Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar Provides Rapid Detection Of Multi Resistant Enterobacteriaceae, Acinetobacter and Pseudomonas

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Overview

Purpose: the aim of this study was to evaluate the performance of Thermo Scientific™ *Brilliance*™ ESBL/*Brilliance*™ CRE Agar (Thermo Fisher Scientific) bi-plate for the detection of multi resistant Enterobacteriaceae, *Acinetobacter* species (spp.) and *Pseudomonas* spp.

Methods: 144 isolates were tested directly onto *Brilliance* ESBL/*Brilliance* CRE Agar.

Results: the overall inclusivity of 83.3% combined with a limit of detection (LoD) of $1x10^1$ for 73.3% of true positive isolates (resistant organisms that showed growth) shows Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar to be a reliable and efficient method of detecting multi resistant Gram negative organisms.

Introduction

This study evaluates the performance of Thermo Scientific™ *Brilliance*™ ESBL Agar (Thermo Fisher Scientific) and Thermo Scientific™ *Brilliance*™ CRE Agar (Thermo Fisher Scientific) used as a bi-plate. The Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar bi-plate uses a combination of antibiotics and chromogens to detect multi resistant Enterobacteriaceae (including extended spectrum beta-lactamase (ESBL) producing and CRE *Escherichia coli,* KESC group organisms *(Klebsiella* spp.*, Enterobacter* spp.*, Serratia* spp.*,* and *Citrobacter* spp.)), and also multi resistant *Acinetobacter* spp. and *Pseudomonas* spp. (see figure 1).

Methods

Beta-lactamase producing organisms are grouped according to their amino acid sequence using the Ambler classification. Out of 144 isolates tested, 87 were CRE and ESBL producers, out of which 25 were Ambler class A, 22 Ambler class B, and 40 Ambler class D (includes OXA-48 producers). In addition, 42 ESBL producing non-CRE isolates and 15 CRE *Pseudomonas* spp. and *Acinetobacter* spp. were tested.

Figure 1. Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar

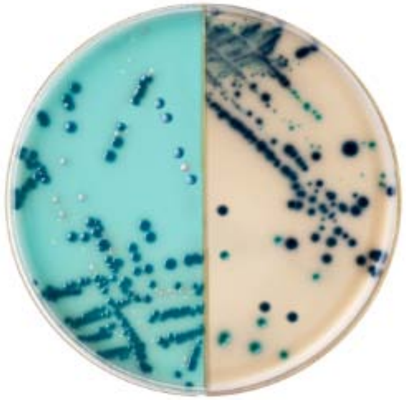

Table 1. Combined inclusivity performance of Thermo Scientific *Brilliance* ESBL and Thermo Scientific *Brilliance* CRE Agar.

Organisms tested	Inclusivity (%)	Percentage of true positive isolates with a LoD of $1x10^1$ CFU/mL (%)
Ambler class A (n= 25)	92.0	60.9
Ambler class B (n= 22)	100	90.9
Ambler class D (includes OXA-48) (n= 40)	72.5	72.4
ESBL (non-CRE) (n= 42)	73.8	64.5
Carbepenem resistant *Pseudomonas* spp. and *Acinetobacter* spp. (n= 15)	100	86.7
Overall (n = 144)	83.3	73.3

Each isolate was suspended in bacteriological saline to match a 0.5 McFarland turbidity standard. Ten µl from each suspension was inoculated onto Thermo Scientific *Brilliance*™ ESBL/*Brilliance*™ CRE Agar. All plates were incubated at 36±1°C for 18-24 hours. Plates were interpreted according to the manufacturer's guidelines.

Results

Table 1 shows the inclusivity and the LoD of Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar.

Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar gave 100% inclusivity for Ambler class B Enterobacteriaceae and carbepenem resistant non-fermenters; *Acinetobacter* spp. and *Pseudomonas* spp.

Overall 73.3% of true positive isolates had a LoD of $1x10^1$ CFU/mL.Out of the remaning isolates;16.7% had a LoD of $1x10^2$ CFU/mL, and 10.0% had a LoD of $\geq 1x10^3$ CFU/mL.

The overall inclusivity of 83.3%, combined with an overall LoD of $1x10^1$ for 73.3% of positive isolates, shows Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar to be a reliable method of detecting multi resistant Gram negative organisms.

Conclusion

Thermo Scientific *Brilliance* ESBL/*Brilliance* CRE Agar provides a reliable method of detecting multi resistant Gram negative organisms (including CRE (Ambler classes A, B, and D), ESBL producing Enterobacteriaceae, and carbepenem resistant *Acinetobacter* spp.and *Pseudomonas* spp.) within 24 hours.

In addition, the use of chromogens within the agar simplifies the interpretation. Along with the incubation time of 18-24hrs, *Brilliance* ESBL/*Brilliance* CRE Agar offers efficient and rapid detection of multi-resistant Gram negative organisms.

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