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CYTOTOXICITY STUDIES ON VARIOUS EXTRACTS OF *ANDROGRAPHIS PANICULATA* AND *CENTELLA ASIATICA* AGAINST HUMAN CANCER CELL LINES

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ABSTRACT

Cancer is one of the leading deaths causing disease in the world. Now a days, there are number of studies were conducted in order to eradicate cancer in the environment. From Ancient times, the medicinal plants used to treat cancer were found in different medicinal system in different parts of the world. The present study concentrates to find out the in vitro anticancer activity of medicinal plants named *Centellaasiatica*and*Andrographispaniculata*. Inorder to find the activity of these medicinal plantsin the invitro (MTT assay) was conducted and the results confirmed that the both the plants have the anticancer activity and the aqueous leaf extract of *Andrographispaniculata*and methanolic leaf extract of*Centellaasiatica* had more potential activity.

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INTRODUCTION

Cancer is one of the major human diseases all over the world. Chemotherapy is an important method which uses chemotherapeutic drugs for the effective treatment of tumor. Chemotherapy reduces the tumor by destroying the rapidly proliferating cancer cells. Ayurveda is one of the traditional medicinal method for curing various diseases since more than 5000 years (Balakrishnan P, *et al*., 2015). Most of the Indian traditional plants have some medicinal properties such as anticancer, anti-cholestrol, antidiarrheal, anti-inflammatory and such predictable diseases. In this current study we have chosen two medicinal plants namely *Centella asiatica* and *Andrographis paniculata* with best cytotoxicity background.

These two plants have various pharmacological activities due to the presence of their phytochemicals. Most phenolic compounds such as flavonoids, shows a wide range of biological effects including anticancer, antibacterial, antiviral, anti-allergic, antioxidant anti-inflammatory and anti-thrombotic properties (Chao WW, *et al*.,2010). *Andrographis paniculata which belongs to* Acanthaceae is an Indian traditional medicinal plant which has been widely located in the southeast Asian countries and *Centella asiatica belongs to* Umbeliferae was located in the asian wet lands (NugrohoAE,*et al*., 2013). Both of the plants were frequently used in different medicinal practices like Ayurveda, siddha, etc., from ancient times. In traditional it has been used to treat various ailments but the mechanism of action of these plants were not studied. So, in this research our moto is to find out the anticancer activities of both plants in various cancer cell lines.

MATERIALS AND METHODS

Chemicals &Plant collection:

The leaves and roots used were selected from the healthy, mature and disease free *Centella asiatica* and *Andrographis paniculata* plant, Collected from kumbakonam, Thanjavur, Tamilnadu, India. All the chemicals were analytical grade from sigma and all the glass wares used were completely sterilized and every process was done at completely sterilized condition.

Extraction:

For preparing the sample in the powder form the crude methanolic and aqueous extracts of both *Centella asiatica* and *Andrographis paniculata* leaves were dried inrotary evaporator under reduced pressure and dried completely. (Rathnasamy S, *et al*., 2014; Zainol MK, *et al*., 2003)

Cell culture:

HeLa (Human cervical carcinoma, tumorigenic and invasive), MCF-7(human breast carcinoma, tumorigenic and non-invasive), DLA and EAC were purchased from Bharadhidasan University, Trichy.

Cytotoxicity study (methyl tetrazolium-MTT assay):

The cytotoxicity effect has been studied in the above cancer cell lines using the 3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide (MTT) test. The cancer cells lines were seeded at 20,000 cells/ml in 96 well plate and were grown overnight. Then the cells were treated with increasing concentration of *Centellaasiatica*and*Andrographispaniculata*(0.5- 1.5%) for 24 h. The culture media was replaced by fresh medium containing MTT (0.5 mg/ml) for 4 h and incubated at 37°C. The absorbance has measured at 590 nm (BabuTD,*et al*., 1995, Shukla A, *et al*., 1999).

AP1, and AP2, represents the aqueous & methanolic leaves extracts of *Andrographis paniculata* respectively. Similarly CA1, and CA2 represents the aqueous & methanolic leaves extracts *Centella asiatica* respectively.

RESULTS & DISCUSSIONS

Cytotoxicity effect (MTT assay):

The samples were evaluated against the Hela, MCF-7 (breast), DLA, and EAC cancer cell lines. When compare with the standard, our samples also has the activity against the tested cancer cell line this is due to the presence of phytochemicals present in the *Centella asiatica* and *Andrographis paniculata* leaves. After the depth analysis it is observed in our studies that the leaves extracts of the both the plants had the more efficient activity against the human cancer cell lines.

Table 1: In vitro cytotoxicity effects of *Centella asiatica* and *Andrographis paniculata* leaves extracts against various human cancer cell lines.

Samples	Concentration (µg/ml)	IC_{50} values			
		Hela	MCF-7	DLA	EAC
CA1	100	40	22	34	22
CA2	100	30	26	24	20
AP1	100	26	20	30	40
AP2	100	44	58	56	48
5-fluorouracil	2×10^{-5}	-	14	-	55

CONCLUSION

There are number of studies were available related to different types of cancers. But till now, the complete eradication of cancer is difficult to achieve around the world. So the current study is mainly concentrated to give advancement in the cancer treatment and to enhance the medicinal properties of our valuable plants. The data reveals that the methanolic extracts of *Centellaasiatica*has more cytotoxicity effect *against DLA & EAC*andaqueousextract of*Andrographispaniculata*has more cytotoxicity effect against HeLa & MCF-7. We concluded that the usage of the plant will be the milestone in the cancer treatment.

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