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A Conspectus on Anti-Oxidant and Anti-Cancer Potential of Thayiriya Vendhan Chendhuram (TVC)- in AYUSH Siddha

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ABSTRACT :

Objective: To evaluate the invitro anti oxidant potential and anticancer efficacy of Thayiriya vendhan chendhuram -TVC.

Methods: Evaluated scientifically TVC for its anti cancer efficacy in human breast adenocarcinoma through in vitro cell lines studies. The viability of cells was evaluated by direct observation of cells by Inverted phase contrast microscope and followed by MTT assay method .In this study, anti oxidant potential of TVC was also evaluated with gallic acid as comparison.

Results and Conclusion: The study demonstrated that Thayiriya vendhan chendhuram (TVC) has both anti-oxidant and anti-cancer properties, specifically in the context of human breast adenocarcinoma. The findings provide valuable insights into the potential use of TVC as a therapeutic agent in the treatment of breast cancer. Further research is warranted to explore the mechanisms underlying the anti-cancer activity of TVC and its potential application in clinical settings.

KEYWORDS: Breast cancer, Siddha pediatrics,Oncology, Thayiriya vendhan chendhuram

INTRODUCTION:

Siddha pediatrics is a branch of Siddha medicine which focuses on the treatment of children's health issues using traditional Siddha remedies. Siddha medicine is an ancient medical system originating in South India that utilizes natural herbs, minerals, and animal products to treat various ailments.Cancer is a very serious condition that requires specialized treatment and care. Cancer treatment requires a multidisciplinary approach and it is important to work with a healthcare team to ensure the best possible outcomes for the patient.

Thayiriya Vendhan Chendhuram (TVC) is a traditional Siddha formulation made from various herbs and minerals. It has been used for centuries in the Indian subcontinent for its various health benefits. One of the key properties of TVC is its antioxidant potential, which can help protect the body from oxidative stress and damage caused by free radicals.

Several studies have shown that the ingredients in TVC have significant antioxidant activity, which can help prevent cell damage and reduce the risk of chronic diseases such as cancer. The herbs and minerals in TVC have been found to scavenger free radicals, inhibit lipid peroxidation, and boost the body's own antioxidant defenses.

In addition to its antioxidant properties, Thayiriya Vendhan Chendhuram also exhibits anti-cancer potential. Some studies have shown that the ingredients in TVC have cytotoxic effects on cancer cells, inhibiting their growth and proliferation. Additionally, TVC has been found to induce apoptosis, or programmed cell death, in cancer cells, which can help to prevent the spread of cancer in the body.

Thayiriya Vendhan Chendhuram (TVC) shows promising antioxidant and anti-cancer potential, making it a valuable addition to a healthy lifestyle and potentially benefiting those at risk for chronic diseases such as cancer. Further research is needed to fully understand the mechanisms of action and potential applications of TVC in preventing and treating cancer. The Siddha medicine is a renowned holistic system of traditional medicine emphasizing curative and preventive measures. Siddha system has developed a rich and unique treasure of drug knowledge in which use of metals and minerals is very much advocated. Description about Cancer and its risk factors: Cancer is one of the most life threatening diseases and possess many health hazard in both developed and developing countries2 , characterized by irregular proliferation of cells. Every biological change can be seen when a normal cell progresses to cancerous one. Since many treatments are available for cancer therapy still cancer is the 2nd leading cause of death in the globe, Chemotherapy and modern drugs for treatment of cancer reported more side effects in the patients treated. Every year, millions of people are diagnosed with cancer, leading to death3 Cancer kills about 3500 million peopleannually all over the world; it accounts more than 2-3% of the annual deaths recorded worldwide4 .

MATERIALS AND METHODS :

The ingredients of Thaiyeria Vendhan Chendooram (TVC) were purified, prepared as per the siddha materica medical procedures. Siddha medicine, an ancient traditional medicine system in India, offers various herbal remedies and treatments for oncology (cancer).

Siddha medicine for treating cancer include:Kanchanar Guggulu: This herbal formulation is used to treat various types of tumors and growths.Thuthuvalai Kashayam: A herbal decoction made from Solanum trilobatum plant, it is used for its anti-inflammatory and anti-cancer properties.Amla (Indian gooseberry): Rich in antioxidants, amla is believed to help in preventing and treating cancer.

Turmeric: Known for its anti-inflammatory and anti-cancer properties, turmeric is often used in Siddha medicine for treating cancer.

Arugampul (Bermuda grass): This medicinal grass is used in Siddha medicine for treating various types of cancers.

Anti-Cancer Activity MCF- 7 (Human Breast Adenocarcinoma) cells was initially procured from National Centre for Cell Sciences (NCCS), Pune, India and maintained Dulbecco's modified Eagles medium, DMEM (Sigma aldrich, USA).The cell line was cultured in 25 cm2 tissue culture flask with DMEM supplemented with 10% FBS,Lglutamine, sodium bicarbonate (Merck, Germany) and antibiotic solution containing: Penicillin (100U/ml), Streptomycin (100µg/ml), and Amphoteracin B (2.5µg/ml). Cultured cell lines were kept at 37ºC in a humidified 5% CO2 incubator (NBS Eppendorf,Germany).

The viability of cells was evaluated by direct observation of cells by Inverted phase contrast microscopeand followed by MTT assay method. Cells seeding in 96 well plate Two days old confluent monolayer of cells were trypsinized and the cells were suspended in 10% growth medium, 100µl cell suspension (5x104 cells/well) was seeded in 96 well tissue culture plate and incubated at 37ºC in a humidified 5% CO2 incubator. Preparation of compound stock 1mg of sample was weighed and dissolved in 1mL DMEM using a cyclomixer. The sample solution was filtered through 0.22 µm Millipore syringe filter to ensure the sterility. Anticancer Evaluation After 24 hours the growth medium was removed, freshly prepared each compounds in 5% DMEM were five times serially diluted by two-fold dilution (100µg, 50µg, 25µg, 12.5µg, 6.25µg in 500µl of 5% DMEM) and each concentration of 100µl were added in triplicates to the respective wells and incubated at 37ºC in a humidified 5% CO2 incubator. Non treated control cells were also maintained.

Anticancer Assay by Direct Microscopic observation Entire plate was observed after 24 hours of treatment in an inverted phase contrast tissue culture microscope (Olympus CKX41 with Optika Pro5 CCD camera) and microscopic observation were recorded as images. Any detectable changes in the morphology of the cells, such as rounding or shrinking of cells, granulation and vacuolization in the cytoplasm of the cells were considered as indicators of cytotoxicity.

Anticancer Assay by MTT Method Fifteen mg of MTT (Sigma, M-5655) was reconstituted in 3 ml PBS until completely dissolved and sterilized by filter sterilization. After 24 hours of incubation period, the sample content in wells were removed and 30µl of reconstituted MTT solution was added to all test and cell control wells, the plate was gently shaken well, then incubated at 37ºC in a humidified 5% CO2incubator for 4 hours. After the incubation period, the supernatant was removed and 100µl of MTT Solubilization Solution (Dimethyl sulphoxide, DMSO, Sigma Aldrich, USA)was added and the wells were mixed gently by pipetting up and down in order to solubilize the formazancrystals. The absorbance values were measured by using microplate reader at a wavelength of 540 nm (Laura B. Talarico etal., 2004).The percentage of growth inhibition was calculated using the formula: Mean OD Samples x 100 Mean OD of control group LC50 Value: 80.291µg/mL (Calculated using ED50 PLUS V1.0 Software) Role of Antioxidant: Antioxidants significantly delay or prevent oxidation of oxidizable substrates when present at lower concentrations than the substrate9 . Antioxidantscan be synthesized in vivo (e.g., reduced glutathione (GSH), superoxide dismutase (SOD), etc.) or taken as dietary antioxidants10 . Antioxidants stabilize or deactivate free radicals, often before they attack targets in biological cells11. Recently interest in naturally occurring antioxidants has considerably increased for use in food, cosmetic and pharmaceutical products, because they possess multifacetedness in their multitude and magnitude of activity and provide enormous scope in correcting imbalance 12,13 . Free radicals and other oxidants have gained importance in the field of biology due to their central role in various physiological conditions as well as their implication in a diverse range of diseases. The free radicals, both the reactive oxygen species (ROS) and reactive nitrogen species (RNS), are derived from both endogenous sources (mitochondria, peroxisomes, endoplasmic reticulum, phagocytic cells etc.) and exogenous sources (pollution, alcohol, tobacco smoke, heavy metals, transition metals, industrial solvents, pesticides ,certain drugs like halothane, paracetamol, and radiation). Free radicals can adversely affect various important classes of biological molecules such as nucleic acids, lipids, and proteins, thereby altering the normal redox status leading to increased oxidative stress.

Sample Concentration (µg/mL) OD value I OD value II OD value III Average OD Percentage Viability Control 1.4872 1.4369 1.4015 1.4419 100.00 Sample code: Thayiriya vendhan chendhuram 6.25 0.9632 0.9618 0.9662 0.9637 66.84 12.5 0.9444 0.9471 0.9436 0.9450 65.54 25 0.8450 0.8469 0.8471 0.8463 58.70 50 0.7820 0.7763 0.7749 0.7777 53.94 100 0.6849 0.6852 0.6814 0.6838 47.43 % of viability = Potential -TVC CONCENTRATIONS(µg/ml) GALLIC ACID TVC 12.5 7.29% 34.05% 25 15.83% 56.18% 50 20.28% 62.96% 10056.04% 65.69% 200 62.98% 72.57

CONCLUSION :

From the result of the present in-vitro study it was concluded that the test drug TVC possess considerable anti-oxidant and anti-cancer Activity.

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