An Equivalency Study of GAR 936, Minocycline, and Piperacillin on the Sensititre™ Dried Susceptibility Panels as Compared to NCCLS Microdilution Method

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ABSTRACT

An in-house evaluation was undertaken to compare the performance of three antimicrobials: GAR 936 (0.008-64µg/mL), Minocycline (0.03-128µg/mL), and Piperacillin (0.06-256µg/mL) on the dried Sensititre 18–24 hour Susceptibility Panel verses the NCCLS (M7-A5) broth microdilution method. The evaluation consisted of 97 isolates, gram positive and gram negative, as well as fastidious strains from Wyeth-Ayerst Research. The isolates were chosen to represent an MIC at or near the sensitive, intermediate, and resistant breakpoints for these antimicrobials. The study also included the standard ATCC quality control strains for microdilution susceptibility testing which were run as controls on each day of testing. Essential agreements were calculated using the ± 1 well dilution standard for comparison studies. The overall agreement rates for the three antimicrobials evaluated were as follows for initial and after re-testing respectively: GAR 936, 95% and 100%, Minocycline, 93% and 100%, and Piperacillin, 95% and 100%.

This evaluation indicates that the performance of GAR 936, with the other antimicrobials on the dried Sensititre 18–24 hour Susceptibility Panel is equivalent to the NCCLS reference broth microdilution method.

Introduction

This comparison study aims to validate the performance of the commercially manufactured Sensititre dried 18-24 hour Susceptibility Panel using the NCCLS reference microdilution method as the standard (M7-A5).

Materials & Methods

Wyeth-Ayerst provided 97 isolates to Trek Diagnostic Systems

Gram Positive		Gram Negative	
1	*Enterococcus casseilflavus*	*2*	*Burkholderia cepacia*
5	*Enterococcus faecalis*	*2*	*Citrobacter diversus*
7	*Enterococcus faecium*	*2*	*Citrobacter freundii*
2	*Enterococcus gallinarum*	*2*	*Enterobacter aerogenes*
2	*Enterococcus raffinosus*	*2*	*Enterobacter cloace*
6	*Staphlococcus aureus (MRSA)*	*10*	*Escherichia coli*
4	*Staphlococcus aureus (MSSA)*	*2*	*Hafnia alvei*
6	*Staphlococcus epidermidis (MRSE)*	*2*	*Klebisiella oxytoca*
4	*Staphlococcus epidermidis (MSSE)*	*3*	*Klebisiella pneumoniae*
5	*Staphlococcus species (CNS)*	*2*	*Morganella morganii*
5	*Streptococcus agalactiae*	*3*	*Proteus mirabilis*
3	*Streptococcus pneumoniae Pen:S*	*2*	*Proteus retgerii*
3	*Streptococcus pyogenes*	*2*	*Proteus vulgaris*
		4	*Pseudomonas aeruginosa*
		2	*Serratia marcescens*
		2	*Stenotrophomonas maltophilia*

Atimicrobials Tested and Source:

ANTIMICROBIALS	BATCH NUMBER	MANUFACTURER
GAR 936	OC8698	Wyeth-Ayerst, Pearl River, NY
Minocycline	10K1585	Sigma, St. Louis, MO
Piperacillin	38H1058	Sigma, St. Louis, MO

Antimicrobial Ranges

Antimicrobials	Range Tested
GAR 936	**0.008-64**
Minocycline	**0.03-128**
Piperacillin	**0.06-256**

QC Isolate Ranges

QC ISOLATES	ATCC NUMBERS	GAR 936 (µg/ml)	MIN (µg/ml)	PIP (µg/ml)
Staphylococcus aureus	ATCC 29213	0.03-0.25	0.06-0.5	1-4
Enterococcus faecalis	ATCC 29212	0.03-0.12	1-4	1-4
Escherichia coli	ATCC 25922	0.03-0.25	0.25-1	1-4
Pseudomonas aeruginosa	ATCC 27853	----------	---------	1-8
Streptococcus pneumoniae	ATCC 49619	0.016-0.12	---------	-----

Susceptibility Testing Methods:

- The inoculum procedure for the Sensititre susceptibility panel was followed using the Sensititre 18 – 24 hour susceptibility panel package insert.
- NCCLS M7-A5 was used for the reference microdilution panels.
- The appropriate medium/organism combinations, according to the NCCLS M7-A5 were utilized.
- Quality Control isolates were tested daily on both the Sensititre and reference panel.
- All 97 isolates were tested on both the reference and the Sensititre panels. All organism/antimicrobial combinations that resulted in a greater than ± 1 well dilution error were re-tested on both the dried and reference panel. QC organisms were tested concurrently. The same inoculum suspension was used to inoculate both panels.

Results

% Essential Agreement Before Retests

Isolate and Number	Tested	GAR	MIN	PIP
Enterobacteriaceae	36	93%	100%	86%
Non- Enterobacteriaceae	8	100%	83%	83%
***Staphylococcus* spp.**	25	86%	70%	93%
***Enterococcus* spp.**	17	97%	94%	100%
S. pneumoniae	3	100%	100%	100%
***Streptococcus* spp.**	8	90%	100%	100%

% Essential Agreement After Retests

Isolate and Number	Tested	GAR	MIN	PIP
Enterobacteriaceae	36	100%	100%	100%
Non- Enterobacteriaceae	8	100%	100%	100%
***Staphylococcus* spp.**	25	100%	100%	100%
***Enterococcus* spp.**	17	100%	100%	100%
S. pneumoniae	3	100%	100%	100%
***Streptococcus* spp.**	8	100%	100%	100%

Conclusions

- This study validates that the Sensititre 18-24 hour dried susceptibility panel is equivalent to the NCCLS reference microbroth dilution method.
- For the 3 antimicrobials tested, the overall agreement for the gram negative isolates after re-testing was 100%, with the gram positive isolates the overall agreement was 100%, and with the fastidious isolates the overall agreement was 100%.

References

1. National Committee for Clinical Laboratory Standards. 2000. Approved Standard M7-A5. Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria that Grow Aerobically-Fifth Edition. NCCLS, Villanova, Pa.