International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJAMSCR |Volume 3 | Issue 2 | April-June- 2015
www.ijamscr.com

Research article ***Medical research***

Part-II

Anti-cancerous properties of the medicinal herbs mentioned in Ayurveda and its availability in the north eastern region of India

Dr. Amit Swarnakar[1], Kangkan Kumar Das[2], Selim Mehmud[3]

[1] *SRF (Ayurveda) North East India Ayurveda Research Institute, Assam*

[2] *SRF (Botany) North East India Ayurveda Research Institute, Assam*

[3] *JRF (Botany) North East India Ayurveda Research Institute, Assam*

***Corresponding author: Dr. Amit Swarnakar**

ABSTRACT

Ayurveda one of the ancient medical procedures is providing a great impact in the life of human society. Many medicinal herbs are mentioned in Ayurveda having the capacity to mitigate many disease conditions that is prevailing in the human society. In today's world scientist around the world have shown great interest in medicinal herbs and trying relevantly to get a solution for cancer. The main aim of the article is to reflect anti-cancerous activities of the medicinal herbs mentioned in Ayurveda and its availability in the north eastern states of India.

Keywords: Anticancer, Ayurveda, Arbuda.

INTRODUCTION

Ayurveda one of the ancient medical procedure had a great impact in the life of human society. Sufferings of the people are increasing day by day because of the prevalence of chaotic conditions making the human society a prey to submerge in the depth of unfavorable commodities leading them to lead a life where disease and death exist. Cancer one of the unsolved question had made the human race miserable and downtrodden and leading them no-where but had made the society where only fear and death exist. In some few years the rate of cancer patient had increased and the main etiological factor behind this scenario is the prevalence of un-wanted harmful products or eatables that the human society is using or facing in the long run of life. Description of cancer is also available in the ayurvedic texts and the acharyas of Ayurveda has given the nomenclature as arbuda. Cancer is a condition where a mass of tissue formed a result of abnormal, excessive, un-coordinated, autonomous and purposeless proliferation of cells. The common term used for all malignant tumors is cancer. Hippocrates (a60-337 BC) coined the term karkinos for cancer of the breast. The word "cancer" means crab, thus reflecting the true character of cancer since it sticks to the part stubbornly like a crab. Similar description is also available in Ayurveda where it says that- vata and other dosas of the body is responsible for the formation of round, static, with little pain, deep-seated mass and the acharyas of Ayurveda has given the nomenclature as arbuda. The main aim of the

article is to reflect anti-cancerous activities of the medicinal herbs mentioned in Ayurveda and its availability in the north eastern states of India.

MEDICINAL PLANTS AND THEIR ANTICANCER ACTIVITIES

North East India is very rich in vegetation. Many plants species are available with great medicinal values and the peoples of North East are using these plants in their day to day life to carry out their activities. Many plants are still need to be explored or need to be identified. Medicinal plants have reflected a great impact in the field of medical science. Research is progressing around the world in different medicinal herbs in order to sense a good result in cancer bearing patients. List of medicinal plants with their anticancer activities has been listed below:-

SANSKRIT NAME	SCIENTIFIC NAME	FAMILY	ANTICANCEROUS ACTIVITIES
Kampillak	*Mallotus philippinensis* Muell Arg.	Euphorbiaceae	Proteinkinase is inhibited with some specificity for PKC by rottlerin,a compound isolated from *Mallotus*. Inhibition of PKCappears due to a strong competition between rottlerinandATP. CaM-kinase III is suppressed by rottlerin as effectivelyas PKC δ, among different protein kinases tested. Novelinhibition property and improved selectivity for a distinctPKCisoenzyme of rottlerin are suggestive from its chemical structure. Rottlerin is also very potent in blockingother kinases including Akt/PKB and p38 MAPK. Italso inhibits human T cell responses, reduces MUC5ACexpression in human epithelial cells [33], abrogates reactiveoxygen species production in hepatic stellate cells andprevents histamine-induced H1-receptor gene expression in HeLa cells. However, still very limited information isavailable of rottlerin towards cancer disease and its mechanismof action.[45]
Kharapuspa	*Ocimum basilicum* Linn	Lamiaceae	Basil or sweet basil *(Ocimumbasilicum)* is cultivated throughout India and is known for its medicinal value. The effects of doses of 200 and 400 mg/kg body weight of hydroalcoholic extract (80% ethanol, 20% water) of the fresh leaves of *Ocimumbasilicum* on xenobiotic metabolizing Phase I and Phase II enzymes, antioxidant enzymes, Glutathione content, Lactate dehydrogenase and lipid peroxidation in the liver of 8–9 weeks old Swiss albino mice were examined. Furthermore, the anticarcinogenic potential of basil leaf extract was studied, using the model of Benzo(a)pyrene-induced forestomach and 7,12 dimethyl benz(a)anthracene (DMBA)-initiated skin papillomagenesis. The hepatic glutathione S-transferase and DT-diaphorase specific activities were elevated above basal level by basil leaf treatment (from $p < 0.005$ to $p < 0.001$). Basil leaf extract was very effective in elevating antioxidant enzyme response by increasing significantly the hepatic glutathione reductase (GR) ($p < 0.005$), superoxide dismutase (SOD) (p

			< 0.05), and catalase activities (p < 0.005). Reduced glutathione (GSH), the major intracellular antioxidant, showed a significant elevation in the liver (p < 0.005) and also in all the extrahepatic organs (from p < 0.05 to p < 0.005). In the forestomach, kidney and lung, glutathione S-transferase and DT-diaphorase levels were augmented significantly, varying from p < 0.01 to p < 0.001. There were significant decreases in lipid peroxidation and lactate dehydrogenase activity. Chemopreventive response was evident from the reduced tumor burden (the average number of papillomas/mouse, p < 0.005 to p < 0.001), as well as from the reduced percentage of tumor bearing-animals. Basil leaf, as deduced from the results, augmented mainly the Phase II enzyme activity that is associated with detoxification of xenobiotics, while inhibiting the Phase I enzyme activity. There was an induction in antioxidant level that correlates with the significant reduction of lipid peroxidation and lactate dehydrogenase formation. Moreover, Basil leaf extract was highly effective in inhibiting carcinogen-induced tumor incidence in both the tumor models at peri-initiational level.[46]
Surasi	*Ocimum sanctum* Linn.	Lamiaceae	The anticancer activity of OS has been proved and cited by several investigators8-11. Thealcoholic extract (AlE) of leaves of OS has a modulatory influence on carcinogen metabolizing enzymes such as cytochrome P 450, cytochrome b5, aryl hydrocarbon hydroxylase and glutathione S-transferase (GST), which are important in detoxification of carcinogens and mutagens.The anticancer activity of OS has been reported against human fibrosarcoma cells culture, wherein AlE of this drug induced cytotoxicity @ 50 □g/ml and above. Morphologically, the cells showed shrunken cytoplasm and condensed nuclei. The DNA was found to be fragmented on observation in agarose gel electrophorosis13. OS significantly decreased the incidence of benzo(a)pyrine induced neoplasia of fore stomach of mice and 3'-methyl-4 dimethylaminoazobenzene induced hepatomas in rats14. The AlE of the leaves of OS was shown to have an inhibitory effect on chemically induced skin papillomas in mice15. Topical treatment of Tulsi leaf extract in 7,12- m dimethylbenz(a)anthracene (DMBA) induced papillomagenesis significantly reduced the tumour incidence, average number of papillomas/mouse and cumulative number of papillomas in mice. Topical application of the extract significantly elevated reduced GSH content and GST activities16. A similar activity was

			observed for eugenol, a flavonoid present in many plants, Including Tulsi17. Oral treatment of fresh leaves paste of Tulsi may have the ability to prevent the early events of DMBA induced buccal pouch carcinogenesis18. Leaf extract of OS blocks or suppresses the events associated with chemical carcinogenesis by inhibiting metabolic activation of the carcinogen. The anticancer activity of OS was observed in Swiss albino mice bearing Ehrlich ascites carcinoma (EAC) and S 180 tumours[47].
Karpura	*Cinnamomum camphora* Nees and Eberm	Lauraceae	Few animal studies demonstrating the potential of camphor in the treatment of cancer have been conducted, but those undertaken included improvement of immune function enhancement of enzymatic breakdown of carcinogens and the increased susceptibility of cancer cells to radiation. Goel*et al*. demonstrated that camphor had a radiomodifying effect. An increase in the frequency of sister-chromatid exchanges (SCE) in mice bone marrow cells occurs after exposure to gamma radiation, but after a single dose of camphor, administered at 0.5 μM/g bodyweight, this frequency was significantly low. Kanematsu and Shibata reported on possible DNA damage as shown by a positive result of the rec-assay using two strains of *Bacillus subtilis*. Camphor, often used in endodontic formulations, presented a positive result in the "rec-assay", showing that camphor may cause genetic toxicity in cells, however, drugs showing positive results do not necessarily cause tumour formation. This shows that more studies on the genotoxicity of camphor are required and that camphor should be used with care. Cultivated sage (*Salvia officinalis*) rich in camphor reduced UV-induced mutagenesis when screened with the repair-proficient strain, and had no effect on spontaneous mutation frequency in mismatch repair-deficient strains. It also enhanced the formation of Lac+ recombinants, but not as a consequence of SOS induction. This result suggested a protective effect through enhanced re-combinational repair. In a subsequent study, Vuković-Gacić*et al*. investigated the inhibitory potential of cultivated sage essential oil and its monoterpenes on UV-induced mutations tested with SY252 and D7. Camphor showed antimutagenic effects at very low concentrations compared with other monoterpenes screened (about 40% reduction of UV-induced revertant at 0.5 and 1 μg/plate), although higher concentrations failed to increase antimutagenic effects. Nikolić*et al.* demonstrated that camphor can reduce UV/4NQO mutagenesis in the NER+, but not the NER− strain of *Escherichia coli* and increased spontaneous and UV-induced recombination in recA730 and

			recA+ cells. Low doses of camphor are antigenotoxic against 4NQO in mammalian cells and stimulate DNArepair, acting as a bioantimutagen. De-Oliveira *et al*. hypothesised based on previous findingshow the genotoxicity of mutagens may be modulated through cytochrome P4502B subfamily enzyme inhibition. In a study including various monoterpenes using pentoxyresorufin-*O*-dependthylase (PROD) as a model substrate for cytochrome P4502B1-enzymes, camphor was found to have an inhibitory effect on the PROD enzyme with an IC50 value of 7.89 μM. Through this mechanism of action it is possible for camphor to be considered antimutagenicbut more studies are required.[48]
Satabari	*Asparagus racemosus* Willd	Liliaceae	Dried AR leaves were extracted with chloroform and dissolved in DMSO. This extract was applied to UOK146 and cell death was estimated by MTT assay. In addition PRCC-TFE3 fusion transcripts were detected by real time PCR. Extract was found to be cytotoxic with an IC***50*** of 0.9 mg/ml as estimated by dose response curve. Antitumor activity of the permissible doses of the extract was assessed by the down regulation of PRCC-TFE3 fusion transcript (38%) responsible for oncogenicity of the UOK146 cell line. No increment in the BAX, a proapoptotic marker level was observed.[49]
Kalihari/Langali	*Gloriosa superba* Linn.	Liliaceae	Gloriosine and colchicine are two commonly used phytochemicals that is present in whole part of plant. Due to the presence of these alkaloids G. superba show many pharmacological properties like anti inflammatory [Jomy et al.,2009], Antimicrobial (Hemaiswarya, 2009), Antithrombotic/Antcoagulent potential (Kee et al., 2008), Anticancer activity(Reuter, 2010), Snake bite potential [Haroon, 2008], Hapatoprotactive activity (Mohandass, 2011), Antioxidant activity (Amudha and Shanthi, 2011) and Anthelmintic Activity (Pawar, 2010) etc[50].
Murba	*Sansevieria roxburghiana* Schult.f.	Liliaceae	Twenty-Four hours after intraperitoneal inoculation of tumor (EAC) cells in mice, HASR was administered at 50 and 100 mg/kg body weight for nine consecutive days. On day 10 half of the mice were sacrificed and rest were kept alive for assessment of increase in life-span. The antitumor effect of HASR was assessed by evaluating tumor volume, packed cell count, viable and non-viable tumor cell count, mediansurvival time and increase in life-span of EAC bearing hosts. Hematological profiles and serum biochemical parameters were estimated. Further, antioxidant properties were assessed by estimating lipid peroxidation,

			reduced glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT).[51]
Visamasti/Kuchila	*Strychnos nux-vomica* Linn	Loganiaceae	In the present study it was examined the anticancer effect of brucine and gemcitabine on MDA MB-231 human breast cancer cells. Cell proliferation was assessed using MTT assay. Soft agar assay was used to evaluate the in-vitro clonogencity of MDA MB-231 cells. Cell migration was determined by in-vitro scratch assay and expression of p65 (NF-kB subunit) was evaluated by western blot analysis. Combination treatment with brucine and gemcitabine resulted in a significant inhibition of cell proliferation than either brucine or gemcitabine alone. Cells treated with combination of brucine and gemcitabine showed additive inhibition in colony formation and cell migration than treated with individual agents. The cells treated with brucine at 300 øM showed a significant decrease in p65-NF-kB expression but in combination treatment there was no additive inhibition of p65 expression compared to brucine treated cells. Overall, our results suggested that brucine in combination with gemcitabine showed supra-additive anticancer effects in MDA MB-231 cells and warrants further in-vivo studies in experimental animal models.[52]
Dhataki	*Woodfordia fruticosa*Kurz.	Lythraceae	The SRB assay was used for screening the extracts of *Woodfordiafruticosa*for *in vitro* cytotoxicity against six human cancer cell lines viz., lung cancer cells (A-549, NCI-H23), colon cancer cells (COLO-205, SW-620), liver cancer cells (HEP-2) and neuroblastoma cancer cells (SK-N-MC). Results demonstrated that the ethanolic extract from the flowers of the plant showed *in vitro* cytotoxicity against two human cancer cell lines viz., HEP-2 and SK-N-MC. This extract did not exhibit any significant activity against other four humancancer cell lines. Surprisingly, the other two extracts (50% ethanolic and hot water) were observed to be inactive against all the human cancer cell lines[53].
Nimba	*Azadirachta indica* A. Juss	Meliaceae	Extracts from young flowers and leaves have strong antioxidant potential. An indicator of oxidative stress, malondialdehyde (MDA), was reduced by 46.0% and 50.6% for flower- and leaf-based extracts, respectively, prompting the recommendation to use neem as a vegetable bitter tonic to promote good healt.[54]
Mahanimba	*Melia azedarach* Linn	Meliaceae	The study was undertaken toevaluate the anticancer activity of *M.azedarach*in comparison withm*Azadirachtaindica*on cancer cell lines and also toevaluate their safety in humans by testingthem on normal cell line. The study alsoaimed to determine the active chemicalconstituents that are responsible fortherapeuticeffects of *M.*

			*azedarach*intraditional usages. In this study, thecytotoxic activity of crude extracts from *M. azedarach*and *A. indica*leaves, pulps andseeds as well as three main fractions of theirleaf extracts were determined against HT-29, A-549, MCF-7 and HepG-2 and MDBK cell lines. MTT assay was used to find their cytotoxic activities. Methanol leaf fraction of *M. azedarach*was subjected for phytochemical study. Results of the present study showed that seed kernel extract of *M.azedarach*exhibited the highest cytotoxic activity and selectivity to cancer cell lines (IC50 range of 8.18- 60.10 μg mL-1). *A. indica*, crude pulp and crude leaf extracts of this plant showed remarkably stronger antiprolifrativeactivity (IC50 ranges of 83.45 -212.16 μg mL-1 and 34.11- 95.51 μg mL-1 respectively) than those of *M. azedarach*(all IC50 values of both plants > 650 μg mL-1). Four flavonol 3-O-glycosides including rutin, kaempferol-3-O-robinobioside, Kaempferol-3-O-rutinoside and isoquercetin along with a purin nucleoside, β-adenosinewere isolated in phytochemical analysis. Methanol leaf fraction of *M. Azedarach* seems to be safer in terms of cytotoxicity. Flavonols are abundant in the leaves of *M.azedarach*and these compounds seem to be responsible for many of medicinal effects exploited in the traditional uses[55].
Patha	*Cissampelos pareira* Linn	Menispermaceae	The HREofCissampelospareirashowedactivityagainstfore-stomachcancerandcarcinogen metabolizing phaseIandphaseII enzymes alongwithanti-oxidantenzymes.Theextractreduced the tumourincidence,themeannumberoftumoursandthe tumour multiplicityonbenzo(a)pyrene-inducedgastriccancerin mice. TheenhancedglutathioneS-transferaselevelandenzymeactivitiesinvolvedinxenobioticmetabolismandmaintaininganti-oxidantstatusofcellswasduetoachemopreventiveefficacy of the extractagainstchemotoxicity(Amresh etal.,2007c).[56]
Guduchi	*Tinospora cordifolia* (Willd) Miers ex Hook. F and Thoms	Menispermaceae	The aqueous, methanol, methylene chloride extract of *T. cordifolia*acts as an antineoplastic agent, showing it is an anti-cancerous agent Which gives highest activity in methylene chloride extract. It was experimented that, when exposure of *T. cordifolia*extract on Hellacells*in-vitro* it killed the cells rapidly[57].
Udumbara	*Ficus racemosa* Linn.	Moraceae	*Ficusracemosa*extract at a dose of 200 and 400 mg/ kg when given orally a significant decrease in lipid peroxidation, xanthineoxidase, γ-glutamyltranspeptidase and hydrogen peroxide (H2O2) generation with reduction in renal glutathione content and antioxidant enzymes generated by

			Potassium bromate (KBrO3), a nephrotoxicagent that induces renal carcinoma in rats .There was significant recovery of renal glutathione content and antioxidantenzymes. These results suggest that *Ficusracemosa*extract is a potent chemopreventiveagent and suppresses KBrO3-mediatednephrotoxicity in rats[58].
Sahijan	*Moringa oleifera* Lam.	Moringaceae	*Moringaoleifera*leaves extracted with methanol and dichloromethane were screened for antioxidant activity. The *in vitro* cancer antiproliferative and chemopreventive properties were also investigated. Radical scavenging assays with 1, 1-diphenyl-2-picrylhydrazyl (DPPH) and 2,2´-azino-bis 3- ethylbenzothiazoline-6-sulfonic acid (ABTS) were used to determine the antioxidant activity. The antiproliferative assay was evaluated on three types of cancer cell lines: hepatocarcinoma (HepG2), colorectal adenocarcinoma (Caco-2) and breast adenocarcinoma (MCF-7), using 3-(4,5-dimethylthiazol- 2-yl)-2,5-diphenyl tetrazolium bromide (MTT) reduction assay. The *in vitro* cancer chemoprevention was performed using quinonereductase (QR) induction assay on hepatoma (Hepa-1c1c7). The chemopreventive activity of the extracts was expressed as concentration to double QR activity (CD value). The methanol extract showed higher free radical scavenging activity than the dichloromethane extract (IC50 = 1.60±0.03 mg/ml in DPPH assay and IC50 = 1.02±0.06 mg/ml in ABTS assay). In the antiproliferative assay, the IC50 of dichloromethane extract varied from 112 to133 µg/ml for HepG2, Caco-2 and MCF-7 cancer cells, but became more than 250 µg/ml for the methanol extract. In the chemopreventive assay, the dichloromethane extract had capacity to induce QR activity significantly (CD value = 91.36±1.26 µg/ml), while the methanol extract had no inductive effect. This study provides evidence that *M. oleifera*leaves possess antioxidant activity, as well as cytotoxic and chemopreventive properties. Therefore, it might be beneficial as a medicinal plant for alternative novel anticancer drugs and nutraceutical products[59].
Punarnaba	*Boerhavia diffusa* Linn.	Nyctaginaceae	Cancer chemo preventive property of B.diffusa was evaluated on 7,12-dimethyl benz(a)anthracene (DMBA) induced skin papillomagenesis in male Swiss albinomice(6-7 weeks old). The cancer chemopreventive efficacy wasassessed by its ability to modulate the activities of enzymes associated with drug metabolism and bifunctional modulators reduced the availability of ultimate carcinogen metabolites in the epithelial stage. A significant increase in the activities of hepatic phase I, phase II system enzymes

			and antioxidantenzymes (glutathione peroxidase, glutathione reductase, superoxide dismutase, and catalase and glutathione level) were observed when mice were fed by oral gavage with Boerhaaviadiffusa extract at a dose level of 125 mg and 250 mg/kg body weight for a period of 14 days in our laboratory. This lead to anassumption that the inhibition of tumorigenesis by the plant extract might have been executed either by preventing the formation of active carcinogens from their precursors or by augmenting detoxification process, preventing promotional events in the mouse skin through free radical scavengingmechanism[60].
Padmakeshar	*Nelumbo nucifera* Gaertn.	Nymphaeaceae	Methanol and acetone leaf extracts were used for anticancer activity by MTT assay. About 6.25 µg/ mL to 100 µg/ mL of sample were used for MTT assay. Methanol leaf extract showed 27% and acetone leaf extract showed 7% in 100 µg/mL of MCF-7 breast cancer cell line. Both extracts showed less anticancer activity against breast cancer. According to Weng*et al*. (2009), armepavine (Arm, C19H23O3N), an active compound from N. nucifera, has been shown to exert immunosuppressive effects *in vitro*. Arm (1-10 µM) concentration dependently attenuated TNF-α- and LPSstimulated α-SMA protein expression and AP-1 activation by HSC-T6 cells without adverse cytotoxicity (Weng et al., 2009). Arm also suppressed TNF-α-induced collagen deposition, NFκB activation and MAPK (p38, ERK1/2 and JNK) phosphorylation.[61]
Saptala	*Jasminum arborescens* Roxb.	Oleaceae	1) Flowers of *J. grandiflorum*are useful to women when brewed as a tonic as it aids in preventing breast cancer and stopping uterinebleeding. 2)Ethanolic and aqueous extracts of whole plant of *Jasminumangustifolium*Linn. have been shown antitumor activity by increasing the survival time (life span) and decrease in peritoneal cancer cell count and body weight against Dalton's ascetic lymphoma (DAL) model.[62]
Swarnakshiri	*Argemone mexicana* Linn.	Papaveraceae	The HeLa and MCF-7 cells were treated with Methanolic extract of *Argemone Mexicana* Linn and effects on the cytotoxic nature of extract of *Argemone Mexicana* Linn. Were determined using Trypan blue and Hoechst tests. The MTT assay results were used to evaluate the anti-cancerous activity of the extract.The effects of plant leaves extract on cancer cells was studied. The IC50 (1.35µg/µl to 1.2µg/µl.) values was found for the extract.The nature of cytotoxicactivity is found to be apoptotic rather than necrosis by Hoechst test. The anti cancer effects of methanol extract of *Argemone Mexicana* Linn.leaves may be related to their content of flavonoids. This study validates the

			traditional use of the plant in management of Cancer.[63]
Palash	*Butea monosperma* Lam.	Papilionaceae	Intraperitonial administration of the aqueous extract of flowers of Buteamonosperma in the X-15-myc onco mice showed antitumorgenic activity by maintaining liver architecture and nuclear morphometry but also down regulated the serum VGEF levels. Immuno-histochemical staining of liver sections with anti-ribosomal protein S27a antibody showed post-treatment abolition of this proliferation marker from the tumor tissue.[64]
Aparijita	*Clitoria ternatea* Linn.	Papilionaceae	Tumour was induced in mice by the intraperitoneal injection of DLA cells. After 24 hours of tumour inoculation, methanol extract of *Clitoriaternatea(*MECT*)* was administered at doses of 100 and 200mg/kg body weight for 14 consecutive days. The effect of MECT was assessed using in vitro cytotoxicity, survival time, peritoneal cell count, hematological studies and antioxidant parameters. Treatment with MECT led to a decrease in tumour volume, packed cell volume and viable count. It also increased the non-viable cell count and mean survival time, thereby increasing the life span of EAC bearing mice. Hematological profile reverted to more or less normal levels in the treated group. The results suggest that MECT exhibit significant antitumour effects in DLA bearing mice.[65]
Nila	*Indigofera tinctoria* Linn.	Papilionaceae	Renukadevi K.P *et al.,*(2011) study has been under taken with an objective to determine theantibacterial, anti oxidant and cytotoxic activity ofthe leaf extract of *indigoferatinctoria*. Antibacterial activity was carried out on *in vitro* lungcancer cell line. The extract screened for phytochemical analysis was found to contain bioactivecompounds like falvonoid, saponins, tannins,steroidal terpens, phenols and anthroquinone were identified by GC -MS analysis. The leaf extract *I.tinctoria*having the ability to inhibit the growth of gram positive bacteria namely Staphylococcus aureus, Bacillus pumilus and Streptococcus pyrogens and zone of inhibition was observed 16 and 17 mm, respectively but not shown growth of inhibition on gram negative bacteria Escherichia and pseudomonas aeruginosa. Strong antioxidant activity was observed both qualitatily and quantitatively. The strong antioxidant was observed at 250ugml-1 with an IC 50 value of 51.66 which is higher than that of standarad ascorbic acid. The cytotoxic effect of *I.tinctoria*leaf extract on lung cancer cell line NCI-H69 was studied. The percentage cell viability of cells was found to decrease at increasing concentration. GC-MS analysis of the leaf extract shows 6 compounds. This study suggests that

			ethanol extract of *Indigoferatinctoria*have profound antibacterial, antioxidant and cytotoxic effect.[66]
Kapikacchu	*Mucuna prurita* Hook.	Papilionaceae	The effect of methanol extract of*Mucunapruriens* (MEMP) on tumor growth and host's survival time was studied by the following parameters: tu-mor volume, packed cell volume, viable and non-viable cell count and life span of the host. MEMP was administered at a 125 and 250mg/kg b.w. once a day for 14 days, after 24 h of tumor inoculation. De-crease in tumor volume, packed cell volume, and viable cell counts were observed in MEMP treated ani-mals when compared to EAC treated animals. Treatment with MEMP at a dose of 125 and 250mg/kg in-creased the mean survival time to 29.5 ± 0.55 and 34 ± 0.2 days respectively. The extract also decreased the body weight of the EAC tumor bearing mice. Hematological studies reveal that the Hb content was decreased in EAC treated mouse, whereas restoration to near normal levels was observed in extract treated animals. There was a significant decrease in RBC count and increase in WBC counts in extract treated animals when compared to EAC treated animals. The study was also extended to estimate the liver biochemical parameters such as LPO, GSH, and antioxidant enzymes like SOD, CAT etc. Treatment with MEMP decreased the levels of lipid peroxidation and increased the levels of glutathione (GSH), su-peroxide dismutase (SOD) and catalase (CAT). The results suggest that the methanol extract of *Mucunapruriens* seeds exhibits significant antitumor and antioxidant effects in EAC bearing mice[67].
Upodika	*Passiflora quadrangularis* Linn.	Passifloraceae	Natural antioxidants derived from plant extracts have been claimed to have multiple biological activities including vasodilatatory, anti inflammatory, anticancerogenic, antiviral, and antibacterial effects (Halliwell et al., 1995; Halliwell, 1997).[68]
Tambulpatra	*Piper betel*Linn	Piperaceae	Though PB as a part of quid has been implicated in oralcancer, many scientists did not agree with these observations.The first indication of it being noncarcinogenicemerged from the work of Bhide and his group5, whenthey showed non-mutagenic properties in betel leaves andthe presence of hydroxychavicol (HC), a phenol in PBLwith anti-mutagenic properties. This proved to be theturning point in PB research, when it was established that PBL per se do not contribute to oral cancer. This providedopportunities to explore the properties of PB. Since then,many biological activities have been demonstrated inbetel leaf. Several medicinal properties have been

				attributedto PB, which include antioxidant, anti-infective,analgesic, anticancer, antidiabetic, hepatoprotective,immunomodulatory, cardiovascular, etc.Someof the activities have been patented.[69]
Pippali	*Piper* Linn	*longum*	Piperaceae	The human lung epithelial adenocarcinoma-HCC-827 cells were cultured and maintained in 90% DMEM (Dulbecco's Modified Eagle's Medium) substituted with 10% Foetal Bovine serum and 1% antibiotic for 24h. The media was then removed and the cell layer was washed with phosphate buffer saline PBS (0.1M pH7.0) to remove the traces of media. Later, 500 µl of trypsin-EDTA was added to the culture flask to remove the adherent cell layer from the flask. After 5min, 2ml of the media was added and single cells were collected. The cells were counted on the haemocytometer to get the exact viability and cell count for the experiments. 1 X 10^5 cells of the human lung epithelial adenocarcinoma-HCC-827 were used for the anticancer study of extracts of *P.longum*.[70]
Marich	*Piper* Linn	*nigrum*	Piperaceae	The evaluation of radical scavenging activity (antioxidant activity) was conducted by the method of (Blois, 1958) with modifications. The following concentrations of extracts were prepared 40µg/mL, 80µg/mL, 120µg/mL, 160µg/mL and 200µg/mL. A stock solution of the sample (100mg/ml) was diluted for 5 concentrations. Each concentration was tested in triplicate. The portion of sample solution (0.5ml) was mixed with 3.0ml of 0.1mM 1,1-Diphenyl-2-2picrylhydrazyl (DPPH, in 95% distilled ethanol) and allowed to stand at room temperature for 30 minute under light protection. The absorbance was measured at 517nm.The scavenging activity of the samples at corresponded intensity of quenching DPPH. Lower the absorbance of the reaction mixture indicates higher free radical scavenging activity.The different in absorbance between the test and the control (DPPH in ethanol) was calculated and expressed as (%) scavenging of DPPH radical. The capability to scavenge the DPPH radical was calculated by using the following equation.[71]

CONCLUSION

Literature search has shown that the plants listed above have got immense ant cancerous activities. These research works has created an atmosphere of positive approach in the field of cancer. Ancient, Ayurveda, a traditional Indian System has proven to be successful since time immemorial in using natural products to prevent or suppress tumors using various line of treatment. Medicinal herbs may enable healthy cells in body to put up a strong fight cancer cells. Still more and more research work is needed in different phases to get a better answer in the field of cancer.

REFERENCE

[1]. Sharma P.V, Dravyagunavigyana, Part 2, page number- 521, *Mallotusphilippinensis* Muell. Arg (Euphorbiaceae): Ethnopharmacology and Phytochemistry Review, Mayank Gangwar, R. K. Goel, and GopalNath, *Laboratory of Gastrointestinal Infections and Molecular Diagnosis, Department of Microbiology, Institute of Medical Sciences, Banaras Hindu University, Varanasi 221005, India Department of Pharmacology, Institute of Medical Sciences, Banaras Hindu University, Varanasi 221005, India*.

[2]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 516,Chemomodulatory efficacy of Basil leaf *(Ocimumbasilicum)* on drug metabolizing and antioxidant enzymes, and on carcinogen-induced skin and fore stomach papillomagenesis,T. Dasgupta, A.R. Rao, P.K. Yadava.

[3]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 513, Pharmacological Actions of Ocimumsacntum–ReviewArticle, P. Kalyankumar *, M. Rupesh Kumar, K. Kavitha, Jagadeesh singh and Rawoof Khan, Department of Pharmacology, East Point college of Pharmacy, Bidarahalli, Bangalore, Karnataka, India.

[4]. Sharma P.V, Dravyagunavigyana , Part 2 , page number – 198, Camphor—A Fumigant during the Black Death and a Coveted Fragrant Wood in Ancient Egypt and Babylon—A Review, Weiyang Chen, IlzeVermaak and Alvaro Viljoen,Department of Pharmaceutical Sciences, Faculty of Science, Tshwane University of Technology, Private Bag X680, Pretoria 0001, South Africa.

[5]. Sharma P.V, Dravyagunavigyana , Part 2 , page number-562, Asparagus racemosus leaf extract inhibits growth of UOK 146 renal cell carcinoma cell line: Simultaneous oncogenic PRCCTFE3 fusion transcript inhibition and Apoptosis independent cell death, Shiv Prakashverma, Vikash Chandra Tripathy, Parimal Das.

[6]. Sharma P.V, Dravyagunavigyana, Part 2, page number-603, GLORIOSA SUPERBA LINN: AN IMPORTANT ENDANGERED MEDICINAL PLANT AND THEIR CONSERVATION STRATEGIES, DHARMENDRA SINGH1, MANISH MISHRA2 & ANIRUDHA SINGH YADAV,Govt. MotilalVigyanMahavidhyalaya, Bhopal, Madhya Pradesh, India,Ecosystem Management and Tech. Forestry, IIFM, Bhopal, Madhya Pradesh, India.

[7]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 769,Antitumor activity of Sansevieriaroxburghiana Rhizome against Ehrlich ascites carcinoma in mice, PallabKanti Haldar1, BiswakanthKar, Asis Bala1, Sanjib Bhattacharya, and UpalKantiMazumder,Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India, and Bengal School of Technology, Sugandha, Hooghly, West Bengal, India.

[8]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 52, Inhibitory effect of gemcitabine and brucine on MDA MB-231human breast cancer cells, Mamatha. Serasanambati1, Shanmuga Reddy Chilakapati1, Jhansi Rani Vangavaragu, Damodar Reddy Chilakapati.

[9]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 472, Flowers of Woodfordiafruticosa exhibit in vitro cytotoxic effect on HEP-2 and SK-N-MC cancer cells, Vikas Sharma, Division of Biochemistry and Plant Physiology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu, 180009, India.

[10]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 149, Neem (Azadirachtaindica A. Juss) - A Nature's Drugstore: An overview, Imam Hashmat1, Hussain Azad and Ajij Ahmed, Department of Preventive and Social Medicine, National Institute of Unani Medicine, Bangalore, INDIA,Department of Moalajat, National Institute of Unani Medicine, Bangalore, INDIA, Department of IlmulAdvia, National Institute of Unani Medicine, Bangalore, INDIA.

[11]. Sharma P.V, Dravyagunavigyana, Part 2, page number- 528, Phytochemistry and Pharmacological Appraisals of Persian Lilac (MeliaazedarachLinn.): A Quick Comprehensive Review, Beauty Akter Rupa1, Md. Nur Kabidul Azam, Md. Abdul Mannan2, Md. Nasir Ahmed and Md. Nazmul Hasan, Department of Biotechnology & Genetic Engineering, University of Development Alternative, Dhanmondi, Dhaka-1205, Bangladesh. TechB Herbal Solution, Bheramara, Kushtia-7040, Bangladesh. Department of Genetic Engineering & Biotechnology, Jessore Science &Technology University, Jessore-7408, Bangladesh.

[12]. Sharma P.V, Dravyagunavigyana, Part 2, page number-627, From arrow poison to herbal medicine – The ethnobotanical, Phytochemical and pharmacological significance of Cissampelos (Menispermaceae), Deepak KumarSemwal, RuchiBadoniSemwal, IlzeVermaak, AlvaroViljoenn Department of Pharmaceutical Sciences, Faculty of Science, Tshwane University of Technology, Private Bag X680, Pretoria 0001, SouthAfrica.

[13]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 751,Tinospora cordifolia (Willd) Hook. F. & Thomson - A plant with immense economic potential, Abhimanyu Sharma, Asmita Gupta, Sakshi Singh AmlaBatra, Biotechnology Lab, Department of Botany, University of Rajasthan, Jaipur (Rajasthan), India

[14]. The useful plants of India by CSIR 1986, PHYTOPHARMACOLOGICAL AND PHYTOCHEMICAL PROPERTIES OF THREE FICUS SPECIES - AN OVERVIEW, BABY JOSEPH AND S.JUSTIN RAJ, Interdisciplinary Research Unit, Department of Biotechnology, Malankara Catholic College, Mariagiri, K.K District. India.

[15]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 111, Antioxidant and anticancer activities of Moringaoleifera leaves, SuphachaiCharoensin, Division of Biochemistry and Nutrition, School of Medical Sciences, University of Phayao, Phaholyothin Rd., Maeka, Amphur-Muang, Phayao 56000, Thailand.

[16]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 630, Detail Study on BoerhaaviaDiffusa Plant for its Medicinal Importance- A Review, AR Mahesh1, Harish Kumar, Ranganath MK and RavirajAnandDevkar, Department of Pharmaceutical Chemistry, Krupanidhi College of Pharmacy, Bangalore-560 034, INDIA, Department of Pharmaceutical Analysis, Krupanidhi College of Pharmacy, Bangalore-560 034, INDIA, Department of Phytochemistry, Natural Remedies Pvt Ltd., Bangalore, INDIA.

[17]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 582, NelumboNucifera (Lotus): A Review on Ethanobotany, Phytochemistry and Pharmacology, Nishkruti R Mehta*, Ekta P Patel, Pragnesh V Patani, Biren Shah, Arihant School of Pharmacy & Bio-Research Institute, Adalaj, Gandhinagar, Gujarat, India.

[18]. JASMINUM SPECIES: AN OVERVIEW,Akash Jain , Rishu Sharma1, Ashok Kumar1, Sunil Sharma,M.M. College of Pharmacy, M.M. University, Mullana, Ambala., Guru Jambeshwar University of Science & Technology (GJUS&T), Hisar.

[19]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 424,in-vitro Anti-Cancer activity of Methanolic extract of leaves of Argemonemexicana Linn.,Kiranmayi.Gali*, G. Ramakrishnan, R. Kothai, B. Jaykar, Department of Pharmacology, Vinayaka Mission's College of Pharmacy, Yercaud Main Road, Salem-636008, Tamilnadu, India.

[20]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 506, PLANT REVIEW: PHYTOCHEMICAL CONSTITUENTS AND THEIR IMPORTANT CHARACTERIZATION OF BUTEA MONOSPERMA (PALASH) Mr.A.G.Hajare ,Dr.M.D.Choudhary, Dr.Nitu S. Gupta ,Department of Chemistry, B.D.College of Engineering, Sewagram Dist-Wardha (MS) Department of Chemistry,Gurunanak college of Engineering,Nagpur(MH).

[21]. Anticancer Activity of Clitoriaternatea Linn. Against Dalton's Lymphoma, Lijy Jacob,*M.S. Latha, Biochemistry and Pharmacognosy Research Laboratory, School of Biosciences, Mahatma Gandhi University, P.D. Hills.P.O, Kottayam, Kerala-686560, India.

[22]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 126, Indigoferatinctoria Linn - A Phytopharmacological Review SaraswathiMotamarri N, Karthikeyan M, Rajasekar S and GopalV,Faculty of Pharmacy, PRIST University, Thanjavur, Tamilnadu, India, College of pharmacy, Mother Theresa Post Graduate and Research Institute of HealthSciences, Puducherry-6, India.

[23]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 569, A review on Mucunapruriens: Its phyto constituents and therapeutic uses Sharma Brijesh Kumar , Ahmad Shamim , Singh Rahul,Verma Rajesh Kumar and Kumar NileshTranslam Institute of Pharmaceutical Education and Research, Meerut (U.P)2Dabur India Limited, Ghaziabad (U.P).

[24]. Pharmacological studies of Passiflora sp. and their bioactive compounds, A. G. Ingale* and A. U. Hivrale, Department of Biotechnology, School of Life Sciences. North Maharashtra University, Jalgaon (MS), India-425001.

[25]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 208, Piper betle Linn. a maligned Pan-Asiatic plant with an array of pharmacological activities and prospects for drug discovery, Nikhil Kumar1, PragyaMisra, AnuradhaDube, Shailja Bhattacharya, MadhuDikshit and ShirishRanade,Betel Vine Biotechnology and Plant Molecular Biology Divisions, National Botanical Research Institute, Lucknow 226 001, India,Division of Parasitology and Division of Pharmacology, Central Drug Research Institute, Lucknow 226 001, India.

[26]. Sharma P.V, Dravyagunavigyana , Part 2 , page number- 275, EVALUATION OF BACTERICIDAL AND ANTICANCER PROPERTIES OF FRUITS OF PIPER LONGUM,S. S. SAWHNEY, R. M. PAINULI, NEHA CHAUHAN, Research and Development Division, Uttaranchal College of Science and Technology, Dehradun.

[27]. Sharma P.V, Dravyagunavigyana , Part 2 , page number-362, Phytochemical Evaluation and Antioxidant activity of Piper cubeba and Piper nigrum, GayatriNahak and R.K. Sahu.