



## ANTIMICROBIAL ACTIVITY OF COMMERCIAL STINGLESS BEE PROPOLIS EXTRACT IN ASSOCIATION WITH SILVER NANOPARTICLES

I Integrative International Congress on Animal and Environmental Health, 1ª edição, de 25/06/2024 a 28/06/2024  
ISBN dos Anais: 978-65-5465-100-4

**GUSMÃO; Jandria Gabriela Vieira Gusmão<sup>1</sup>, PEREIRA; Gabriel Martins Pereira<sup>2</sup>, ABREU; Ana Cláudia Souza Abreu<sup>3</sup>, PEIXOTO; Andreza da Silva Peixoto<sup>4</sup>, SARMENTO; Anna Célia Oliveira Sarmiento<sup>5</sup>, TERCETI; Mateus de Souza Terceti<sup>6</sup>, FERNANDES; Graciene do Socorro Taveira Fernandes<sup>7</sup>**

### RESUMO

Propolis has antimicrobial and anti-inflammatory properties and has been studied and used in traditional medicine for centuries. Recently, the association of propolis with silver nanoparticles has been explored to increase its effectiveness in combating bacterial and fungal strains resistant to conventional treatments. Combining propolis (EP) with silver nanoparticles (AgNPs) can enhance the antimicrobial effects of both components. AgNPs provide a controlled release of the metal, prolonging the antimicrobial activity. Furthermore, propolis can act as a vehicle to transport AgNPs to the site of infection, improving their effectiveness. This work aimed to analyze the antimicrobial capacity of *Scaptotrigona depilis* bee EP sold in association with AgNPs against standard strains of *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Candida albicans*. An aqueous solution of AgNO<sub>3</sub> was prepared at a concentration of 3 mM, which was mixed with EP in test tubes in the proportions of 1:9, 1:4, and 2:3 and incubated in a water bath at 80 °C for 60 minutes. Subsequently, the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (CBM)/Minimum Fungicide Concentration (CFM) tests were carried out. A microbial suspension at 0.5 on the McFarland scale was prepared with the selected strains inoculated in TSB® Kasvi broth. For the MIC, a ratio of 1:9 was used in a microdilution plate, which was incubated at 37 °C for 24 hours. The MIC and CBM/CFM tests were performed only with the EP for comparison purposes. The results of the synthesis of EP+AgNP's, by visual inspection, only the suspension in the proportion of 1:9 showed a color change, being one of the main indications of the formation of stable AgNP's, which was the suspension used to carry out the MIC tests, CBM and CFM. The analyses carried out with *S. aureus* and *P. aeruginosa* only with EP did not demonstrate inhibition; however, the *C. albicans* strain showed inhibition at dilutions of 1mL/mL-1 and 0.5 mL/mL-1, while CFM demonstrated that EP had no fungicidal activity at any dilution. As for the tests with EP+AgNP's, all strains studied showed inhibition at dilutions of 1mL/mL-1 and 0.5 mL/mL-1, and CBM and CFM at dilutions of 1 mL/mL-1, demonstrating that the association of propolis with AgNP's presents promising results in combating different bacterial and fungal strains. Due to the growing challenge of antimicrobial resistance, exploring alternative strategies, such as combining natural compounds and nanoparticles, may provide new approaches to treating infections.

**PALAVRAS-CHAVE:** Synergistic effects, Microbial resistance, Traditional medicine, Green synthesis

<sup>1</sup> Universidade Federal do Oeste do Pará , jandriagabriela@outlook.com

<sup>2</sup> Universidade Federal do Oeste do Pará , gabrielmartins28bio@gmail.com

<sup>3</sup> Universidade Federal do Oeste do Pará , claudia\_saraff@hotmail.com

<sup>4</sup> Universidade Federal do Oeste do Pará , andrezapeixoto9@gmail.com

<sup>5</sup> Universidade Federal do Oeste do Pará , oannacelia8@gmail.com

<sup>6</sup> Universidade Federal do Oeste do Pará , mateusterceti@gmail.com

<sup>7</sup> Universidade Federal do Oeste do Pará , gracienefernandes@hotmail.com

<sup>1</sup> Universidade Federal do Oeste do Pará , jandriagabriela@outlook.com  
<sup>2</sup> Universidade Federal do Oeste do Pará , gabrielmartins28bio@gmail.com  
<sup>3</sup> Universidade Federal do Oeste do Pará , claudia\_saraff@hotmail.com  
<sup>4</sup> Universidade Federal do Oeste do Pará , andrezaeixoto9@gmail.com  
<sup>5</sup> Universidade Federal do Oeste do Pará , oannacelia8@gmail.com  
<sup>6</sup> Universidade Federal do Oeste do Pará , mateusterceti@gmail.com  
<sup>7</sup> Universidade Federal do Oeste do Pará , gracienefernandes@hotmail.com