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ANTI-INFLAMMATORY ACTIVITY AND ANTICANCER ACTIVITY OF TURMERIC EXTRACT AGAINST BREAST CANCER CELL LINE

U Sorubavalli — Department of Biochemistry, Sri Akilandeswari Women's College, Wandiwash – 604408, TN, India

Dr K Padmalochana* — Head Department of Biochemistry, Sri Akilandeswari Women's College, Wandiwash – 604408, TN, India *Corresponding Author

ABSTRACT In this study, phytochemical, antioxidant, antimicrobial, anticancer and analysis of *curcuma longa* were collected from local market of Chennai. The turmeric extract of was extracted with ethanol. The extract of *curcuma longa* can be used to treat various cancer such as: breast cancer. Ethanolic extract of *curcuma longa* have good effect on breast cancer cell line. That inhibits the proliferation of cancer cell. This study thus summarized as the turmeric extract of are good for health and can be used as pharmacological drugs to treat various diseases like, allergies, Alzheimer disease, cardiovascular disease.

KEYWORDS :

INTRODUCTION

CLASSIFICATION of Turmeric

Curcuma species such as: Curcuma mangga, Curcuma zedoaria, Costus speciosus, Curcuma xanthorrhiza, Curcuma aromatic, Curcuma phaeocaulis, Zingiber cassumun. Breast cancer is one of the leading cancers affecting women globally. In India, over 50,000 women die of breast cancer every year. Breast cancer is a heterogeneous disease that shows remarkably different biological characteristics and clinical behaviours (kumar, et al., 2013).

If breast cancer is not treated, the cancer cells in the breast will keep growing. They can spread to other parts of the body, such as bones, the liver or the lungs. This is called secondary breast cancer. Over time, these cancer cells can stop some organs in your body from working, or lead to other life threatening problems. It is better if the breast cancer is found before it spreads to other parts of the body and if you start treatment as early as possible.

Curcuma longa is a major spice crop grown abundantly in India and other tropical countries. Its major constituent is curcumin which gives turmeric its unique aroma, flavor and medicinal properties. The present study aimed at comparing the in vitro antimicrobial activity of two varieties of turmeric, the PTS and Erode variety and to screen the phytochemicals present in turmeric leaves. Six Gram positive and Gram negative bacteria namely Serratia marcesens, Escherichia coli, Bacillus subtilis, Klebshiella pneumoniae, Streptococcus pyrogens and Staphylococcus aureus were subjected to test the antimicrobial activity along with two fungi namely, Candida albicans and Aspergillus niger. The ethanolic and methanolic extracts of rhizomes and leaves were subjected to microbial susceptibility assays using agar well diffusion method. Phytochemical screening of two leaf varieties was done to test the presence of phytochemicals responsible for the antimicrobial potential of leaves of C.longa. The results of the present study revealed that both ethanol and methanol extracts showed antimicrobial activity on rhizome and leaf extracts. The rhizome extracts showed high inhibition over E.coli, S.pyrogens, B.subtilis and C.albicans. The leaf extracts possessed antimicrobial potential against S.pyrogens, B.subtilis and C.albicans. The phytochemical screening of leaf extracts showed the presence of flavonoids, cardiac glycosides and phenols in both the leaf varieties. The present study indicated the antimicrobial property of turmeric leaves which can also be used for therapeutic purposes along with other medicinal plants. Among the two varieties tested, the Erode variety was found superior in its antimicrobial potential (Ponnanikajamideen et al., 2013).

Curcumin is isolated from turmeric. The effect of solvent composition on the total extraction yield of turmeric has been investigated using the dipping method. HPLC-UV diode-array (DAD), electrospray mass spectrometry (ESI) and TLC have been used simultaneously to analyze curcumin in a fresh turmeric extract. From the results, it is evident that the percentage of curcumin extracted from turmeric by pure methanol was higher than any aqueous methanol composition; although the total extraction yield was the highest in 100 % water (Rajeshkumar et al., 2015).

Breast cancer is one of the major health problems among women in both developed and developing countries. The objective of the present investigation is focused on the DPPH Radical Scavenging Activity and anticancer effect of the methanolic extract of Moringa concanensis Nimmo leaves against Breast cancer (MCF-7) cell line. The study was facilitated by collecting the plant sample and subjected to crude extraction. The anticancer activity of the crude methanolic leaf extract of M. concanensis against MCF- 7 cell line was examined by MTT assay. The present study confirms that the crude leaf extract of M. concanensis has potential anticancer activity against MCF- 7 cell lines while compared to the control. M. concanensis leaves possess remarkable anticancer property which may lead to development of novel compounds as natural phytomedicine (Pavunraj, et al., 2019).

Curcumin, a principal component of turmeric (Curcuma longa), has potential therapeutic activities against breast cancer through multiple signalling pathways. Increasing evidence indicates that curcumin reverses chemo-resistance and sensitizes cancer cells to chemotherapy and targeted therapy in breast cancer. To date, few studies have explored its pot enti al antiproliferation effects and resistance reversal in antiestrogen-resistant breast cancer. In this study, we therefore investigated the efficacy of curcumin alone and in combination with tamoxifen in the established antioestrogen-resistant breast cancer cell lines MCF-7/LCC2 and MCF-7/LCC9. We discovered that curcumin treatment displayed anti-proliferative and pro- apoptotic activities and induced cell cycle arrest at G2/M phase. Of note, the combination of curcumin and tamoxifen resulted in a synergistic survival inhibition in MCF-7/LCC2 and MCF-7/LCC9 cells. Moreover, we found that curcumin targeted multiple signals involved in growth maintenance and resistance acquisition in endocrine resistant cells. In our cell models, curcumin could suppress expression of pro-growth and anti-apoptosis molecules, induce inactivation of NF-κB, Src and Akt/mTOR pathways and downregulate the key epigenetic modifier EZH2. The above findings suggested that curcumin alone and combinations of curcumin with endocrine therapy may be of therapeutic benefit for endocrine-resistant breast cancer Nagalingam, et al., 2019).

METHOD AND MATERIALS

SOXHLET PROCEDURE

The turmeric was washed with distilled water to remove adherent particles, shade dried and powdered. 25g of sample was weighed and extracted with 300ml of ethanol by continuous hot percolation with the help of soxhlet apparatus for 10hrs of time. On completion the extract was filtered and concentrated using rotary evaporator under reduced pressure and controlled temperature of 50^0C – 60^0C. The yield obtained weighed 2g**.** The extract was stored for future use.

ANTI- INFLAMMATORY ACTIVITY

Inhibition of protein denaturation

Method of (Mizushima and Kobayashi and Sakat *et al)* 100µl of Sample was added with 500µl of 1% BSA. The mixture was incubated for 10 minutes at 37ºC. Heat the contents in a water bath at 51ºC for 20 minutes. Cool down to room temperature and check the absorbance at 660nm against the blank. Acetyl Salicylic acid was used as positive control.

CALCULATION

%inhibition = 100-{(A1-A2)/A0*100}
A0 = positiv control, A1 = extract, A2 = product control

ANTICANCER ACTIVITY Cell line and culture

MCF-7cell line was obtained from NCCS, Pune. The cells were maintained in Minimal Essential Medium supplemented with 10% FBS, penicillin (100 U/ml), and streptomycin (100 µg/ml) in a humidified atmosphere of 50 µg/ml CO2 at 37 °C.

In Vitro assay for Anticancer activity (MTT assay) (Mosmann, 1983)

Cells (1 × 105/well) were plated in 24-well plates and incubated at 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 DMEM 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.

RESULT

Antimicrobial, antioxidant and anticancer analysis of turmeric on breast cancer cell line.was carried out. For the study, turmeric powder was extracted with ethanol using soxhlet apparatus.

After condensation of the crude extract was obtained, and it was used for the analysis. The qualitative phytochemical analysis of the turmeric extract, shows the presence of compound such as: steroides, anthraquiones and flavonoids.

Table:1 Show that anti-inflammatory assay of turmeric

S.No	Samples	Concentration (µg)	O.D at 660nm	% Inhibition
1	Turmeric	100	0.365	21.47
		400	0.227	42.75

ANTI CANCER ANALYSIS

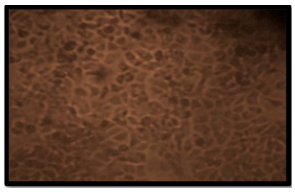
Breast cancer cell line was maintained in the laboratory at 37˚c into 5%co_2 condition in atmosphere. The cells were subculture and seeded 24 well plate. The cell were inhibited at 37˚c in 5%co_2 condition for 24hrs of time.

The cell were observed under microscope for the confluent monolayer. once the cell reached the confluent monolayer, The sample was added into the well for the incubation. The MTT analysis was carried out and the IC50 value was recorded at 62.5µg/ml

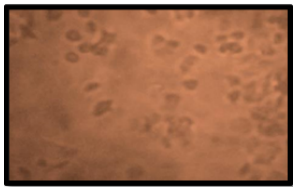
Table:2 Shows the percentage viability of breast cancer cell line with turmeric extract Anticancer effect of Turmeric on MCF-7 cell line

S.No	Concentration (µg/ml)	Dilutions	Absorbance (O.D)	Cell Viability
1	1000	Neat	0.365	33.36
2	500	1:1	0.412	37.65
3	250	1:2	0.463	42.32
4	125	1:4	0.524	47.89
5	62.5	1:8	0.573	52.56
6	31.2	1:16	0.640	58.50
7	15.6	1:32	0.703	64.25
8	7.8	1:64	0.766	70.00
9	Cell control	-	1.094	100

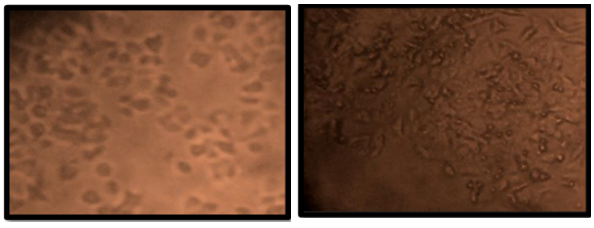
Figure:1 shows the viable cell of MCF7 with different concentration of turmeric extract Anticancer effect of Turmeric on MCF-7 cell line Normal MCF-7 cell line



Toxicity- 1000 µg/ml



Toxicity- 62.5µg/ml **Toxicity- 7.8 µg/ml**



Anticancer analysis of turmeric extract on breast cancer cell line was carried out. The result show that turmeric extract significantly inhibited the viability of breast cancer cell line the IC50 concentration of turmeric extract on the breast cancer cell line was the recorded at 62.5mg/ml.

Bhavani, *et al*., (2017) studied the biological effect of curcumin, MCF-7/LCC2, MCF- 7/LCC9 and their wild-type cells were treated with different concentrations of curcumin for 96h, cell proliferation was inhibited by curcumin in a dose-dependent manner. This anti-proliferation effect was observed within a 24 h period, which continued to increase over the next 96h. Similar IC50 values for curcumin in endocrine-resistant cells and the wild-type cells were detected (IC50 = 9.718 µM after 96 h or 9.815 µM after 48 h, 12.240 µM after 96 h or 12.004 µM after 48 h and 11.344 µM after 96 h or 10.930 µM after 48 h in MCF-7, MCF- 7/LCC2 and MCF-7/LCC9 cells, respectively).

Curcumin being the active component of turmeric contributes to its anti-cancer activity. Hence, the turmeric extract with its antimicrobial, antioxidant and anti cancer activity can be subjected to further research and aid in pharmological industries and drug development.

CONCLUSION

The presence of various phytochemicals showed that ethanolic extract of *curcuma longa* have the free radical scavenging activity of *curcuma longa* showed that the significance anticancer activity. Cancer cell especially in breast cancer cell line using MMT assay.

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