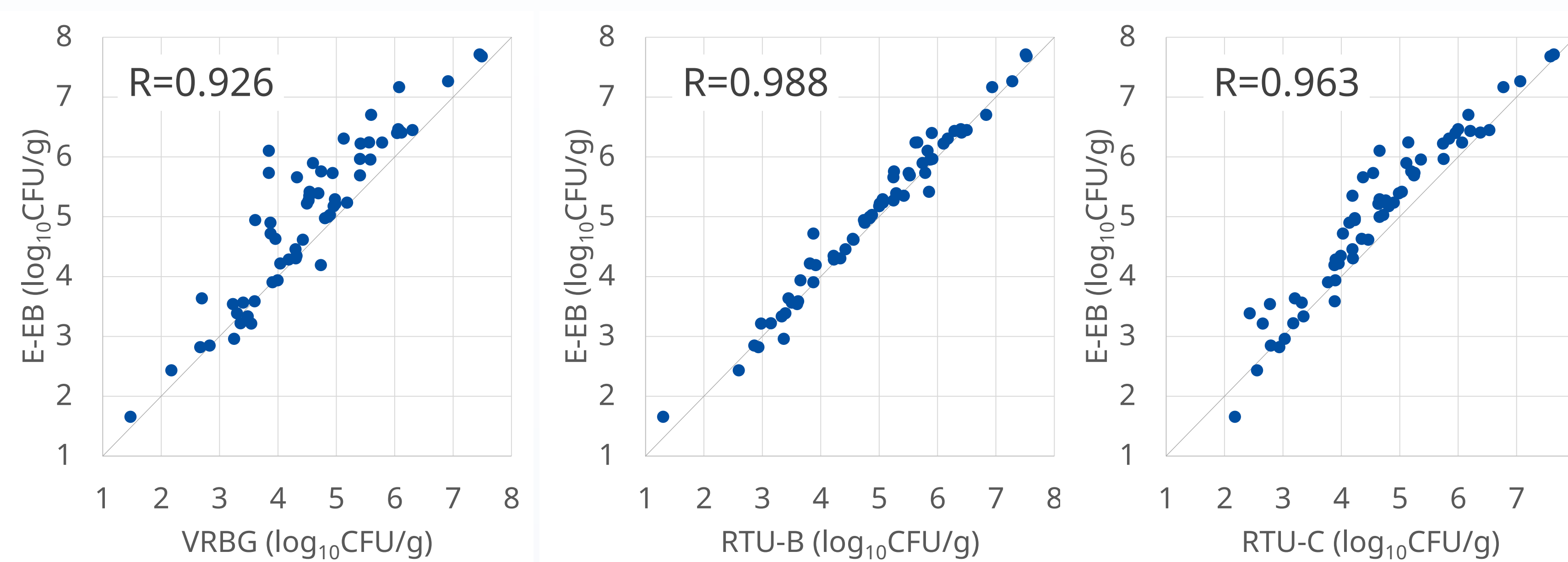
### Inclusivity and Exclusivity

All 44 *Enterobacteriaceae* strains were positive on all four media. E-EB and VRBG were false positive for *Aeromonas* spp. and RTU-C was false positive for one strain of *Pseudomonas* spp.

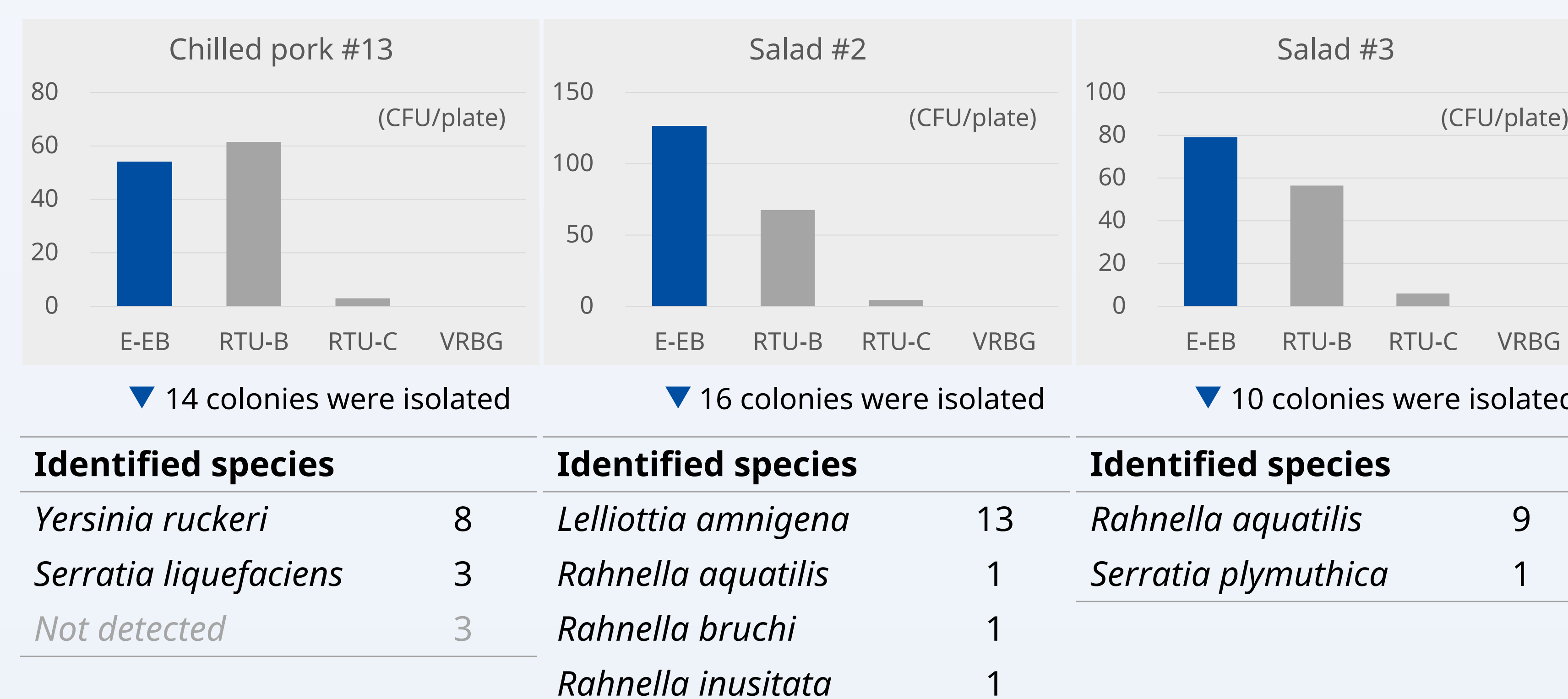
	<i>Enterobacteriaceae</i>	Non target	False positive strain
E-EB	44/44	1/19	<i>Aeromonas</i> sp.
RTU-B	44/44	0/19	
RTU-C	44/44	1/19	<i>Pseudomonas</i> sp.
VRBG	44/44	1/19	<i>Aeromonas</i> sp.

### Relative trueness study

The correlation coefficients between E-EB and VRBG, RTU-B, RTU-C were 0.926, 0.988, and 0.963, respectively.



In 10 of the food samples tested, the number of colonies on E-EB was 10 times higher than on VRBG. Among these, colonies were picked from E-EB for one raw meat sample and two raw vegetable samples. The results of species identification showed that the colonies collected from E-EB were *Enterobacteriaceae*.



Identified species	Count	Identified species	Count	Identified species	Count
<i>Yersinia ruckeri</i>	8	<i>Lelliottia amnigena</i>	13	<i>Rahnella aquatilis</i>	9
<i>Serratia liquefaciens</i>	3	<i>Rahnella aquatilis</i>	1	<i>Serratia plymuthica</i>	1
Not detected	3	<i>Rahnella bruchi</i>	1		
		<i>Rahnella inusitata</i>	1		

## CONCLUSIONS

- Easy Plate EB showed similar selectivity performance to VRBG and a high correlation with VRBG and existing RTU media.
- However, it was noted that Easy Plate EB may provide higher bacterial counts than VRBG in certain foods, such as raw meat and vegetables.
- This suggests that the growth performance of media for *Enterobacteriaceae* may vary depending on the food flora and storage conditions.

## CONTACT INFORMATION

Kentaro Takenaka  
✉ [ktakenaka@mail.kikkoman.co.jp](mailto:ktakenaka@mail.kikkoman.co.jp)



Kikkoman Biochemifa Company  
<https://biochemifa.kikkoman.com/e/kit/>

