Phytochemical Examination and Antiproliferation Effect of Acacia senegal and Boswellia sacra Extract on Colon Cancer Cell (Caco-2)

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Chronic autoimmune diseases threatening human health have widely spread, yet modern-day pharmaceuticals remain of animal origin and cause the body to develop drug resistance or experience adverse effects (liver or kidney damage) due to prolonged consumption. This research used qualitative and quantitative tests to explore the potential of bioactive compounds from Acacia senegal (AG) and Boswellia sacra (BS) as natural anti-cancer agents due to their traditionally renowned anti-inflammatory, antioxidant, and antimicrobial effects. Methanolic extractions of AG, BS, and AG-BS mixture samples were prepared through maceration and analyzed using LC-MS and HPLC to identify phytochemicals. The AG-BS mixture showed high levels of flavonoids like Rutin and phenolic acids like p-Coumaric and Caffeic, possibly attributing to the therapeutic characteristics of the plant samples. The cytotoxicity of the extracts was evaluated against colorectal adenocarcinoma cells, Caco-2, using MTT and Trypan Blue assays. BS demonstrated the most potent antiproliferative effect on Caco-2 cells (cytotoxicity%: 96.55%), surpassing the chemotherapy drug Doxorubicin (94.83%), AG-BS mixture (29.31%), and AG (2.59%). IC50 values for BS, AG-BS mixture, and AG were 26 μM, 106 μM, and 2620 μM, respectively, indicating the concentration required for 50% inhibition or cell death. These findings suggest that natural compounds from AG and BS extracts may have significant potential for novel treatments with minimal side effects. Further in vitro studies on other established cancer cell lines, analyzing the extracts' effectiveness at the cellular level, and quantifying the cell death rate in the cell cycle are essential to validating their potential as alternative anti-cancer therapeutics.