Antibiotic growth promoters and tannin susceptibility of *Clostridium perfringens* isolates of bovine and poultry.

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Abstract:
Antibiotics have been included in the formulation of feed for livestock production for more than 40 years as a strategy to improve feed conversion rates and to reduce costs. The use of antimicrobials as growth promoting factors (AGP) in subtherapeutic doses for long periods is particularly favorable for the selection of antimicrobial resistant microorganisms. Tannins added in the diet are being used to improve nutrition and health in farm animals as an alternative to antibiotic growth promoters and to control enteric clostridial diseases. This study was undertaken to determine the in vitro susceptibility of *Clostridium perfringens* to antimicrobials and tannin based additives used in poultry production. Susceptibility to 7 AGPs (antimicrobial growth promoters), 9 therapeutic antimicrobials and 2 tannin based extracts was determined for 30 *C. perfringens* strains isolated from poultry and cattle. Statistical analyses and MIC distributions showed reduced susceptibility to avilamycin, bacitracin, josamycin and lincomycin in some isolates. Reduced susceptibility to avilamycin (66,7%), bacitracin (77,8%) and flavomycin (44,4%) was identified in chicken, whereas bovine isolates had reduced susceptibility only to tetracycline. No clear reduced susceptibility, but elevated MIC50 for ampicillin and trimetoprim-sulphamethoxazole was found in chicken isolates in comparison with isolates from cattle. Lower susceptibility to these antimicrobials was highly correlated with an increased resistance to bacitracin and others AGPs. Tannin susceptibility of *C. perfringens* isolates from both animal species revealed no statistically significant differences in MIC distributions. The results presented suggest that antibacterial activity of tannins against C. perfringens could be effective during long periods of time because it would be difficult for these anaerobic Gram positive bacteria to develop resistance. Besides the benefits over productive parameters and animal health, tannins added to feed could be a better alternative to antimicrobial growth promoters as the rotation due to increased resistance would not be necessary.

Keywords: Poultry, cattle, Clostridium perfringens, antimicrobial growth promoter, antimicrobial resistance.

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