Title: MINIMAL INHIBITORY AND BACTERICIDAL CONCENTRATION OF ETHANOLIC EXTRACTS OF PROPOLIS COLLECTED IN THE RIO GRANDE DO SUL STATE, BRAZIL

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Abstract

Propolis is a resinous substance composed by salivary secretions, wax and pollen produced by honey bee. This natural product has a wide biological activity, especially as antimicrobial agent, which is modulated by a complex and variable chemical composition, influenced by the available regional flora as well as the seasonal variations. The aim of this study was to investigate the antimicrobial activity of 14 ethanol extracts of propolis (EEP) against four bacterial genera of medical importance. Two samples of gross propolis where collected from each one of the seven mesoregions of Rio Grande do Sul State, Brazil. Eight strains were tested including: *Escherichia coli* ATCC 8739 and *E. coli* APEC 31 (avian pathogenic); *Staphylococcus aureus* ATCC 25923 (positive for *IcaD* gene) and *S. aureus* isolated from bovine mastitis (positive for *IcaA* gene) - both genes from the *ica*ABCD group, responsible for the intracellular adhesion-; *Rhodococcus equi* ATCC 33071 (positive for *vapA* gene) and *R. equi vapA* negative; and two *Aeromonas hydrophyla* strains, both isolated from lesions on *Rhamdia quelen*. The minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) of each EEP was evaluated by broth microdilution. In all of the strains tested, the MIC ranged from 0.025 up >6.4mg/mL, the MIC_{50} was 0.8 mg/mL and the MIC_{90} was 6.4 mg/mL. The MBC ranged from 0.2 up >6.4 mg/mL and the MBC_{50} and MBC_{90} were >6.4 mg/mL. The lowest MIC value was observed for *R. equi* followed by *S. aureus*, *A. hydrophila* and *E. coli*. However, the lowest MBC value was verified against *A. hydrophila* followed by *R. equi*, *S. aureus* and *E. coli*. It is important to highlight that the most resistant strain was *E. coli* APEC 31. The higher EEPs' antimicrobial activity according to mesoregions was observed for Central-east > Central-west > Metropolitan > Southeast > Northwest > Northeast > Southwest. One EEP from the Central-east mesoregion showed the best antimicrobial activity, with MIC_{50} 0.1 mg/mL and MBC_{50} 1.6 mg/mL. Based on the preliminary results obtained in this study, the authors intend to develop new tests, increasing the number of bacterial isolates tested, as well as the number of propolis samples from each mesoregion. Hereafter, we are planning to determine if there is a significant difference among the EEPs, especially according to its geographic origin and the microorganisms analyzed.

Keywords: *Aeromonas hydrophila*, Antimicrobial Activity, *Escherichia coli*, *Rhodococcus equi*, *Staphylococcus aureus*.

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