Cytotoxicactivity of *Momordicacymbalaria* on A-432, A-549, A-498 and AGS cell line

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Abstract

The anticancer potential of ethanolic extract of *Momordicacymbalaria* fruits was evaluated against skin cancer cell line A-432, lung cancer cell line A-549, kidney cancer cell line A-432, stomach cancer cell line AGS. It was noticed that IC_{50} value of *Momordicacymbalaria* crude fruit extract on skin carcinoma was 47.19 µl/ml, lung cancer 51.88 µl/ml and seed extract was kidney cancer 3.63 µl/ml, stomach cancer 15. 90 µl/ml. Thus, *Momordicacymbalaria* fruit and seed extract might be used as potent anticancer source.

Key Word- *Momordicacymbalaria*, Skin cancer, Lung cancer, Kidney cancer, Stomach cancer.

Introduction

Cancer is a disease of disorders induced by cell cycle regulation failure. Cancer is correlated by uncontrolled cell division that is abnormal. Some external factors (tobacco, chemicals, radiation even infectious organisms) including internal factors are responsible for cancer inherited mutations, hormones, immune conditions, and mutations that occur from metabolism [1]. Due to the absence of widespread and systematic early diagnosis procedures, that dealing prognosis detected in advanced stages of the disease and its growing prevalence on a world basis, cancer is a major global health concern in general. Indeed, one of humanity's biggest obstacles is the battle to combat cancer [2].

In recent times, plant-derived molecules have often been a significant source of medicines for different diseases and also have gained considerable recognition due to its various bioactive compounds, namely cytotoxic and cancer potential therapeutic impact [3]. Plants have a special role in the diagnosis of cancer. It is known that plant-derived chemicals comprise and over 50% of anticancer agents in one way or the other [4, 5].

The fruits of *M. cymbalaria* consumed as vegetable are rich in crude fiber, calcium, potassium, sodium and vitamin C as compared to bitter gourd [6]. The plant is disease resistant and its fruits have

medicinal value [7]. The tuber is used as an abortificient [8]. The plant is used as hypoglycemic, antidiabetic and hypolipidemic [9]. Its crude fiber decreases the absorption of cholesterol form the gut. It delays the digestion and conversion of starch in to sugars. Such attribute would be desirable for diabetic patients [10]. The plant *Momordicacymbalaria* is an important source of Ca and other essential elements with sufficiently low (below permissible limits) contaminant trace metals. This study focuses on the cytotoxic properties of this plant.

Based on the literature survey, it is evident that no work has been carried out on the evaluation of anticancer property of both the fruit and seed extracts. Hence in this present study, the anticancer potential of ethanolic extract of fruit and seeds *Momordicacymbalaria* of was assessed by investigating the inhibition of cell growth of A431, A549, A498 and AGS cancer cells after treatment with the extracts. Morphological changes of the cancer cell lines treated with the seed extracts were also observed in this study.

Material and Method

The fruits and seeds of *M. cymbalaria* were extracted by continuous extraction in Soxhlet apparatus for 12 hr, using ethanol (40 - 45^{o}C boiling range) as a solvent [11]. The extraction the solvent was evaporated, using rotary evaporator and the powder obtained was dried over anhydrous sodium sulphate and stored -4^{o}C for further analysis. The various concentration of ethanolic extracts were prepared for the further analysis.

MTT assay-

The cells were seeded at a density of approximately 5×103cells/well in a 96-well flat-bottom micro plate and maintained at 37^{0}C in 95% humidity and 5% CO_2 for overnight. Different concentration (400, 200, 100, 50, 25, 12.5µl/mL) of samples was treated. The cells were incubated for another 48 hours. The cells in well were washed twice with phosphate buffer solution, and 20 µL of the MTT staining solution (5mg/ml in phosphate buffer solution) was added to each well and plate was incubated at 37^{0}C. After 4h, 100 µL of di- methyl sulfoxide (DMSO) was added to each well to dissolve the formazan crystals, and absorbance was recorded with a 570 nm using micro plate reader [12].

Result

The cytoxicity of alcoholic extract of fruits and seeds of *M. cymbalaria* is shown in figure 1,2,3 and 4 .It is clear form fig. that the cell viability is considerabley decresed with incresing concentation

of plant extract against the skin carcinoma cell line A-432, lung cancer cell line A-549, kidney carcinoma cell line A- 498 and stomach cell line AGS. It is also evident that the anticancer activity of fruit extract shows 47.19 µl/ml, IC- 50 value for skin carcinoma and 51.88 µl/ml, IC 50 value for lung cancer cell lines. The seed extarcts of *M. cymbalaria* against kidney carcinoma A-498 cell lines shows 3.64 µl/ml, IC 50 value and stomach cancer line AGS shows IC 50 vaolue 15.90 µl/ml. The MTT assey of fruit extract shows better anticancer potential than the seed extract.

For the treatment of various cancers, the chemotherapy with conventional drugs are mostly used which also creates side effect on the other organs. But due to the low toxicity of natural products and phytoconstituents, the utilization of medicinal plants for the cancer treatment is concentrated [13]. Nearly about 65% medicines has been isolated form the natural sources [14].In the last several years, a number of preliminary studies have been under taken to reveal the anti-cancer activity of *Momordica* sp. The intake of bitter melon are inversely related to the incidence of cancer. In view of the [15] treatment of fractionated seed extract of *M. charantia* in human myeloid HL60 cells induced the differentiation and can be used as therapy for leukemia. [16] The inhibiting property of MAP 30 protein isolated from seeds of *M. charantia* against the growth of Hep G2 leukemia cells. [17]In a breast cancer cell line, the fresh leaf extract of bitter melon substantially lowers MMP-2 and MMP-9 gene expression. They also noticed that these extract could increase them RNA level of TIMP-2, known to have inhibitory effects on the activity of MMP-2. [18] Isolated a novel cucurbitane-type triterpenoid from wild bitter gourd that induces apoptotic death in breast cancer cells. The seed extracts of *M. cochinchinensis* have been reported as inhibitors for breast cancer against ZR-75-30 breast cancer cells [19]. Xiong*et al*., (2009) isolated a novel ribosome-inactivating protein called α-momorcharin and β-momorcharin from the mature seeds of *M. charantia*which efficiently inhibits the growth of prostate cancer.

In the present study the cell death was significantly observed from 12.5 to 400µl/ml concentration. The anticancerous property of fruit extract against skin carcinoma and lung cancer was evident due to the cell growth inhibition and cell death followed by aggregated round dead cells. The IC-50 value of fruit extract against skin and lung cancer was up to 50 µl/ml, which indicate the anticancerous potential of fruit extract. While the seed extracts tested against kidney carcinoma and stomach cancer exhibits very low IC 50 value indicating its ineffectiveness for cancer prevention.

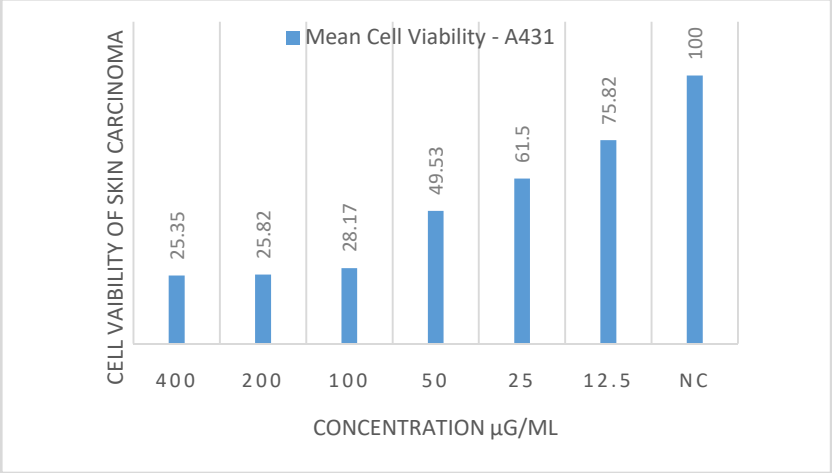

Figure 1: Effect of fruit extract of *M. cymbalaria* on skin carcinoma cell line.

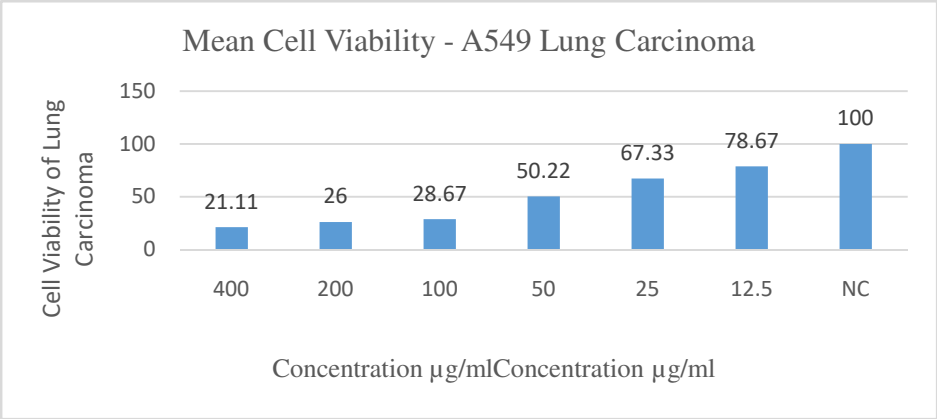

Figure 2: Effect of fruit extract of *M. cymbalaria* on lung cancer cell line.

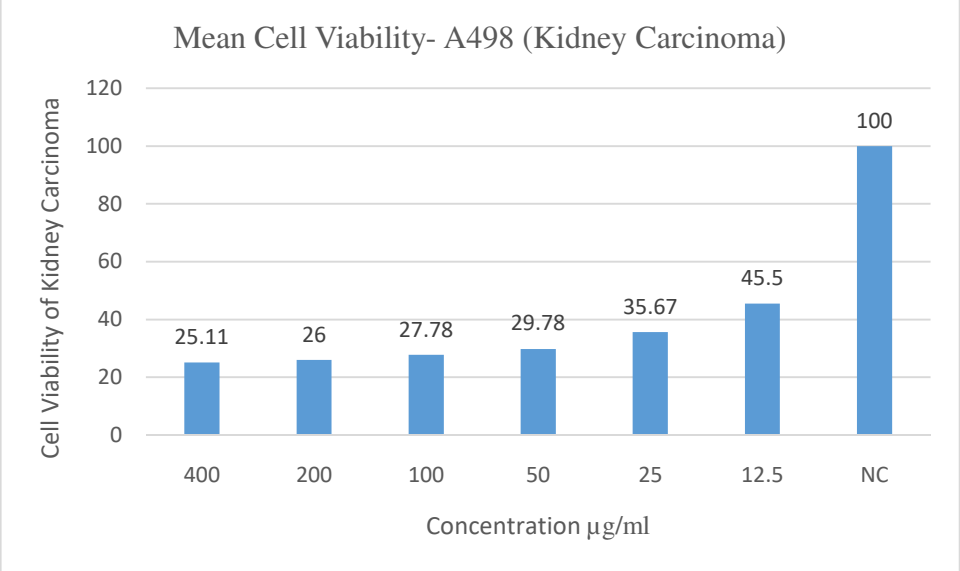

Figure 3: Effect of seed extract of *M. cymbalaria* on Kidney Cancer cell line

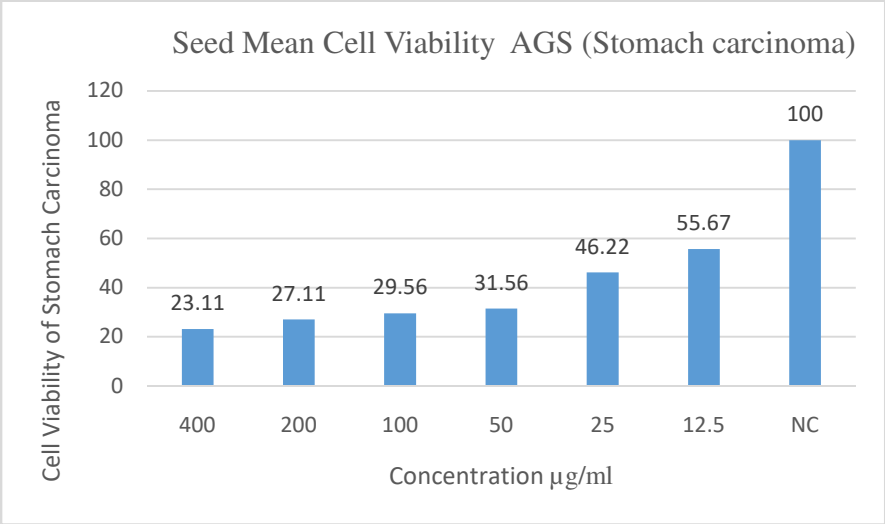

Figure 4: Effect of seed extract of *M. cymbalaria* on Stomach cancer cell line

Conclusion

The entire fruit of *Momordicacymbalaria* might be used against skin and lung cancers. The fruits might be utilized as a potent source for the development of bioactive molecule against lung cancer, after toxicity studies and clinical trials.

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