Cytotoxic effects of Mangifera indica L. kernel extract on human breast cancer (MCF-7 and MDA-MB-231 cell lines) and bioactive constituents in the crude extract

ABSTRACT

Background: Waterlily Mango (Mangifera indica L.) is thought to be antioxidant-rich, conferred by its functional phytochemicals. Methods: The potential anticancer effects of the ethanolic kernel extract on breast cancer cells (MDA-MB-231 and MCF-7) using MTT, anti-proliferation, neutral red (NR) uptake and lactate dehydrogenase (LDH) release assays were evaluated. Cytological studies on the breast cancer cells were also conducted, and phytochemical analyses of the extract were carried out to determine the likely bioactive compounds responsible for such effects. Results: Results showed the extract induced cytotoxicity in MDA-MB-231 cells and MCF-7 cells with IC50 values of 30 and 15 μg/mL, respectively. The extract showed significant toxicity towards both cell lines, with low toxicity to normal breast cells (MCF-10A). The cytotoxic effects on the cells were further confirmed by the NR uptake, antiproliferative and LDH release assays. Bioactive analyses revealed that many bioactives were present in the extract although butylated hydroxytoluene, a potent antioxidant, was the most abundant with 44.65%. Conclusions: M. indica extract appears to be more cytoxic to both estrogen positive and negative breast cancer cell lines than to normal breast cells. Synergistic effects of its antioxidant bioactives could have contributed to the cytotoxic effects of the extract. The extract of M. indica, therefore, has potential anticancer activity against breast cancer cells. This potential is worth studying further, and could have implications on future studies and eventually management of human breast cancers.

Keyword: Mangifera indica L; Kernel extract; MCF-7 cells; MDA-MB-231 cell; Cytotoxicity; Anticancer activity