

TITLE: Determination of antibacterial and antioxidant activities of propolis extracts from stingless bees native to Brazil.

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ABSTRACT

Propolis is produced from natural resins collected from vegetation, combined with bee saliva. Among the native propolis, Mandaçaia (*Melipona quadrifasciata*) and Jataí (*Tetragonisca angustula*) are among the most found propolis species in Brazil. Even the chemical components of propolis extracts contribute to the antimicrobial activities that currently, the issue of bacterial resistance to conventional antimicrobials makes the search for new antimicrobial drugs and therapeutic innovations urgent. The 4 samples of propolis extracts (EP) were obtained from meliponaries: 1 EP of jataí and 1 EP of mandaçaia from Distrito Federal, 1 EP of jataí from Paraná and 1 EP of mandaçaia from Santa Catarina. The antibacterial activity of the PE was verified by Determination of the Minimum Bactericidal Concentration (MBC). The inocula used were bacterial strains: *Staphylococcus aureus* ATCC 25923, *Streptococcus mutans* ATCC 25175 (Gram-positive), and *Klebsiella pneumoniae* ATCC BAA-1706 and *Salmonella enterica* ATCC 14028 (Gram-negative). The antioxidant activity of PE was evaluated through the reduction of 1,1-diphenyl-2-picrylhydrazyl (DPPH) and 2,2'-azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) radicals. Tests were performed in triplicate and results expressed as mean in mM/mg TEAC (Trolox Equivalent Antioxidant Capacity). All EP in this study showed bactericidal activity against the Gram-positive and Gram-negative bacteria tested. Regarding Gram-positive bacteria, the CBM values of the PE of mandaçaia were <0.2 mg/mL for both *S. aureus* and *S. mutans*. And the jataí EP showed CBM values of 0.3-0.5 mg/mL for *S. aureus* and 0.25-0.3 mg/mL for *S. mutans*. For the mandaçaia PE, the CMB values were 0.3 mg/mL for Gram-negative bacteria (*K. pneumoniae* and *S. enterica*). The jataí PE presented CBM of 0.3-0.5 mg/mL for both *K. pneumoniae* and *S. enterica*. Regarding the antioxidant activity, the mandaçaia EP showed higher antioxidant activity than the jataí EP. For the mandaçaia PE, the results ranged from 35.32 to 42.33 mM/mg TEAC for ABTS and from 1.62 to 4.11 mM/mg TEAC for DPPH. And for the jataí EP, the results ranged from 1.88 to 2.22 mM/mg TEAC for ABTS and from 0.12 to 0.20 mM/mg TEAC for DPPH. Therefore, the extracts of mandaçaia and jataí showed bactericidal activity to Gram-positive and Gram-negative bacteria, as well as the jataí extract in oxidizing activity, therefore, the activities positively allow the development of new strategies in antimicrobial therapies with extracts of propolis from stingless bees native to Brazil.

Keywords: Propolis, Anti-Infective Agents, Antioxidants, Gram-Positive Bacteria, Gram-Negative Bacteria.

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