Comparative Anticancer Evaluation of Selected herbal Medicinal Plants

1Dr Bharadwaj Vedula, 1Dr Kandanala Mallika, 1*Dr Srikanth Reddy Kamireddy

1. Department of Pathology, Konaseema Institute of medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India

*corresponding author: Dr Srikanth Reddy Kamireddy
E-Mail: dr.srikanthreddykamireddy@gmail.com

Abstract
Cancer is an ailment which gradually influences and brings down the life expectancy of human beings. There is an increasing exigency towards the aversion and remedy for this life threatening disease. Fortunately, most of the researches accentuate on naturally derived product, as they considered having less toxicity and less side effects when compared to the current treatment viz., chemotherapy. Actually, the most prevalent drug sources are natural drugs and can provide more structural diversity and novelty. So in the present study, the anti-proliferative potential of extracts of three Indian medicinal plants namely Ammanniabaccifera, Azimatetracantha, Melothriamadera spatana are assessed in contradiction of human cervical cancer cell line (Hela) by cytototoxic assay (MTT). The results of cellular viability in human cervical Cancer line (Hela) demonstrated a pronounced anti proliferative activity that may be attributed to the phyto constituent present in the extracts.

Keywords: Ammanniabaccifera, medicinal plants, human cervical cancer cell line, MTT

How to cite this article: Vedula B, Maillika K, Kamireddy SR (2020): Comparative anticancer evaluation of selected herbal medicinal plants, Ann Trop Med & Public Health; 23(S21): SP231917. DOI: http://doi.org/10.36295/ASRO.2020.231917

1 Introduction
In Present situation, Cancer is probably the best executioner worldwide and is spreading speedily. The investigation of Ayurvedic works of art has uncovered that the symptomatology of the sickness substance Arbuda can be associated to that of tumor or malignancy. The most outstanding indication is that of an expanding which persistently continues expanding in size yet never reaches to the phase of decay until and except if muddled by superimposed contamination [1-2]. This expanding is round, unflinching, somewhat difficult, gradually developing and wide based1. As indicated by Ayurvedic writing three humors, Vata (air), Pitta (fire) and Kapha (water), commonly facilitate to play out the ordinary capacity of the body. In kindhearted tumor (Vataja, Pittaja or Kaphaja) a couple of the three humors/frameworks are crazy and consequently not very unsafe [3]. Threatening tumors are extremely destructive on the grounds that all the three significant humors/frameworks lose shared coordination and in this manner a disappointment of guideline is displayed which results into a fatal dismal condition2. In clinical science the strategies accessible to treat a malignancy tolerant primarily incorporates medical procedure, chemotherapy and radiotherapy [4], and so on As these realized strategies are expensive and have results with impediments of their utilization, there is need of successful and satisfactory disease therapeutics specialists that ought to be non-poisonous, exceptionally adequate against various malignant growths, attractive, practical and worthy by human populace.

Methods
Evaluation of Anticancer Activity
The anticancer of the hexane and ethanol excerpts of all the three plant drugs were evaluated using the cytototoxic assay, MTT assay, which Is In view of those ability for mitochondria succinate dehydrogenase proteins for existing units to decrease those yellow water dissolvable substrate 3-(4,5 dimethyl thiazol-2-yl)-2,5 diphenyl tetrazolium bromide (MTT) under an insoluble, colored formazan item which is measured spectrophotometrically. Since

decrease from claiming MTT can just happen over metabolically animated phones and the level by movement may be a measure of the viability of the cells [4-5].

In Vitro Anticancer Screening Studies Using HeLa Cell Line
The human cervical growth borealis transport (HeLa) might have been got starting with national focal point for Mobile science (NCCS), Pune. The phones were developed Previously, Eagles least fundamental medium holding 10% fetal cow-like serum (FBS).

To screening analysis those units were seeded under 96 great plates Previously, 100 µl of the medium holding 10% FBS, at planting thickness of 10,000 phones /well and incubated In 37°C ,5% CO2, 95% air Furthermore 100% relative humankind (RH) to 24h former should expansion of extracts. Every last one of six extracts (ABE, ABH, MME, MMH, consumed Also ATH) were solubilised on dimethyl sulfoxide (DMSO) And weakened Previously, particular serum allowed medium. After 24h, 100µl of the medium holding the extracts at Different focuses (62.5µg/ml,125µg/ml,250µg/ml,500µg/ml) Furthermore 1000µg/ml might have been included Also incubated during 37°C, 5% CO2, 95% air Furthermore 100% rh to 48h. Triplicate might have been looked after and the networking without extracts are taken as control cells were also inoculated with the standard drug tamoxifen at a concentration of 10µg/ml. After 48h, 15µl of MTT (5µg/ml) in phosphate Endured saline (PBS) might have been included on each great And incubated during 37°C to 4h. The medium with MTT might have been solubilised to 100µl about DMSO et cetera absorbance might have been measured during 570nm utilizing micro plate reader, those rate Mobile restraint might have been dead set utilizing those taking after recipe And IC50 qualities were ascertained starting with those chart plotted the middle of rate cell restraint And log centralization.

Rate Mobile restraint = [(100- Abs (drug)/Abs (control)] X 100.

Results
The percent cell growth inhibition by each extract was studied on HeLa cell line by MTT cell viability assay. Treatment of HeLa cells with all the extracts resulted in growth inhibition and the percentage cell inhibition at various concentrations are tabulated in Table I. The graphical representation of % growth inhibition are given in Fig1-6 and IC50 values are also given in Table I Positive control (Tamoxifen) showed the highest percent cell inhibition as it is a well known anti-estrogenic drug which attacks cervical cancers on several fronts when used at high dose for short term[5]. Among the six extracts tested, Azimatetracantha hexane extract was the most active against HeLa cell line as shown by the least IC50 value (130mg/ml). The pattern of cell growth inhibition was found to be minimum at lower concentrations tested (0.063 and 0.125mg/ml) followed by a sudden rapid increase and almost 100% inhibition was noticed at the maximum dose tested (100mg/ml) for all extracts except Azimatetracantha hexane extract for which 95% inhibition resulted with 250mg/ml itself and 100% inhibition attained at 500mg/ml. The hexane extracts of Melothriamaderaspatnaand Azimatetracantha were better in inhibiting cancer cell growth compared to ethanolic extract, whereas ethanolic extract of Ammaniabaccifera showed greater anticancer activity than that of its hexane extract.

Discussion
Phenolic compounds exhibit a prominent role in the prevention of cancer as well as anti proliferative and cytotoxic action in several tumour cells[6]. The reason for the absence of a linear correlation between the phenolic content and the in vitro antiproliferative activity of the extracts may be the contributed by the other classes of phytoconstituents which possess anti cancer activity. The other major classes of phytoconstituents, steroids and saponins, present in the extracts, k is stated for anti proliferative movement through the induction of tumour cell apoptosis and changes in membrane permeability and pore formation[7,8,9].

Betulinic corrosive might have been separated from the hexanchus griseus extracts of every last one of three chose plants. Betutinic corrosive An broadly conveyed pentacyclic lupine – sort triterpene has been distinguished Similarly as An Exceptionally particular development inhibitor from claiming mankind's melanoma, neuro ectodermal And harmful tumor units And might have been appeared for actuate apoptosis over these cells[10]. It need demonstrated dynamic in vitro against An board for neoplastic cell lines including cervical carcinomas[11]. Betulinic corrosive holds incredible guarantee Similarly as An novel restorative system in the medication from claiming mankind's tumors as it induces apoptotic cell demise On disease units by activating those mitochondrial pathway from claiming apoptosis, an instrument advantageous in the disappointment for standard
chemotherapeutics [12]. The impact of betulinic corrosive on mitochondrial capacities brings about antiangiogenic impacts to endothelial phones Andbetulinic corrosive need Additionally been showed up for restrain aminic peptidase N, a chemical that is included in the regulation of angiogenesis Also through communicated over a few tumors [13]. Betulinic corrosive., a triterpenoid, present in Ammania baccifera root (1636.4ppm) may be responsible for the exhibited anti cancer activity [14].

Another phytoconstituent isolated and quantified from the hexane extracts of all the three plants is β sitosterol, a phytosterol the dietary inclusion of which has been proved to enhance tamoxifen efficacy in breast cancer patients[15]. β sitosterol, a constituent of vegetable oils has been claimed for reducing the breast cancer risk[16] and it has shown anticancer activity in cervix cancer cells[17].

Quercetin, a flavonoid isolated from Azimatetracantha, a potential anticancer agent the mechanism of action of which counting cell cycle regulation, interaction by type II estrogens binding sites, and tyrosine kinase inhibition [18]. Quercetin when administrated by short i.v infusion in a phase I clinical trial has demonstrated tyrosine kinase inhibition in vivo also [19]. Earlier reports on anticancer activity of plant drugs reveal the cytotoxic potential of the chosen plants.

Ethanolic leaf extract of Azimatetracantha lam has been reported to possess substantial anticancer activity against Ehrlich Ascites Carcinoma Tumourbearing mice[20]. The present study also demonstrates the maximum antiproliferative acitivity of A. Tetracantha hexanextract.

The methanolic excerpt of Ammania baccifera leaves displayed selective cancer cell line cytotoxicity with IC50 values of 0.55, 0.59 and 0.91 mg/ml-1 in contradiction of gastric, colon and breast cancer cells correspondingly [21]. The present study confirms the cytotoxic activity of Ammania baccifera on HeLa cell line also. Melothria maderaspatana has also been reported to possess anticancer action[22].

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the extract</th>
<th>IC50(μg/ml)</th>
<th>Dose mg/ml</th>
<th>percent cell inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.06 0.12 0.25 0.5 1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ammania baccifera hexane</td>
<td>270</td>
<td>3.91 14.4 37.9 95.9 99.8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ammania baccifera ethanolic</td>
<td>170</td>
<td>4.40 25.7 76.8 87.1 98.4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Melothria maderaspatna hexane</td>
<td>250</td>
<td>7.94 22.0 39.0 95.4 99.7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Melothria maderaspatna ethanolic</td>
<td>440</td>
<td>3.16 7.88 23.4 50.6 94.7</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Azimatetracantha hexane</td>
<td>130</td>
<td>17.1 37.6 95.0 100 100</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Azima tetracantha ethanolic</td>
<td>330</td>
<td>8.03 18.1 27.7 71.9 100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tamoxifen</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

The anticancer activity of hexane and ethanolic extract of all the three plant were screened by MTT assay. The
result obtained from the anticancer activity shows that among the hexane extract tested, the hexane extract of *Azimatetracantha* demonstrated the proliferative efficacy in HeLa cell line. And among the compound tested quercetin isolated from *Azimatetracantha* has most promising proliferative efficacy against HeLa cell line than the other two compounds tested.

References

22. Husseini ASN, Kingston DG, Screening of the medicinal plants used in Sudan Folk medicine for anticancer activity (II), Fitoterapia, 1982;53:/19-123.