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# *Cytotoxic activity of Alangium Salvifolium on human breast cancer cell lines MCF-7, MDA-MB-468.*

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**Abstract**

**Objectives:** The goal is to investigate anticancer properties, identify and characterize selected chemical compounds, and test and evaluate the anticancer compound's effects on cancer cells using cytotoxicity assays. and the possibility of developing a novel anticancer drug.

The objective of this study was to investigate the anti proliferative activities of alkaloidal extract of Alangium Salvifolium leaves against MCF-7, MDA-MB-468 breast cancer cell lines.

**Keywords:** Breast cancer, apoptois, cytotoxicity assay, anti proliferative activity, alkaloidal extract.

**Background :**

**Cancer**

One of the most prevalent causes of disease-related deaths worldwide is cancer, known as the abnormal division, proliferation and accumulation of cells in an organism. It can affect a single organ as well as spread to distant organs. Because cell division and growth are controlled by genes, cancer is basically a gene-associated illness. Although DNA repair systems in the event of damage can improve the function of the gene, they can not always be successful. Under normal conditions, they grow, divide and proliferate when cells receive signals from the outer membrane. Cancer cells, on the other hand, have their own signal systems that allow abnormal growth differently from normal cells and, after contact with other cells, do not stop dividing; they continue to grow and proliferate.

**Cancer treatment**

Although some cancer therapy standards have been established, different approaches and treatments are used specifically for each type of cancer. In cancer therapy alone or in combination, biological therapies such as radiotherapy, chemotherapy, surgery, immunotherapy, hormone therapy, targeted therapies and gene therapy may be used. However, there are advantages as well as disadvantages to these methods, known as the gold standard. Despite the discovery of many chemotherapeutic drugs (Adriamycin, Cisplatin, Campotins, Vinblastin, Mercaptopurine, etc.) that inhibit the uncontrolled process of cell division for the treatment of various types of cancer, the serious side effects of these drugs on the hematopoietic system, bone marrow,

gastrointestinal epithelial cells and hair follicles are a significant disadvantage. In addition, multi-drug resistance (MDR) is another important problem in anticancer treatment.

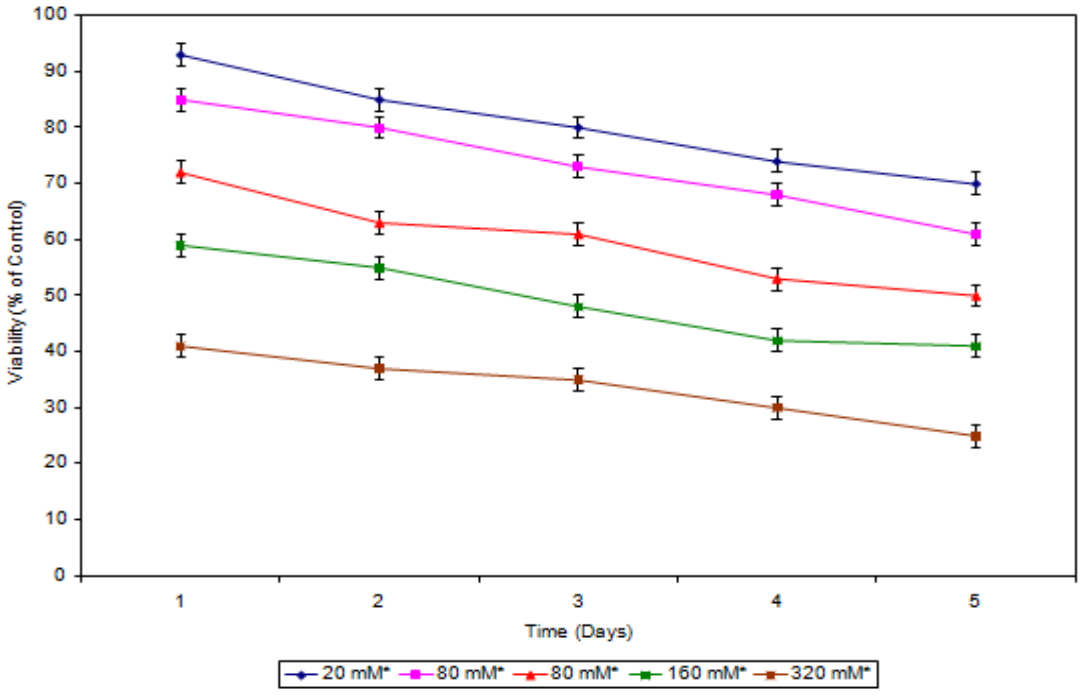
## HUMAN BREAST CANCER CELLS MCF-7 AND MDA- MB-468

The compounds AS1 and AS2 from *A. salviifolium* inhibited the growth of MCF-7 and MDA-MB-468 human breast cancer cells in a dose and time dependent manner. At 320M concentrations, the *A. salviifolium* compounds AS1 and AS2 inhibited the growth of breast cancer cells by about 80% (Table 1.1 and Graph-1a, b, c& d). Alkaloidal extracts from *A. salviifolium* leaves showed potential antioxidant and anticancer properties, as well as inhibiting proliferation .

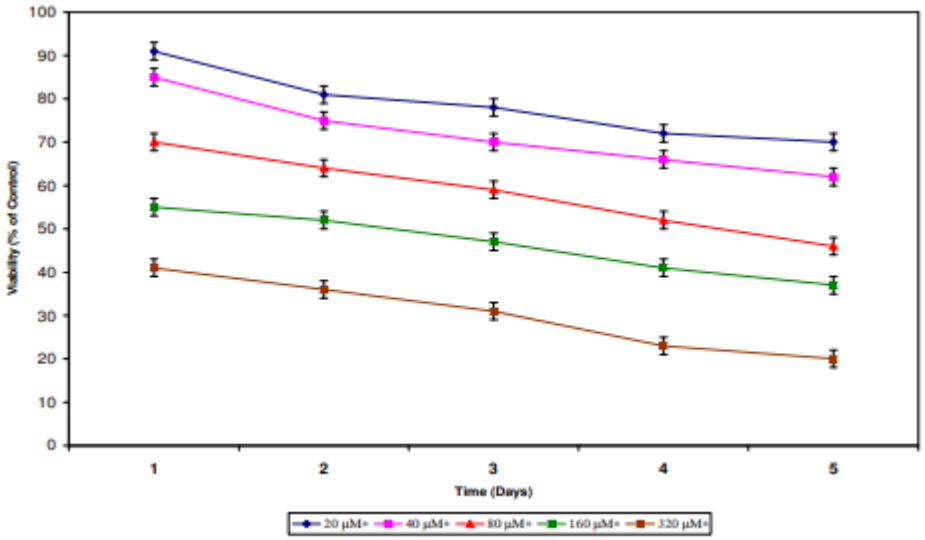
**Table 1.1: Analysis of variance for Cytotoxic activity of *A. salviifolium* compounds against Human Breast Cancer cells MCF-7 and MDA-MB-468**

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | **Sum of Squares** | **Df** | **Mean Square** | **F** | **Sig.** |
| **AS1MCF7** | **Between Groups** | 10051.67 | 3 | 3350.556 | 1489.136 | 0 |
| | **Within Groups** | 18 | 8 | 2.25 | | |
| | **Total** | 10069.67 | 11 | | | |
| **AS1MDAMB** | **Between Groups** | 7142 | 3 | 2380.667 | 1785.5 | 0 |
| | **Within Groups** | 10.667 | 8 | 1.333 | | |
| | **Total** | 7152.667 | 11 | | | |
| **AS2MCF7** | **Between Groups** | 7688.917 | 3 | 2562.972 | 2196.833 | 0 |
| | **Within Groups** | 9.333 | 8 | 1.167 | | |
| | **Total** | 7698.25 | 11 | | | |
| **AS2MDAMB** | **Between Groups** | 5057 | 3 | 1685.667 | 1264.25 | 0 |
| | **Within Groups** | 10.667 | 8 | 1.333 | | |
| | **Total** | 5067.667 | 11 | | | |

| PARAMETER | | AS1MCF7 | AS1MDAMB | AS2MCF7 | AS2MDAMB |
|---|---|---|---|---|---|
| | Mean | 4.6667 | 6 | 4.6667 | 6 |
| | Std. Deviation | 0.5774 | 1 | 0.5774 | 1 |
| | Std. Error of Mean | 0.3333 | 0.5774 | 0.3333 | 0.5774 |
| 80 | Mean | 42.6667 | 35 | 32.3333 | 26.6667 |
| | Std. Deviation | 1.5275 | 1 | 1.5275 | 1.5275 |
| | Std. Error of Mean | 0.8819 | 0.5774 | 0.8819 | 0.8819 |
| 160 | Mean | 62 | 53.6667 | 50 | 42 |
| | Std. Deviation | 2 | 1.5275 | 1 | 1 |
| | Std. Error of Mean | 1.1547 | 0.8819 | 0.5774 | 0.5774 |
| 320 | Mean | 83.3333 | 72 | 74 | 62 |
| | Std. Deviation | 1.5275 | 1 | 1 | 1 |
| | Std. Error of Mean | 0.8819 | 0.5774 | 0.5774 | 0.5774 |
| Total | Mean | 48.1667 | 41.6667 | 40.25 | 34.1667 |
| | Std. Deviation | 30.256 | 25.4999 | 26.4545 | 21.4639 |
| | Std. Error of Mean | 8.7341 | 7.3612 | 7.6368 | 6.1961 |

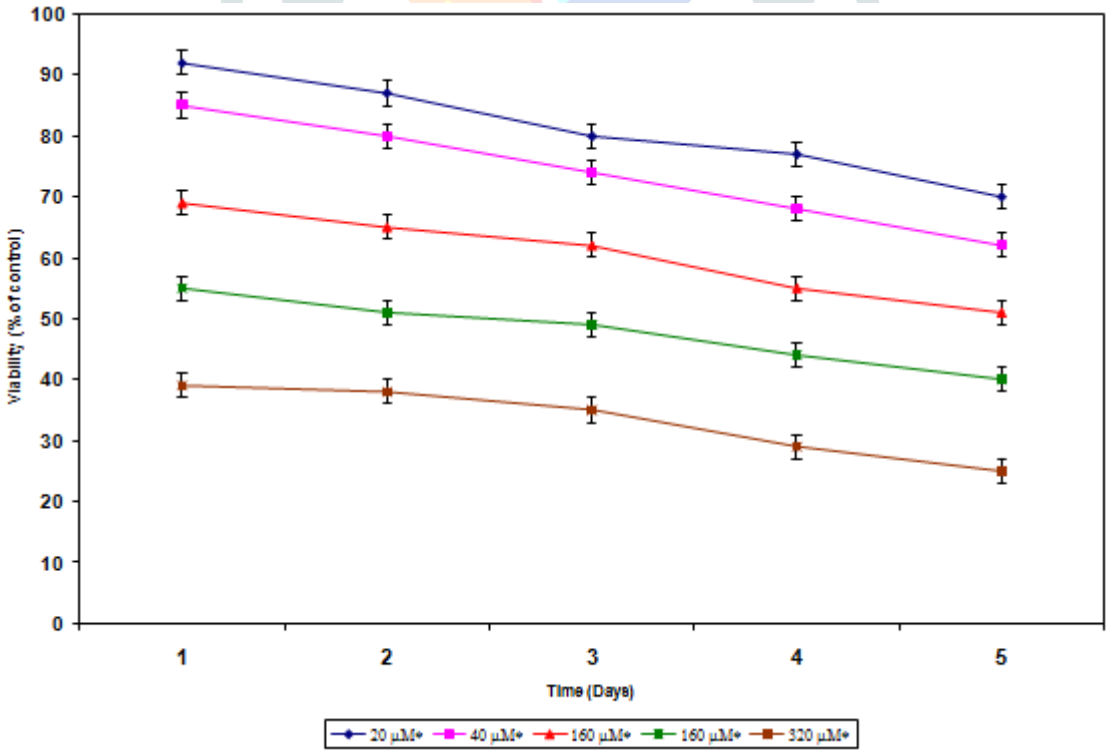



**Graph 1a: Cytotoxic Activity of *A. salviifolium* Compound AS1 against Human Breast Cancer Cells MCF-7**

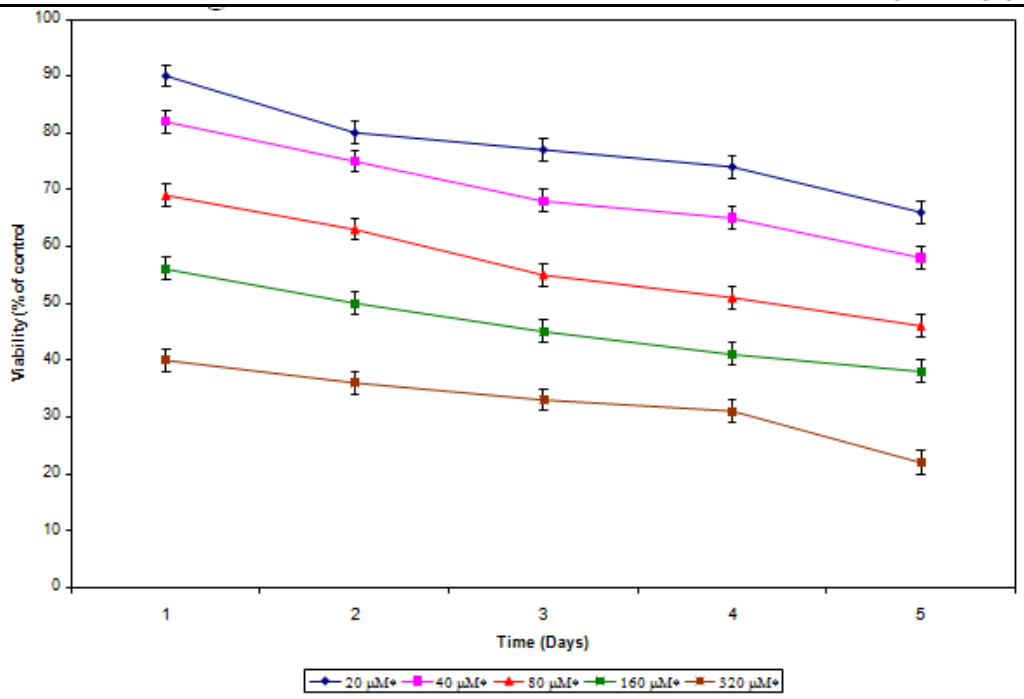



**Graph 1b: Cytotoxic Activity of A. salviifolium Compound AS1 against Human Breast Cancer Cells MDA-MB-468**

$IC_{50}$ values of cancer cells MCF-7 and MDA-MB-468 determined after treated cells were incubated for 72h with *A. salviifolium*compound AS1. OD values of each treated group were compared with that of the Control at the same time point, the single (*) indicates a significant difference from the control ($P < 0.05$), one way Anova Dunnett C Test. Results are mean value ± standard deviation of independent experiments performed intriplicate.




**Graph 1c: Cytotoxic Activity of *A. salviifolium*Compound AS2 against Human Breast Cancer Cells MCF-7**




**Graph 1d: Cytotoxic Activity of *A. salviifolium*Compound AS2 against Human Breast Cancer MDA-MB 468**

**Conclusion :**

The *A. salviifolium* was chosen for the research. The compounds AS1 and AS2 from *A. salviifolium* inhibited the growth of MCF-7 and MDA-MB-468 human breast cancer cells in a dose and time dependent manner. At 320M concentrations, the *A. salviifolium* compounds AS1 and AS2 inhibited the growth of breast cancer cells by about 80%. As a result, *A. salvifolium* compounds AS1- Deoxytubulosine and AS2 - carboline Hermaline have the potential to control Breast Cancer Cells.

The present study revealed chemical compounds exhibiting its cytotoxic potential on cancer by inducing apoptosis and can be effectively utilized as antitumour agents.