Contemporary North American *Mycoplasma hyopneumoniae* MICs

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Key points:

- Antibiotic susceptibility profiles of eleven *M. hyopneumoniae* isolates circulating in the US within the most recent six years were obtained.
- Overall, a high *in vitro* efficacy of the tested antimicrobials against *M. hyopneumoniae* field isolates was observed.

Background

Mycoplasma hyopneumoniae (*M. hyopneumoniae*) is the causative agent of enzootic pneumonia, which has a recognized negative effect on productive performance and economic revenue in finishing pigs (1). Control of *M. hyopneumoniae* infections is usually attempted in various ways, including optimization of management practices, use of vaccines, and treatment with antibacterial compounds. Moreover, protocols for eradication of *M. hyopneumoniae* incorporate the use of antimicrobials (2).

Information about antimicrobial susceptibility is largely limited, as *M. hyopneumoniae* is especially hard to culture and antibiograms are not routinely performed. Indeed, the most current publicly available data on antimicrobial susceptibility for *M. hyopneumoniae* isolates from the US is dated several decades ago (3). In this context, the aim of this study was to determine the *in vitro* susceptibility to different antibiotics of *M. hyopneumoniae* contemporary isolates originating from clinical cases in the US.

Materials and Methods

Eleven *M. hyopneumoniae* field isolates were obtained from US swine clinical specimens dating within the last six years. Minimum inhibitory concentration (MIC) values of the examined antibiotics against the isolates were determined by microbroth dilution method (4). Briefly, 100 µL of the appropriate antimicrobial solution were distributed into the corresponding well of microtiter plates, with a final range of antimicrobials from 0.001 to 64 mg/L. The test was accomplished on 10^4 CCU/mL of each isolate. All isolates were tested in three independent replicates. For each isolate, a positive (growth) control was included by adding 100 µL of culture in a well with no antimicrobial. For negative (uninoculated) controls, two wells were filled with 200 µL of sterile medium. *M. hyopneumoniae* strain 11 (ATCC 25095) was used as reference for the MIC test. Plates were incubated at 37°C up to 14 days.

Results

The highest variance in the MIC values obtained was observed for tilmicosin and oxytetracycline, whereas the lowest variance was recorded for tylvalosin (Table 1). Compared with ATCC 25095, the *M. hyopneumoniae* US isolates MIC_{90} values were higher for all compounds but for tilmicosin, lincomycin, oxytetracycline and tiamulin. The highest MIC_{90} values for *M. hyopneumoniae* US isolates were achieved at ≤8 µg/mL for tilmicosin and oxytetracycline, whereas the lowest were recorded at ≤0.016 µg/mL for tylvalosin.

Table 1. MIC values for the reference strains (ATCC), MIC range and MIC_{90} values (mg/L) for *M. hyopneumoniae* isolates from the US. The MIC_{90} value corresponds to the antimicrobial concentration that inhibited the growth of 90% of the isolates (in this case, 10 out of 11).

Antimicrobial	MIC parameter (µg/mL)		
	ATCC 25095	MIC range	MIC_{90}
Enrofloxacin	0.062	0.031 - 0.5	≤0.5
Marbofloxacin	0.062	0.031 - 2	≤2
Tylosin	0.25	0.031 - 0.25	≤0.25
Tilmicosin	8	0.031 - 8	≤8
Tulathromycin	0.25	0.031 - 0.25	≤0.125
Tylvalosin	0.008	0.008 - 0.031	≤0.016
Lincomycin	0.5	0.031 - 0.5	≤0.5
Oxytetracycline	0.031	0.125 - 8	≤8
Tiamulin	0.125	0.016 - 0.125	≤0.125
Florfenicol	2	0.031 - 2	≤2

Discussion and conclusions

This study presents the antibiotic susceptibility profiles of *M. hyopneumoniae* isolates circulating in the Midwest region of the US. Overall, a high *in vitro* efficacy of the tested agents against *M. hyopneumoniae* was observed. Results from this study represent a renewed step towards appropriate and accurate antibiotic treatment in the event of mycoplasma diseases in swine.

References

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