WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 8, Issue 4, 382-393. Review Article ISSN 2277– 7105

A REVIEW ON MATERIA MEDICA ANTI-CANCEROUS PLANT

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Article Received on
23 Jan. 2019,

Revised on 13 Feb. 2019,
Accepted on 06 March 2019

DOI: 10.20959/wjpr20194-14466

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ABSTRACT

Cancer is characterized by the abnormal growth of cells, which tend to rapidly increase in number; multiply in an uncontrolled way and spread. Cancer, in worldwide accounting estimated for a 9.6 million deaths in 2018.Cancer is the second most common disease in India responsible for 0.3 million deaths per year. Overall, we see that globally the majority of cancer occur in those aged over 50, with 46% aged 50-69 and 37% aged over 70yrs old. The common risk factor for cancer include aging, radiation exposure, sun exposure, tobacco, family history, poor diet, alcohol or being overweight. Some cancer causes can be prevented but others like aging can't be prevented. Worldwide it is estimated that 80% of the population use herbs because of less side effects than other methods of remediation. On using allopathic drugs in chemotherapy treatment may cure initially but there will be reoccurrence. Nowadays, there is a productivity to use the traditional method like Ayurveda, Siddha drugs in cancer treatment. We review the anticancer drugs given in materia medica book and also collected the details from various sources. We have reviewed the details of materia medica anticancer plant.

KEYWORDS: Cancer, Materia medica, Anti-cancerous herbs, Papaver somniferum, Acacia catechu, Xanthium stratium, Citrus limonum, Indigofera cassioides, Kaempferia parviflora.

I. INTRODUCTION

An abnormal growth of cells which tend to proliferate in an uncontrolled way and in, some cases, to metastasize.[1] Cancer may also be called malignancy, a malignant growth or tumour (resulting from an uncontrolled division of cells), or a neoplasm(literally a new growth). It is

the second leading cause of death globally, and is responsible for an estimated 9.6 million deaths in 2018.[2] According to the National cancer registry programme of the Indian Council of Medical Research (ICMR), more than 1300 Indians die every year due to cancer. Progress against many other causes of deaths and demographic drivers of increasing population size, life expectancy and - particularly in higher-income countries - aging populations mean that the total number of cancer deaths continues to increase. This is a very personal topic to many: nearly everyone knows or has lost someone dead to them from this collection of diseases. The National Cancer Institute (NCI) has screened approximately 35,000 plant species for potential anticancer activities. Among them, about 3,000 plant species have demonstrated reproducible anticancer activity.

Low cost with no adverse effect. In addition, a growing body of scientific research shows that herbal medicines can be highly effective for certain disease and conditions. Moreover as research in the same area increases the optimum doses for herbal medicines or known to ever greater accuracy but allopathic medicines are provides a partial and quick relief from a disease, which may not be permanent.

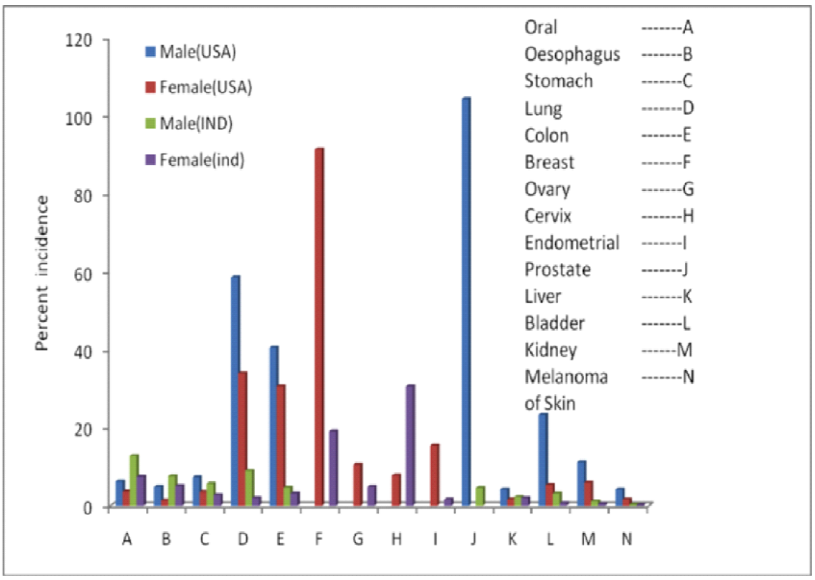
1.1. Cancer prevalence

According to International Agency for Research on cancer (IARC) Globally, the cancer burden is estimated to have risen to 18.1 million new cases and 9.6 million deaths in 2018. The total cancer cases are likely to go up from 979,786 cases in the year 2010 to 1,148,757 cases in the year 2020 in India. There will be an estimated 18.1 million new cancer cases (17.0 million excluding non melanoma skin cancer) and 9.6 million cancer deaths (9.5 million excluding non melanoma skin cancer) in 2018. In both sexes combined, lung cancer is the most commonly diagnosed cancer (11.6% of the total cases) and the leading cause of cancer death (18.4% of the total cancer deaths), closely followed by female breast cancer (11.6%), prostate cancer (7.1%), and colorectal cancer (6.1%) for incidence and colorectal cancer (9.2%), stomach cancer (8.2%), and liver cancer (8.2%) for mortality. Among females, breast cancer is the most commonly diagnosed cancer and the leading cause of cancer death, followed by colorectal and lung cancer (for incidence), and vice versa (for mortality); cervical cancer ranks fourth for both incidence and mortality.[2]

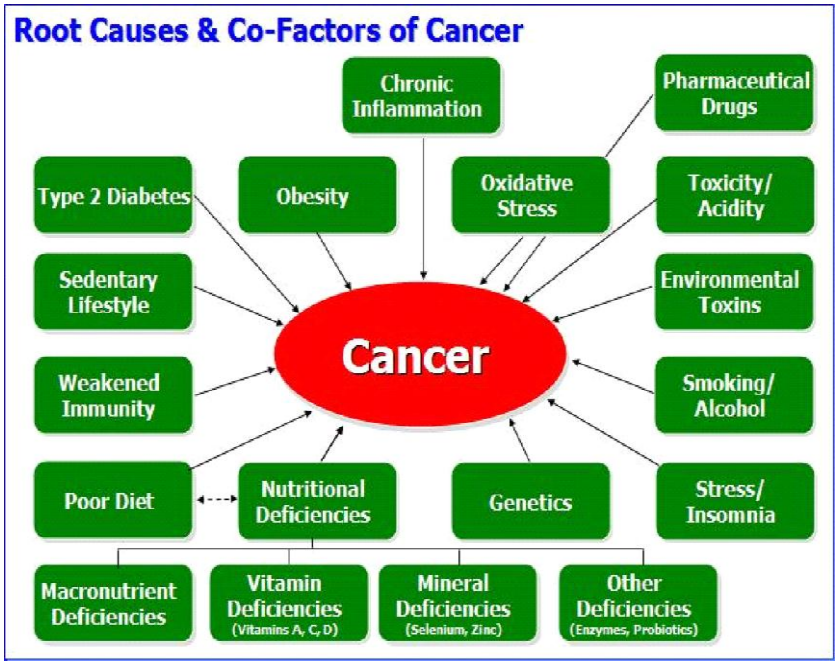
It is defined as the number of living people who have ever been diagnosed with cancer. It includes people diagnosed with cancer in the past as well as those who were recently diagnosed. It does not include the number of people who may develop cancer in their

lifetime. The breakdown of cancer prevalence by age as well as the age-specific prevalence rate across population.[7] The majority of cancer occurs in aged 50 & approximately 83-84% of known cancer, 46% age 50-69, One quarter of new cases are diagnosed in people aged 65 to 74 and 37%-70 years,1%of cancer occurs in children as under 14 years. We see that tracheal, bronchus, and lung cancer is leading form of cancer death in high and middle income countries. As the scenario as is given below to comparison of India and other countries as.[4]

1.2 World Cancer Scenario



1.3 Etiology of Cancer



1.4 Risk Factors[6]

It is usually not possible to know exactly why one person develops cancer and another doesn't. But research has shown that certain risk factors may increase a person's chances of developing cancer. Scientists look at large groups of people and compare those who develop cancer with those who don't. The risk factors for cancer includes, Biomedical factors-genetic susceptibility, hormonal factors in females. lifestyle factors-smoking, alcohol consumption, physical inactivity and obesity, chronic infections, diet. Environmental factors-sunlight, radiation, occupational exposure and pollution.

1.5 Why People With Cancer Use Herbal Medicine

Herbal medicine is one of the most commonly used complementary and alternative therapies by people with cancer. Some studies have shown that as many as 6 out of every 10 people with cancer (60%) use herbal remedies along a side conventional cancer treatments. People have used herbal medicine for centuries to treat many different health conditions. It is often promoted as a natural way to help you relax and cope with anxiety and depression. Or, to help with other conditions such as hay fever, irritable bowel syndrome, menstrual (period) problems and eczema. As with most types of complementary or alternative therapy, some people might use it to help themselves feel better or more in control of their situation.[3]

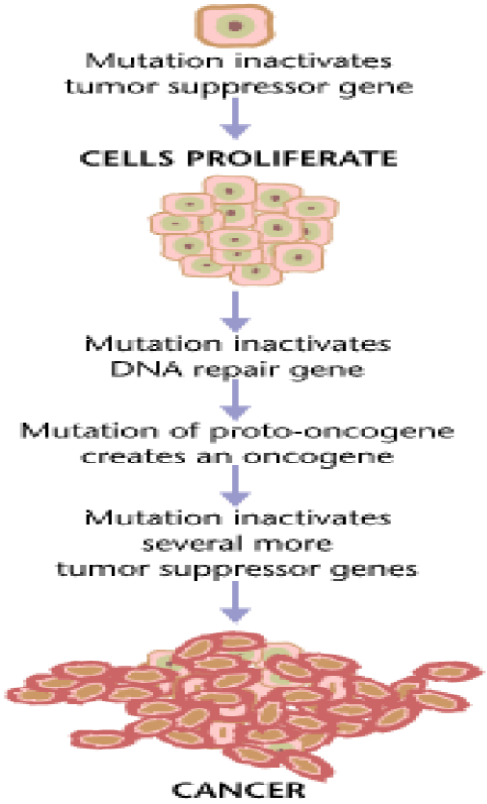
2. Types of Cancer[8]

Anal Cancer	Bile duct Cancer	Bladder Cancer
Bowel Cancer	BrainTumuor	Breast Cancer
Cervical Cancer	Endocrine Cancer	Cervical Cancer
Endocrine Cancer	Eye Cancer	Gallbladder Cancer
Kidney Cancer	Leukaemia Cancer	Liver Cancer
Lung Cancer	Lymphoma	Melanoma
Mesothelioma	Ovarian Cancer	Pancreatic Cancer
Penis Cancer	Peritoneal Cancer	Prostate Cancer
Skin Cancer	Soft tissue Cancer	Stomach Cancer
Testicular Cancer	Thymus Cancer	Thyroid Cancer

2.1 Pathophysiology of Cancer

Cancer describes more than 150 diseases processes characterised by the uncontrolled growth of the cells. The uncontrolled growth of the cells has to adjacent structures & destroy the surroundings organs and tissues. Malignant cells have lose their ability to change the healthy cells some of they are pain, cancer cells are same as that of the original type of cells but have abnormal growth. Dysplasia is general category often that results of chronic irritation as change in cervical tissue for long standing irritation of cervix. Metaplasia is the first level of

dysplasia, & its reversible, abnormal change as one type to another type of cells and also produce disorder of cell pattern. Anaplasia is most advanced form of metaplasia & refers to increase in number of cells in tissues which result in the form of certain physiologic alteration. Cancer cell as to grow very slow as in malignant state & it can remove easy in this state. Mutated genes are called Oncogenesis and it allow the uncontrolled growth of cells.(The rate of cancer cells are growing number of cancer cells actively spreading & rate of normal tissue are being destroyed.)[5]



3. MATERIA MEDICA

Materia medica (Latin word), is the body of remedial substances used in the practice of medicine or the origin and properties of substance used in practice of medicine. The branch of medical science concerned with the study of drugs used in the treatment of disease, includes pharmacology and the history, physical and chemical properties of drugs. The anti-cancerous plants which are given in the Materia Medica are, Papaver somniferum, Xanthium stratium, Acacia catechu, Citrus limonum, Indicoferac cassioides, Kaempferia parviflora

3.1 Xanthium Strumarium

Xanthium strumarium is a species of annual plants belonging to the Asteraceae family. It probably originates in North America. It has been used in traditional medicine in South Asia

and traditional Chinese medicine. It grows up to 5ft tall. Small quantities can be consumed, seed or seedlings should not be eaten in large quantities because they have extremely toxic chemical carboxyatratyloside. It is used to treat nasal and sinus Congestion and anti-cancerous drug. The solvent which is commonly used for extraction is methanol, chloroform, hexane. The part used for extraction is fruit, leaf, root. The identified phytochemicals in x.strumarium is xanthathine, sequeisterpene and lactone.

3.2 Papaver Somniferum[12]

Papaver somniferum commonly known as the opium poppy or bread seed poppy is a species of flowering plant in the family Papaveraceae. It is a valuable ornamental plant. It is an annual herb growing to about 100cm (39 inch) tall. All parts of the plant exclude the latex when wounded. Australia, Turkey, India are the producers of poppy for medicinal purposes and poppy based drugs, such as Morphine or Codeine, noscapine. The part used for research is stem, leaf, capsule, root, latex, and seed. Solvent used for extraction is hexane, methanol, ethyl acetate, ammonium acetate, ethanol, etc.

3.3 Citrus Limonium

Citrus is a genus flowering trees and shrubs in the family Rutaceae. Cultivated mainly for its alkaloids, having anticancer activity and antibacterial potential in crude extracts of different parts(viz., leaves, stem, root and flower).Citrus flavonoids have a large spectrum of biological activity including antibacterial, antifungal, antidiabetic, anticancer and antiviral activity. It grows on small, thorny trees which reaches a height of 10-20 feet. Use of citrus limonum is scurvy, skincare, Digestion, Constipation, Pepticulcer, Eyecare,gout, weightloss. chemicals: Carbohydrates, alkaloids, saponins, tannins, flavonoids, steroids.

3.4 Acacia Catechu

Biological source: It consists of dried aqueous extract prepared from the heartwood of Acacia catechu wild. It belongs to the family Leguminosae. It grows up to 15 m (50 ft) in height. Chemical constituents: Catechin, Catechols, Catecholamine, Acacatechin, Catechu red, Quercetin. It has been used as traditional medicine in South Asia, Southeast Asia, including India, Myanmar, Thailand, and Indonesia.

3.5 Indicoferac Cassioides

It is a deciduous shrub growing to 3.5m.It belongs to the family as Fabaceae or Leguminosae. It is a large genus of over 750 species of flowering plant. The plant produces suckers from its

rootstock. A decoction of the roots is used in treatment of coughs pain in chest and anticancer activity. The plant parts to be used as leaves, stem, and aerial parts of plant. The solvent used for the plant as methanol and ethanol for extraction process. It used for the identification of chemical constituents in the plant parts. Its detail as given in the table.

3.6 Kaempferia Parviflora

It's otherwise as black ginger is a herbaceous plant. It's belongs to the family as Zingiberaceae. It's rhizome has been used as folk medicine for many centuries. It has used the solvent as methanol, hexane, and chloroform. It has been shown its pharmacological activities such asanti-inflammatory, anti-oxidant, anti-gastric, anti-bacterial, anti-fungal, antiplasmodial, aphrodisiac activities in plants.

CONCLUSION

We conclude that(Papaver somniferum, Xanthium striatum, Acacia catechu, Citrus limonum, Indigoferac cassioides, Kaempferia parviflora) plants have many activities like(for treating dysentry, diarrhoea, spasms, pain, metabolic ailments etc.) as that of specially anti cancer activities is proven for above mentioned plants. In that the plants have the phytochemicals like Noscapine, Morphine, flavonoids, alkaloids, Xanthatin, Sequeiterpene, lactone, tannins, etc. The maximum solvent used to extract from plants were methanol & ethanol to separate chemical constituents. Most of the plants parts are root, stem, leaves, capsules to be used. In that the selectively the plants details were given in the table as follows..,

Table.1: Plants And Its Constituent For Anti Cancer Diseases[11-24]

Botanical name of the plant	Parts used for research	Solvent used for extraction	Identified phytochemical	Title of the research	Author	Article published
Papaver somniferum	Stem Leaf Capsule Root	Hexane Methanol Ethyl acetate	Noscapine, Morphine	Anticancer activity of *papaver somniferum*	Done Asli Guler etal.,	Journal of the turkish chemical society on 2016; 3(3): 349-366.
	Stem	Methanol	Noscapine	Characterization of three 0-methy transferase involved in noscapine biosynthesis in opium poppy	Thu-Thug T. Dang et al.,	ResearchGate,In plant physiology 159(2):618-31.April 2012
	Latex	Ammonium acetate, Sodium acetate	Codeine Noscapine	The poppy plant-phyto chemistry and pharmacology	Upendra Chalise et al.,	Journal Info global journal of pharmaceutical science, 2015; 5(1): 58-65
	Poppy capsules	Ethanol	Noscapine	Isolation and characterization of anti tumour alkaloid from poppy capsules	Ibrahim Bulduk et al.,	Journal of chemistry Vol-2013.Article ID 493870,4 Pages
	Seed	Methanol Hexane	Noscapine	Effects of promoter variations of the N-methyl canadine 1-hydroxylase gene on noscapine production in opium poppy	Davar Abedini,et al.,	Scientific Reports 2018 8:4973
	Leaf	Methanol Hexane	Noscapine	Effects of promoter variations of the N-methyl canadine 1-hydroxylase(CYP82Y1) gene on noscapine production in opium poppy	Davar Abedini,et al.,	Scientific Reports 2018 8:4973
	Capsules	Water Chloroform Morpholine Dioxane	Noscapine	Synthesis and cytotoxic properties of novel derivatives of noscapine	Sergey Tkachenku, et al.,	"Rethinking Npasa Source Of Drug Leads"2008,(1-9).
ACACIA CATECHU	Heartwood, Leaves, Bark	Ethanol	Flavonoids Alkaloids Glycosides Tannins	Phytopharmacology of *acacia catechu* wild and Identification of Antioxidant Principles	Monu,milind parle,et al.,	World journal of pharmacy and pharmaceutical sciences volume 3,issue 11,2014

			Sugars			
	Heartwood	Petroleum ether Benzene Acetone Ethyl acetate Ethyl alcohol Methyl alcohol	Catechin, Catechumatic acid, Epicatechin	Pharmacognostical studies *on acacia catechu* wild and identification of antioxidant principles	V.Gayathri Devi,et al.,	International Journal of Pharmacy and Pharmaceutical Sciences Vol 3,supple 2,2011,108-111
	Leaves	Methanol	Flavonoids	In vitro antimicrobial activity of *acacia catechu* and its phytochemical analysis	Bhawna Sunil Negi et al.,	Indian Journal of microbiology.2010 oct-50(4):369-374.
XANTHIUM STRATIUM	Fruit	Methanol	Sequiterpene lactones	Xanthatin and Xanthinosin from the burs of *xanthium stramarim L.* as potential anticancer agent	Ramirez-Erosa,et al.,	Can J Physiol Pharmacol. 2007 Nov;85(11):1160-72
	Root	Chloroform Methanol Hexane	Xanthathine,	Anticancer potential of some ayurvedic plants of north eastern India.	M.Bora,et al.,	International journal of Research.Ayurveda Pharma.8 (2), 2017.
	Fruit	Chloroform Methanol Hexane	Sequiterpene lactones	Anticancer Properties of Phytochemicals Persent in Medicinal Plants of North America.	Wasundara Fernando et al.,	Book citation-Natural DrugDelivery.2013,162-163
	Leaves	Water Methanol Dichloromethane	Xanthatin	Biological activities of xanthatin from x.strumarium	Endalkachew *et al.*,	Phyto therapy Research Phytother Red.25:1883-1890(2011)
	Leaf	Hydro alcohol	Xanthatin	The effects of hydro alcoholic extract of x.strumarium on L929 tumor cell line	Sahebi-Asghar Kassee et al.,	International Conference on earth, Environment and life science (EELS-2014), 23-24, 2014.
	Fruits	Water Methanol	Sequiterpene lactones	Antitumor activity of xanthium stramarium L. on human cervical cancer HeLa cells	Khanjan Vaishnav,et al.,	Journal of cancer and Tumor International 2(1): 1-13,.2015.001
CITRUS LIMONUM	Peel	Methanol	Flavonoids	Anticancer activities of citrus peel polymethoxyflavones related to angiogenesis and others	Liwen Wang,Jinhan et al.,	Biomed Research International Research volume 2014.

	Fruit	Methanol	Flavonoids	Anticancer potential of citrus juices and their extracts :A systematic review of both preclinical and clinical studies	Santa Crimi, et al.,	Frontiers in Pharmacology. 2017.vol-8
INDICOFERAC-CASSIOIDES	Leaves	Methanol	1-Octadecanol, 4-Heneicosanone ,Salicylic acid	Invitro and invivo anticancer activity of indicoferac cassiodes Rottl.ex.Dc	Raju Senthil Kumaran et al.,	Asian Pacific Journal of Tropical Medicine.(2003), pp. 1022-1037.vol-4 issue-5 2011
	Aerial plant and stem	Methanol Ethanol	Beta-sistosterol	Antiproliferative activity of flavoidal fraction of Indicoferac tinctoria is through cell cycle arrest and apoptic pathway in a 549 cells	Ravichandran et al.,	Journals of Biological Science. 1981-2002 J Nat-prdt, 66(7).
KAEMPFERIA PARVIFLORA	Rhizome	Methanol Hexane Chloroform	GermaceneD,Beta-elemene,Alpha-copaene,E-caryophyllene	Suppression of benign prostate hyperplasia by Kaempferia parviflora rhizome	Kazuya Murat Koryo Co., et al.,	Pharmacognosy Research. A Rapid Publication Journal. Fitolerapia,2004;75;89-92.Pubmed, vol-5 issue-4 2013
	Rhizome	Ethanol	Alpha-pinene, Camphene, Limonene, Linalool	Quality evaluation of Kaempferia parviflora rhizome with reference 5,7-dimethoxy flavone	Yamon Pitakpawasutthi ,1 et al.,	Journal of Advanced Pharmaceutical Technology and Research,. 2013;11:4–16 2002; 25:10–1.
	Rhizome	Ethanol	Flavonoids, Linalool.	Kaempferia parviflora extract exhibit anticancer activity against Hela Cervical cancer cells.	Sarangapin potikanond et al,.	Fronties in Pharmacology. 2017,sep-11
	Rhizome	Ethanol	Flavonoids	Bioactive flavonoids from Kaempferia parviflora	Chavi yenjai et al,.	Fitoterapia Vol 75 issue-1 Jan-2004 (89-92).

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