Rapid Identification And Confirmation Of Extended Spectrum Beta-Lactamase Utilizing *Brilliance*™ ESBL Agar And Sensititre™ ESBL Antimicrobial Susceptibility Panels

P. Stagg[1], D. Paisey[1], Bains, J[1], A. Appleton[2], C. Bastulli[3]. [1]Thermo Fisher Scientific, East Grinstead, UK, [2]Thermo Fisher Scientific, Basingstoke, UK, [3]Thermo Fisher Scientific, Cleveland Ohio, US

Overview

Purpose:. This study was undertaken to determine if Sensititre™ ESBL antimicrobial susceptibility panels could be used directly with *Brilliance*™ ESBL agar for the rapid identification, confirmation and MIC determination of suspect organisms.

Methods: A collection of 66 clinical isolates were inoculated onto *Brilliance* ESBL Agar and Columbia Blood Agar (CBA). Post-incubation, Sensititre ESBL antimicrobial susceptibility testing panel inocula was prepared from colonies grown on both *Brilliance* ESBL Agar and CBA plates.

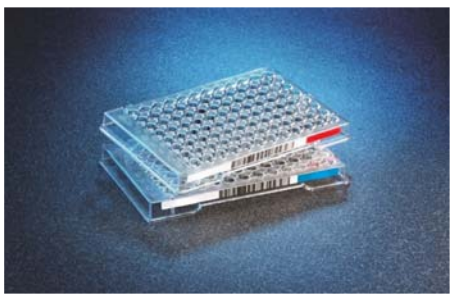
Results : The Sensititre ESBL antimicrobial susceptibility testing panel correctly differentiated all the ESBL-producing isolates from organisms containing other resistance mechanisms. The MIC was unaffected by inoculation directly from the selective *Brilliance* ESBL Agar compared to the non selective CBA.

Introduction

Extended spectrum β-lactamases (ESBL) are usually plasmid-mediated β-lactamases most commonly found in *Klebsiella pneumoniae*, *Escherichia coli* and other Gram-negative bacilli, and have emerged as a major threat worldwide with limited treatment options[1].

Rapid identification and confirmation of ESBL-producing organisms in the clinical setting is imperative in improving patient outcomes and preventing spread. This study was undertaken to determine if Thermo Scientific Sensititre™ ESBL antimicrobial susceptibility testing panel (Thermo Fisher Scientific, figure 1) could be used with Oxoid *Brilliance*™ ESBL Agar (Thermo Fisher Scientific, figure 2) for the rapid identification, confirmation and Minimum Inhibitory Concentration (MIC) -determination of suspect organisms

FIGURE 1. Sensititre antimicrobial susceptibility testing panels



Methods

Thirty one *K. pneumonia* (21 ESBL-producers), 22 *E. coli* (14 ESBL-producers) and 13 other Enterobacteriaceae (either ESBL-producers or AmpC-producers), were inoculated onto *Brilliance* ESBL Agar and Columbia Blood Agar (CBA). All plates were incubated at 36±1°C for 24 hr.; any *Brilliance* ESBL Agar showing no growth at this time were re-incubated for a further 24 hr.

Sensititre ESBL antimicrobial susceptibility testing panel consists of the following antibiotic combinations: cefotaxime/clavulanic acid, ceftazidime/clavulanic acid, cefpodoxime/clavulanic acid, ceftriaxone/clavulanic acid and cefepime/clavulanic acid, Sensititre ESBL antimicrobial susceptibility testing panel inocula were prepared from colonies grown on both *Brilliance* ESBL Agar and CBA plates. QC testing was performed following the manufacturer's instructions and CLSI M100-S21[2].

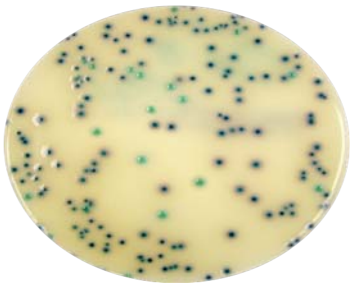
Results

Brilliance ESBL Agar has previously proven to be a valuable screening method for detection of ESBL-producing Enterobacteriaceae, with a sensitivity and specificity of ≥95%[3].

The Sensititre ESBL antimicrobial susceptibility testing panel correctly differentiated all ESBL-producing isolates that grew on *Brilliance* ESBL Agar from those containing other resistance mechanisms.

For 500 observations, the MIC was unaffected by inoculation of Sensititre ESBL antimicrobial susceptibility testing panel directly from selective *Brilliance* ESBL Agar compared to the non-selective CBA. The majority of observed MICs from these two procedures were within one doubling dilution, producing a 97% essential agreement.

FIGURE 2. *Brilliance* ESBL Agar



Conclusions

The Sensititre ESBL antimicrobial susceptibility testing panel can be used as a direct confirmatory test for suspect organisms isolated on *Brilliance* ESBL Agar. The prior use of *Brilliance* ESBL Agar does not influence the MIC result. The combination of *Brilliance* ESBL Agar with the Sensititre ESBL antimicrobial susceptibility testing panel offers a rapid, simple solution for identification, confirmation and antimicrobial susceptibility testing of ESBL-producing organisms.

References

1.Goyal, A., Prasnad, K.N., Prasad, A., Gupta, S., Ghoshal, U., Ayvagari, A. (2009). Extended spectrum beta-lactamases in Escherichia coli and Klebsiella pnuemoniae and associated risk factors. Indian J Med Res. 129;695-700.

2.Clinical Laboratory Standards Institute. Performance Standards for Antimicrobial Susceptibility Testing, Twenty-first informational supplement (M100-S21).

3.Huang, T-D., Bogaerts, P., Berhin, C., Guisset, A., Glupczynski, Y. Evaluation of Brilliance™ ESBL Agar, a Novel Chromogenic Medium for the Detection of Extended-Spectrum Beta-Lactamases-Producing *Enterobacteriaceae.* J. Clin. Micro. 48:6 2091-2096;

Thermo SCIENTIFIC