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GREEN SOURCE: A POWER OF NATURE TO CURE CANCER

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ABSTRACT

Cancer is a most important public health problem in equally developed and developing countries. Plant derived agents are being used for the healing of cancer. In this review we focused about some Medicinal plants have therapeutic potential due to the occurrence of natural antioxidants carrying out as reducing agents, free radical scavengers and quenchers of singlet oxygen. Superior part of their antioxidant action is due to bioactive compounds present in plant as secondary metabolites.

Key words: Cancer, Anti-cancerous Indian medicinal plants, Natural antioxidants.

INTRODUCTION

Herbal medicines are linked to the use of different plant parts like leaves, roots, tubers, stems and even flowers for the medicinal purposes according to World Health Organization (WHO) report in 2003. Attempts are underway to work out the therapeutic and anti-neoplastic properties of medicinal plants by [1-6]. Consequently, herbal medicines have received much attention as substitute anticancer drugs. Medicinal plants can reduce or minimize the toxic side effect of chemotherapy and radiation treatment by reinforcing their cancer killing action. Some of the plants, selected for the present study, include:

Withania somnifera (Ashwagandha)

The two main components of Ashwagandha Withaferin A and Withanolide E inhibit the growth of tumor showing a strong immune suppressive effect by stopping cancerous cells division. It is evident that foods rich in anti-oxidants play an important role in the prevention of cancer, cardiovascular and neurogenerative diseases. There has been a surge of research in its effect in animal models of atherosclerosis, hyperlipidemia, myocardial infarction, myocardial ischemia reperfusion injury, cerebral ischemia, cardiomyopathy, cardiac hypertrophy, cardiotoxicity and congestive heart failure. Many pharmacological studies have been conducted to investigate the properties of ashwagandha and to authenticate its use as a multi-purpose medicinal agent. Studies on Withania somnifera suggests that it reduces tumor cell proliferation and enhances the effectiveness of radiation therapy while potentially mitigating undesirable side effects [7].

Azadirachta indica (Neem)

The National Research Institutes' 1992 information on neem anticipated that ongoing research into the components of a tree identified in India as a rural community pharmacy would reveal useful cures for multiple types' cancer. Azadirachta indica, popularly known as neem, is abundant in India and other Asian nations. Each part of the neem tree has some medicinal property and is thus known as 'wonder plant'. During the last five decades, the chemistry of the neem compounds, its pharmacological actions, clinical studies and plausible medicinal applications has been studied. Studies

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conducted in Malaysia, Thailand and India show that neem helps to boost antioxidant levels and thus protects against liver damage and carcinogens. All parts of the neem tree can be used such as the fruit, seeds, bark, oil, roots, and leaves. This feature highlights its potent effects on cancers. An important mechanism that has been discovered is programmed cell death, in which cancer cells are directly killed. Research has shown that neem produces glutathione, which is a carcinogen-detoxifying enzyme and is one of the antioxidants that neem produces. Studies on neem indicate that it increases the positive effects and at the same time reduces the side effects of some traditional cancer treatments. Neem has been used and tested on quite a few cancers. These include lung, cancer, stomach, skin, prostate, breast cancer, etc. Neem based creams are used to treat skin cancer and neem based products are also taken internally to test its effect on lymphocytic cancer. Researchers are still going on to evaluate the effects of neem as an alternative treatment that can be taken alongside conventional cancer treatment.

Ocimum sanctum (Tulsi)

Tulsi (*Ocimumsanctum*) plants have secondary metabolites with cancer protective activity through decrease of excess amounts of nitric oxide. Tulsi radically decreases the incidence of benzo (a) pyrene induced neoplasia (squamous cell carcinoma in stomach of mice) and 3-methyldimethylaminoazobenzene Induced hepatomas. In India Tulsi is taken as the most sacred plant. The use of Ocimum sanctum (Tulsi) as an aromatic plant has been well documented in Ayurveda. Several recent investigations using these extracts have indicated that O. sanctum poses significant anti-inflammatory antioxidant [8], and immuno- modulatory [9] properties. Various studies have been performed with Ocimum sanctum for its antibacterial, antioxidant, antiulceric, antimalarial, antidiabetic, anti-inflammatory, antilipidemic, anticancer and immunomodulatory properties. The active components of O. sanctum consist of phenols and flavones that have been shown to have significant antioxidant [10,11] and anti-inflammatory activity both in vivo and in vitro conditions [12,13]. Overall, Tulsi is a premier adaptogen, helping the body and mind to adapt and cope with a wide range of physical, emotional, chemical and infectious stresses, and restore disturbed physiological and psychological functions to a normal healthy state.

***Terminalia arjuna* (Arjuna)**

Several medicinal plants have been described to be beneficial for cardiac ailments in "Atharva Veda" an ancient treatise from which Ayurveda, the Indian system of Medicine owes its origin [14,15]. Terminalia arjuna (Combretaceae) is a good hypocholesteremic, hypolipidemic, anticoagulant, antihypertensive, antithrombotic, antiviral, antifungal and antibacterial agent. Many useful phytoconstituents have been isolated from T. arjuna which includes, triterpenoids for cardiovascular properties, tannins and flavonoids for its anticancer properties, and so on.

Aloe Vera (Gheekumari)

The Aloe plant is a part of the lily family but its Aloe barbadensis which is commonly called Aloe vera. Aloe was also mentioned as a laxative in the Egyptian Papyrus Ebers from 1552 BC [16]. The suggested medicinal use of Aloe vera is based on its historic and traditional use, and analysis of pharmacologic and toxicological research [17]. It contains constituents that accelerate wound healing, helps reduce inflammation, pain & itching, acts as a wonderful moisturizing agent, penetrant and a natural hypo-allergent.

Aegle Marmelos (Bel)

All parts of Aegle marmelos are medicinally useful like, leaves, fruit pulp, flower, stem bark, root bark, [18-19]. A. marmelos shows a broad spectrum of anti-bacterial, anti-fungal, [20-22], anti-inflammatory [23], antinociceptive and antipyretic activities [24]. When taken fresh, it is useful in constipation, chronic dysentery and dyspepsia. Unripe fruit is astringent, digestive, stomachic and demulcent. Pulp is stimulant, antipyretic and antiscorbutic. Root and stem bark are used as antipyretic. Aegle marmelos is widely used in the treatment of hepatitis in folk medicine. Also the study confirms the claim on this plant as a potential hepatoprotective agent in the traditional medicine [25].

Phyllanthus Emblica L. (Amla)

Preliminary research on *Phyllanthus emblica* in vitro demonstrates antiviral and antimicrobial properties [26]. There is also evidence that its extracts induce apoptosis and modify gene expression [27] in addition *Phyllanthus emblica* leaves, bark or fruit have shown potential efficacy against laboratory models of disease, such as for inflammation, cancer, age-related renal disease, and diabetes [28,29]. The potential anticancer effects of aqueous fruit extract of *P. emblica* was tested in several different human cancer cell lines such as A549 (lung), HepG2 (liver), HeLa (cervical), MDA-MB-231 (breast), SKOV3 (ovarian) and SW620 (Colorectal). *P. emblica* extract significantly inhibited the growth of several human cancer cell lines at doses of 50-100 µg/ml [30].

Brassicaceae Mustard (B.Nigra).

Brassica vegetables are highly regarded for their nutritional value and it is a good medicinal source for many diseases. In addition phytochemicals investigation indicate oleic acid, phenolics, carotenoids, selenium, glucosinolates and vitamin C present in barssicaceae mustard seed [31-35], and offer broad-spectrum support

for caring against the ubiquitous cancer. Mustard leaves have been reported to possess many bioactive substances and antioxidant properties [36]. Earlier reviews appeared dealing with bio-cidal, bio-herbicidal, anti oxidant, anti cancer activities of glucosinolates and their products from Brassicaceae [37-40].

Coriandrum Sativum L. (Coriander)

Sativum is well known for its antioxidant properties and some of its active components have been identified. Coriander contains active phenolic acid compounds, including caffeic and chlorogenic acid. The flavonoids include quercetin, keampferol, rhamnetin and apigenin**.** Most of these compounds are known to inhibit free radicals generated in the cellar system, when they are obtained through the diet. *C sativum* has been conventionally referred to as antidiabetic, anti-inflammatory and cholesterol lowering [41]. Various activities of Coriandrum sativum include anthelmintic [42], anti-implantation [43], anti-microbial [44], anti-mutagenicity [45], antioxidant, hepato-protective [46], anxiolytic, sedative, muscle relaxant [47].

Trachyspermum Ammi Sprague. (Ajwain)

Trachyspermum ammi (L.) a well known spice is a traditional herb widely used for curing various diseases in both humans and animals. Aromatic chemicals present in Ajwain; inhibit other undesirable changes in food, affecting its nutritional quality, texture and flavor. Decoction of Ajwain seeds is used for treatments of abdominal discomfort, diarrhea, cough and stomach troubles [48]. Fruit of Ajwain is reported to have antiseptic, antifungal/ antibacterial and antithelminitic effects [49]. In T. ammi (Ajwain) a major phenolic compound, Thymol is present and has been reported to be an antispasmodic, germicide and antifungal agent [50]. The essential oil of *T. ammi*, the principle active constituents of the oil is phenols, mainly thymol (35 to 60%) and some carvacrol [51]. Both the phenols Thymol and carvacrol are responsible for the antiseptic, anti-tussive and expectorant properties [52]. Ajowan is an aromatic seed spices, generally used as a digestive stimulant or to treat liver disorders.

Carum Carvi L. (Caraway)

The phytochemical estimation oil of C. carvi collected from various countries has been widely studied [53]. Many data indicated the essential oil is useful as an antimicrobial, antifungal, molluscidal, nematicidal, antioxidant and anti-aflatoxigenic activities, as well a potential drug used as a cancer preventing agent [54-56]. In addition it is most commonly used in cases of gastric problems, flatulence and indigestion. It has been very efficient in relief of flatulent colic in infants. It is also known to boost the immune system and possesses antibacterial [56], antiulcerogenic [57], antitumor [56], antiproliferative [58] and antihyperglycemic [59].

Allium Sativum L. (Garlic)

The effects of garlic on health, with its possible preventive effects on the development of cancer in humans have been mentioned in previous reviews. In addition *A sativum* have free radical scavenging activity, immune system modulation and direct cytotoxic effect on cancer cells [60]. Now a day's Numerous epidemiological, clinical and laboratory studies have demonstrated the role of garlic in cancer prevention [61-63] especially in relation to digestive tract cancers, including esophageal and stomach cancers [64,65]. There is also promising research evaluating the use of garlic in leukemic, melanoma [66] and neuroblastoma [67] cell lines.

CONCLUSION

Now everyday phytochemical and pharmacological studies are conducted on different parts of these plants. The present literature supports the potential of certain medicinal plants. More research can be done to investigate the unknown and unexplored potential of these plants. Further analysis of these plants (active compounds) can be carried out by way of making use of different analytical methods such as HPTLC, HPLC, FTIR, NMR and UV spectrophotometer analysis.

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