

## Spices — Medicinal Value

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Spice is defined as “a strongly flavoured or aromatic substance of vegetable origin, obtained from tropical plants, commonly used as a condiment”. A spice is a dried seed, fruit, root, rhizome, bark or vegetative substance or flower bud used in nutritionally insignificant quantities as a food additive for the purpose of flavoring. Spices are distinguished from herbs, which are leafy, green plant parts used for flavoring purposes. Herbs, such as basil or oregano, may be used fresh, and are commonly chopped into smaller pieces; spices, however, are dried and usually ground into a powder. American Spice Trade Association (ASTA) defines spices as “any dried plant product used primarily for seasoning purposes”. Included are tropical aromatics (pepper, cinnamon, cloves, etc.), leafy herbs (basil, oregano, marjoram, etc.), spice seeds (sesame, poppy, mustard, etc.) and dehydrated vegetables (onions, garlic, etc.). Many spices have other uses like food preservation, medicine, religious rituals, cosmetics, and perfumery or as vegetables.

In ancient times, spices were as precious as gold; and as significant as medicines, preservatives, and perfumes. Spices have been used since time immemorial to enhance or vary the flavours of foods. One of the first uses of spices was for religious purposes such as for incense, embalming, in sacrificial rites, and as charms, perfumes, or medicines. In the middle Ages, spice became a luxury item, a commodity so valued that it was accepted as currency. And is it too outlandish to claim that America was discovered due to spice—after all, it was the search for trade routes to India’s valuable spices that inspired explorers like

Columbus (Brown, 2003). The resultant spice trade is an integral part of the history of the rising and falling empires of India, China, Italian city states like Venice, Holland, England, and Portugal. From ancient times to the present, Asia has been well known as the ‘Land of Spices’. The Maluku Islands of Indonesia, also known to English speakers as the Moluccas, are referred to as the ‘Spice Islands’. For the Indians who produce and export the majority of spices for world markets, the term ‘Spice Bowl of the World’, is applied to the State of Kerala. Many of the world’s finest spices like black pepper, cardamom, nutmeg, ginger and turmeric have been produced in Kerala (Chomchalow, 1996).

The fame of Indian spices is older than the recorded history. The story of Indian Spices is more than 7000 years old. Centuries before Greece and Rome had been discovered, sailing ships were carrying Indian spices, perfumes and textiles to Mesopotamia, Arabia and Egypt. It was the lure of these that brought many seafarers to the shores of India. Theophrastus described black pepper and long pepper (*P. longum* L.) in the 4<sup>th</sup> century BC. The powerful Chola Kings before 100 BCE supposedly took pepper to Indonesia (Parthasarathy *et al.* 2007). Long before Christian era, the Greek merchants thronged the markets of South India, buying many expensive items amongst which spices were one. Epicurean Rome was spending a fortune on Indian spices, silks, brocades, Dhaka Muslin and cloth of gold, etc. It is believed that the Parthian wars were being fought by Rome largely to keep open the trade route to India.

It is also said that Indian spices and her famed

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products were the main lure for crusades and expeditions to the East. However, compared to other goods traded, spices took up less cargo space, so their popularity was higher than bulkier products. Ancient peoples such as the Egyptian, the Arab and the Roman made extensive uses of spices, not only to add flavor to foods and beverages, but as medicines, disinfectants, incenses, stimulants and even as aphrodisiac agents. No wonder they were sought after in the same manner gold and precious metals. Spices like turmeric and paprika, are used more for imparting an attractive colour than for enhancing taste. Most of the spices also finds place in various medicines. The extracts are used as infusions, decoctions, macerations, tinctures, fluidextracts, teas, juices, syrups, poultices, compresses, oils, ointments and powders.

#### Uses of spices

Basic Function	Major Spices	Other related spices used
Flavouring	Parsley, cinnamon, allspice, dill, mint, tarragon, cumin, marjoram, star anise, basil, anise, mace, nutmeg, fennel, sesame, vanilla, fenugreek, cardamom, celery	Garlic, savory, bay leaves, clove, leek, thyme, rosemary, caraway, sage, oregano, onion, coriander
Deodorizing/masking	Garlic, savory, bay leaves, clove, leek, thyme, rosemary, caraway, sage, oregano, onion, coriander, Japanese, pepper, mustard, ginger, horseradish, red pepper, pepper	
Pungency	Garlic, onion, bay leaves, clove, thyme, rosemary, caraway, sage, savory, coriander, pepper, oregano, horseradish, Japanese pepper, saffron, ginger, leek, mustard	Parsley, pepper, allspice, mint, tarragon, cumin, star anise, mace, fennel, sesame, cardamom, mustard, cinnamon, vanilla, horseradish, Japanese pepper, nutmeg, ginger
Colouring	Paprika, turmeric, saffron	

#### Common ethno-medical uses of some spices

Spices	Ethno-medical uses
Allspice	To cure toothache, carminative and stimulant
<i>Alpinia</i>	Used in infusion to heal stomach cramps and dysentery.
Anise	Used as carminative, for stomachache and gastric pain and as vermifuge.
Black pepper	Dried powder used for curing urinogenital complaints and berries with onion are used to extract guinea worms.
Clove	Bark infusion used for diarrhea, dysentery and leaf infusion for diabetes. Fruits as remedy against diarrhea, as beverage and tonic. Seeds are used to treat blood pressure and sugar in urine.
Fennel	Leaf infusions for stomach ailments, remedy to vomiting
Ginger	Rhizomes used for treating hemorrhage, malaria, headache, as a digestive, carminative and anti asthmatic
Nutmeg	Spice, fruit is chewed to alleviate stomachache
Turmeric	Treating sprains, bruises, as analgesic, to treat stomach pain etc.
Vanilla	Used against poor blood circulation and skin ailments

Source: Sasikumar, (2008)

#### Inherent qualities of Indian spices

Spices have been used for their flavour, aroma and color and as preservatives for thousands of years. Their use in traditional systems of medicine dates back to centuries. Today there is greater scientifically validated knowledge on spices phytochemistry, therapeutic effects of their bioactive principles, and mechanism of action. Most of the medicinal properties are attributed to the secondary metabolites – the essential oils and oleoresins – present in spices, a large number of which have been identified. The various phytochemicals include flavonoids, terpenoids, lignans, sulfides, polyphenolics, carotenoids, coumarins, saponins, plant sterols, curcumins, phthalides etc. Several chemical constituents in

spices viz, most of the secondary metabolites, pungent principles, volatile oil compounds, alkaloids etc. are responsible for the numerous medicinal properties.

Spice	Important flavour compounds
Allspice	Eugenol, $\beta$ -caryophyllene
Anise	(E)-anethole, methyl chavicol
Black pepper	Piperine, S-3-Carene, $\beta$ -caryophyllene
Cardamom	$\alpha$ -terpinyl acetate, 1-8-cineole, linalool
Turmeric	Turmerone, Zingiberene, 1,8-cineole
Ginger	Gingerol, Shogaol, neral, geranial
Mace	$\alpha$ -pinene, sabinene, 1-terpenin-4-ol
Nutmeg	Sabinene, $\alpha$ -pinene, myristicin
Cumin	Cuminaldehyde, p-1,3-mentha-dienal
Fennel	(E)-anethole, fenchone
Saffron	Safranol
Vanilla	Vanillin, p-OH-benzyl-methyl ether

The ideal climate and optimum production practices keeps inherent qualities of Indian spices intact as result they are valued high in International market. It is essential to continue the tradition of conquering supremacy of Indian spices in the global market by combining modern tools and traditional technical knowhow's. There are a lot of unique flavour and quality we have in some of our spices such as Lakadong turmeric, Malabar pepper, Bhut Jalokia etc. which are under GI regime or being considered under GI regime.

#### Medicinal Properties of Important Spices

**Black pepper:** Black pepper (*Piper nigrum* L.) has a number of pharmacological properties viz, analgesic, antipyretic, antimicrobial, antifungal etc. which have been attributed to the pungent principle in the berries, piperine. Anticonvulsive and vasodilatory properties are also exhibited by this compound and it's various homologues like piperettine, piperanine, piperyl Co A, piperolin B and pipericine. In general, black pepper contains about 3-5% volatile oil, 8-16% oleoresin and 2-6% piperine. Some of the traditional varieties like Kottanadan and Kumbhakodi are rich in oleoresin and piperine. Some of the new varieties with high quality are Malabar excel, Sreekara and Subhakara.

It is considered as stomachic, carminative and diaphoretic. Piperine has shown to stimulate the taste buds causing reflux stimulation of gastric secretions and thus improves digestion. Piperine is reported to have antipyretic, anti-inflammatory and analgesic activities. A derivative of piperine, tetrahydropiperine enhances the skin permeability and hence can be used for many topical

applications. Piperine can increase the bioavailability of drugs as well as aminoacids from food, by increasing the intestinal cell permeability. The effect of piperine on the bioavailability and pharmacokinetics of propranolol and theophylline has been examined clinically. They could establish that the enhanced systemic availability of oral propranolol and theophylline could be exploited to achieve better therapeutic control using Piperine.

In traditional Chinese medicine, a dried powder containing radish and pepper corn (1:99) is being used to treat epilepsy. Due to this property of piperine, pepper is used in the treatment of epileptic fits in Ayurveda. The effective compound has been identified as 'antiepilepsirene', widely known in Chinese hospitals for epilepsy. As a natural medicinal agent, black pepper in tea form has been credited for relieving arthritis, nausea, fever, migraine headaches, poor digestion, strep throat, and even coma. It has also been used for non-medical applications as an insecticide.

**Ginger:** Ginger (*Zingiber officinale* Roscoe, Zingiberaceae) has been widely used as a dietary spice, as well as in traditional oriental medicine. The rhizome of ginger contains pungent vanillyl ketones, including [6]-gingerol and [6]-paradol, and has been reported to possess a strong anti-inflammatory activity. Ginger has been known to have **anti oxidant and anti carcinogenic** properties. The gingerols are a group of structurally related polyphenolic compounds isolated from ginger and known to be the active constituents. The chemopreventive efficacy in colon cancer of ginger has been well demonstrated. The number of tumors as well as the incidence of cancer was significantly decreased on treatment with ginger. This is mainly attributed to the presence of pungent vallinoids viz. [6]-gingerol and [6]-paradol, shogaols, zingerone etc. An anti/ulcer constituent, 6/gingesulfonic acid, and three monoacyldigalactosylglycerols, gingerglycolipids A, B, and C, were isolated from ginger showed weaker pungency and more potent anti/ulcer activity than 6/gingerol and 6/shogaol. [6]-gingerol, a pungent ingredient of ginger has **anti bacterial and anti inflammatory property**. Previous studies have demonstrated that [6]-gingerol inhibits mouse skin tumor promotion anchorage/ independent growth of cultured mouse epidermal cells stimulated with epidermal growth factor. Cyclooxygenase/2 (COX/2), a key enzyme in the prostaglandin biosynthesis, has been recognized as a molecular target for many anti-inflammatory as well as chemopreventive

agents promoting activities. Kim *et al.* (2005) found its anti-angiogenic activity *in vitro* and *in vivo*.

The bioactive components of ginger rhizomes were characterized by spectroscopic analysis as zingerone and dehydrozingerone, which exhibited potent **antioxidant and tyrosinase inhibition activities**. It was observed that both number and position of hydroxyl groups on aromatic ring and a double bond between C/ 3 and C/ 4 played a critical role in exerting the antioxidant and antityrosinase activity. Many studies have established ginger as Anti ulcer, Anticonvulsive, analgesic, hepatoprotective, hypotensive, endothelium-dependent and independent vasodilator, cardio-suppressant and stimulant.

**Turmeric:** *Curcuma longa* L., (*Zingiberaceae*) has been attributed a number of medicinal properties in the traditional system of medicine treating for several common ailments. It belongs to the genus *Curcuma*, which consists of several plant species with underground rhizomes and roots. About 40 species of the genus are indigenous to India, indicating the Indian origin. It had been originally used as a food additive to improve the palatability, storage and preservation of food.

Turmeric possesses powerful antioxidant properties and has been prescribed for years in the treatment of various diseases. Curcuminoids which are found within turmeric is so powerful that it may benefit both cancer and AIDS patients. In Ayurveda, turmeric has been used internally as a stomachic, tonic and blood purifier and topically in the prevention and treatment of skin diseases. This tropical root delivers a smorgasbord of powerful health benefits. New research shows that turmeric and its main bioactive compound, curcumin has the power to block inflammation, stop cancer, kill infectious microbes, and improve heart health. It has been prescribed in liver diseases, and particularly for jaundice, and urinary tract diseases.

The rhizome is 70% carbohydrates, 7% protein, 4% minerals, and at least 4% essential oils. It also has vitamins, other alkaloids, and is about 1% resin. The active ingredient in turmeric is called "curcumin", although in its raw state turmeric only contains 2-5% curcumin. Curcumin is the substance that is responsible for the biological activity of turmeric. Turmeric extract, volatile oil from turmeric and curcuminoids are reported to possess anti-inflammatory activity and hence

effective for treating arthritis and diseases affecting liver and gall bladder. Curcumin has been shown to reduce inflammation by lowering histamine levels, while possibly increasing the production of natural cortisone by the adrenal glands. It has been shown to be helpful in the treatment of arthritis, rheumatoid arthritis, osteoarthritis, injuries, trauma, etc. Turmeric has shown in its anti-oxidant, anti-mutagenic, and anti-carcinogenic action and has positive effects in the recovery from chemotherapy and radiation treatment. Curcuminoids can also act as photochemoprotective agents that provide protection against UV B radiation induced oxidative stress reducing the risk of incidence of skin cancer.

An interesting property of curcuminoids is their anti-HIV effect which has been demonstrated during *in vitro* and *in vivo* experiments, including a limited number of human studies. They are also antimicrobial and Anti-angiogenic.

With the support of Nanotechnology, the therapeutic effect of turmeric can be enhanced. In future, the therapy can be used for curing various diseases. Not only does turmeric slow down cancer growth, it's also been found to correct the cystic fibrosis defect in mice, help prevent the onset of alcoholic liver disease, and may slow down other serious brain diseases like multiple sclerosis and *Alzheimer's disease*. Future research programmes need to focus on these aspects.

**Small Cardamom:** Small cardamom, known as the 'queen of spices', which belongs to the family of *Zingiberaceae*, is a rich spice obtained from the seeds of a perennial plant, *Elettaria cardamomum* Maton. It is one of the highly prized spices of the world and is the third most expensive spice after saffron and vanilla. **Cardamom essential oil** has traditionally been used as a tonic to the digestive system, as well as a component of **many sensual aphrodisiac blends**. The oil has the aroma of freshly dried cardamom pods, **far superior to the comparatively flat steam distilled variety of this oil**. Cardamom oil may relieve spasm, making it possibly beneficial for colitis, irritable bowel syndrome, indigestion and cramps. Cardamom oil may be of benefit where the digestive system is affected by nervous tension. In addition, cardamom oil can relieve nausea and may be useful for morning sickness in pregnancy.

Cardamom is strongly tonic and stimulant, stomachic and carminative and to a lesser degree, listed as neuro muscular antispasmodic. It is also reported as anti inflammatory and analgesic and is

also effective against post operative nausea and vomiting. Cardamom essential oil acts as, antiseptic, carminative, digestive, diuretic, stimulant, stomachic and anti-spasmodic. It possesses antimicrobial and anti-inflammatory activity. The essential oil of cardamom is used for its uplifting and invigorating properties and helps digestion and nausea. It is used as an aphrodisiac, helpful in countering the irritation experienced during premenstrual tension (PMS) and works well on the respiratory system, to ease coughs and warming the body.

The volatile oil of cardamom seeds is more effective in inhibiting the growth of the microbial species examined than fixed oil. The inhibitory effect of volatile oil against some pathogenic fungi was increased as volatile oil concentration increased and had highly inhibitory effect on the selected pathogenic bacteria. Moreover, it exhibits highly cytotoxic and anticarcinogenic activities against human tumour cell lines. Extract of cardamom seed displayed a variable degree of antimicrobial activity on different microorganisms.

**Large cardamom:** India is the largest producer of large cardamom (*Amomum subulatum* Roxburgh) with an annual production of 12,100 MT followed by Nepal (2500 MT) and Bhutan (1000 MT). More than 85% of the production within India is from Sikkim. An estimated 8000 tonnes of large cardamom are produced annually in Sikkim alone, which constitutes nearly 80% of total production from India. It is also called greater Indian or Nepal cardamom, which is a native of Eastern Himalayan region. Large cardamom is the most important perennial cash crop of the region and is widely cultivated with Himalayan alder (*Alnus nepalensis*) as shade tree.

Large cardamom possesses many medicinal properties like antiseptic (pulmonary), antispasmodic (neuromuscular), aphrodisiac, expectorant, anthelmintic, antibacterial (variable), cephalic, cardiogenic, diuretic, emmenagogue, sialogogue, stomachic, stimulant tonic-nervous and digestive. The spice is broadly used to treat infections in teeth and **gums**, to prevent and treat throat troubles, congestion of the lungs and pulmonary tuberculosis, inflammation of eyelids and also digestive disorders. Among other species, varieties and cultivars, *Amomum villosum* is used in traditional Chinese medicine to treat stomach-aches, constipation, dysentery, and other digestion problems. The components in the volatile oil, *viz*; 1,8-Cineole, Terpinene Terpinol, Sabinine, alpha-

pinene and Limonine act as tonic for the heart and liver, appetizer, promotes the elimination of bile and helps to reduce congestion of the liver. It is also useful in treating gonorrhoea. Large cardamom fruit, commonly known as 'Heel kalan' or 'Bari Ilaichi' is used in Unani system of medicine in gastrointestinal disorders.

#### Tree Spices

**Cinnamon:** Cinnamon is used as an ingredient in many 'ayurvedic' and 'Unani' medicinal preparations. The bark of *C. zeylanicum* is an aphrodisiac, anthelmintic and tonic. It is useful in the treatment of 'vata', biliousness, parched mouth, bronchitis, diarrhoea, itching, heart diseases and urinary diseases. The bark is a carminative and expectorant; it is useful in hydrocele, flatulence, headache, piles etc. Cinnamon possesses various biological activities such as antioxidant, antimicrobial, antidiabetic and antiallergic activities.

**Antioxidant activity:** Cinnamon and its essential oil are used as preservatives in food from ancient time. It is due to the antioxidant property of cinnamon. Phenolic compounds such as hydroxy cinnamaldehyde and hydroxycinnamic acid present in the cinnamon extract act as scavengers of peroxide radicals and prevent oxidative damages (Wu *et al.*, 1994). Cinnamon is reported to possess anti-inflammatory, immunological, antibacterial activity and antidiabetic activity.

**Nutmeg:** Nutmeg is more commonly used in Oriental than in Western medicine. Medicinally it is known for its stimulative and carminative properties. The seeds are carminative, stomachic, astringent, deodorant, narcotic, aphrodisiac and useful in flatulence, nausea, and vomiting. Powdered nutmeg is rarely administered alone but it enters into the composition of numerous medicines as aromatic adjuncts. Oil of nutmeg is useful in the treatment of inflammation of the bladder and urinary tract, halitosis, dyspepsia, flatulence, impotence, insomnia and skin diseases. It is also used externally as a stimulant and ointment as a counterirritant. Most of the pharmacological properties of nutmeg are attributed to the compounds present in the essential oil. Mace oil possesses almost identical physiological and organoleptic properties as nutmeg oil. Nutmeg butter is a mild external stimulant used in the form of ointments, hair lotions and plaster, and used against rheumatism, paralysis and sprains.

Another application of nutmeg essential oils is in aromatherapy, which is gaining importance these days. The main constituents of nutmeg and mace- myristicin, elemicin and isoelemicin -when presented in aroma form, act as stress relievers. In Japan, many companies diffuse such aromas through air ventilation systems to improve the work environment as well as the quality of air. Both nutmeg and mace contain the active ingredient myristicin, which possesses narcotic properties. Nutmeg butter also contains elemicin and myristicin, which cause psychotropic effects. Ingestion in large quantities produces narcosis, delirium, drowsiness, epileptic convulsions and even death. It also causes temporary constipation and difficulty in urination and increased fat deposition in liver. Powdered nutmeg is used occasionally as a hallucinogenic drug, but such use is dangerous as excessive dose of mace has a narcotic effect and symptoms of delirium and epileptic convulsions appear after 1-6 hours of consumption. The anticarcinogenic property, hypolipidemic effect, Antioxidant, Antibacterial and Antifungal activity of nutmeg essential oil has been well documented.

**Clove:** Cloves have been used by India's traditional Ayurveda healers since ancient times to treat respiratory and digestive ailments. Like many culinary spices, cloves help relax the smooth muscle lining of the digestive tract and eating cloves is said to be aphrodisiac. Aqueous extract of clove flower bud inhibits immediate hypersensitivity in rats by inhibition of histamine release from mast cells in vivo and in vitro. Cloves are more often used to assist the action of other herbal remedies rather than alone. It is spicy, warming, stimulant, anodyne, anesthetic (topical), anti-emetic, anti-gripping (added to other herbs), vermifuge, uterine stimulant, stomachic, aromatic, carminative, antiseptic, antiviral, antibacterial, antifungal, antispasmodic, expectorant, aphrodisiac, promotes salivation and digestive juices; Oil is expectorant, anesthetic, emmenagogue; affects kidney, spleen, stomach and has preservative properties.

In Chinese medicine cloves are used as a kidney tonic (especially for impotence associated with deficient yang), to warm the body, increase circulation and as a digestive aid. It is used to treat indigestion, diarrhea, hernia, and ringworm and other fungal infections. In Ayurveda cloves are used to treat respiratory and digestive ailments, flatulence, nausea and vomiting.

Clove kills intestinal parasites and exhibits broad anti-microbial properties thus supporting its traditional use as a treatment for diarrhoea, intestinal worms, and other digestive ailments. Clove has strong anticancerous property. The sesquiterpenes,  $\alpha$ -caryophyllene,  $\beta$ -caryophyllene epoxide,  $\alpha$ -humulene,  $\beta$ -humulene epoxide and eugenol present in clove oil showed potential anticarcinogenic activity by inducing the detoxifying enzyme, glutathione-S-transferase in mouse liver and small intestine. *Eugenol*, the primary component of clove's volatile oils, functions as an anti-inflammatory substance. In animal studies, the addition of clove extract to diets already high in anti-inflammatory components (like cod liver oil, with its high  $\omega$ -3 fatty acid content) brings synergistic effect. Clove contains a variety of flavonoids, including kaempferol,  $\beta$ -caryophyllene and rhamnetin, which contribute to clove's anti-inflammatory and antioxidant properties.

**Garcinia:** The genus *Garcinia* consists of many underutilized medicinal crops. It belongs to the family Clusiaceae, consisting of over 200 species distributed in the tropics of the world chiefly in Asia, Africa, and Polynesia. They are evergreen polygamous trees, shrubs, and herbs. About 35 species are reported to exist in India. It is the source for a revolutionary natural diet ingredient which is currently a rage in America, Japan, Europe and other western countries. The hydroxy citric acid (HCA), which is obtained from water extract of *Garcinia* fruit is non-toxic, tasteless, odorless compound and found to be very effective herbal alternate for controlling obesity and cholesterol by inhibiting lipogenesis in human body. The existence of HCA in *Garcinia* fruit is a relatively new to the Western herbalism, but has been used for thousands of years in the Orient as a food supplement in the folk culinary preparation in many countries. In India, especially in the south India and in the North Eastern parts of India it is used as an appetite suppressant and to inhibit the absorption and synthesis of fat, cholesterol and triglycerides. In other words, it is a dietary aid. The common species are *G. gummigutta*, *G. tinctoria*, *G. indica*, *G. mangostana*, *G. subelliptica* in Western Ghats and *G. cowa* (Kuji thekara), *G. pedunculata* (Bor thekara) *G. lancifolia* (Rupohithekara) and *G. oxiphyllo* (Mahi thekara) in North Eastern Himalayan foot hills. Traditionally, *Garcinia* species have been used as anti inflammatory, anti immuno

suppressive, anti protozoal, and anti microbial agents. Various medicinal properties attributed to *Garcinia* are antioxidant, anti inflammatory, anticancerous, anti HIV agent and anti obesity.

### Leafy Spices

**Curry leaves:** Curry leaves have been studied for their antifungal activities. This leaf has been used as herbal medicine and has pharmaceutical activity which includes anti bacterial, anti fungal, anti diabetes and anti inflammatory effects.

**Parsley:** Apart from the culinary uses, parsley is known for its anticancer, antioxidant, diuretic and laxative properties. Photosensitizing toxic furocoumarines including psoralen, bergaptene and isoimperatorin have been found in parsley roots, which can induce dermatitis.

**Celery:** Celery has been used traditionally to treat many disorders. All parts of the plant are known to be a remedy for one or other maladies. The herb is used in treating rheumatism. Infusions from the seeds are used for rheumatoid arthritis and gout. Root tinctures have been used to cure urinary disorders, such as urinary stones, as a kidney stimulant and cleanser. Wild celery relieves indigestion. It promotes restfulness and sleep in hysteria patients and also used to lower blood pressure. The ripe seeds, herb and root are aperient, carminative, emmenagogue, galactogogue,

nervine, stimulant and tonic. The polyacetylenes present in celery have shown to be highly toxic towards fungi, bacteria, and mammalian cells, and to display neurotoxic, anti-inflammatory and anti-platelet aggregatory effects and to be responsible for allergic skin reactions. The effect of these polyacetylenes towards human cancer cells, their human bioavailability and their ability to reduce tumour formation in a mammalian *in vivo* model indicates that they may also provide benefits for health.

### Conclusion

Spices are important horticultural components with varied uses. Their demand is increasing in food and pharmaceutical preparations. North Eastern States has great scope to expand the spices cultivation. Adoption of improved varieties and production of quality planting materials of these crops for wider coverage is needed. Organic produce gets premium price in the market and effort has to be oriented towards harnessing the opportunity exists in NE States. Post harvest is another important area which needs special attention for minimizing wastage and extending the usage of these precise commodities. Intensive cultivation of those spices suitable for the NE region can be taken up, keeping in view the medicinal and nutraceutical properties of these spices.