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Medicinal properties of some Indian spices

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Abstract

The term "Spice" applies to natural plant or mixtures in whole or ground form, which are used for imparting flavour, aroma and piquancy to the food items. Spices and condiments are a major commercial crop in India and are the backbone of agricultural industry.The importance of spices in dietary, medicinal and other uses and their commercial importance are immense. Present article deals with all aspects and facts of the spices and condiments which may meet the requirements of all those handling them at various stages, from harvesting to their end-use. The article also incorporates brief description of some most commonly used spices in India with their medicinal properties along with major areas of their production.

Key words: Spices, Food, Diseases, Medicine, Condiments.

Introduction

Spice is defined as a strongly flavoured or aromatic substance of vegetable origin, obtained from tropical plants, commonly used as a condiment. In ancient times, they were as precious as gold; and as significant as medicines. India which is known as the land of spices, plays a significant role in the global spice market. Spices and condiments are products of plants, which are mostly used for seasoning, flavouring and thus, enhancing the taste of foods, beverages and drugs (Parry, 1969; Dziezak, 1989; Iwu, 1993; Manandhar, 1995). Spices provide a means to enhance cuisine to gustatory perfection, while at the same time, these condiments contain bioactive principles that help to prevent serious ailments such as hypertension and infection (Manandhar, 1995).

Plants used as spices and condiments are usually aromatic and pungent (Achinewu *et al.*, 1995). Iwu (1993) had reported that the plants owe these properties to the presence of varying types of essential oils. The most important spices traditionally traded throughout the world are products of tropical environments. The major exception to this group are the capsicums *i.e.*, chilli peppers, paprika and coriander which are grown over a much wider range of tropical and non-tropical environments. Production of spices and essential oils in these wet and humid environments brings special difficulties for crop and product management. Drying the crop to ensure a stable stored product is of particular importance, and in wet humid environments, this creates the need for efficient and effective drying systems. In terms of world trade value, the most important spice crops from the tropical regions are pepper, capsicums, nutmeg/mace, cardamom, allspice/pimento, vanilla, cloves, ginger, cinnamon and turmeric. Coriander, cumin, mustard, and sesame seeds and the herbs sage, oregano, thyme, bay and the mints are the most important spice crops from non-tropical environments.

History of spices in India

The story of the Indian spices is more than 7500 years old. Centuries before Greece and Rome had been discovered, sailing ships were carrying Indian spices. Today, India is one of the largest exporting nations of spices in the world. Different variety of spices grows due to natural conditions available in various parts of India. The major Western, South-west, South and South-east is tropical in weather conditions, North-west, North are dry with less humidity and North-east and East have pre-dominantly high-rainy seasons.

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Ancient Ayurvedic texts prescribe spices for curative and therapeutic purposes. Ayurvedic scripts dating back to 3000 years, list the preventive and curative properties of various spices. The main body of the work consists of highly readable monographs on individual spice plants, which contain detailed information on botany, name of the corresponding primary drug substances, their effects and side effects (Dziezak, 1989).

Uses of spices

Spices may be derived from many parts of the plant: bark, buds, flowers, fruits, leaves, rhizomes, roots, seeds, stigmas and styles or the entire plant tops. The term 'herb' is used as a subset of spice and refers to plants with aromatic leaves. Spices are often dried and used in a processed but complete state. Another option is or used to prepare extracts such as: essential oils by distilling the raw spice material (wet or dry), or to use solvents to extract oleoresins or other standardized products (Manandhar, 1995).

Use of spices is dynamic and plieotropic. In ancient times, spices had been used to make the food last longer. In the days when refrigeration was absent and even today in some remote parts of India where electricity is not available, spices are used in food for preservation. Spices are also used for their curative properties such as ginger prevents dyspepsia, garlic reduces cholesterol and hypertension, fenugreek is a good resistance builder, pepper often serve as antihistamines and turmeric is used for stomach ulcers and for glow of the skin (Luthra *et al*., 2001;Atsushi *et al*., 2006; Agbor *et al*., 2007). In India, after dinner mint is substituted by the fragrant spices such as fennel, cardamom or cloves. They are effective mouth fresheners, aid digestion, prevent heartburn and curb nausea (Wright *et al.*, 2007). Others such as assafoetida and ginger root, have been known to counteract flatulence and colic, and are added to lentils, a must with every Indian meal (Lee *et al.*, 2009; Akhani *et al*., 2004). Spices are also used for the flavoring and aroma to the foods. They adds a specific smell to the foods which enhances the hunger and up regulate the secretion of digestive juices in mouth as well as in stomach. Ginger, pepper, saffron and mint are some most frequently used spices as flavoring agents (Atsushi *et al.*, 2006; Agbor *et al*., 2007; Aung *et al*., 2007). Besides in food and medicinal purposes, spices are also used in cosmetics to add a pleasant smell to the substances like perfumes, tinctures and face-washes (Dugoua *et al*., 2007; Lopez *et al*., 2009; Oshiro *et al*., 1990). In social events such as marriage and religious celebrations, use of spices proves their non-ignorable participation in all major aspects of life.

Some common* Indian *spices

Assafoetida (*Ferula assafoetida* L.)

Commonly known as "Heeng", assafoetida belongs to the family Apiaceae. People from central Asia, Iran to Afghanistan use *assafoentida* as an important spice in food and as an essential ingredient for home remedies. In the Jammu region of India, assafoetida is used as medicine for flatulence and constipation by 60% of locals (Iranshahy and Iranshahy, 2011). Due to potent medicinal potential, assafoetida also known as devil's dung, food of the gods, Kaayam (Malayalam), Ingua (Telugu), Ingu (Kannada) and Perungayam (Tamil). Assafoetida has a pungent, unpleasant smell when raw, but in cooked dishes, it delivers a smooth flavour. Assafoetida is dried latex (oleo-gum-resin) exuded from the living rhizome, rootstock or taproot of an umbelliferous plant of varied species. It contains about 40-64% resin, 25% endogenous gum, 10-17% volatile oil and 1.5-10% ash. The resin portion is known to contain asareninotannols 'A' and 'B', ferulic acid, umbelliferone and four unidentified compounds (Lee *et al*., 2009). Use of assafoetida is beneficial in treatment of asthma, excessive and painful menstruation, tooth ache, sexual impotency fever, and whooping cough (Ballabh and Chaurasia, 2007). There is reporting that a*ssafoetida* also possesses anti-influenza A (H(1)N(1)), antiviral and cytotoxic effects (Lee *et al*., 2009).

Bay leaves (*Cinnamomum tamala* L.)

The leaves of *Cinnamomum tamala (family Lauraceae)* are known as tejpatta, are popularly known across the globe for their versatile and irresistible aroma and taste. Bay is an evergreen tree that is recognized by names as, 'Sweet bay', 'Bay laurel' and 'True laurel'. Originating in the south slopes of the Himalayas, the bay leaves have essential oil containing cinnamic aldehyde and traces of eugenol as its main constituents. Compounds present in extract of bay leaves are monoterpinene, myrcene, α- pinene, sesquiterpene, ocimene (Bakkali *et al*., 2008). Antidiarrhoeal activity of the standardized extract of *Cinnamomum tamala* has been proved in experimental rats (Rao *et al*., 2008; Nagendra *et al*., 2009).

Turmeric (*Curcuma longa* L.)

Curcuma longa L. or turmeric belongs to family Zingiberaceae. Rhizome of this plant is used as spice and popularly known as Haldi in India. The use of turmeric dates back nearly 4000 years, to the Vedic culture in India, when turmeric was the principal spice and also of religious significance. Turmeric is also sometimes called 'Indian saffron' because of its brilliant yellow colour.

In Ayurveda, the traditional Indian system of medicine, curcumin has been used in several ways namely as an ingredient in the preparation of medicinal oils, ointment and poultice, in leprosy and diabetes, for stomach ache, carminative, tonic, antirheumatic, blood purifier, antiseptic and cure for liver ailments (Luthra *et al*., 2001). Turmeric contains up to 5% essential oils and up to 3% curcumin, a polyphenol. It is the active substance of turmeric. The raw juice of curcumin is used to tear in gallstones, gall bladder

complaints, and dental-troubles and for sore throat and common cold parasitic skin diseases and to cure piles (Mukherjee *et al*., 2011).

Various sesquiterpenes and curcuminoids have been isolated from the rhizome of *C. longa*, attributing a wide array of biological activities such as antioxidant (Srinivas *et al*., 1992), anti-inflammatory (Ghatak *et al*., 1991), wound healing (Chang and Bni, 1987), anticancer, antiproliferative (Surh, 1999), antifungal (Apisariyakul *et al*., 1995) and antibacterial activity (Shankarnarayanan and Jolly, 1993; Oshiro *et al*., 1990; Hegnauer, 1963).

Bishop's weed (*Trachyspermum copticum* L.)

Trachyspermum copticum or Bishop's weed or commonly known "ajwain" belongs to the Apiaceae family, is primarily grown and used in the Indian subcontinent. The most utilized part of Bishop's weed is the small, caraway like fruits that have the essential oil (2.5 to 5% in the dried fruits) being dominated by thymol (35 to 60%); α-pinene, p-cymene, limonene and terpinene as its main constituents (Hawrelak *et al*., 2009). Bishop's weed is an aromatic spice with a wondrous flavour. The major components of *T. copticum* L. oils are piperitone (23.65%), alpha-pinene (14.94%), limonene (14.89%), 1,8-cineole (7.43%) and thymol (37.2%), p-cymene (32.3%), gamma-terpinene (27.3%), respectively. It is concluded that the essential oils could be safely used as a preservative material on some kinds of foods to protect them from toxigenic fungal infections (Rasooli *et al*., 2008). **A**jwain is much used as a medical plant in ayurvedic medicine (India) to help against diseases of the digestive tract and fever. The reported medicinal properties of *Trachyspermum* are antiasthma, antibronchitis, pain killer, wound healing, anti-influenza and mouth disorders (Silver, 2007).

Cardamom (*Elettaria cardamomum* L.)

Cardamom or "chotti elaycahi" is the dried fruit of the herbaceous perennial plant belong to the family Zingiberaceae. The fruits of *Elettaria cardamomum* are used in Unani system of medicine to treat gastrointestinal disorders. The essential oil form cardamom was found to contain 71 compounds. The major components are α-terpinyl acetate (44.3%), 1,8-cineole (10.7%), α-terpineol (9.8%) and linalool (8.6%) (Nakatsu *et al.*, 2000). It is evident that cardamom extracts significantly enhance the cytotoxic activity of natural killer cells, indicating their potential anticancer effects. Cardamom exerts immunomodulatory roles and antitumor activities, and hence, they manifest themselves as natural agents that can promote the maintenance of a healthy immune system. Cardamom constituents can be used as potential therapeutic tools to regulate inflammatory responses and prevent/attenuate carcinogenesis (Maidalawieh and Carr, 2010).

Cassia (*Cinnamomum cassia* L.)

Cassia or "dalchini" is the spice that has its mention in the bible, and hence, is regarded as the first cinnamon species that was known to mankind. Belonging to the Zingiberaceae family, Cassia contains 4% essential oil of which 75 to 90% are composed by cinnamic aldehyde. Eugenol is found in traces along with small amounts of coumarin (Kim *et al*., 2004). Cassia is known to elicit variety of health promoting properties including antidyspepsia, antiflatulence, anti-influenza, antiarthritis, against cold and rheumatism, antidiarrhea, antimicrobial, and antiemetic. Its bark is known to be beneficial in type 2 diabetes and antioxidant activity (Dugoua *et al*., 2007; Blevins *et al.*, 2007). Cassia bark is a popular ingredient in foods, beverages, perfumery and cosmetics, while cassia oil has an extensive application in liquors and beauty products (Bakkali *et al.*, 2008).

Cumin (*Cuminum cyminum* L.)

Cumin, in India popularly called as Jeera is the dried fruit of small herbaceous plants belongs to the Apiaceae family. It was popular even during the Biblical times as an efficient digestive food flavour for ceremonial feasting. From Latin America to North Africa and all over Asia, cumin is the most popular spice used.

An array of medicinal properties of cumin is reported in literature. It is frequently used in treatment of inflammation, pain, digestive disorders, blood purification, in reducing inflammation of uterus and itching (Proestos *et al*., 2006). Seeds of *Cuminum cyminum* have been reported to act as hypoglycaemic agent (Srinivasan, 2005) and its methnolic extract have also been reported for reduction in total serum cholesterol (Shrike and Jagtap, 2009).

Fennel (*Foeniculum vulgare* Mill)

In India, fennel is called saunf and is the traditional spice of the region. Fennel is the dried aromatic ripe fruit of herbaceous plant belongs to Apiaceae family, grows well in mild climates. *Foeniculum vulgare* essential oils are known for its antioxidant, antimicrobial activity (Miguel *et al*., 2010). Its seed oils are also reported for hypoglycemic and hepatoprotective effects in mice and rats (Hanefi *et al*., 2003). Fennel has been shown to possess antispasmodic, antifungal, and hypoglycemic properties (Dongare *et al*., 2011).

Pepper (*Piper nigrum* L.)

Pepper is commonly known as kali mirch in India. The black color fruits of *Piper nigrum* plant of family Piperaceae are used as spice. Pepper is one of the most studied spice exhibits several medicinal properties. Besides piperine others alkaloids such as piperidine and piperettine are responsible for most of the beneficial effects of this spice. As a traditional curative, pepper is used as aches and pain reliever. It is used

in treatment of cough and cold, digestive problems and cholera, anti-influenza, anti-rheumatoid, antiarthritis, antispasmodic and antioxidant (Chaudhry and Tariq, 2006).

Nutmeg (*Myristica fragrans* HOUTT)

Myristica fragrans is an evergreen tree indigenous to the Banda Islands in the Moluccas of Indonesia and in the south part of India. Nutmeg grounds or Jiaphals are often used as a spice for savoury dishes. It is used as natural food flavouring in baked goods, syrups, beverages, and sweets. Myristica *fragrans* seeds have been reported for LDL-antioxidant activity to identify the most potent LDL-antioxidant (Kwon *et al*., 2008). *Myristica fragrans* fruit extract showed hypolipidemic activity (Alpana *et al*., 1996). Antibacterial activity by the nutmeg extract was also found against the enteropathogenic *E. coli* bacteria (Akiko *et al*., 2002).

Fenugreek (*Trigonella foenum-graecum* L.)

Fenugreek is used both as a spice (seed) and also used in curry. Its seeds commonly known as "Methi" are rich source of polysaccharide galactomannan. Seeds are also a source of saponins such as diosgenin, gitigenin, tigogenin and neotigogens. Other bioactive constituents of fenugreek include muiclage, volatile oils and alkaloids such ascholine and trigonelline.

The seeds of fenugreek are known for their carminative, tonic and antidiabetic effects (Eidi *et al*., 2007). *Trigonella foenum-graecum* seed aqueous extract are reported to elicit antiulcer, hypoglycaemic activity (Zia *et al*., 2001) and leaves extract are reported for antiinflammatory and antipyretic effects (Ahmadiani *et al*., 2001). Gastro protective effect of fenugreek seeds is also observed in experimental gastric ulcer in animals (Pandian *et al*., 2002). Seeds of fenugreek were used to lower serum cholesterol, triglyceride, and low-density lippoprotein in human patients and experimental models of hypercholesterolemia (Mukherjee, 2003). Fenugreek is currently available commercially in encapsulated forms and is being prescribed as dietary supplements for the control of hypercholesterolemia and diabetes by practitioners of complementary and alternative medicine.

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