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Minimum Inhibitory Concentration determination for ceftiofur, spectinomycin, and lincomycin/spectinomycin 1:2 against *Actinobacillus suis* and *Haemophilus parasuis*.

Salmon SA¹, Libal MC², Klinefelter T², Bosch GJ¹, Bradford JR¹, Watts, JL¹, Hoffman LJ²

¹ Pharmacia&Upjohn, Kalamazoo, MI; ² Iowa State University Diagnostic Laboratory, Ames, IA

Minimum Inhibitory Concentrations (MIC) are of importance in therapeutic selection, dose determination and retreatment interval. MIC₉₀ is the concentration of the antibiotic required to inhibit growth of at least 90% of the isolates tested in the laboratory. The MIC₉₀ of a large number of clinical isolates can indicate unique *in vitro* activity of a particular antibacterial against a specific bacterial species. MICs are also used by diagnostic laboratories to report *in vitro* results of susceptibility testing. The interpretive categories for susceptibility testing are reported as susceptible, intermediate or resistant. Breakpoint concentrations approved by the National Committee for Clinical Laboratory Standards (NCCLS) are based on three criteria: MIC, pharmacokinetics, and *in vivo* efficacy data for each individual antibacterial agent.

In vivo Trial: Isolates of two emerging swine pathogens, *Actinobacillus suis* (n=77) and *Haemophilus parasuis* (n=76) were tested to determine the MIC₉₀ of ceftiofur, lincomycin and lincomycin/spectinomycin against these pathogens. The testing, done at the Iowa State University Diagnostic Laboratory; conformed to the guidelines established by NCCLS. The organisms used were isolated from infected swine in Iowa, North Carolina, California, and Indiana. Ceftiofur was highly active *in vitro* against the strains of *A. suis* and *H. parasuis* tested with MIC₉₀ of ≤ 0.06 $\mu\text{g}/\text{mL}$ against both swine pathogens. Spectinomycin was slightly more active against *H. parasuis* (MIC₉₀= 8.0 $\mu\text{g}/\text{mL}$) than against *A. suis* (MIC₉₀ of ≤ 32.0 $\mu\text{g}/\text{mL}$) The lincomycin/spectinomycin (1:2) combination was also slightly more active against *H. parasuis* strains (MIC₉₀=2.0/4.0 $\mu\text{g}/\text{mL}$) than against the strains of *A. suis* (MIC

₉₀=8.0/16.0 $\mu\text{g}/\text{mL}$). In conclusion, ceftiofur was highly active against the strains of *A. suis* and *H. parasuis* tested; spectinomycin and the lincomycin/spectinomycin combination demonstrated moderate activity *in vitro*.

Discussion: NCCLS approved breakpoints for ceftiofur have been determined in swine against *Actinobacillus pleuropneumoniae*, *Pasteurella multocida*, *Streptococcus suis*, and *Salmonella choleraesuis*. They are ≤ 2 $\mu\text{g}/\text{mL}$ (susceptible), 4 $\mu\text{g}/\text{mL}$ (intermediate) and ≥ 8 $\mu\text{g}/\text{mL}$ (resistant). The MIC₉₀ determined for *H. parasuis* and *A. suis* in this trial are similar to those for *P. multocida* and *A. pleuropneumoniae* indicating that infections of *H. parasuis* and *A. suis* should respond to the currently recommended dosage of ceftiofur.

NCCLS approved breakpoints for lincomycin have been determined in swine against streptococci as ≤ 0.25 $\mu\text{g}/\text{mL}$ (susceptible), 0.5 $\mu\text{g}/\text{mL}$ (intermediate) and ≥ 14 $\mu\text{g}/\text{mL}$ (resistant). For organisms other than streptococci, the breakpoints are ≤ 0.5 $\mu\text{g}/\text{mL}$ (susceptible), 1-2 $\mu\text{g}/\text{mL}$ (intermediate) and ≥ 4 $\mu\text{g}/\text{mL}$ (resistant). Clindamycin is used to test for susceptibility to lincomycin. NCCLS approved breakpoints have not been determined for spectinomycin or the lincomycin/spectinomycin combination for swine pathogens.