

Some Potential and Effective Important Medicinal Plants for Cancer Treatment

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ABSTRACT

Globally, the number of cases of cancer are increasing gradually and cancer is one of the leading causes of death nowadays. It causes the serious health problems, mortalities and physical disabilities. Cancer kills about 3500 million people annually. There are many chemo preventive agents which have been used to treat cancer but are very toxic that restricts their usage. Currently, some plant products are being used for treatment of cancer and have shown promising anti-cancer properties and have to be evaluated in humans. Hence, this article contains few medicinal plants, which are natural source of anticancer agents.

Keywords– Cancer, health problems, natural anticancer agents, 3500 million people, chemo preventive agents, humans, medicinal plants, etc.,.

INTRODUCTION

Cancer is a diverse set of genetic disease that shares common feature. Every cause, that leads to cancer is actually leading to changes in the genes or at the genetic level. Mutations or genomic alterations are responsible for cancer. Globally, cancer is one of the leading cause of mortality and morbidity. After cardiovascular disease, cancer is the second leading cause of death [1-4]. It is projected that there will 26 million new cases of cancer and 17 million deaths of cancer per year, by 2030 [5]. For treatment of cancer, therapies used are chemotherapy and radiotherapy but they do have various side-effects on human body. So, alternative methods are required for the treatment which do not include more toxicity and side-effects on human.

From the very beginning, plants always act as a God to us, as they provide continuous remedies to the mankind for thousands of years. For the preparation of several drugs, we have various knowledge about medicinal plants nowadays and it has been a great significant [6]. Many studies have found that some plants have medicinal properties and role for treating cancer.

Therefore, in this review efforts have been made to provide information about the use of medicinal plants that have anticancer properties.

ANTICANCER CTIVITY OF MEDICINAL PLANTS

Actaea racemosa (Kingdom: Plantae; Family: Renunculaceae)

It is commonly known as black cohosh and black snakeroot. It is a herbal extract. It have number of benefits, most of them are related to women's health or hormonal balance. This plant have major role in amenorrhea and ovarities [7]. Actein is the main compound of this plant which shows inhibition of human HepG2 liver Cancer cell growth by reducing the level of cholesterol and free fatty acids in liver [8].

Ardisia crenata (Kingdom: Plantae; Family: Primulaceae)

It is known variety of names Christmas berry, Australian holly, Coral ardisia, Coral bus, Coral berry, etc and is mostly found in East Asia. A 3% solution of glyphosphate or triclopyr ester, or 4% triclopyr amine, has been shown effective in management of ***Ardisia crenata***. The leaves of ***Ardisia crenata*** are being investigated as a remedy to stop asthematic contractions. The plant contains a medicinal substance known as FR900359 that could treat cancer and many more problems like asthma, hypertension and Uveal melanoma [9].

Boswellia serrata (Kingdom: Plantae; Family: Burseraceae)

Boswellia serrata belongs to the Burseraceae family. The plant is native to much of India and the Punjab region which extends to Pakistan[10] It contains various derivatives of boswellic acid including β -boswellic acid, acetyl- β -boswellic acid, 11-keto- β -boswellic acid and acetyl-11-keto- β -boswellic acid [11] which is an active compound and shows potential activity to inhibit tumor angiogenesis through the vascular endothelial growth factor signaling [12]. According to studies treatment with acetyl-11-keto- β -boswellic acid supress tumor growth in xenograft mice with

human prostate [13]. Extracts of *Boswellia serrata* have been clinically studied for osteoarthritis and joint function, with the research showing trends of slight improvement in pain and function [14]. It has been used in Indian traditional medicine for diabetes [15].

Ziziphus jujube (Kingdom: Plantae; Family: Rhamnaceae)

It is commonly known as Jharber. This plant grows in dry climate and on sandy soil. The plant is used in traditional medicine as anticancer drug. The bioactive compound (triterpenic acids and polysaccharide) is present in the fruit of ***Ziziphus jujube*** which shows some anticancer properties [16]. Fruit of ***Jujube*** contains several bioactive compounds, like flavonoids, triterpenic acid, phenolic acids, cerebrosides and polysaccharides. Each constituent of this plant have some benefits [17].

***Withania somnifera* (Linn.) Dunal** (Kingdom: Plantae; Family: Solanaceae)

It is a small subtropical shrub, which is known as Ashwagandha. The leaves and roots of this plant is used in making Ayurvedic medicine. The extract of W. somnifera is suggested to modulate a variety of biological features [18]. Therefore, it has been used extensively in many indigenous preparations for its cardiogenic, antitumour, antistress, antioxidant properties [19, 20]. W.somnifera formulation has shown to induce cell cytotoxicity in several human cancer cell line [21]. The most active components Withaferins and Withanolides have been reported effective against different types of cancer cell line [22].

Plumbago zeylanica (Kingdom: Plantae; Family: Plumbaginaceae)

Plumbago zeylanica belongs to the family Plumbaginaceae. It is commonly known as white leadwort, chitrak, ceylon leadwort, doctorbush is a species of ***plumbago*** with a pantropical distribution. It goes throughout the tropical and subtropical climates of the world, including Australia and India. According to studies there is presence of various phytochemicals in this plant that includes, plumbagin, plumbagin acid, isoorientin, steroids, glucosides and psorelen [23]. Plumbagin is a naphthoquinone which is isolated from the roots of ***Plumbago zeylanica*** and it possess antitumour activity by controlling the hormone refractory invasive prostate cancer [23]. Plumbagin shows apoptosis induction in cancer cells and also inhibit growth of these cells [

24,25]. *Plumbago zeylanica* shows therapeutic activity against skin disease, rheumatic pain, wounds and scabies [26].

Lepidium sativum (Kingdom: Plantae; Family: Brassicaceae)

It belongs to the family Brassicaceae. It is referred to as garden cress to distinguish it from similar plants also referred to as cress, is a rather fast growing, edible herb. It is genetically related to watercress and mustard [27]. In some region, garden cress is also known as mustard cress, garden pepper cress etc. When it is consumed raw, cress is a high nutrient food containing substantial content of vitamin A, C and K and several dietary minerals. Being a member of Brassica family it has good anticancer property. Garden cress seeds contain antioxidants like vitamin A and K which help to protect cells from damage by free radicals. So, these cells have a chemo protective nature. In India, it is commonly used as Ayurvedic medicine to prevent postnatal complications. They are also useful in treatment of Asthma, cough, leprosy, skin infection, dysentery, diarrhoea, etc [28].

Mentha pulegium (Kingdom: Plantae, Family: Lamiaceae)

Mentha pulegium belongs to the family Lamiaceae. It is commonly called as pennyroyal, squaw mint, mosquito plant [29] and pudding grass [30]. It is found in Europe, North Africa and Middle East. Pennyroyal is a traditional folk remedy, emmenagogue, abortifacient and culinary herb, but is toxic to the liver and has caused some deaths. There is no known antidote for pennyroyal toxicity [31]. Some natural substances that are included is pennyroyal polygon, isomenthone, Octaan-3-ol [32]. According to some studies, the inhibitory effect of flavonoids on proliferation of cancer cells via apoptosis induction refers to pennyroyal [33].

Anacardium occidentale (Kingdom: Plantae; Family: Anacardiaceae)

The cashew tree (*Anacardium occidentale*) is considered as cashew nut or snack nut. It is native to the Northern and North-eastern region of Brazil [34]. The leaf extract is used in treating several diseases in tropical America. Number of biological properties like antioxidant, anti-inflammatory and antimicrobial effect have drawn the attention in public. These species are used as infusion for causing ailments in Brazil [35]. Proanthocyanidine is a class of flavonoids that is

present in cashew and prevents the cancer cells from dividing and spreading throughout the body.

Tinospora cordifolia (Kingdom: Plantae; Family: Menispermaceae)

It is commonly found in Srilanka, India, Myanmar and China. It's stem and roots contains important alkaloids. It is known as "giloya" in hindi, "guduchi" in sanskrit, and "heartleaf moonseed plant" in english. It's roots contains various alkaloids which includes tinosporin, choline, isocolumbin, columbin, tetrahydroplamatine [36, 37]. It's stem is generally used for the treatment of fever, jaundice, skin and urinary disease [38]. In vitro study shows ***Tinospora cordifolia*** is able to kill Hela cells, this shows the potential of this plant as an anticancer agent. It's extract shows dose dependant cell death as compared to the controls [39]. Dichloromethane extract of ***Tinospora cordifolia*** showed anticancer activity in mice transplanted with Ehrlich ascites carcinoma [40].

Xanthium strumarium (Kingdom: Plantae; Family: Asteraceae)

It is commonly known as rough cocklebur, clotbur, common cocklebur, woolgarlebur .It probably originates in North America and has been extensively naturalised elsewhere. It possesses antibacterial, antifungal, antitumour, anti-inflammatory, antioxidant and insecticidal activities. It contains xanthinin, xanthostrumarin, xanthatin, phytosterols, xanthanolides, xanthanol and xanthinosin. 8-epi-xanthatin and its epoxide shows antitumour activity by inhibiting the tumour cell lines proliferation. 8-epi-xanthatin acts as a Farnesyl transferase inhibitor and also inhibits microtubules interfering agents, this shows the potential of 8-epi-xanthatin in the anticancer activity [41].

Artemisia annua (Kingdom: Plantae; Family: Asteraceae)

It is also known as sweet wormwood, sweet sagewort and is native to temperate Asia [42, 43, 44]. An extract of an ***Artemisia annua*** exhibits the activity against triple negative human breast cancer [46]. The extract decreased tumour growth, inhibited cancer cell proliferation and induced apoptosis in vivo in TNBC MDA-MB-231 xenografts grown on CAM and in nude mice too [45]. Several studies have shown that a chemical compound present in ***Artemisia annua*** that is artemisinin, react with iron, present in haemoglobin, in red blood cell, to form free radicals.

Cancer cells often become resistant to most of chemotherapy drugs, that doesn't seem to happen with artemisinin. And unlike many cancer treatment, artemisinin isn't toxic. It is also cheap and easy to give to the cancer patient.

Although all parts of these plants contain high amount of medicinal properties. Here these plant parts contain specific compounds for cancer treatment.

TABLE 1

Plants	Useful parts for the Treatment
<i>Actaea racemosa</i>	Rhizome and root
<i>Ardisia crenata</i>	Leaves
<i>Boswellia serrata</i>	Leaves
<i>Ziziphus jujube</i>	Fruits
<i>Withania somnifera (Linn.)Dunal</i>	Roots and Leaves [46, 47,48]
<i>Plumbago zeylanica</i>	Roots(contains an acrid crystalline principle)
<i>Lepidium sativum</i>	Seeds
<i>Mentha pulegium</i>	Leaves
<i>Anacardium occidentale</i>	Leaves and fruits
<i>Tinospora cordifolia</i>	Roots and stems
<i>Xanthium strumarium</i>	Seeds
<i>Artemisia annua</i>	Leaves

Useful main parts of plant for the cancer treatments.

CONCLUSION

Cancer is one of the major problem in the world. There are many drugs and therapies to treat cancer but they have some side-effects too, due to their toxic effect on normal healthy cells.

Therefore, there is an urgent need of an alternative medicine for the treatment of cancer. Medicinal plants contains various secondary metabolites which shows their potential towards numerous disease treatment. Anticancer agents which are derived from medicinal plant source have largely contributed to the development of new drug. This review contains various information about medicinal plants and their derivatives.

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