

EVALUATION OF ANTICANCER ACTIVITIES OF PLANT EXTRACTS AGAINST BREAST CANCER CELL LINES (MCF-7)

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Abstract

Medicinal plants are the main source of bioactive compounds which are used for treatment of fetal and infectious diseases. In recent era it is also increasing the demand of medicinal plants due to the presence of important drugs. *Persicaria hydropiper* and *Caralluma fimbriata* are the source of the active compounds used as traditional medicines. *P. hydropiper* belong to family Polygonaceae and *C. fimbriata* to Apocynaceae. Cancer is a syndrome in which uncontrol division of cells are present in normal body tissues. It is spread by blood and lymphatic system to other body parts. During the present study the anticancer potential of different extracts of *P. hydropiper* and *C. fimbriata* against breast cancer cell lines (MCF-7) was evaluated. Breast cancer cell lines were seeded in 96 well plates and treated with different extracts of *P. hydropiper* and *C. fimbriata*. The MTT(3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide) dye was added after incubation of 24 hours. Then check the absorbance by plate reader at 570 nm wavelength. The IC₅₀ value of aqueous extracts of *C. fimbriata* was 5.07 µg/ml while chloroform extracts of *P. hydropiper* showed excellent anticancer activity against the breast cancer cell line (MCF-7) with an IC₅₀ value of 1.23µg/mL. The availability of plant extract also contributes to the treatment of cancer in developing

countries. *P. hydropiper* n-hexane extract and *C. fimbriata* chloroform and aqueous extracts possess very potent anticancer activity against MCF-7 cell lines.

Keywords: Apoptosis, *C. fimbriata*, *P. hydropiper*, IC₅₀, breast cell line (MCF-7)

INTRODUCTION

Medicinal plants are the main source of bioactive compounds which are used in the treatment of fetal and infectious diseases. In recent era it is also increasing the demands of medicinal plants due to the presence of important drugs [1]. *Persicaria hydropiper* and *Caralluma fimbriata* are the main source of the active drugs used as traditional medicines. *P. hydropiper* belong to family Polygonaceae and *C. fimbriata* to Apocynaceae [2,3]. In cancer, the cells do not respond well to the normal body signals of growth. In this way, such cell becomes independent of the control mechanism of our body. "It is a syndrome in which uncontrol division of cells are present in normal body tissues. It spread by blood and lymphatic system to other body part". It is the second foremost cause of death in most developed counties. Cancer is the most fatal, dangerous and life-threatening problems all over the world [4]. Each year, the American Cancer Society estimates the numbers of new cancer cases and deaths in the United States and compiles the most recent data on population-based cancer occurrence and outcomes using incidence data collected by central cancer registries and mortality data collected by the National Center for Health Statistics. In 2023, 1,958,310 new cancer cases and 609,820 cancer deaths are projected to occur in the United States. Cancer incidence increased for prostate cancer by 3% annually from 2014 through 2019 after two decades of decline, translating to an additional 99,000 new cases; otherwise, however, incidence trends were more favorable in men compared to women. For example, lung cancer in women decreased at one-half the pace of men (1.1% vs. 2.6% annually) [5].

The mortality rates of all types of cancer decrease 32% between 1991 to 2019 in both sexes males and females [6]. Deaths due to cancer have a large socioeconomic impact worldwide. It has been estimated that 90-95% of deaths due to cancer can be considerably reduced by changing our lifestyles and controlling environmental factors. The need of the time is to combat cancer and natural products have shown promising results in this regard. The role of carcinogens in carcinogenesis is essential for the understanding of cancer chemo prevention [7].

Breast cancer is the most widely distributed type of cancer among women. Instead of recent advances in screening and treatment, it is still the most invasive form of cancer in developing countries. The most commonly occurring cancers around the globe are Blood cancer, breast cancer, lung cancer, cervix cancer, prostate cancer, bone cancer and ascites cancer. All of these cancers can be lethal [8]. The objectives of this study was to evaluate the anticancer potential of different extracts of *C. fimbriata* and *P. hydropiper*.

MATERIAL MAETHODS

The methanolic, chloroform, ethyl acetate, n-hexane and distilled water extracts were used for evaluation of the anticancer potential. The breast and prostate cancer cell lines MCF-7 and Du-145 were used for the anticancer assay respectively. The cell lines were which was collected from University of California, USA. The anticancer in the Dr. Ali lab.303 Irma lerma collage of pharmacy. The cell lines were cultured in complete growth media Dulbecco's modified eagle medium (MDEM). The 10% fetal bovine serum (FBS) for basic supplementation and 1 % penicillin for decontamination were added. The 80% confluency of the culture of the flask was counted. When the culture flask confluency became 80% then allowed to be splitting. Added 1ml of trypsin for detachments and collected all the cells and centrifuged at 1350 rpm. Counted the cell lines by hemocytometer and seeded 2500 cells per each well of 96 well plates. Incubated the 96 well plates for 24hrs at 37 °C in 5% CO₂. Checked their confluency of cells after overnight incubation. The following formula was used for counting cell lines.

Cells/ml= Total number of cells in all four chambers /4×Df.×10⁴.

After 24 hours, aspirated the old media and added the dilutions of plant extracts of different concentrations. i.e., 200µg/ml ,100µg/ml, 50µg/ml, 20µg/ml, 10µg/ml, and 5µg/ml. After 48 hours and 72 hours aspirated the old media and added the 3-(4,5-dimethylthazol-2-yl)-2,5 diphenyltetrazolium bromide (MTT) solution. Then after two hours, the formazan color was produced in each plate and checked in the plate reader in 570 nm wavelength. The assay was carried out as described [9].

RESULTS

The anticancer activities were analyzed on the bases of their IC₅₀ values. So, the IC₅₀ of all extracts was analyzed. The excellent IC₅₀ value of aqueous extracts of *C. fimbriata* was 5.07 µg/ml followed by chloroform, n-hexane, methanol and ethyl acetate extracts i.e., 6.67µg/ml, 6.67µg/ml, 9.45µg/ml and 11.30µg/ml respectively against breast cancer cell line (MCF-7). The results are shown in the Figure,1.

The chloroform extracts of *P. hydropiper* showed excellent anticancer activity against the breast cancer cell line (MCF-7) with an IC₅₀ value of 1.23µg/mL. The IC₅₀ value of n-hexane and aqueous extracts was 2.76 µg/mL and 1.67µg/mL respectively. The IC₅₀ values of ethyl acetate and methanolic extract i.e., 10.45 µg/mL and 9.90µg/mL against breast cancer cell line MCF-7 were observed. The results are shown in the Figure,2.

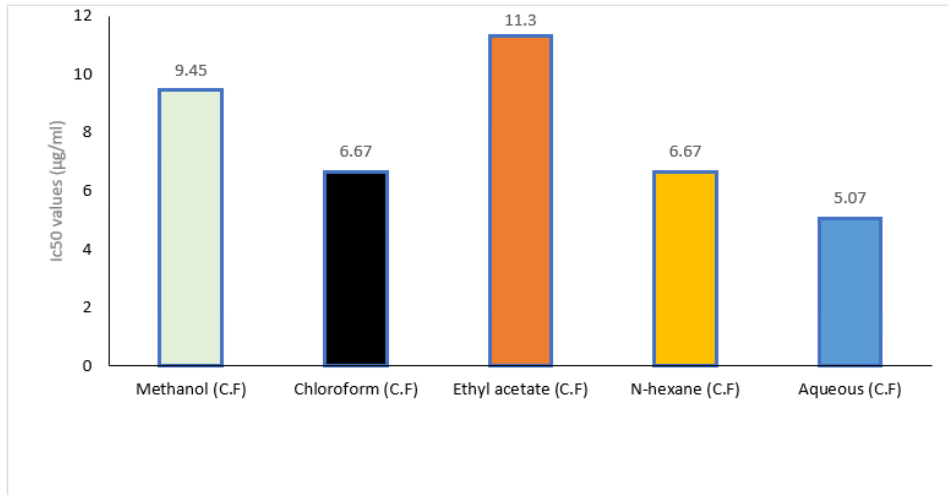
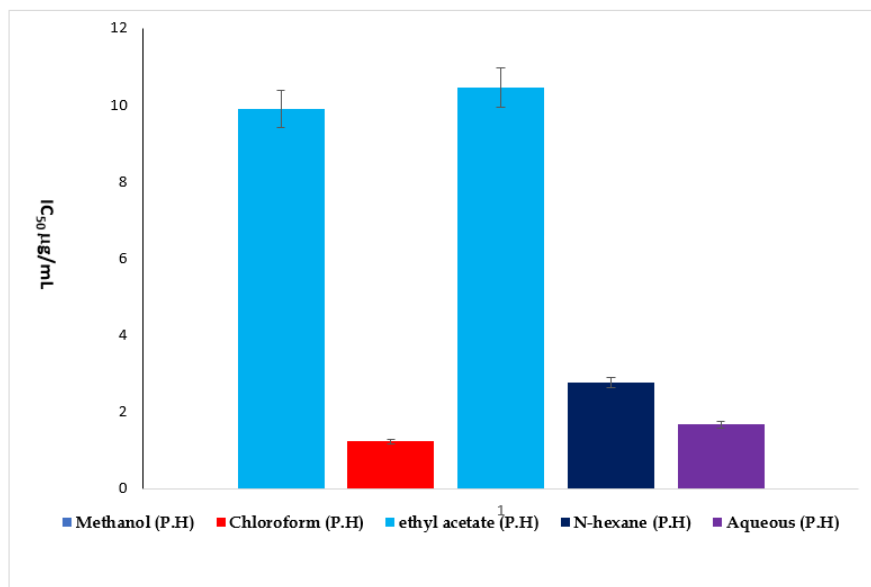


Figure 1: IC₅₀ values of extracts of *Persicaria hydropiper* against breast cancer cell lines (MCF-7)



Figures 2: IC₅₀ values of extracts of *Persicaria hydropiper* against prostatic cancer cell lines (DU-145) of different extracts

DISCUSSION

Suhasini *et al.*, 2018, reported the cytotoxic properties against human colon cancer cell lines. The ethyl acetate and n-Hexane extracts of *C. fimbriata*, showed good antiproliferative activity against the KB mouth cell line. After evaluating the drug's clinical efficacy and practical usability it may be utilized to treat oral cancer[10]. The anticancer potential of *C. fimbriata*'s methanolic extract against the A549 lung cancer cell line was

studied at a concentration of 100 µg/ml. It was observed that dose/duration and the inhibition of cancer cell line growth are related [11]. A similar result was found in the result of Suhasini *et al.*, 2018, that the *P. hydropiper* has cytotoxic properties against human colon cancer cell lines [10].

CONCLUSION

P. hydropiper n-hexane extract and *C. fimbriata* chloroform and aqueous extracts possess very potent anticancer activity against MCF-7 cell lines through inhibition of cancer cell lines by reducing apoptosis. Based on funding it is outstanding to explore and further can be introduced as a new anticancer drug for various cancer treatment.

Conflict of interest: None

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