

## Combinatorial Cytotoxic Effects of Damnacanthal and Doxorubicin against Human Breast Cancer MCF-7 Cells in Vitro

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### ABSTRACT

Despite progressive research being done on drug therapy to treat breast cancer, the number of patients succumbing to the disease is still a major issue. Combinatorial treatment using different drugs and herbs to treat cancer patients is of major interest in scientists nowadays. Doxorubicin is one of the most used drugs to treat breast cancer patients. The combination of doxorubicin to other drugs such as tamoxifen has been reported. Nevertheless, the combination of doxorubicin with a natural product-derived agent has not been studied yet. *Morinda citrifolia* has always been sought out for its remarkable remedies. Damnacanthal, an anthraquinone that can be extracted from the roots of *Morinda citrifolia* is a promising compound that possesses a variety of biological properties. This study aimed to study the therapeutic effects of damnacanthal in combination with doxorubicin in breast cancer cells. Collectively, the combination of both these molecules enhanced the efficacy of induced cell death in MCF-7 as evidenced by the MTT assay, cell cycle, annexin V and expression of apoptosis-related genes and proteins. The effectiveness of doxorubicin as an anti-cancer drug was increased upon addition of damnacanthal. These results could provide a promising approach to treat breast cancer patients.

**KEYWORDS:** damnacanthal; doxorubicin; MCF-7; combination

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