

Evaluation Of Thermo Scientific Sensititre Susceptibility MIC Plates For The MIC Determination Of Gram Negative Isolates For Amoxicillin, Amoxicillin/Clavulanic Acid, Cefotaxime, Meropenem and Piperacillin-Tazobactam

Oleksiuk, M.¹, Screen, J.¹, Scopes, E.¹, Bursens, J.².

¹Thermo Fisher Scientific, Basingstoke, Hants, UK. ²Thermo Fisher Scientific, Erembodegem, Belgium

Overview

Purpose: This study compared the performance of Thermo Scientific™ Sensititre™ susceptibility MIC plates using both manual (Thermo Scientific™ Sensititre Vizion™ system) and auto (Thermo Scientific™ Sensititre ARIS™ System) reading methods to broth microdilution MIC panels manufactured according to ISO 20776-1 to determine the MIC of Enterobacteriaceae, spp. Acinetobacter spp. and Pseudomonas spp.

Methods: Enterobacteriaceae spp., Acinetobacter spp. and Pseudomonas spp. were tested on Sensititre susceptibility MIC plates and broth microdilution MIC panels containing amoxicillin, amoxicillin/clavulanic acid (constant 2), cefotaxime, meropenem and piperacillin-tazobactam (constant 4).

Results: Sensititre susceptibility MIC plates showed greater than 90% essential agreement and categorical agreement with broth microdilution for all antimicrobials tested.

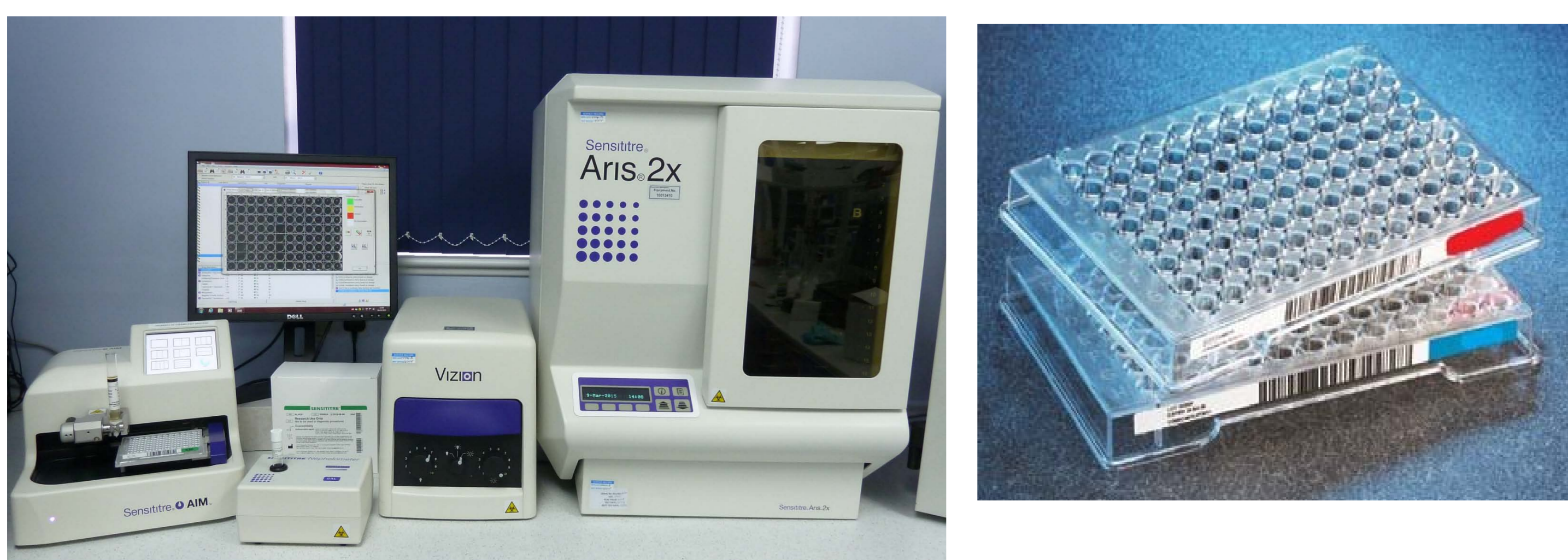
Introduction

Automated or semiautomated systems have been widely used for species identification and susceptibility testing in many laboratories¹. The Sensititre System is a leader in antimicrobial susceptibility and identification testing, offering flexible, customizable testing options to accommodate laboratories of all sizes².

Methods

Sensititre susceptibility MIC plates and broth microdilution MIC panels were manufactured to contain amoxicillin, amoxicillin/clavulanic acid (constant 2), cefotaxime, meropenem and piperacillin-tazobactam. Enterobacteriaceae, spp., Acinetobacter spp. and Pseudomonas spp. were cultured onto Columbia Blood Agar and incubated at 36 ±1°C for 18-24 hr. A 0.5 McFarland suspension of each isolate was prepared using Sensititre demineralised water and diluted to give a final inoculum of 5x10E4 - 5x10E5 cfu/ml for the Sensititre susceptibility MIC plates (according to the technical insert) or 2x10⁵ – 8x10⁵ cfu/ml for broth microdilution MIC panels (according to ISO 20776-1). Sensititre susceptibility MIC plates and broth microdilution MIC panels were inoculated using the Thermo Scientific™ Sensititre AIM™ and incubated at 36 ±1°C for 18-19 hr.

FIGURE 1. Sensititre AIM, Sensititre Nephelometer, Sensititre Vizion system, Sensititre ARIS System (left) and Sensititre susceptibility MIC plates (right).



Sensititre susceptibility MIC plates were read both manually (using the Sensititre Vizion system) and automatically (using the Sensititre ARIS System). Broth microdilution MIC panels were read manually. The essential agreement (EA) and categorical agreement (CA) of the Sensititre susceptibility MIC plates were calculated using the broth microdilution MIC panels as the reference method according to ISO 20776-2 criteria.

Results

Figure 2 shows the EA and CA of all antibiotics tested were greater than 90% with the EA of amoxicillin, cefotaxime and piperacillin-tazobactam (constant 4) being greater than 95%. The CA for amoxicillin, amoxicillin/clavulanic acid (constant 2) and cefotaxime were equal to or greater than 95%.

FIGURE 2. Comparison of results from Sensititre susceptibility MIC plates and broth microdilution MIC panels

Antimicrobial	Essential Agreement (%)		Categorical Agreement (%)	
	Manual (Sensititre Vizion) read	Automatic (Sensititre ARIS) read	Manual (Sensititre Vizion) read	Automatic (Sensititre ARIS) read
Amoxicillin	99.1	99.1	99.3	99.6
Amoxicillin/Clavulanic Acid (constant 2)	93.7	93.7	96.0	95.6
Cefotaxime	97.0	97.3	96.3	96.3
Meropenem	94.0	92.5	92.8	93.1
Piperacillin-tazobactam (constant 4)	96.7	96.1	93.4	94.3

Conclusion

Sensititre susceptibility MIC plates are a suitable alternative to broth microdilution MIC panels manufactured according to ISO 20776-1 for the determination of MICs of Enterobacteriaceae spp., Acinetobacter spp. and Pseudomonas spp. for amoxicillin, amoxicillin/clavulanic acid (constant 2), cefotaxime, meropenem and piperacillin-tazobactam (constant 4).

References

1. Sapino, B., Mazzucato, S., Solinas, M., Gion, M., Grandesso, S. (2012) Comparison of different methods for determining beta-lactam susceptibility in Pseudomonas aeruginosa. New Microbiologica, 35, 491-494.
2. Thermo Scientific Sensititre Susceptibility and Identification System brochure LT2013A/CS/02/12.

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