The Association for Mass Spectrometry: Applications to the Clinical Lab

An LC-MS/MS Method for Simultaneous Measurement of Five Antimicrobial Drugs (Vancomycin, Gentamicin, Amikacin, Linezolid and Teicoplanin) for TDM.

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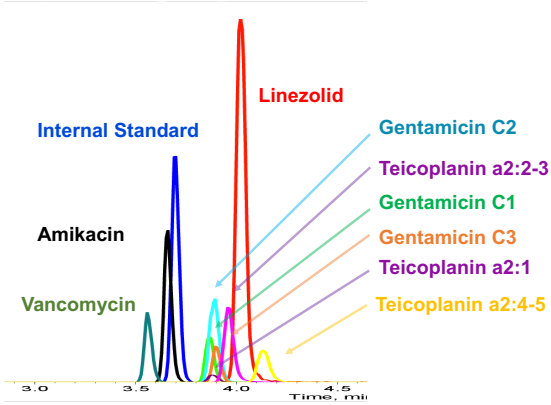
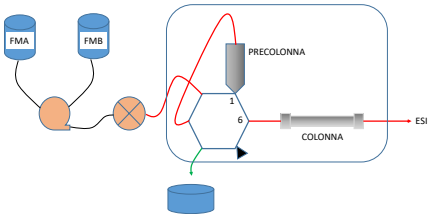
Introduction

LC-MS/MS is pivotal for measuring any xenobiotic molecule in biological fluid. Besides its incontrovertible advantages there is usually the need to rely on an isotopically-labeled internal standard for mitigating any matrix and/or recovery issues. Nonetheless these labeled compounds can pose availability and cost constraints when related to newly-introduced pharmaceutical drugs. Hereby we present the results achieved by a new protocol for measuring the nowadays most used antibiotic drugs.





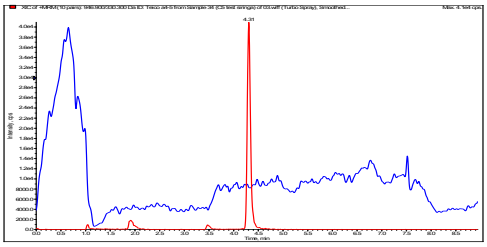
Method

Method relies on a commercially available kit centered on:
- A protein precipitation sample preparation.
- A special plumbing for a quick on-line sample clean-up.
- The addition of a single internal standard, not an isotopologue.

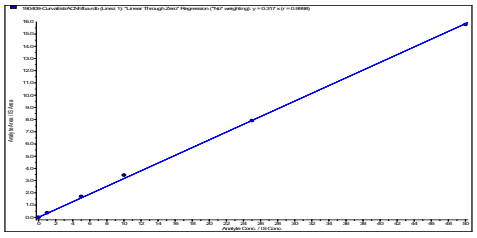
Results

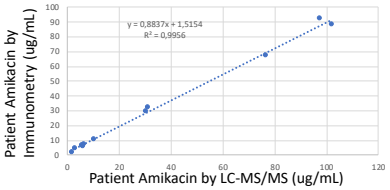
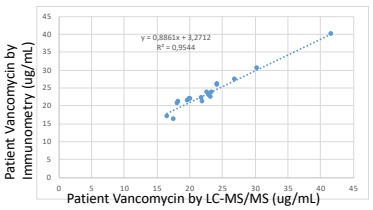
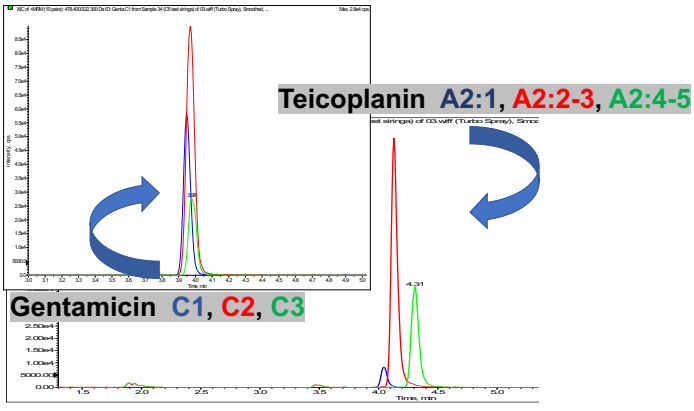
- Verified through post-column standard addition as Ion-suppression negligible.
- Adequate linearity and LLOQ for all the drugs and good precision.

	AMIKACIN	VANCOMYCIN	TEICOPLANIN	GENTAMICIN	LINEZOLID
LLOD (ng/ml)	6,9	25,1	13,7	0,94	2,1
LLOQ (ng/ml)	23,0	83,7	45,7	3,13	7,2
Linearity (µg/ml)	1 - 50	2 - 100	2 - 100	0,2 - 10	1 - 50



ANALYTE	LEVEL	AVG CONC. (µg/mL)	CV% Intra	CV% Inter	CV% Total
Amikacin	Basso	2,5	5,6%	8,1%	9,8%
	Medio	6,3	7,1%	7,4%	10,3%
	Alto	32,7	6,0%	7,9%	9,9%
Vancomycin	Basso	4,4	5,2%	10,0%	11,3%
	Medio	11,7	5,5%	11,0%	12,3%
	Alto	56,7	4,3%	8,8%	9,8%
Teicoplanin	Basso	3,7	4,4%	10,4%	11,3%
	Medio	10,4	4,5%	8,4%	9,5%
	Alto	49,9	3,8%	6,7%	7,7%
Gentamicin	Basso	0,47	4,5%	6,1%	7,6%
	Medio	1,22	5,9%	8,1%	10%
	Alto	6,19	3,8%	8,9%	9,7%
Linezolid	Basso	3,0	6,5%	9,0%	11,1%
	Medio	7,8	2,1%	6,8%	7,1%
	Alto	30,8	1,9%	7,2%	7,4%



Conclusion

- Good correlation with Immunometry on patient samples (slope = 0.89 for measured Amikacin and Vancomycin).
- Homologues of Gentamicin and Teicoplanin resolved.