

CILANTRO: THE CORIANDER LEAVES



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Cilantro: An Introduction

Cilantro is a term used for the fresh stems and tender young leaves of the coriander plant. Scientific name of Coriander is *Coriandrum sativum*. It is an umbelliferous annual herbaceous plant belonging to the family Apiaceae (Umbelliferae). Cilantro is a plant of temperate climate; however it may be grown in tropical and subtropical climates as well. Cilantro is a short-lived herb.

Coriander Plants

Coriander plants are mainly grown for coriander seeds which is an important condiment used for various food preparations. Coriander seeds are also used for preparing coriander powder which is an essential ingredient of various curry powders. Common names of coriander greens are Coriander leaves, Cilantro, Chinese parsley, Cilantrillo, Culantro, Mexican parsley, and Yuen sai.

Origin

Coriander is believed to be a native to southern Europe and Mediterranean Regions which includes Asia.

Cilantro: Botanical Description

- **Plants:** Plants reach up to a height of one meter upon full growth. Stems are slender, erect, and branched with hollow stems.
- **Leaves:** Strong-scented pinnately compound leaves.
- **Flowers:** Small whitish or pinkish flowers are produced in compound umbels.
- **Fruits:** Fruit is globular and contains two seeds.
- **Roots:** Roots are slender and highly branched.

Nutrition and Health Benefits

Fresh cilantro foliage is rich in potassium, iron, Vitamin C, Vitamin K and Vitamin A. It is also rich in dietary fiber. 100 grams of cilantro foliage contains 2.8 grams of dietary fiber, 521 mg of Potassium, 27 mg of Vitamin C, 6748 IU (international unit) of Vitamin A, 2.5 mg of Vitamin E (alpha-tocopherol) and 310 $\hat{\text{A}}\mu\text{g}$ of Vitamin K (phylloquinone).

Significance of Dietary Fiber in Diet

Dietary fiber is good for human body. Cilantro leaves are rich source of dietary fiber. High fiber foods is good for weight loss as they take long time to get digested and also make you feel full for a long period of time. High fiber food aids in digestion, cures constipation, lowers blood cholesterol, cleanses the gastrointestinal tract and may reduce the risk of developing diabetes and colorectal cancer.

Significance of Potassium and Vitamin C in Diet

- Potassium is an essential mineral that plays an important role in lowering blood pressure.
- Vitamin C is also known as ascorbic acid. It is a powerful antioxidant vitamin. Vitamin C helps in absorption of iron and calcium. It increases body's natural immunity. Vitamin C deficiency results in a disease called scurvy. Major symptoms of scurvy are bleeding gum, joint pain, and hair loss.

Significance of Vitamin K and A in Diet

Vitamin K is essential for blood clotting, and for preventing heart diseases, cancer, and osteoporosis. Vitamin K deficiency results in bleeding gums and bleeding nose.

Vitamin A is also known as Retinol. It is essential for eye health. It also strengthens body's natural immune system. Vitamin A is also essential for tissue building, and skin health. Vitamin A Deficiency results in night blindness, and drying of skin and eyes.

Significance of Vitamin E in Diet

Vitamin E is essential for strengthening body's natural immune system and cardiovascular system. It is a powerful antioxidant vitamin and hence protects the body from heart diseases and cancer. Vitamin E deficiency results in weakening of muscular system and nervous system. Other deficiency symptoms include lack of coordination and balance.

Other Nutrients Present in Cilantro

In addition to this, fresh cilantro foliage contains iron 1.77mg per 100 grams of edible portion. Iron is essential for RBC (red blood cell) formation and transfer oxygen between the tissues and within the blood. Red colour of blood is due to the presence of iron in it. Iron is essential for increasing body immunity and also for the synthesis of neurotransmitters. Iron deficiency results in anaemic appearances, increase in heart rate and breathing, poor immune system, yellowing of the body and severe headaches. Dark green leafy vegetables and leguminous vegetables are good sources of iron.

Vitamin B: Thiamine

Thiamine is essential for proper functioning of muscular and nervous systems. It also facilitates fatty acid production in the body and is essential for energy production within the body. Its deficiency disorder is called Beriberi, major symptoms of which is improper functioning of muscular and nervous systems.

Vitamin B: Riboflavin

Riboflavin is essential for eye health, skin health, hair health and energy metabolism. It is a powerful antioxidant vitamin. It also helps in the activation of Vitamin B6 and Vitamin B4. Major deficiency symptoms include swelling and redness of mouth, lips, tongue and skin. Another deficiency is anaemia due the decreased RBC (red blood cell) count.

Vitamin B: Niacin

Niacin or Nicotinic acid is essential for skin health, proper functioning of nerves, and digestion. It also reduces blood cholesterol level and therefore risk of heart attack. Deficiency disorder is called Pellagra. Deficiency symptoms include rashes on the skin, dementia and diarrhea. The more severe case of the deficiency leads to death.

Vitamin B6: Pyridoxine

Vitamin B6 is also known as Pyridoxine. It is essential for fat metabolism and protein metabolism. It also helps in the production of RBCs and neurotransmitters. Vitamin B6 facilitates proper functioning of estrogen and testosterone hormones in the body. Deficiency symptoms include depression, improper functioning of immune system and sores in mouth.

Vitamin B: Folate

Folate is essential for energy production from food. It helps in synthesis of nucleic acids and proper functioning of immune system and blood production by facilitating functioning of iron and increasing production of RBCs. It also helps in controlling amino acid metabolism. Major deficiency symptoms include birth defects in new born babies, diarrhea, hearing loss due to ageing, improper functioning of immune system, weakness, fatigue and headaches. Regular consumption of folic acid helps in slowing down progression of hearing loss with ageing; to prevent birth related defects in new born babies; for protection from cancer, heart diseases, depression and degeneration of body due to ageing; and to prevent memory loss and osteoporosis.

Nutrient in Fresh Coriander Leaves

Nutrients	Unit	Value /100 g
Water	g	92.21
Energy	Kcal	23
Protein	g	2.13
Fat	g	0.52
Carbohydrate	g	3.67
Fiber, total dietary	g	2.8
Sugars, total	g	0.87
Calcium	Mg	67
Iron	Mg	1.77
Magnesium	Mg	26
Phosphorus	Mg	48
Potassium	Mg	521
Sodium	Mg	46
Zinc	Mg	0.5
Vitamin C	Mg	27
Thiamin	Mg	0.067
Riboflavin	g	0.162
Niacin	g	1.114
Vitamin B-6	g	0.149
Folate	µg	62
Vitamin A	IU	6748
Vitamin E	Mg	2.5
Vitamin K	µg	310
Fatty acids, total saturated	g	0.014
Fatty acids, total monounsaturated	g	0.275
Fatty acids, total polyunsaturated	g	0.04

Nutrient in Dried Coriander Leaves

Nutrients	Unit	Value /100 g
Water	g	7.3
Energy	Kcal	279
Protein	g	21.93
Fat	g	4.78
Carbohydrate	g	52.1
Fiber, total dietary	g	10.4
Sugars, total	g	7.27
Calcium	Mg	1246
Iron	Mg	42.46
Magnesium	Mg	694
Phosphorus	Mg	481
Potassium	Mg	4466
Sodium	Mg	211
Zinc	Mg	4.72
Vitamin C	Mg	566.7
Thiamin	Mg	1.252
Riboflavin	g	1.5
Niacin	g	10.707
Vitamin B-6	g	0.61
Folate	µg	274
Vitamin A	IU	5850
Vitamin E	Mg	1.03
Vitamin K	µg	1359.5
Fatty acids, total saturated	g	0.115
Fatty acids, total monounsaturated	g	2.232
Fatty acids, total polyunsaturated	g	0.328

Growing Practices for Cilantro: Open-Field Growing of Cilantro

Sunlight: Coriander/cilantro plants prefer full sun for its healthy growth. It is a plant of temperate climate. Hence ideal growing conditions are cool climate with full sunlight. Cilantro plants do not prefer hot climate as plants go into bolting quickly in hot climates which will adversely affect the harvest of fresh cilantro foliage. Bolting of plants is good if plants are grown for seeds. Fresh foliage of bolted plants is not suitable for edible purposes as they taste bitter.

Temperature: Optimum temperature requirement of coriander is 7 to 27 degrees centigrade.

Rainfall: Coriander grows well with an annual precipitation of 300 to 2600 mm.

Soil: It grows best in well-drained deep fertile loamy soils. The plant is drought tolerant. Ideal soil pH is 5 to 8.

Site Preparation: Prepare the site by ploughing, tilling and leveling. Incorporate organic manures such as compost or farm yard manure or rotten leaves into the top soil to enrich soil fertility. Later, at the time of planting, pits are prepared to sow the seeds.

Varieties: 'Costa Rica', 'Leisure', and 'Long Standing

Propagation: Coriander plant is propagated via seeds

Planting Time: Seeds are sown either early in spring or late in fall. Seeds require plenty of moisture to germinate. Hence watering is required soon after sowing.

Seeds germinate within a week. Normally two or three seeds are sown in each pit.

Seed germination rate may be enhanced by soaking the seeds in water overnight or for a day before sowing.

Spacing: Seeds are planted in rows 3 feet apart at the rate of 12 to 15 to the foot.

Sowing Depth: Seeds are sown at a depth of about half an inch.

Thinning: After seeds are germinated, and seedlings are established in the soil or when seedlings are 2 to 3 inches tall, thinning may be practiced in overcrowded areas. Generally one plant per pit is kept for facilitating growth of the plants. While thinning is done, the healthiest plant is allowed to grow on the site.

Fertilizer and Manure Application: Coriander does not require heavy manuring and fertilizer application. Application of organic fertilizers such as compost and farm yard manure at the time of field preparation is considered sufficient.

Disease: Fungal wilt and mildew are two fungal diseases that are found affecting the cilantro plant. Field sanitation helps control these diseases.

Pest: Leaf hoppers and aphids are found attacking the cilantro plants in certain regions. In order to control these pests, use of insecticidal soaps is recommended.

Weed: Manual weed control is recommended for small gardens. Spreading a biomulch (such as mulch of dried leaves) at the base of the plants minimize weed growth.

Irrigation: Plants are watered as and when required. Established cilantro plants do not require regular watering. However, care is taken to ensure that soil is moist (not soggy) always. Yield of foliage is more if plants are irrigated regularly.

Aftercare: Coriander is easy to grow and no special care is necessary once plants are established in the soil.

Harvesting: Cilantro foliage may be harvested almost one month after planting. Harvesting is done by using sharp, clean shears or scissors. Multiple harvests are possible. During harvesting top one third portion of the plant is harvested and rest is left on the plant to grow into new leaves. Harvesting may be done at weekly intervals. Weekly harvests will also delay bolting (flowering and fruit setting) of the plant. Therefore three to four harvest cycles per plant is possible. Once harvest cycles are over, the plant soon start flowering. It is up to the grower to decide that the plants need to be left at the site for flowering and seeding. Foliage of bolted plants taste bitter and hence is not recommended for culinary uses. In tropical hot climates, once vegetative growth of the plant is over, plants go into bolting easily; that is flowering and subsequent fruit setting happens. Seeds are harvested once they mature. Coriander seeds are an important condiment of commercial significance.

Harvesting Stage and Quality: Cilantro foliage is harvested as developing stems and tender leaves and quality is mainly determined by its visual appearance. Visual characteristics such as freshness, uniformity of size, form and color, and lack of defects (damaged or yellowed leaves, decay, insect damage, wilting) and characteristic aroma are used to determine the quality of the produce.

Storage: Cilantro leaves may be preserved by freezing or drying. In order to freeze them, put the leaves in a freezer bag and store in the freezer. In order to dry them, spread the leaves in a warm place and dry them. Dried leaves are stored in an air tight container.

Desirable Post Harvest Management Practices

- *Optimum temperature for storage:* For cilantro, storage at 0°C (32°F) is required to optimize quality and storage life.
- *Optimum relative humidity:* >95%
- *Shelf life at optimum temperature and humidity:* 3 weeks (21 days) at 0°C (32°F). However, according to UC Davis, fresh culinary quality, which is based on the presence of essential oils and aroma in the cilantro foliage, declines after 10 days of storage.
- *Storage and Packaging:* Cilantro foliage may be cooled by hydro cooling before packaging or room cooling after packaging. Cilantro foliage may be iced for prolonging shelf life.
- *Controlled Atmosphere (CA) storage:* Low O₂ (1-5%) and High CO₂ (5-15%) atmospheres at moderate temperatures 5-10°C (41-50°F) maintain green color and reduce decay in cilantro (source: UV Davis)

Container Gardening of Cilantro

Container gardening of cilantro plants is most suitable for urban homes, a majority of whom live in apartments. Most commonly used containers are cement pots, earthen pots and pans, wooden barrels, boxes and crates, plastic jars, cans and buckets, tin boxes and drums.

Choosing an Ideal Container

While selecting containers, following factors should be considered:

- *Adequate drainage:* Containers should have at least one hole of an adequate size at the bottom as in earthen pots, to drain out excess water
- Containers can easily be placed on the terrace, window sills, window boxes, balcony and verandah where direct sunlight is available for the plant. Remember, cilantro needs direct sunlight for healthy growth
- Containers can hold sufficient volume of growing medium
- Containers should be lightweight and easy to handle
- Containers should be durable and free of toxic substances
- Containers should prevent root circling

- Cilantro, the Coriander Greens
- Containers should facilitate easy repotting which needs to be done on yearly basis or as and when plant roots grow out of its container
- In case of cilantro, the grower may opt for a container which is at least 18 inches wide and 8 to 10 inches deep. The point is to choose a container that can contain the full grown cilantro plant.

Preparing an Ideal Growing Medium: An ideal growing medium for container-grown plants may be prepared by mixing equal quantities of good soil (preferably sterilized) + river sand + well-decomposed organic manure (vermicompost or compost or farmyard manure) + a nitrogenous fertilizer (e.g.: urea). While preparing the growing medium, focus is given whether the growing medium is strong enough to hold cuttings or seedlings firmly; free of insect-pests and disease-causing pathogens; and has good water-holding capacity, aeration and drainage. After growing plants for a season, the growing medium needs to be replenished with additional plant nutrients. This may be done along with repotting.

Sowing or Planting Process: After choosing the right container and filling with an appropriate growing medium, now it's time for sowing seeds. Growing medium is watered lightly and a handful of seeds are directly sown into the container by dispersing the seeds evenly on the top of the growing medium. After sowing, seeds are covered with another layer of growing medium. After that, the container is placed on a spot where direct sunlight is available as seeds need full sunlight to germinate. Seeds germinate within a week. Water the container daily by spraying water using a spray bottle. Never pour water into the growing medium while seeds are still germinating as this practice may adversely affect seed germination.

Care of Container-grown Cilantro Plants

- Container-grown plants require more care and attention than garden-growing (open field-growing) plants.
- It is essential to water frequently depending on the season, and size of the plant and container.
- Plants need extra water in dry summer season, so watering should be done twice a day (morning and evening).
- Too much watering can be as harmful in winter as too little in summer.
- Since cilantro is a dry-climate (temperate climate) herb, focus is to keep the soil moist always but not soggy.

- Water-logging must be avoided by all means.
- During extreme climate such severe winters, scorching summers and rainy season, plants need to be moved inside into a protected area.
- Topdressing or foliar application of plants with nitrogenous fertilizers in small quantities improves plant growth and yield.
- In top dressing, 5 to 10 grams of urea may be applied in moist soil once a week or once in 10 days, starting from 3 weeks after sowing seeds or 2 weeks after transplanting seedlings.
- High doses of fertilizers are very harmful as it kills the plants due to fertilizer burning.
- If urea is applied in dry soil, the plants must be watered immediately.
- Generally, organic manures and biofertilizers are recommended for container-grown plants.
- Pruning may be necessary to induce growth and to remove undesirable growth and damaged or dead stems.
- Pinching of terminal buds may be practiced to promote bushy growth.
- Drying out of roots is a problem in winter.
- Covering the base of the plants with white polyethylene sheet or winter blanket may prevent this problem up to some extent.

Harvesting Cilantro Foliage: Cilantro foliage is ready to be harvested when the plant reaches up to 4 to 6 inches tall. Harvesting is done by sharp knife or scissors. Top one-third portion of the plant is removed while harvesting as it encourages further vegetative growth. Multiple harvests are possible at weekly intervals. Up to four harvests may be done from a single plant



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Growing Practices and
Nutritional Information

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