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In Vitro Anticancer Effect of Sesamum Indicum Extract

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ABSTRACT

Aim: To investigate anticancer effect of Sesamum Indicum extract against breast cancer cell line (MCF -7).

Introduction: MCF-7 is a breast cancer cell line. Breast cancer is the malignant tumor that starts in the cells of the breast .Among Indian women, breast cancer is the commonest cancer in Indian women. Sesamum Indicum (Pedaliaceae) is a plant growing and cultivated in India etc. This plant is used for some medicinal uses such as digestive ,sedative, tonic, diuretic as well as for functional GIT disorders.

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Materials and Method: The plant materials *S. indicum* powder was purchased from Life care phytolab Private limited.

Cytotoxicity assay on MCF7 cell line Chemicals and reagents: MTT (3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyl tetrazolium bromide) invitrogen,USA. Acridine orange were obtained from Sigma, USA. All other fine chemicals were obtained from Sigma–Aldrich, St. Louis.

Cell culture: MCF-7 cells obtained from NCCS (National Centre For Cell Science, Pune) were cultured in Rose well Park Memorial Institute medium (RPMI), supplemented with 10% fetal bovine serum, penicillin/streptomycin (250 U/mL), gentamycin (100µg/mL) andamphotericin B (1mg/mL) were obtained from Sigma Chemicals, MO, USA. All cell cultures were maintained at 370C in a humidified atmosphere of 5% CO2. Cells were allowed to grow to confluence over 24 h before use.

Cell growth inhibition studies by MTT assay: Cells (1 × 105/well) were plated in 24-well plates and incubated in 370C with 5% CO2 condition. After the cell reaches the confluence, the various concentrations of the samples were added and incubated for 24hrs. After incubation, the sample was removed from the well and washed with phosphate-buffered saline (pH 7.4) or MEM without serum. 100µl/well (5mg/ml) of 0.5% 3-(4,5-dimethyl-2-thiazolyl)-2,5-diphenyl--tetrazolium bromide (MTT) was added and incubated for 4 hours. After incubation, 1ml of DMSO was added in all the wells .The absorbance at 570nm was measured with UV- Spectrophotometer using DMSO as the blank. Measurements were performed and the concentration required for a 50% inhibition (IC50) was determined graphically. The % cell viability was calculated using the following formula:% cell viability = A570 of treated cells / A570 of control cells × 100 Graphs are plotted using the % of Cell Viability at Y-axis and concentration of the sample in X-axis. Cell control and sample control is included in each assay to compare the full cell viability assessments

Conclusion: The present study is to demonstrate the toxicity of the extract *Sesamum indicum* on MCF -cell lines. Cytotoxicity, induction of cell cycle arrest and apoptosis probably constitute the antitumour mechanisms of extract. From the research we identified that *Sesamum Indicum* has anticancer effect and is used to treat breast cancer.

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KEYWORDS

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INTRODUCTION

According to the World Health Organization, more than 11 million people are diagnosed with cancer every year and it is estimated by 2020 there will be 16 million new cases per year, and moreover approximately 7 million people are died from cancer every year worldwide, which is coming in the second level after cardiovascular diseases (Greenlee,R.T et al., 2001)

There are several research are going in the anticancer drug development including herbal based drugs and nanoparticles based drugs (Venkat Kumar K et al., 2017) The researchers have been developed other anti-cancer strategies to overcome such fatal disease, and accordingly novel pharmacological paradigms have been developed quickly and efficiently moves prospective anti-cancer drugs from the discovery phase through pharmacology testing and into therapeutic trial assessment. Some of these developments are based on natural products (Rajeshkumar S et al., 2017)

Breast cancer is the malignant tumor (a tumor with the potential to invade other tissues or spread to other parts of the body) that starts in the cells of the breast. It occurs both in men and women.But most prevalent for women. Among Indian women, breast cancer is the commonest cancer in Indian women overall.The information given here is for female breast cancers. In India, 1,62,468 new cases and 87,090 deaths were reported for breast cancer in 2018. (Agarwal G et.al., 2008)

Sesame (*Sesamum indicum*) is a flowering plant in the genus Sesamum, also called benne. Sesamum has many other species, most being wild and native to sub-Saharan Africa. Sesamum indicum is one of the cultivated type, originated in India . A meta-analysis showed that sesame consumption produced small reductions in both systolic and diastolic blood pressure. Sesame oil studies reported a reduction of oxidative stress markers and lipid peroxidation.Sesame seeds contain the lignans sesamolin, sesamin, pinoresinol and lariciresinol (T.Ogasawara et.al., 1988). The oil from sesame plant is an important ingredient in Ayurvedic remedies in India and is used in Chinese medicine to increase energy and prevent aging (Lee CC.et.al) due to the presence of bioactive components present in the seed including polyunsaturated fatty acids, phytosterols, tocopherols, vital minerals and unique class of phenylpropanoid compounds namely lignans such as sesamin, sesamol and sesamolin (Hirose N et al.,1991). These phytochemicals provide defense mechanism against reactive oxygen species and increases keeping quality of oil by preventing oxidative rancidity (Bedigin D et al., 1986).Sesame lignans have various pharmacological properties including. antioxidant activity antimicrobial activity, antiproliferative activity ,lowering cholesterol levels (Liu Z et al., 2006).increasing hepatic fatty acid oxidation enzymes and show antihypertensive effects (Akshaykumary L et al., 1999)

Keeping this in view, the present study was aimed to evaluate anticancer activity of *S. indicum* extract.

MATERIALS AND METHOD

The plant materials *S. indicum* powder was purchased from Life care phytolab Private limited.

Cytotoxicity assay on MCF7 cell line

Chemicals and reagents

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Cell culture

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Cell growth inhibition studies by MTT assay

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Graphs are plotted using the % of Cell Viability at Y-axis and concentration of the sample in X-axis. Cell control and sample control is included in each assay to compare the full cell viability assessments.

RESULT

In this study we have analyzed the anticancer activity of plant extract *Sesamum Indicum* at different concentrations such as 1 ng, 10 ng, 100 ng, 1 µg, 10 µg and 100 µg. in that our plant extract shows good activity against the breast cancer cell lines in MTT assay. In this study, while increase the concentration of plant extract the % of cell viability also increased shown in figure 1 and Table 1.

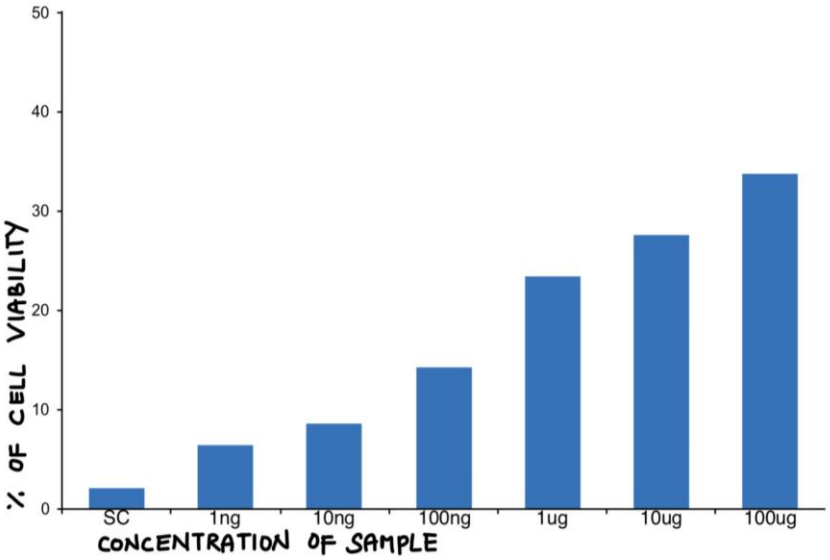

Figure 1: Cell viability of Sesa**mum Indicum**

Table 1: Cell viability of Sesamum Indicum

S.No	Concentration	Cell Viability (%)
1	SC	1.917954
2	1ng	6.339904
3	10ng	8.524241
4	100ng	14.065
5	1ug	23.33511
6	10ug	27.49068
7	100ug	33.61747

IC50 = 148.76 µg

The figure 2 shows the microscopic image of breast cance cell line reacted with plant extract. In that when comapre with control morphology our plant extract actively involved in the inhibition of cell growth.

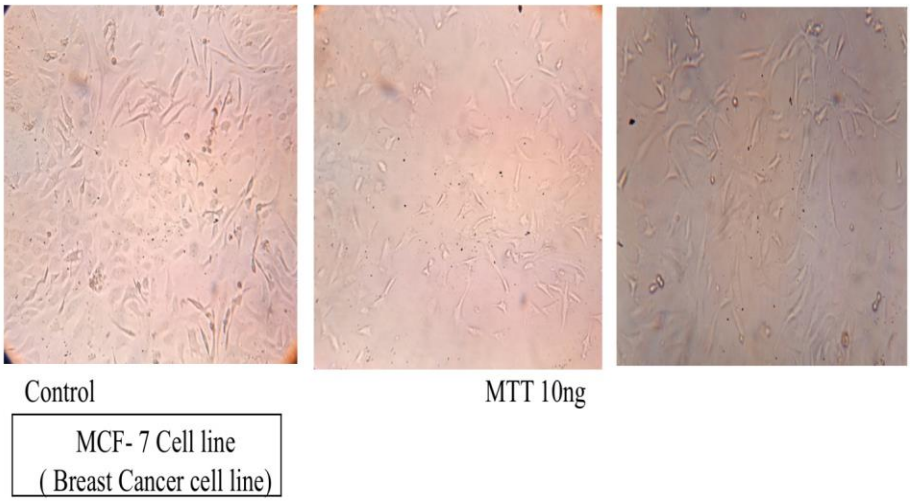

Figure 2: Anticancer activity of *Sesamum Indicum* extract against breast cancer cell line

DISCUSSION

A long time ago, surgery, radiotherapy and drugs constituted the major approaches for treating malignant tumors (Huang J et al., 1997),but clinically, these approaches pose challenges severe toxicity, side effects and low selectivity. Natural products have long been used to prevent and treat many diseases including cancer thus, they are good candidates for the development of anti-cancer drugs (Butler MS et al., 2004). Xu et al., 2003 demonstrated that the ethanol extract of *Sesamum indicum* L. can significantly inhibit the proliferation of mouse tranextract of *Sesamum indicum* L. can significantly inhibit the proliferation of mouse transplantable S180 sarcoma and H22 hepatoma, whereby tumour invasion depths were decreased and tumour weight reduced (Xu H et al., 2003) But the active components in the ethanol extracts of *Sesamum indicum* L. were not elucidated. In our future studies we are planning to isolate the active compounds from the plant extract.

CONCLUSION

The present study is to demonstrate the toxicity of the extract *Sesamum indicum* on MCF -cell lines. Cytotoxicity, induction of cell cycle arrest and apoptosis probably constitute the antitumour mechanisms of extract. From the research we identified that *Sesamum Indicum* has anticancer effect and is used to treat breast cancer.

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