Minimum Inhibitory Concentrations of Cefotaxime and Gentamicin against Escherichia coli and Salmonella spp. isolated from diarrheic Pigs

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Introduction
Pathogenic bacteria cause infectious diseases, leading to health problem and massive production and economic losses in pig farming system. Antimicrobial agent administration is still one of preferential choices for treatment and control of the bacterial diseases. In order to effectively use of antimicrobials, an in vitro antimicrobial susceptibility is ought to be tested before implementing the treatment plan. The minimum inhibitory concentrations (MIC) testing of bacteria also provides useful information to direct the prudent use of antimicrobials in pig production. Therefore, the aim of this study was to determine the MICs for 2 antimicrobial agents: cefotaxime and gentamicin against Escherichia coli and Salmonella spp, the pathogenic bacteria recently isolated from diarrheic pigs in Thailand.

Materials and methods
Bacteria: All tested bacteria were isolated from specimens from clinical cases submitted to Livestock Animal Hospital, Faculty of Veterinary Science, Chulalongkorn University, Thailand, during year 2010. The bacterial identification was performed using standard biochemical method. All bacterial strains were preserved at -80 °C freezer before use. The bacteria were cultivated on tryptic soy agar (TSA, Oxoid, UK) supplemented with 5% sheep blood. After incubation at 37°C for 18-24 hours, a loopful of bacterial colony was suspended in Muller Hinton Broth (MHB; Difco Lab, USA) and the cell density was adjusted to McFarland standard 0.5, or approximately 10^8 CFU/ml. The inocula were then diluted ten-fold in sterile normal saline, giving a final cell density of approximately 10^5 CFU/ml.

Antimicrobial Agents: The antimicrobials tested were cefotaxime and gentamicin (Sigma Chemical Co., USA). A serial two-fold dilution of antimicrobials dissolved in the appropriate solvent was processed according to CLSI.

Minimum Inhibitory Concentration (MIC): The procedures were in accordance with the international recommendations provided by the Clinical and Laboratory Standards Institute (CLSI). Mueller Hinton Broth (MHB) with two-fold agents was inoculated with the standardized inoculums of the isolates to be tested. After incubation for 18-20 hour, the MIC was determined as the lowest concentration of the antimicrobial in the tube with no visible growth of bacteria.

Result and Discussion
The MICs of cefotaxime and gentamicin against 20 E. coli and 20 Salmonella spp. isolated from diarrheic pigs is shown in Figure 1. Approximately 60% of E. coli and 40% of Salmonella spp. were susceptible to cefotaxime. A lesser extent was found when tested with gentamicin as only 20% of E. coli and 15% of Salmonella spp. were susceptible. E. coli was apparently susceptible to both antimicrobials than Salmonella spp.

In conclusion, the MIC obtained in this study provides a guideline for therapeutic use of both antimicrobials under field conditions.

Figure 1 Determination of MICs against cefotaxime (CTX) and gentamicin (GEN) against 20 Salmonella spp isolated from diarrheic pigs (upper panel) and 20 E.coli isolates associated with pig disease (lower panel).

References

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