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Cytotoxic Effect of *Nymphaea stellata* on a Triple-Negative Breast Cancer Cell Line

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Nymphaea stellata Willd., commonly known as water lilies, is a group of flowering plants belonging to Nymphaeaceae family. Triple negative breast cancer (TNBC), lacking oestrogen, progesterone receptors, and HER2, is one of the most invasive types of cancers with extremely challenging treatment regimes. As TNBC has proven to be difficult to treat effectively, the present study aimed to determine the activity of *N. stellata* extracts on a TNBC cell line, MDA-MB-231. Dried petals and stamens were separately extracted with hexane, chloroform, ethyl acetate, and methanol solvents using ultrasonication. The MDA-MB-231 cells were cultured in Leibovitz's L-15 Medium at 37°C and treated with the four extracts in different concentrations (400µg/mL, 200µg/mL, 100µg/mL, 50µg/mL and 25µg/mL). Sulforhodamine B assay was performed to check cytotoxicity by determining half-maximal inhibitory concentration values (IC_{50}). Only cells treated with methanolic extracts showed a distinct change in morphology when observed under a phase contrast light microscope, suggesting a possible apoptotic activity against MDA-MB-231 cells. Cells exposed to the petal methanol extract and stamen methanol extract exerted the highest cytotoxic effects with IC_{50} of 222.5 µg/mL and 232.9 µg/mL after 24 h of exposures, respectively. Whereas chloroform extracts showed slight cytotoxicity (petal: 497.5 µg/mL and stamen: 427.5 µg/mL) than their ethyl acetate extracts (stamen: 505.4µg/mL and petal: >1000µg/mL). However, Hexane extracts did not show any cytotoxic effects on TNBC cells. Overall, out of four extracts methanolic extracts of *N. stellata* exhibited cytotoxicity to TNBC cells. Therefore, methanol-based extractions of both stamens and petals could be utilized for the isolation of potential anti-cancer compounds that suppress the growth of TNBC cells.

Keywords: *triple-negative breast cancer, Nymphaea stellata, Sulforhodamine B assay*