Antibacterial activities of aditoprim against pathogenic bacteria from pigs, chickens, calves, sheep and fish

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Aditoprim (ADP) is an antibacterial dihydrofolate reductase inhibitor. However, the antibacterial activities and spectrum of ADP and its metabolites have not been systematically studied yet. Here, the in vitro antibacterial activities of ADP and its main metabolites (ADP₁, ADP₂ and ADP₃) were assayed against common animal pathogens. It was shown that Salmonella and Streptococcus from swine, Escherichia coli and Salmonella from chickens, E. coli, Streptococcus, Mannheimia, Pasteurella from calves, Pasteurella and Mannheimia from sheep, and E. coli, Flavobacterium columnare, and Yersinia ruckeri from fish were highly susceptible to ADP (MIC or MIC₅₀≤4 μg/mL). Haemophilus parasuis from swine, Staphylococcus aureus, Aeromonas punctate, Mycobacterium tuberculosis, Streptococcus agalactiae from fish, and Klebsiella from calves and sheep showed moderate susceptibility to ADP (MIC or MIC₅₀=8~16 μg/mL), whereas E. coli, Actinobacillus pleuropneumonia, Pasteurella, S. aureus, Clostridium perfringens from swine, S. aureus, C. perfringens from chickens, and S. aureus from calves were resistant to ADP. ADP₁ and ADP₂ showed equal activities to those of their parent compound, while ADP₃ exhibited no antibacterial activity. The killing effect of ADP against Streptococcus suis CVCC607 (MIC=2 μg/mL, MPC=12.8 μg/mL) is concentration-dependent. The post-antibiotic-effect (PAE) of ADP exhibited a positive correlation with the concentration and exposure time of ADP to S. suis CVCC607, and elongated in combination use with sulfamethoxazole. This study firstly showed that ADP had strong and broad spectrum antibacterial activity and had potential to be used in the treatment of streptococcosis in swine.

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