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Evaluation of four commercial methods for colistin susceptibility testing

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BACKGROUND

Acquired resistance to colistin in enterobacterial isolates is rising. There is however no optimal method for susceptibility testing. The joint CLSI-EUCAST Polymyxin Breakpoints working group recommends broth microdilution like Sensititre®, but studies on other commercial testing methods are limited (1). The aim of this study is the evaluation of four different commercial methods to help selection.

MATERIAL AND METHODS

Susceptibility testing was performed on a collection of 40 clinical isolates of *Enterobacteriaceae* from AZ Groeninge hospital, Belgium. Colistin MIC was determined in parallel by four methods: two automated methods (AST-N236,

Vitek2® (Biomérieux) and Phoenix® (BD)) and two microdilution methods (Umic® (Biocentric) and SensiTest® (ELITech))* Microdilution by Sensititre® (Thermo Fisher) was used as reference method, in line with EUCAST recommendations. All susceptibility methods were performed according to manufacturers' instructions. MIC results were interpreted using the breakpoints by the joint CLSI-EUCAST working group. *In house* real-time PCR for detection of *mcr* genes (*mcr-1* to *mcr-4*) was performed on colistin resistant isolates.

RESULTS

Twenty isolates exhibited susceptibility to colistin and 20 isolates acquired resistance from which 7 were *mcr-1* positive *E. coli* isolates. The essential and categorical agreements are shown in table 1. With Vitek 2®, Phoenix® and Umic® false susceptible results were found. These isolates had a MIC of 2 mg/L on Vitek 2® and Umic®, but a MIC of 4 mg/L on Sensititre®. Both isolates were *mcr-1* positive. The false sensitive result on Phoenix® also had a MIC of 2 mg/L, but a MIC of >8 mg/L on Sensititre®.

	EA	CA	#ME	#VME
Vitek2®	97,5%	97,5%	0	1
Phoenix®	97,5%	97,5%	0	1
Umic®	92,5%	97,5%	0	1
Sensitest®	97,5%	100%	0	0

Table 1. Essential (EA) and categorical agreement (CA) between Sensititre® and Vitek 2®, Phoenix®, Umic® and Sensitest® along with the number of major (ME) and very major errors (VME).

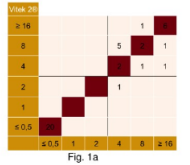

Fig. 1a

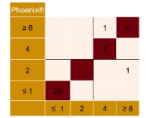

Fig. 1b

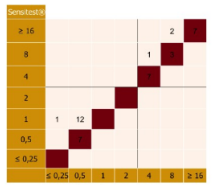

Fig. 1c

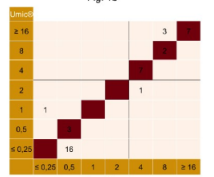

Fig. 1d

Fig. 1a-1d. Correlation for MIC colistin values between between Vitek 2® (fig. 1a), Phoenix® (fig. 1b), Umic® (fig. 1c) and Sensitest® (fig. 1d) as test method and Sensititre® as reference method.

CONCLUSION

All test methods showed good essential and categorical agreements. With exception of the Sensitest® method, MIC results within one-dilution step below the S breakpoint however may indicate false susceptibility, especially in *mcr-1* positive isolates, leading to very major errors. Such results need confirmation by another well-validated method.

REFERENCES 1. Poirel L *et al.* Polymyxins: antibacterial activity, susceptibility testing, and resistance mechanisms encoded by plasmids or chromosomes. Clin Microbiol Rev 2017;30:557-596.

* SensiTest (ELITech):
The product mentioned in this poster was produced by Liofilchem and was initially called SensiTest.
However the SensiTest™ trademark belongs to Thermo Fisher, therefore after ECCMID 2018 Liofilchem changed the product name from SensiTest to ComASP without altering any technical characteristics of the product.
The ComASP™ trademark belongs to Liofilchem.
ELITech is a commercial distributor of Liofilchem products in Belgium.