

Review on Ayurveda and Modern aspect of Spices for Cancer Prevention

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Abstract

Cancer is commonly perceived as a life threatening that affect nearly every part of the body. In Ayurveda *Ahinsaka Arbuda* is correlate with cancer. According to Ayurveda cancer originates due to metabolic crisis with aggregation of *Vata* factors and suppression of *Kapha* factors and both interacting in one another that resulting proliferation. Herbal spices are carrier of numerous chemical compounds with health improving properties. This study was aimed to review and analyze the medicinal importance of spices for cancer prevention according to Ayurveda and modern aspect. The data were collected from ancient Ayurveda texts books, Sri Lankan traditional medical books and journal articles in scientific databases. Turmeric (*Curcuma longa*), Ginger (*Zingiber officinale*), Garlic (*Allium sativum*), Clove (*Syzygium sativum*), Black cumin (*Nigella sativa*), Cinnamon (*Cinnamomum cassia*) and Black cardamom (*Amomum subulatum*) were identified as cancer preventive spices. They are mentioned under the treatment formulations of *Pilika* (cancer) and *Kusa Pilika* (abdominal cancer) with having the property of pacifies *kapha* and *vata dosha* which helps to prevent proliferation of cancer. Anti-carcinogenic, Anti-angiogenic, anti-proliferative, anti-invasive, antineoplastic, antioxidant, anti-inflammatory, anti-tumor, analgesic, chemo preventive, antibacterial and antiviral pharmacological actions were identified in spices for cancer prevention. These spices are medicinally very important in cancer prevention according to this study. Further studies and today our attention should be span for claims about the ability of foods, with including spices to prevent cancer risk and to enhance the quality of life.

Keywords: Cancer, Aruba, Spices, Ayurveda, Pharmacological actions

Introduction

Epidemiological, preclinical and clinical studies continue to provide fundamental insights in to dynamic relationships between nutrients-defined as any substance in the diet that brings about physiological effect and health. Out of thousands of chemical structures that have been identified in plant foods, many are found in spices. Many spices, like turmeric, red chili, coriander, cumin and mint have been shown to cure diseases ranging from the common cold and cough to cancerous tumours [1].

According to Ayurveda, every human being is a unique part of nature with a unique individual constitution known as *prakriti*, which is a combination of three dynamic biological energies known as *doshas*. They are *vāta*, *pitta* and *kapha*. Every person has a predominance of any one of these *doshas* that has an upper hand in determining the personality, traits, and behavioral attributes of person. When there is an absolute balance between these *doshas* as per nature's law, there is hale, heartiness, *doshic* imbalances due to lifestyle changes, climatic conditions and unhealthy habits leads to sickness. Also the buildup of *ama* (toxins), blocks normal circulation in the body that reduces energy levels and cause for illness and disease. Every treatment in Ayurveda commences with an attempt to recognize the unique

individual constitution of a person. This assists in analyzing the mental and physical characteristics of a person along with their individual constitution. The credibility of Ayurveda lies in its distinctive way for treating individuals in a unique manner by prescribing natural remedies that suit their *prakriti* even if a group of people are affected by the same illness. In Ayurveda concept, according to *Susruta Samhita* cancer is described as inflammatory or non-inflammatory swelling and mentioned either as *Granthi* (minor neoplasm) or *Arbuda* (major neoplasm). Those *Arbuda* are categorized as *Hinsak Arbuda* and *Ahinsaka Arbuda*. This *Ahinsaka Arbuda* is correlate with carcinoma. According to the principle of Ayurveda cancer originates due to metabolic crisis that aggregation of *vāta* factors and suppression of *kapha* factors and while both interacting in one another that resulting in proliferation. According to Ayurveda there are six types of *Arbuda* that describe in *dosha* prominence as *Vātaja*, *Pittaja*, *Kaphaja*, *Raktaja Mamsaja* and *Medoja*. Excessive intake of *tikta* (bitter), *katu* (pungent), *kashaya* (astringent) foods, *ruksha padartha* (dry foods), more stress and strain are causative factors for *Vātaja Arbuda*. *Pittaja Arbuda* is cause due to the excessive intake of *amla* (sour), *katu* (pungent), *lavana* (salty) diet, *vidahi padartha* (fried food) and *krodha* (more anger). Excessive intake of *madhura* (sweet), *amla* (sour), *lavana* (salty) diet, *snigdha padartha* (oily foods) and sedentary nature are the causative factors for *Kapaja Arbuda*. Excessive intake of *vidahi* (fast food etc.), *amla* (sour) and *ushna* (hot) diet are responsible for *Raktaja Arbuda*. *Mamsaja Arbuda* can cause due to the excessive intake of *mamsa* (meat), injuries and irregular diet. Excessive intake of oily foods, sweets, alcohol and lazy attitude are etiological causes for *Medoja Arbuda*. When concerning the pathogenesis, *vāta dosha* is responsible for cell division and aggravation of *vāta dosha* with suppression of *kapha dosha* or both the *doshas* interacting with one another may result in proliferation of cells [2].

Objective

To review and analyze the medicinal importance of spices for cancer prevention according to Ayurveda and modern aspect.

Methodology

A literature review was done on the Ayurveda and modern aspect of spices for cancer prevention. For the authentic data in literature, six ancient Ayurveda and traditional texts were selected and searched. Literature review was carried out in *Susruta Samhita* Vol II, *Thalpathe Piliyam* Vol XIII, *Thalpathe Piliyam* Vol XIX, *Pilika* and *Gedi Vedakama*, *Ayurveda Pharmacopoeia* Vol II and *Bhaisajya Rathnavali* Vol III. Further research was carried out that based on the data collected from these books with using eight journal articles in scientific databases. Searched keywords were *Arbuda*, *Pilika*, *Carcinoma* and *Spices*. These data were categorized under the Ayurveda and traditional uses, pharmacological uses and chemical composition that effects for cancer prevention. Those findings were analyzed and discussed the importance of spices for cancer prevention according to Ayurveda and modern aspect.

Results and Discussion

Table 1: Data collected from extensive literature review of Spices for Cancer prevention.

Name of the Spice	Ayurveda and Traditional medical uses	Pharmacological actions	Chemical composition
Turmeric (<i>Curcuma longa</i>)	<i>Kusa pilika</i> . Balance <i>vāta</i> , <i>pitta</i> , and <i>kapha</i> . Kindles <i>agni</i> (digestive fire) and helping to reduce <i>kapha</i> and <i>āma</i> (toxins).	Retard the growth of cancer cells causing prostate cancer, melanoma, breast cancer, brain tumour,	Polyphenol curcumin or diferuloyl methane

	Supporting the blood, liver, joints, immune system, and digestive tract. Bitter, pungent taste and heating nature enable it to have a mobilizing and cleansing energy.	pancreatic cancer and leukaemia. Anti-proliferative, Anti-invasive and Anti-angiogenic.	
Ginger (<i>Zingiber officinale</i>)	<i>Kusa Pilika.</i> <i>Ushna virya</i> subdues <i>vāta</i> and <i>kapha</i> . Affects all <i>dhātus</i> (tissues) and specifically the digestive, respiratory, and circulatory <i>srotas</i> (channels). <i>Āmanāśaka</i> (destroys toxins), <i>Pācana</i> (digestive), <i>Chardinigrahaṇa</i> (prevents nausea), <i>Hikkānigrahaṇa</i> (stops hiccups), <i>Agni dīpana</i> (enkindles the digestive fire), <i>Grāhī</i> (absorbs fluids from the intestines), <i>Arśoghna</i> (removes piles), <i>Śitapraśamana</i> (reduces feelings of cold), <i>Rasāyana</i> (rejuvenative), <i>Kāsaśvāsahara</i> (alleviates cough and breathing difficulties), and <i>Vedanāsthāpana</i> (alleviates pain).	Chemopreventive and antineoplastic effects.	Gingerols, paradols, shogaols, and gingerones.
Garlic (<i>Allium sativum</i>)	<i>Kusa Pilika.</i> <i>Arbuda.</i> Use for Asthma, bronchitis, chest	Inhibit cancer caused by polycyclic aromatic hydrocarbons and nitrosamines.	Organosulfar compounds.

	congestion and skin diseases.	Antibacterial properties, which in turn may block the formation of cancer-causing substances, enhance cell repair, reduce cell proliferation or induce cell death. Reduced risk of certain cancers, including cancers of stomach, colon, oesophagus, pancreas and breast.	
Clove (<i>Syzygium aromaticum</i>)	Enhance circulation, digestion and metabolism and help counter stomach disorders such as gas, bloating and nausea. Pacifies <i>vāta</i> , <i>kapha</i> and increase <i>pitta</i> .	Antioxidant and anti-inflammatory activities. Anticancer properties.	Sesquiterpenes Volatile oil (eugenol), caryophyllene, tannins and gum
Black cumin (<i>Nigella sativa</i>)	Kusa Pilika. Pacifies <i>kapha</i> and <i>vata dosha</i> while increasing of <i>pitta</i> . Has medicinal effects of <i>dīpana</i> (improves digestion), <i>rōchana</i> (improves taste), <i>vātahara</i> (balances <i>vāta</i> , useful in neurological disorders), <i>sangrāhi</i> (absorbent), <i>jwaraghna</i> (useful in fever), <i>adhmanahara</i> (relives bloating), <i>gulmahara</i> (useful in abdominal tumour), <i>chardhihara</i> (relives vomiting) and <i>atisārahara</i>	Has effect of anti-inflammatory, analgesic and useful in nephrotoxicity with hepatotoxicity. Effective against many diseases like cardiovascular complications, diabetes, asthma, kidney problems and cancer. Anti-carcinogenic, anti-tumour activities.	Crude oil and thymoquinone

	(useful in diarrhoea and dysentery).		
Cinnamon (<i>Cinnamomum cassia</i>)	<p>Pilika. Kusa Pilika. Reduced <i>kapha</i> and <i>vata dosha</i>. Helpful in increase of metabolic fire and appetite, while reliving anorexia. Effective in relieving flatulence, abdominal pain, improving liver functions, diarrhoea, haemorrhoids, irritable bowel syndrome, fever, blood related problems and chronic respiratory problems. Increasing <i>ojas</i> that responsible for immunity, strength and vitality.</p>	Anticancer properties, antibacterial and antiviral effects.	Cinnamaldehyde.
Black cardamom (<i>Amomum subulatum</i>)	<p>Pilika. Kusa Pilika. <i>Tridosha</i> (balancing for all <i>doshas</i>). Warming and detoxifying effects aid in reducing the accumulation of <i>āma</i> (toxins) in the body. Reduce <i>kapha</i> in the stomach and lungs (such as congestion and mucous) and pacifies <i>vāta</i>.</p>	Antioxidant properties. Inhibit chemical carcinogenesis	1,8 – cineole, esters, Limonene, alpha-terpinyl acetate

Typically, spices are the dried aromatic parts of plants, generally the seeds, berries, roots, pods and sometimes leaves. Spices comprise an important component of our daily diets. Spices add aroma and taste to food and possess certain medicinal properties as well. Some

spices are rich sources of flavonoids, which can block carcinogenesis. For instance, the potential of turmeric (curcumin), red chilli (capsaicin), cloves (eugenol), ginger (zerumbone), garlic (diallyl sulphide), fennel (anethole), kokum (gambogic acid), fenugreek (diosgenin) and black cumin (thymoquinone) in cancer prevention has been established [3].

These spices are also used in traditional medicines for various types of cancer (*Pilika*) conditions. Turmeric, ginger, garlic and black cumin contain formula had used for *kusa pilika* (abdominal cancer) as decoction or paste [4]. Although, cinnamon bark, garlic, ginger and black cumin contain formula had used as the decoction for *kusa pilika*. Black cardamom contain formula had used as the *kusaguliya* in the management of *kusa pilika*. Also, Cinnamon bark and black cardamom contain fried paste had used in the application for *pilika* conditions [5]. Garlic with black cumin containing decoction, garlic fried with ghee and garlic mixed with cow's milk including formulas were used as the medicines for *arbuda* [6].

Turmeric (*Curcuma longa*), also known as *haridra*, is said to give the energy of the Divine Mother and to grant prosperity. Turmeric is used in Ayurveda to balance *vāta*, *pitta*, and *kapha*, though in excess, it can aggravate *pitta* and *vāta*. It has a particular beneficial effect for *rasa* and *rakta dhātu* (the blood and plasma of the circulatory system). It also kindles *agni* (digestive fire), helping reduce *kapha* and *āma* (toxins). Turmeric is traditionally used for supporting the blood, liver, joints, immune system, and digestive tract. Its bitter and pungent taste and heating nature enable it to have a mobilizing and cleansing energy [7] [8]. Turmeric contains the powerful polyphenol curcumin or diferuloyl methane, which has been clinically proven to retard the growth of cancer cells causing prostate cancer, melanoma, breast cancer, brain tumour, pancreatic cancer and leukaemia [9]. Various preclinical cell culture and animal studies suggest that curcumin has potential as an anti-proliferative, anti-invasive and anti-angiogenic agent as a mediator of chemo resistance and radio resistance as a chemo preventive agent. Curcumin promotes apoptosis, which safely eliminates cancer breeding cells without posing a threat to the development of other healthy cells [10].

The rhizomes of *Zingiber officinale* commonly known as ginger, is one of the most widely used spices. It is also an integral part of Ayurveda and Traditional medicines. Ginger is pungent and sweet in *rasa* (taste) with *virya* (energy) of *ushna* (heating). Its *vipāka* (post-digestive effect) is sweet. Even though it has a pungent and heating, it is tonifying, as a sweet *vipāka* implies. In Ayurveda Medicine, this sweet *vipāka* leaves a cooling, lasting effect. Through its *ushna virya*, it subdues *vāta* and *kapha*, while increasing *pitta*, though it is often found counter-balanced in *pitta*-reducing remedies. As the “universal medicine,” it affects all *dhātus* (tissues) and specifically the digestive, respiratory, and circulatory *srotas* (channels). The Ayurvedic actions of ginger, as *Āmanāśaka* (destroys toxins), *Pācana* (digestive), *Chardinigrahaṇa* (prevents nausea), *Hikkānigrahaṇa* (stops hiccups), *Agni dīpana* (enkindles the digestive fire), *grāhī* (Absorbs fluids from the intestines), *arśoghna* (Removes piles), *Śitaprasāmana* (reduces feelings of cold), *Rasāyana* (rejuvenative), *Kāśaśvāsahara* (alleviates cough and breathing difficulties), and *Vedanāsthāpana* (alleviates pain) [7] [8]. Ginger is an excellent source of several bioactive phenolics, including non-volatile pungent compounds such as gingerols, paradols, shogaols, and gingerones. Number of preclinical investigations with a wide variety of assay systems and carcinogens have shown that ginger and its compounds possess chemo preventive and antineoplastic effects [11].

The medicinal properties of garlic (*Allium sativum*) enhance immune functions and has antibacterial, antifungal and antiviral activities. In Ayurveda, garlic is used for the treatment of various conditions like asthma, bronchitis, chest congestion, skin diseases like leprosy and skin conditions like leucoderma [7] [8]. Fresh and garlic has been shown to inhibit cancer caused by polycyclic aromatic hydrocarbons and nitrosamines. The protective effect to garlic has been attributed to presences of organosulfur compounds. These compounds in garlic may give rise to its antibacterial properties, which in turn may block the formation of cancer-causing substances, enhance cell repair,

reduce cell proliferation or induce cell death. Several population studies show an association between an increased intake of garlic and reduced risk of certain cancers, including cancers of stomach, colon, oesophagus, pancreas and breast [12].

Clove (*Syzygium aromaticum*) is one of the most commonly used spices in Sri Lanka. In Ayurveda, cloves are considered to enhance circulation, digestion and metabolism and help counter stomach disorders such as gas, bloating and nausea. The essential oil of clove is used as an ingredient in oral hygiene products to promote tooth health and freshen the breath. The clove contributes the pungent and astringent tastes. Cloves help pacify *vāta* and *kapha* and increase *pitta* [7]. The major chemical constituent of clove includes sesquiterpenes, volatile oil (eugenol), caryophyllene, tannins and gum. Through the phytochemical reactions of eugenol that possess insecticidal, antioxidant and anti-inflammatory activities. Recent studies have also identified the promising anticancer properties of clove [13].

Black cumin (*Nigella sativa*) has been used in a traditional medicine. It has *rooksha* (dryness) and *laghu* (lightness) *guna* with *katu* (pungent) and *tikta* (bitter) *rasa*. Also it has *katu vipāka* with *ushna virya*. It pacifies *kapha* and *vata dosha* while increasing of *pitta*. It has medicinal effects of *dīpana* (improves digestion), *rōchana* (improves taste), *vātahara* (balances *vāta*, useful in neurological disorders, paralysis), *sangrāhi* (absorbent), *jwaraghna* (useful in fever), *adhmanahara* (relives bloating), *gulmahara* (useful in abdominal tumour), *chardhihara* (relives vomiting) and *atisārahara* (useful in diarrhoea and dysentery). It has effect of anti-inflammatory, analgesic and useful in nephrotoxicity with hepatotoxicity [7][8]. The crude oil and thymoquinone extracted from its seeds and oil are effective against many diseases such as cardiovascular complications, diabetes, asthma, kidney problems and cancer. Experimental evidence indicates anti-carcinogenic, anti-tumour activities of Saffron with its compounds in vitro and vivo platforms [14].

Cinnamon bark (*Cinnamomum cassia*) is another popular herbal ingredient in traditional oriental medicine. It has *katu* (pungent), *tikta* (bitter) and *madhura* (sweet) *rasa* with *laghu* (light), *ruksha* (dry) and *thikshna* (piercing or sharp) *guna*. It has *ushna virya* (potency) with *katu* (pungent) *vipāka*. It reduced *kapha* and *vata dosha*. It is helpful in increase of metabolic fire and appetite, while reliving anorexia. It is effective in relieving flatulence, abdominal pain, improving liver functions, diarrhoea, haemorrhoids, irritable bowel syndrome, fever, blood related problems and chronic respiratory problems. Cinnamon helps in increasing *ojas* that responsible for immunity, strength and vitality [7][8]. It possessed diverse pharmacological activities including antibacterial, antiviral and anticancer properties [15].

Black cardamom (*Amomum subulatum*) has warming and calming qualities, along with sweet and pungent tastes. Although it is considered to be *tridosha* (balancing for all *doshas*) and while those with *pitta* imbalance it should use sparingly or in moderation. Cardamom's warming and detoxifying effects aid in reducing the accumulation of *āma* (toxins) in the body and maintaining health. In addition, it helps to reduce *kapha* in the stomach and lungs (such as congestion and mucous) and pacifies *vāta* [7][8]. Black cardamom has also been found to have antioxidant properties. The ability of cardamom to inhibit chemical carcinogenesis was shown by the reach studies [16].

Conclusion

An extensive literature survey was done on the spices for cancer prevention according to Ayurveda and modern aspects. It revealed that there are many spices with valuable therapeutic effects on cancer prevention. According to Ayurveda, *Ahinsaka Arbuda* is correlate with carcinoma. Ayurveda described cancer originates due to metabolic crisis that aggregation of *vāta* factors and suppression of *kapha* factors and while both interacting in one another that resulting in proliferation. Turmeric (*Curcuma longa*), Ginger (*Zingiber officinale*), Garlic (*Allium sativum*), Clove (*Syzygium aromaticum*), Black cumin (*Nigella sativa*), Cinnamon (*Cinnamomum cassia*) and Black

cardamom (*Amomum subulatum*) are the seven spices that identified under this review. These all spices are mentioned under the treatment formulations of *Pilika* and *Kusa Pilika*. Also having the property of pacifies *kapha* and *vata dosha* which helps to prevent proliferation of cancer. These spices have anti-carcinogenic, Anti-angiogenic, anti-proliferative, anti-invasive, antineoplastic, antioxidant, anti-inflammatory, anti-tumor, analgesic, chemo preventive, antibacterial and antiviral pharmacological actions. These spices are medicinally very important in cancer prevention according to this study. Ayurveda and traditional medical systems prevailing in Sri Lanka have made use of these spices with therapeutic effects to cancer prevention. Although there are number of phytochemical studies were carried out using these spices. Historically, herbs and spices have enjoyed a rich tradition of use for their flavour enhancement characteristics and for their medicinal properties. The rising prevalence of chronic diseases worldwide and the corresponding rise in health care costs is propelling interest among researches and the public for multiple health benefits related to these food items, including a reduction in cancer risk and modification of tumour behaviour. A growing body of epidemiological and preclinical evidence points to spices as minor dietary constituents with multiple anticancer characteristics. Further studies and today our attention should be span for claims about the ability of foods, with including spices to prevent cancer risk or to enhance the quality of life.

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