Cytotoxic Investigation of Isolated Polyprenylated Benzophenones from the Stem-Bark Extracts of *Garcinia maingayi*

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Abstract

Cancer incidence rates are growing rapidly globally and have become the second leading cause of death in the world. Finding a cure for cancer is in the crucial state as many people are dying daily, even though there are many available diagnostics tools. In line with drug development, *Garcinia* species is one of the important plants that are extensively studied for its health benefits. The study aimed to evaluate the bioactivity of the isolated pure compounds for its anti-proliferative effect and apoptosis. Sequential solvents extraction from stem-bark extracts of *Garcinia maingayi* that is native to Malaysia has led to the isolation of four polyprenylated benzophenones labeled as GB 1, GB 2, GB 3, and GB 4, respectively. Their structures were elucidated primarily based on the NMR and MS spectral data. These compounds were evaluated for their anti-proliferative effect using the MTT assay against HeLa, MCF-7, and HepG2 cancer cell lines and apoptotic effect using the Annexin V/7-AAD and the flow cytometry. The results showed that these compounds possess potent anti-proliferative effects against HeLa, MCF-7, and HepG2 cell lines with IC_{50} values ranging from 5 to 50 µM. These compounds also reduced numbers of cells upon 48 hours of treatment with selected concentrations based on microscopic views. GB 1 to GB 4 induced apoptosis in cancer cells at 48 hours in the presence of Annexin V/7-AAD staining.

In conclusion, these compounds possess interesting anti-tumor properties and thus warrant a further investigation on the mechanistic study, structure-activity relationship (SAR), and identification of putative molecular targets that are crucial in the development of anticancer drugs. The therapeutic uses in cancer have benefited from medicinal plants as major sources of chemicals driving pharmaceutical discovery over the past century. Hence, this research is an attempt to isolate and identify bioactive compounds as cytotoxic agents.

***Keywords*:** *Garcinia maingayi, polyprenylated benzophenone, cytotoxic, apoptosis, flowcytometer, anti-tumor*