

Effects of *Cuscuta pentagona* Extract on Breast Cancer Cells in Cell Culture

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Abstract---Recent studies report on exciting information about using an anticancer *plant* compounds to kill cancerous cells including breast *cancer cells*. The aim of this study was to determine the effects of *Cuscuta pentagona* extract on MCF7 (breast cancer) line cell viability in cell culture. In this laboratory experimental study, we used MTT assay to determine cell viability following administration of different doses (1µg/ml, 100µg/ml, 1mg/ml and 10mg/ml) of *Cuscuta pentagona* in cell culture. The data were statically analyzed using ANOVA. The results showed that the administration of different doses (1µg/ml, 100µg/ml, 1mg/ml and 10mg/ml) of *Cuscuta pentagona* resulted in decreased viability of MCF7 cells ($P<0.05$). The higher the dose of extract was administered, the lower viability in MCF7 cells was observed. Our findings indicate that *Cuscuta pentagona* extract has cytotoxic effects on breast cancer cells in cell culture.

Keywords--- *Cuscuta pentagona*, MCF7, Viability.

I. INTRODUCTION

CUSCUTA pentagona (figure I) is a parasitic plant which is placed in the family Convolvulaceae, but was formerly classified in the family Cuscutaceae. It is a parasite of a wide range of herbaceous plants but is most important as a pest of lucerne and other legumes [1], [2]. *Cuscuta pentagona* can severely impact host growth and reproduction [3]. *Cuscuta*(Convolvulaceae), are one of the most ecologically and economically significant groups of parasitic plants. *Cuscuta* spp. have yellow-to-orange vines that lack obvious chlorophyll, roots, and expanded leaves, and thus are completely dependent on aboveground attachment to other plants for survival and reproduction [4]. It has been demonstrated that *Cuscuta pentagona* seedlings use plant volatiles to locate and choose among hosts [5], [6], and so has cytotoxic effects on host plants.

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Fig. 1 *Cuscuta pentagona*

Breast cancer is the most common cancer in females all over the world with approximately one million new cases each year as well as one of second leading causes of death among females. Breast cancer in women is believed to represent a more biologically aggressive disease, but aside from commonly known hereditary predispositions, little is still known about the underlying molecular genetic causes. Treatment for invasive breast cancer usually involves some combination of surgery, radiation therapy, chemotherapy, hormone therapy and/or targeted therapy. The treatment of rare malignant lesions is frequently controversial due to the absence of trials to determine the optimal managements [7]-[9].

There is growing interest in investigating on medicinal plants acting as anticancer against breast cancer cell lines all over the world. Recent studies show that there are plant extracts that has antiproliferative effects on breast cancer cell lines [10], [11].

Despite considerable reports on inhibitory effects of plants in *Cuscuta* genus on cancer cells, there is not considerable report on the effects of *Cuscuta pentagona* growing in North-Iran on cancer cells, particularly MCF7 cells. The main aim of this study was to determine the effects of *Cuscuta pentagona* extract on MCF7 (breast cancer) line cell viability in cell culture.

II. MATERIAL AND METHODS

A. Extract preparation

Cuscuta pentagona extract was prepared and different concentrations of extract (1 μ g/ml, 100 μ g/ml, 1mg/ml and 10mg/ml) were used in our study.

B. Protocol of Study

We used MTT assay in this work to determine the effects of *Cuscuta pentagona* extract on MCF7 cells viability in cell culture. Briefly, the procedure was carried out in the following steps:

DAY ONE: 100 μ l of cells was added into each well (96 well plate) and incubate at 37 with 5% co2 overnight.

DAY TWO: The media was removed and extract was added and incubated at 37 with 5%co2 overnight. For control 10%FBS was added to media.

DAY THREE: extract was removed from media. 20 μ l of 5 mg/ml MTT was added to each well and incubated for 4 hours at 37oC. 150 μ isopropanol was added and covered with tin foil and agitate cells on orbital shaker for 15 min. Absorbance was read at 570 nm with a reference filter of 630 nm and recorded.

C. Statistical Analysis

Statistical significance was evaluated by one-way analysis of variance (ANOVA) using SPSS 19. Significance was measured using Fisher's least significant for the exact P values and significant differences are noted in the results. Differences with $P < 0.05$ were considered significant

III. RESULTS

Figure II represents viability of MCF7 cells in response to different doses of *Cuscuta pentagona* extract.

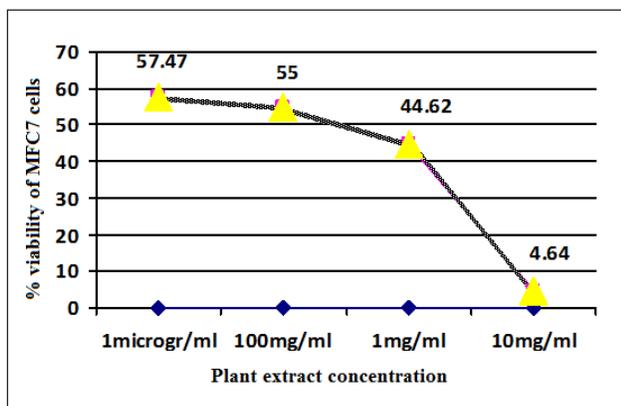


Fig. 2 Viability of MCF7 cells in response to different doses of *Cuscuta pentagona* extract.

The results showed that the administration of different doses (1 μ g/ml, 100 μ g/ml, 1mg/ml and 10mg/ml) of *Cuscuta pentagona* resulted in decreased viability of MCF7 cells ($P < 0.05$). The higher the dose of extract was administered, the lower viability in MCF7 cells was observed.

IV. DISCUSSION

In our study, we reported inhibitory effect of *Cuscuta pentagona* extract on cell viability of MCF7 (breast cancer) cells. Our findings also indicated that higher doses of *Cuscuta pentagona* extract had higher cytotoxic effects on MCF7 cells. In line with our study there are other reports indicating that administration of some plant extracts inhibit tumor growth including breast tumors [11]-[13]. It has also been shown that there are other plant extracts acting as anticancer against breast cancer cell [13].

The studies show that *Cuscuta pentagona* acts in cellular level to damage host cells in plants growing on them [14], so, it is expected that *Cuscuta pentagona* extract to inhibit cellular growth at cellular and molecular level in cancer cells. In this respect, the inhibitory effects of *Cuscuta pentagona* on MCF7 cells may result from RNA translocation. Studies indicate that RNA translocation occurs between certain parasitic plant species and their hosts [15].

V. CONCLUSION

We have shown that *Cuscuta pentagona* extract has inhibitory effect on viability of MCF7 cells. This discovery of the anticancer potential of *Cuscuta pentagona* may help in the development of chemopreventive drugs and may have therapeutic effects in the treatment of breast cancer.

ACKNOWLEDGMENT

We appreciate all who helped us to exert the present study.

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