Script

Spices and health benefits

Dear Students, in to-day's lecture, we will discuss about " spices **and health benefits.**

Introduction

India has been world famous for its spices since ancient days and its share has been 15 per cent in the world market. There was a great demand for these spices in the Middle East and European countries. These spices are mostly used for flavoring for cooked food and for preparing medicines and dyes etc. Main spices include pepper, chilies, turmeric, ginger, cardamom, coriander,clove,nut mug, areca nut etc. India is the largest producer of spices with annual output of 4.4 million tons (2005-06). Spices and herbs have been used for thousands of centuries by many cultures to enhance the flavor and aroma of foods. Early cultures also recognized the value of using spices and herbs in preserving foods and for their medicinal value.

This episode deals with:

1: Classification of spice according to their edible part

2: Most important spice commonly used

3: Spice oil and Oleoresins

4: Aroma compound

5: Conclusion:

Spice has a special place in the trade, it is economically important crop.
Many herbs and spices are potentially good agricultural products , are also light and easy to store and transport.

Table-1:Classification of spice according to their edible part

Common types of spices from their sources:

- Fennel mustard and are seeds
- Cinnamon and are barks
- Cloves are dried buds of flowers
- Turmeric, ginger and galingale are roots and rhizomes
- Mace is aril of nut mug fruit
- Saffron is the stigma of the flower
- Asafetida is the resin or dried sap of the tree

2:Most important spice commonly used

- Turmeric
- Coriander
- Cumin
- Mustard
- Curry leaves
- Tamarind
- Asafetida
- Black cardamom
- Red chili
- Ginger
- Cloves Nutmeg

I**:Turmeric**:

Family-,Zingiberaceae

Genus: *Curcuma*

Species: *Curmuma.longa*

Turmeric is an Indian spice, it is also called as Golden Spice of Life. In medieval Europe it is known as Indian saffron ,used for flavor, colour, and medicine as well as tradition rituals, like festivals and for god , ect. It is a principal element in curry powder used all over the world. Oldest grandmother medicine is turmeric power with milk , even today it is in practice ,it can be beneficial for various health problems. Turmeric offers many health benefits since it has both anti-inflammatory and anti-oxidant and properties.

Medicinal Uses:

The use of turmeric started during ancient Vedic period, dates back nearly 3000 years to the Indian culture. Various medicinal properties of turmeric have been reported in 'Ayurveda' – the ancient Indian Medicinal System. Some of its properties are listed below:

1. Blood purifier
2. Detoxifies the liver.
3. Immunity booster
4. Helps indigestion.
5. Controls cholesterol levels.
6. Fights allergies.
7. Reduces mucus formation.
8. Used as an anti-septic for wounds and external ulcers.
9. It is a strong anti-oxidant.
10. Prevents and cures various health problems such as urinary infections, gall stones and parasitic infections.
11. It is also said to be protective against different types of cancers.

The main ingredient in turmeric is 'curcumin' which gives a yellow color to the rhizome. It is a Highly potent antioxidant and the most bioactive component, the major medicinal effects of turmeric are due to 'curcumin', it is a resinous pigment.

2:Cumin:

Family: Apiaceae (Umbelliferae)

Genus: *Cuminum*

Species:*Cuminum.cyminum*

Cumin, known as ‘Jeera’ in India, it is annual herb grown in many parts of the world. Cumin belongs to the family, Apiaceae also known as the *Umbelliferae* family.

Used in rasam, curry powder, cakes, cheese and in condiments famous jeera bread .

Its main constituent and important aroma compound is cuminaldehyde (4-isopropylbenzaldehyde). Cumin has been used therapeutically used for thousands of years and it has healing as well as curative properties. Seeds are roasted for its aroma and robust flavor. Cuminaldehyde is a constituent of the essential oil of eucalyptus, cassia,cumin and others.

- Cumin seeds contain numerous phyto-chemicals that are known to have antioxidant, carminative and anti-flatulent properties. The seeds are an excellent source of dietary fiber.
- Its seeds contain certain health-benefiting essential oils ie, *cuminaldehyde* (4-isopropylbenzaldehyde),*pyrazines*, *2-methoxy-3-sec-butylpyrazine*, *2-ethoxy-3-isopropylpyrazine*, and *2-methoxy-3-methylpyrazine.*
- It improve gut motility and help in digestion by augmenting gastro-intestinal enzyme secretions.

3: Mustard : Brassica ,

Family Brassicaceae, mustard family.

Ginus:*Brassica*

Members of brassica include, cabbage,cauliflower,broccoli, Brussels sporous,canola oil. After being heated they ‘pop’ and release a rich flavor. They are used in south Indian cooking as part of the Tadka , mustard paste is used for flavor in Bengali fish preparations mustard is must in many types of pickle preparations.

Mustard seeds contain a hygroscopic integument containing lignin, cellulose, hemicellulose and mucilage, oil, sugars.100 g of mustard seeds provide 4.733 mg of **niacin** (vitamin B-3). Niacin is a part of nicotinamide co-enzymes that helps in lowering of blood cholesterol and triglyceride levels. It is a rich in oil and also high in calories ie 100g of seeds provide 508 calories, quality proteins, essential oils, omega 3 fatty acid,vitamins, minerals, and dietary fiber. Mustard seeds and its oil has traditionally been used to relieve muscle pain, rheumatism and arthritic pain and pickle preparation.

4:Curry leaves:

Family:Rutaceae

Genus: *Murraya*

Species*: M.koenigii*

Curry leaves come from a tree ,has amazing flavor, used as a spice to add fragrance and flavor to southern Indian dishes. It is a spicy ingredient and can be used dried or fresh and is grown throughout southern India. The curry tree is used not only for its leaves, but the bark and roots are known as a tonic and a stimulant. The main nutrients present in curry leaves are carbohydrates, energy, fiber, calcium, phosphorous, iron, magnesium, copper and minerals. It also contains various vitamins like nicotinic acid and vitamin C, vitamin A, vitamin B, vitamin E, antioxidants, plant sterols, amino acids, glycosides and flavonoids, zero fat is found in curry leaves.

Health benefits: Protects the Liver, skin care, digestation , curry leaves have the potential to reduce LDL cholesterol levels. **Fights against Cancer:** The chemical carbazole alkaloids constituents found in curry leaves such as phenols are helpful in fighting cancers such as leukemia, prostate cancer and colorectal cancers. **Anti-Diabetic Properties, Gastrointestinal Protection.** Some of the other chemical constituents present in curry leaves include carbazole alkaloids.

5:Tamarind :

Family: Fabaceae

Genus: *Tamarindus*

Species: *Tamarindus indica*

Tamarind (***Tamarindus indica***) is a leguminous tree , belongs to the family Fabaceae. The genus ***Tamarindus*** is a monotypic monotypic taxon, having only a single species, evergreen tree.

It is a tree that originates from Madagascar and the tamarind pulp is used in many culinary Indian creations. The tamarind kernel powder is extensively used too. It is used as a condiment in India and is widely cultivated, road side tamarind trees are seen in many rural areas, forest lands.

The tamarind fruits, used extensively in food and for cooking around the world, include traditional medicine and metal polish.The wood can be used for house constriction,the roof of the houses, windows, doors ect. Cultivation has spread around the world in tropical and subtropical zones, because of the simple growth and many uses. Contain ,tartaric acid , sugar,B vitamins, with sweet and sour taste.

1. Tamarind has multiple benefits as cathartic, febrifuge, antiseptic and refrigent.
2. Tamarind is used as an Ayurvedic medicine for gastric problem, digestion problems and cardio protective activity.
3. Tamarind can be used as a mild laxative. The pulp which comes from the pods of the tamarind tree is a gentle laxative that improves general sluggishness of the bowels. One to two tablespoons of the pulp in evening can improve bowel movements.
4. Tamarind is very useful to treat bilious disorders. Being acidic it excites the bile and other juices in the body.
5. Tamarind leaves are used in herbal tea for reducing malaria fever.
6. Tamarind lowers cholesterol level in the body and helps in promoting healthy heart.
7. Sore throat is treated when gargled with dilute tamarind pulp.
8. Decoction of tamarind leaves is useful in treating jaundice and ulcers.
9. Dilute tamarind decoction can help in destroying the stomach worms in children.
10. Tamarind protects from Vitamin C deficiency and also used as blood purifier
11. It heals the inflammation of the skin to great extent.
12. Tamarind seeds are used in preparations of eye drops that treat dry eye syndrome.
13. Being a good source of antioxidants, tamarind helps fight against cancer.
14. Juice extracted from tamarind flowers are used for treating piles

15. Tamarind juice is used as a cleaning agent of brass, copper and other metal.

6:**Asafoetida:**

Family:Apiaceae

Genus:*Ferula*

Species: *Fassa-foetida.*

Strangely known as ‘the devil;s dung and for its pungent odor. It is the dried latex or gum exuded from the living underground rhizome or tap root of several species of Ferula, a perennial herb which grows in India (although it originated in the Americas). It is prepared from the sap of a plant which is dried into a grayish resin.It is used as a condiment and flavoring agent in Indian food. It gives the unique flavor to Rasams and Sambars , flavoring Curries, Sauces and Pickles of southern India.

Medical applications: Asafoetida reduces the growth of indigenous microflora in the gut, reducing formation of gas in intestine or stomach. It has a broad range of uses in traditional medicine as an antimicrobial, uses for treating cold, stomach pain, whooping cough ect.

Asafoetida oleo-gum-resin has been reported to be antiepileptic in other form of medicins and the main form of treatment for people with epilepsy.

7:Black cardamom:

Family:Zingiberace

Genus: *Amomum*

Species: *Amomum subulatum*

Black cardamom known for its smoky, pungent aroma , have a strong camphor -like flavor, and is used in many Indian dishes. It is the dried ripe fruit , often referred to as the “queen of spices” because of its pleasant fragrance and taste and it is different from green cardamom.

8 :Red chili:

Family: Solanaceae

Genus: *Capsicum*

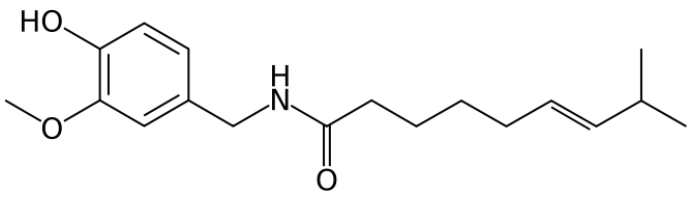
Species:

Chili is the dried ripe fruit of the genus Capsicum. It is believed to be native to South America, first introduced to the Indians from the Portuguese in the 15th-century. Today it is used in the famous Indian curry dishes as a main spice. The substances that give chili peppers their intensity when ingested or applied topically are capsaicin (8-methyl-*N*-vanillyl-6-nonenamide) and several related chemicals, collectively called capsaicinoids. Capsaicin extracted from chilies is used in pepper spray as an irritant, butless-lethal weapon. Red chili powder is known as the "king of all spices. India is the world's largest producer, consumer and exporter of chili peppers. Guntur in the south India state of Andhra Pradesh.

Medicinal

Capsaicin is considered a safe and effective analgesic agent in case of arthritis pain,herpeszoster -related pain, diabiatic neuropathy and headaches .Red chilies contain large amounts of vitamin-C and small amounts of carotene (provitamin A). Yellow and especially green chilies (which are essentially unripe fruit) contain a considerably lower amount of both substances. In addition, peppers are a good source of most B vitamins ,Vitamin $B_{6.}$ They are very high in potassium ,magnesium ,rich in vitamin –C as well as iron.

The substances that give chili peppers their intensity when ingested or applied topically are capsaicin (8-methyl-*N*-vanillyl-6-nonenamide) and also other few chemicals, it is collectively known as capsaicinoids. **Capsaicin** are chemically(**8-methyl-*N*-vanillyl-6-nonenamide**) ,it is a volatile, hydrophobic,colouless,waxy compound.



Capsaicin structure.

9:Ginger:

Family: Zingiberaceae

Genus: *Zingiber*

Species: *Z.officinale*

Ginger is part of the Zingiberaceae family. **Ginger has a long history , it is a commercial crop and it was used for relieving digestive problems such as nausea, loss of appetite, motion sickness and pain.**

The root or underground stem (rhizome) of the ginger plant can be consumed fresh, powdered, dried as a spice, in oil form or as juice ect in food or as such and as a floke medicine.

The phenolic compounds present in ginger are known to help relieve gastrointestinal irritation, stimulate saliva and bile production and suppress gastric contractions and helps movement of food and fluids through the GI tract.

Ginger provides a variety of vitamins and minerals:

- Carbohydrate - 17.77 g
- Dietary Fiber - 2 g
- Protein - 1.82 g
- Dietary Fiber - 2 g
- Sugars - 1.7 g
- Sodium - 13 mg
- Vitamin B6 - 0.16 mg
- **Calcium** - 16 mg

- Iron - 0.6 mg
- Vitamin C - 5 mg
- Potassium - 415 mg
- Magnesium - 43 mg
- Phosphorus - 34 mg
- Zinc - 0.34 mg
- Folate - 11 mcg
- Riboflavin - 0.034 mg
- Niacin - 0.75 mg
- Iron - 0.6 mg

Figures above are per 100g of ginger.

Ginger contains very potent anti-inflammatory compounds called *gingerols*. These substances are believed to reduce osteoarthritis or rheumatoid arthritis as well as improvements in their mobility when they consume ginger regularly. The pungent taste of ginger is due to nonvolatile phenylpropanoid-derived compounds, particularly gingerols .

Ginger is not only be warming on a cold day, but can help promote healthy sweating, which is often helpful during colds and fever and it is good detoxification process.Fresh ginger can be substituted for ground ginger at a ratio of six to one, although the flavors of fresh and dried ginger are somewhat different. Powdered dry ginger root is typically used as a flavoring for recipes such as famous ginger bread, cookies, crakers, cakes,ginger juice and ginger beer. Candied ginger, or crystallized ginger, is the root cooked in sugar until soft, and is a type of confectionery.

The characteristic odor and flavor of ginger is caused by a mixture of Zingerone, and gingerols, volatile oils that compose one to three percent of the weight of fresh ginger. In laboratory animals, the gingerols increase the movement of thegastrointestinal tract and have analgrsic, antipyretic, and antibacterial properties. Gingerols can inhibit growth of ovarine cancer cells.


10:Cloves:

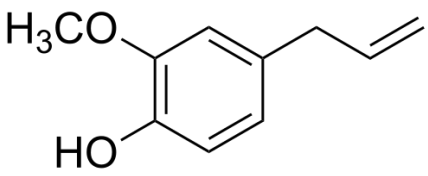
Family: Myeraceae

Genus: *Syzygium*

Species: *S.aromaticum*

Cloves are the aromatic flower buds ,tree is ever green and commonly used as spice in many countries since centuries.

Cloves: Cloves contain strong germicidal phenolic chemical, eugenol and also cloves have approximately 16-18% essential oil content which contains the antimicrobial compound eugenol. It exhibit strong inhibitory antimicrobial effects against food borne pathogens.



Eugenol, characteristic aroma of cloves

Health benefits:

- Cloves are anti-fungal, antibacterial, antiseptic and analgesic. They're packed with antioxidants and are good sources of minerals (especially manganese), omega-3 fatty acids, fiber and vitamins
- **Temporarily treat a toothache and it will reduce the pain by controlling the infection**
- Relieve upper respiratory infections, drink tea with few cloves to prevent cold and fever
- It is also used as cough expectorant
- **Reduce inflammation; it is used to treat arthritis and rheumatism in ayruvedic medicines.**
- It improve digestion, diarrhea, intestinal gas and stomachaches.

11:Nutmeg:

Family: Myristicaceae(Flowering plants)

Genus:*Myristica*

Species: *Myristica fragrans*

The most important commercial species is *Myristica fragrans*, it is ever green tree. Nutmeg is the seed, roughly egg-shaped dried, while mace is the dried and it is ues in powder form. Several other commercial products are also produced from the trees, mainly essential oils, oleoresins and nutmeg butter. This volatile compounds contains 60-80% d-camphene, as well as d-pinene, limonene, d-borneol, l-terpineol, geraniol, safrol, and myristicin. Nutmeg is used for flavouring many dishes, usually in ground or grated form and it is

used as a infants medicine in small quantities, also a traditional medicine for new born in India and other countries. It also used in small quantities in garam masala and essential oil from nutmeg is used widely in the perfumery and pharmaceutical industries. An ointment of nutmeg butter has been used as a counter-irritant and in treatment of rheumatism.

World production of nutmeg is estimated to average between 10,000 and 12,000 tonnes per year, with annual world demand estimated at 9,000 tonnes; production of mace is estimated at 1,500 to 2,000 tones.

11:Coriander:

Coriander:(seeds, powder, fresh leaves)
Family: Apiaceae
Genus: *Coriandrum*
Spiceies: *C.sativum*

Coriander is an annual herb, known in India as ‘Dhaniya’ is very essential spice used in both south and north Indian cooking.. The fresh coriander leaves are generally used as garnish on top of finished dishes, curry ,it rich in vitamin C . It has very delicate sweet aroma, it is tempted by everyone.

- The characteristic aromatic flavor of coriander seeds comes from their essential volatile oils and fatty acids. Some important fatty acids in the dried seeds include *petroselinic acid, linoleic acid (omega 6), oleic acid,* and*palmitic acid.* In addition, the seeds contain

essential oils such as *linalool (68%), a-pinene (10%), geraniol, camphene, terpine* etc. These active compounds are responsible for digestive, carminative, and anti-flatulent properties of the seeds.

Its seeds are an excellent source of minerals like **iron, copper, calcium, potassium, manganese, zinc** and **magnesium and other** many vital B-complex vitamins like thiamin, riboflavin, and niacin. The leaves of *Murraya koenigii* are also used in Ayurvedic medicine and it also possess anti-diabetic properties

Scientific researches have proved that the antibacterial properties of this plant and it improves oral health. As an infusion, this herbal remedy has been used for digestive problems, diarrhea and anorexia. Recent studies have shown that coriander can cause a mild euphoria. Due to its analgesic proprieties, coriander leaves may help in treating arthritis.

Dear students we will discuss some more spices , Aroma compound and Conclusion ,in the next class.