CERTAIN INDIAN MEDICINAL PLANTS SAFEGUARD AGAINST CANCER

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ABSTRACT

Herbal products are considered to be symbols of protection in comparison to the synthetic products that are regarded as risky to human life and environment. Some Medicinal plants have therapeutic potential due to the occurrence of natural antioxidants functioning as reducing agents, free radical scavengers and quenchers of singlet oxygen. Majority of their natural activity is due to bioactive compounds viz. phenol, polyphenolic, alkaloids, Saponin, and other secondary metabolites. And now the major challenge in pharmaceutical industry is drug improvement and discovery. This review discusses about some Indian medicinal plants with regard to their anti-cancerous property.

Keywords: Anti-cancerous activity, Indian Medicinal plants, Brassica nigra, Carum carvi, Phyllanthus emblica, Trachyspermum ammi, Coriandrum sativum, Allium sativum, Spinacia oleracea
INTRODUCTION

Plant kingdom is a potential source of chemical constituents with antitumor and cytotoxic activities owing to their enormous propensity, which synthesizes a variety of structurally diverse bioactive compounds (Kim et al., 2005; Indap et al., 2006). The discovery of new drugs and their development into commercial products takes place across the broad scope of the pharmaceutical industry and research institutes. Attempts are underway to work out the therapeutic and anti-neoplastic properties of medicinal plants (Abo et al., 2000; Graf, 2000; Ankli, 2002; Neto, 2002). Consequently, herbal medicines have received much attention as substitute anticancer drugs. The rich and diverse plant sources of India are likely to provide effective anticancer agents. Medicinal plants can reduce or minimize the toxic side effects of chemotherapy and radiation treatment by reinforcing their cancer killing action. Some of the medicinal plants available in India which are anti-cancerous have been reviewed in this article.

MATERIALS

Brassica nigra L. (MUSTARD)


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 brassicaceae mustard seed (Conaway et al., 2001; Fimognari et al., 2002) and offer broad-spectrum support for caring against the ubiquitous cancer. Mustard leaves have been reported to possess many bioactive substances and antioxidant properties (Kim et al., 2003). Earlier reviews appeared dealing with biocidal, bio-herbicidal, antioxidant, anticancer activities of glucosinolates and their products from Brassicaceae (Fahaey et al., 2001; Zukalova and Vasak 2002; Halkier and Gershenzon 2006; Vig et al., 2009).

Coriandrum sativum L. (CORIANDER)

Scientific classification - Kingdom: Plantae; (unranked): Angiosperms; (unranked): Eudicots (unranked): Asterids; Order: Apiales; Family: Apiaceae; Genus: Coriandrum; Species: C. sativum L.

C. sativum is well known for its antioxidant properties and some of its active components have been identified. Coriander contains active phenolic acid compounds, including caffeeic and chlorogenic acid. The flavonoids include quercetin, keampferol, rhamnetin and apiogenin. Most of these compounds are known to inhibit free radicals generated in the cell system, when they are obtained through the diet. C sativum has been conventionally referred to as anti-diabetic, anti-inflammatory and cholesterol lowering (Chithra and Leelamma, 1999). Various activities of Coriandrum sativum include anthelmintic (Eguale T et al., 2007), anti-implantation (Al-Said MS et al., 1987), anti-microbial (Begnami AF et al., 2010), anti-mutagenic (Cortes-Eslava et al., 2004), antioxidant, hepato-protective (Samojlik I et al., 2010), anxiolytic, sedative and muscle relaxant (Emamghoreishi M, 2005).

Trachyspermum ammi SPRAGUE. (AJWAIN)

Scientific classification: Kingdom: Plantae; (unranked): Angiosperms; (unranked): Eudicots; (unranked): Asterids; Order: Apiales; Family: Apiaceae; Genus: Trachyspermum; Species: T. ammi Sprague.

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 (Anikumar et al., 2009). Fruit of Ajwain is
reported to have antiseptic, antifungal, antibacterial and anthelminitic effects (Morsi, 2000). In *T. ammi* (Ajwain) a major phenolic compound, Thymol is present and has been reported to be an antispasmodic, germicide and antifungal agent (Nagalakshmi et al., 2000). The essential oil of *T. ammi*, the principle active constituents of the oil is phenols, mainly thymol (35 to 60%) and some carvacrol (Tsimidou and Boskou, 1994). Both the phenols Thymol and carvacrol are responsible for the antiseptic, anti-tussive and expectorant properties (Treas and Evans, 2002). Ajowan is an aromatic seed spices, generally used as a digestive stimulant or to treat liver disorders.

**Carum carvi L. (CARAWAY)**

Scientific classification - Kingdom: Plantae; (unranked): Angiosperms; (unranked): Eudicots; (unranked): Asterids; Order: Apiales; Family: Apiaceae; Genus: *Carum*; Species: *C. carvi*.L.

The phytochemical essential oil of *C. carvi* collected from various countries has been widely studied (Samojlik, I et al., 2010). Many data indicated the essential oil is useful as an antimicrobial, antifungal, molluscidal, nematicidal, antioxidant and anti-aflatoxicigenic activities, as well a potential drug used as a cancer preventing agent (Samojlik, I et al., 2010 and Zheng, G et al., 1992). 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 (Zheng, G. et al., 1992), antulcerogenic (Khayyal MT et al., 2001), antitumor (Zheng G et al., 1992), anti-proliferative (Nakano Y et al., 1998) and anti-hyperglycemic effects.(Eddouks M et al., 2004).

**Spinacia oleracea L. (SPINACH)**

Scientific classification – Kingdom: Plantae; clade: Angiosperms; clade: Monocots; Order: Asparagales; Family: Amaranthaceae; Subfamily: Allioideae; Genus: Allium; Species: *A. sativum*.L.

*Spinacia oleracea* L. is commonly reported to be a good source of minerals, vitamin B complex, ascorbic acid, carotenoids (b-carotene, lutein, zeaxanthine), flavonoids, apocyamin and p-coumaric acid (Bergan et al., 2001). The entire plant is used as a remedy for urinary calculi and the leaves are used for bowel and lung inflammation (Jain and De Fillipps, 1991). Apart from having nutritional value, it has been also credited with various biological activities like virus inhibitor (Adam G et al., 2008), anthelmintic (Patil UK et al., 2009), antioxidant, (Verma RK et al., 2003) hepatoprotective (Gupta R S et al., 2006) and reducing risk of breast cancer (Longnecker MP et al., 1997). Extracts of spinach leaves show high anti-oxidative activities and are well tolerated in animal studies (Lomnitski L, et al., 2003).

**Allium sativum L. (GARLIC)**

Scientific classification – Kingdom: Plantae; clade: Angiosperms; clade: Monocots; Order: Asparagales; Family: Amaryllidaceae; Subfamily: Allioideae; Genus: Allium; Species: *A. sativum*.L.

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* has free radical scavenging activity, immune system modulation and direct cytotoxic effect on cancer cells (Abdullah et al., 1988). Now a day’s numerous epidemiological, clinical and laboratory studies have demonstrated the role of garlic in cancer prevention ( Flieischauer et al., 2001, Galeone et al., 2006.) especially in relation to digestive tract cancers, including esophageal and stomach cancers (Berspalov et al., 2004). There is also promising research evaluating the use of garlic in leukemic melanoma (Taylor et al., 2006) and neuroblastoma (Karmakar et al., 2007) cell lines.
**Phyllanthus emblica L. (AMLA OR INDIAN GOOSEBERRY)**

Scientific classification – Kingdom: Plantae; Division: Flowering plant; Class: Magnoliopsida; Order: Malpighiales; Family: Phyllanthaceae; nTribe: Phyllantheae; Subtribe: Flueggeinae; Genus: Phyllanthus; Species: *P. emblica* L.

Preliminary research on *Phyllanthus emblica* in vitro demonstrates antiviral and antimicrobial properties (Saeed S *et al.*, 2007). There is also evidence that its extracts induce apoptosis and modify gene expression (Penolazzi L *et al.*, 2008). In addition *Phyllanthus emblica* leaves, bark or fruits have shown potential efficacy against laboratory models of disease, such as for inflammation, cancer, age-related renal diseases, and diabetes (Yokozawa T *et al.*, 2007), (Rao TP *et al.*, 2005). 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. (Ngamkitidechakul *et al.*, 2010).

**CONCLUSION**

Although a large number of synthetic drugs are being added to the world of modern pharmacopoeia, but still no system of medicine in the world could solve all the health problems. Several diseases like AIDS, Bird-flue, and Cancer etc., therefore the search for new therapeutic constituents from plants is genuine and urgent. In India, there is an ocean of knowledge about medicinal plants and rich medicinal flora, but still only a few pearls have been searched as therapeutic agents. There are large numbers of indigenous plants left which have not been investigated thoroughly from modern scientific view or their curative values have not been recognized. Thus there is an urgent need for systematic phytochemical investigation of those plants which have not been investigated systematically.

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**REFERENCES**


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