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COMPARISON OF CYCLOOXYGENASE ENZYME ACTIVITY INHIBITION IN CONTROL AND ALANGIUM SALVIIFOLIUM COMPOUNDS TREATED BREAST CANCER CELLS.

Biotechnology

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KEYWORDS

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. The most common type of cancer that causes death in both men and women is lung cancer. Prostate cancer in men and breast cancer in women are in second place.

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, immuno therapy, 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.

Common malignant growth therapies, such as chemotherapy and radiation treatment, neglect to target undifferentiated disease organisms and also cause harm to ordinary cells.

Anticancer Activity of Natural Compounds
The worldwide development of cancer registries has led to a search for novel medicines that are toxic to cancer cells while having no harmful effect on normal cells. Previously used anticancer drugs showed relatively high toxicity not only to the tumour cells, but also to the normal cells of the part of the body in which the cancer developed. Currently, the search for novel anticancer drugs is being conducted among terrestrial plants, as well as in marine environments. Plants have been used to treat illnesses for centuries. In different parts of the world, several plants are consumed as part of traditional folk medicine for their health benefits. A need for new anticancer drugs is created by the rise in the incidence of different cancer types.

Many studies are being conducted to discover and develop effective anticancer drugs due to issues such as cytotoxicity and drug resistance in existing chemotherapeutic agents.

Our work explores the anticancer properties of selected chemical compounds and test and evaluate the anticancer compounds effects on cancer cells using the biochemical characterization of tumor marker enzymes and the possibility of developing a novel anticancer drug.

Cyclooxygenase -2(COX-2) is frequently expressed in multiple cancer cells and is asoociated with poor prognosis. It is the key enzyme of prostaglandin E2 (PGE2) that has been proved to promote the development, proliferation and metastasis of tumor cells.

COX-2 is a membrane-bound enzyme that plays a key role in synthesis of important biological hormones-prostaglandins(PGs), such as PGE2,PGF2 α and thromboxane. COX-2 is usually negligible in normal cells except basal expressed in a few organs, such as stomach, kidney, central nervous and female reproduction. While it is frequently expressed in most types of cancers.

Cyclooxygenase-2 (COX-2) is an inducible form of the enzyme that catalyses the synthesis of prostanoids, including prostaglandin E2 (PGE_2), a major mediator of inflammation and angiogenesis. COX-2 is overexpressed in cancer cells and is associated with progressive tumour growth, as well as resistance of cancer cells to conventional chemotherapy and radiotherapy.

The cyclooxygenase enzyme activity in A.*salviifolium*-treated MCF-7 and MDA-MB-468 cells was investigated, and the enzyme activity was found to be inhibited to the greatest extent at 320 M concentration. In the treated cells, enzyme activity was found to be 67.3%, 66.8%, 78.6%, and 81.7%, respectively (Table 1.1, Graph 1.1).

The cyclooxygenase enzyme was strongly inhibited by *A. salviifolium* compounds, which was similar to the cyclooxygenase inhibitory effect of Neolignans. In a previous study, the cyclo oxygenase inhibitory effect was found to be non-toxic to mammalian cells .

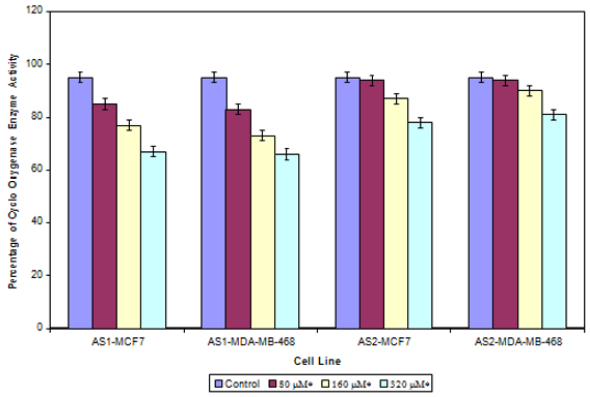
Table 1.1: Analysis of variance for cyclooxygenase activity of*A. Salviifolium* compounds

ANOVA						
		Sum of Squares	Df	Mean Square	F	Sig.
AS1MCF7	Between Groups	6.032	3	2.011	1566.708	.000
	Within Groups	1.027E-02	8	1.283E-03		
	Total	6.042	11			
AS1MDAMB	Between Groups	7.336	3	2.445	565.380	.000
	Within Groups	3.460E-02	8	4.325E-03		
	Total	7.370	11			
AS2MCF7	Between Groups	2.674	3	.891	625.544	.000
	Within Groups	1.140E-02	8	1.425E-03		
	Total	2.686	11			
AS2MDAMB	Between Groups	2.285	3	.762	376.147	.000
	Within Groups	1.620E-02	8	2.025E-03		
	Total	2.301	11			

Report

PARAMETER		AS1MCF7	AS1MDAMB	AS2MCF7	AS2MDAMB
Control	Mean	6.05	6.13	6.05	6.16
	Std. Deviation	4.58E-02	1.00E-02	2.00E-02	1.00E-02
	Std.ErrorofMean	2.65E-02	5.77E-03	1.16E-02	5.77E-03
80	Mean	5.18	5.4267	5.65	5.8267
	Std. Deviation	1.00E-02	3.06E-02	6.25E-02	3.79E-02
	Std.ErrorofMean	5.77E-03	1.76E-02	3.61E-02	2.19E-02
160	Mean	4.7	4.5167	5.24	5.5833
	Std. Deviation	2.00E-02	0.1258	1.00E-02	5.69E-02
	Std.ErrorofMean	1.16E-02	7.27E-02	5.77E-03	3.28E-02
320	Mean	4.1133	4.1267	4.78	4.9667
	Std. Deviation	5.03E-02	2.08E-02	3.61E-02	5.77E-02
	Std.ErrorofMean	2.91E-02	1.20E-02	2.08E-02	3.33E-02
Total	Mean	5.0108	5.05	5.43	5.6342
	Std. Deviation	0.7411	0.8186	0.4941	0.4574
	Std.ErrorofMean	0.2139	0.2363	0.1426	0.132

Enzyme Cycloxygenase When comparing the activity of *A. salviifolium* compound treated cells to that of control cells, a single (*) indicates a highly significant difference (P 0.05), one-way ANOVA Dunnett C Test. The results are the averages plus the standard deviations of three independent experiments carried out in triplicate.



Graph 1.1: Cyclooxygenase enzyme activity of A. salviifolium compounds treated MCF-7 and MDA-MB-468 cells

CONCLUSION :

The goal is to investigate anticancer properties, identify and characterize selected chemical compounds, and test and evaluate the anticancer compounds effects on cancer cells using the possibility of developing a novel anticancer drug.

The *A. salviifolium* was chosen for the research. Biochemical analysis of *A. salviifolium* compounds AS1 and AS2 on MCF7 and MDA- MB-468 cell revealed there was an inhibition activity of *A. salviifolium* compounds on cyclo oxygenase enzyme. As a result AS1-Deoxytubulosine and AS2 - carboline Hermaline have the potential to control Breast Cancer Cells.

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