EVALUATION OF SECONDARY METABOLITES ISOLATED FROM COLOMBIAN PLANTS AS A THERAPEUTIC ALTERNATIVE IN THE TREATMENT OF CANCER AND BACTERIA PATHOGEN CONTROL

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Cancer is the first or second leading cause of premature death (30–69 years) in 134 countries, and it ranks third or fourth in 45 countries, with ~10 million deaths/per year [1]. Nowadays, cancer treatment alternatives include surgery, radiotherapy, chemotherapy, immunotherapy, and targeted therapy [2]. Therefore, given the paradigm of cancer as a systemic disease, chemotherapy, and targeted therapy, used to eliminate metastatic cells, have assumed an essential role in treatment, which is why they have begun to focus more clearly [3].
On the other hand, antibiotics concerning secondary metabolites are produced mainly by microorganisms with many biological activities capable of interfering with the development of other living cells. According to research findings, antibiotics can promote cancer apoptosis, inhibit cancer growth and prevent cancer metastasis. For these reasons, antibiotics are increasingly being used to assist in the treatment of cancer [4]. However, there is a growing increase in bacterial resistance, so new potent and specific antimicrobials are needed.

This work proposes the exploration of Colombian diversity as an attractive alternative in the search for antimicrobial and cytotoxic compounds. Particular attention will be given to the use of industrial wood residues such as Abarco (Cariniana piriformis), Algarrobo (Hymenaea courbaril), Cedro (Cedrela odorata), Guayacán (Tabebuia chrysantha), Palma (Elaeis guianensis), Roble (Quercus robur), Sapán (Caesalpinia sappan) and Teca (Tectona grandis). These materials provide abundant and sustainable sources of bioactive and structurally diverse compounds.

Thus, bioguided fractionation and elucidation of the structure of secondary metabolites were carried out by chromatography and spectrometric techniques (TLC, Column, UPLC/MS, and NMR). Subsequently, the evaluation of antimicrobial and cytotoxic activity was achieved by MIC (Minimum Inhibitory Concentration) and MTT (Enzymatic Reduction to formazan) methods, using cell lines (Vero, Caco-2, HepG2, MCF-7, and 4T1) and several bacterial strains (Klebsiella pneumoniae, Escherichia coli, Staphylococcus aureus, and Pseudomonas aeruginosa).
Accordingly, extracts and chromatography fractions from Guayacan and Teca showed antimicrobial potential against resistant strains of K. pneumoniae and P. aeruginosa with 49-100% growth inhibition at 100 µg/mL. Cytotoxic activity against MCF-7, 4T1, Caco-2, Vero, and HepG2 cell lines also was noticed, with LC50 18.03 µg/mL. Although several compounds have been identified, currently, progress is being made in the biodirected isolation of other compounds and their spectroscopic characterization.

References

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