

Total phenolic content, antioxidant and cytotoxic activity of cocoa (*Theobroma cacao* L.) polyphenols extracts on cancer cell lines

ABSTRACT

Introduction: Cancer chemopreventive agents from natural sources have been actively investigated over the years to seek prevention against cancer. In this study, cocoa polyphenols extract (CPE) was examined to explore its antioxidant and cytotoxicity activities. **Methods:** CPE was analysed for total phenolic content (TPC) and antioxidant activity (DPPH radical scavenging activity and FRAP ferric-reducing antioxidant power assays). In vitro cytotoxicity effect of CPE against HepG2, HT-29, HeLa, MCF-7, MDA-MB-231 and WRL-68 cell lines after 48 h exposure was measured by MTT assay. **Results:** The study showed that CPE had higher total phenolic content (13560.0 ± 420.1 mg GAE/100g dry weight of sample) than vitamin E ($p < 0.05$). CPE exhibited strong antioxidant activity comparable with ascorbic acid in both DPPH ($IC_{50} = 14.73 \pm 1.47$ μ g/ml) and FRAP (2130.33 ± 2.33 μ M of FE/1 mg of dry weight of sample). The cytotoxicity study showed that CPE exhibited the highest cytotoxicity effect against MCF-7 with lowest IC_{50} value (3.00 ± 0.29 mg/ml) compared to other cancer cell lines after 48 h treatment ($p < 0.05$). **Conclusion:** Our results indicate that CPE demonstrated high total phenolic content, free radical scavenging activity, ferric reducing ability and cytotoxicity activity towards HepG2, HT-29, HeLa, A549, MDA-MB-231 and MCF-7 cancer cell lines. Further isolation of bioactive constituents from CPE should be done to characterise its potential chemopreventive activity as well as to elucidate the mechanism of cancer cell death induced by CPE.

Keyword: Cocoa polyphenols extract; DPPH; FRAP; MTT assay; TPC