

EVALUATION OF THE CYTOTOXIC POTENTIAL OF DIFFERENT GEOPROPOLIS EXTRACTS IN AN IN VITRO MODEL OF GASTRIC CANCER

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Introduction: Gastric cancer is a global public health problem and the fifth most common type of neoplasm worldwide, being associated with high mortality rates. This burden is attributed not only to late diagnosis but also to the limited effectiveness of current treatments, highlighting the urgent need for the development of new therapeutic approaches. In this context, geopropolis—a mixture of propolis (composed of resins, plant exudates, and enzymes secreted by bees) with clay or soil—has emerged as a promising research target due to its reported antioxidant, antibacterial, and antineoplastic properties. These biological activities are largely associated with its rich composition of phenolic compounds and flavonoids. **Objectives:** To evaluate the cytotoxic effects of three different geopropolis extracts in an in vitro model of gastric cancer. **Methods:** Metastatic gastric cancer cells (AGP01) and non-neoplastic human embryonic kidney cells (HEK-293) were subjected to the MTT cell viability assay to assess the cytotoxic potential of three geopropolis extracts obtained from the bee species *Melipona flavolineata* (UA), *Melipona seminigra pernigra* (UBR), and *Melipona fasciculata* (UC). Cell cultures were treated with concentrations of 200, 100, 50, 25, 12.5, 6.25, and 3.125 µg/mL for 72 hours. Data were analyzed using nonlinear regression with a sigmoidal dose–response model to determine the mean inhibitory concentration (IC₅₀), using GraphPad Prism v9 software. Statistical comparisons were performed using one-way ANOVA followed by Bonferroni correction, with significance set at $p < 0.05$. Selectivity indices (SI) were also calculated to compare the effects on tumor and non-tumor cells. **Results:** The geopropolis extract derived from the UBR species showed an IC₅₀ of 8.3 µg/mL for AGP01 cells and 22.2 µg/mL for HEK-293 cells. For the UC species, the IC₅₀ exceeded 200 µg/mL for AGP01 and was 54.08 µg/mL for HEK-293. Similarly, the UA

species extract presented an IC₅₀ greater than 200 µg/mL for AGP01 and 27.05 µg/mL for HEK-293. Regarding selectivity, no selective cytotoxicity was observed for UC and UA extracts, whereas the UBR extract demonstrated high selectivity, with a selectivity index of 2.7. **Conclusion:** The geopropolis extract produced by *Melipona seminigra* exhibited high selective cytotoxic activity against metastatic gastric cancer cells, indicating its potential as a promising candidate for the development of more effective and selective antineoplastic therapies. Its preferential effect on tumor cells compared with non-tumor cells reinforces its therapeutic relevance, particularly for advanced stages of gastric cancer, where safer and more targeted treatment options are critically needed.

Keywords: Gastric cancer; geopropolis; treatment