



PRAMUKH SWAMI SCIENCE & H.D.PATEL ARTS COLLEGE ,KADI

## B.SC. 4- (BOTANY,MINOR) FENNEL

### Fennel



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# FENNEL



# Fennel



## FENNEL

**BOTANICAL NAME :** *Foeniculum vulgare*

**FAMILY :** Apiaceae

- ❖ It is a highly aromatic and flavourful herb with culinary and medicinal uses
- ❖ Fennel is a hardy, perennial herb with yellow flowers and feathery leaves





## Biological classification

Kingdom	Plantae	
Subkingdom	Tracheobionta	Vascular plants
Super division	Spermatophyta	Seed plants
Division	Magnoliophyta	Flowering plants
Class	Magnoliopsida	Dicotyledons
Order	Apiales	
Family	Apiaceae	Carrot family
Genus	Foeniculum	
Species	Foeniculum vulgare	



## Introduction:

- ❖ Perennial Herb
- ❖ Aromatic Herb
- ❖ Branched
- ❖ Flavorable
- ❖ Long day plant



## Botanical Description:

### Roots:

- Tap root
- spindle-like
- The basic part is tuber ( bulb-like thickened)



## Botanical Description

### Stem:

- Erect
- Hollow
- cylindrical
- green



## Botanical Description:

### Flowers:

- Small
- Yellow
- Umbel topped
- Fruit is 4-5 mm long, 1-2 mm wide



## Botanical Description:

### Seeds:

- Have three to five lines in length
- Elliptical
- Slightly curved
- Obtuse at the ends
- Greenish-yellow





## Production Technology:

### Climate:

- Fennel required cool and dry climate. Dry and cool climate during seed set results in better yield.
- 15-20c° is best for germination

### Soil:

- Well Drained
- Loamy and rich in organic matter soils are best for high yield.
- Shallow sandy soil are not suitable
- pH should 5.5-7.0

## Sowing Method:

### Direct Sowing :

- Direct sowing is done through drill
- 15-20 cm P-P
- 56-60 cm R-R





## Seed rate

Seed rate required for direct sowing is 10-12 kg/ha.

## Fertilizer

Nitrogen: 90kg /ha

Phosphorus: 40kg/ha





## Irrigation

- First irrigation is done soon after seed sowing
- One or two light irrigations are required until seed germination.
- Afterwards, the crop is irrigated at an interval of 15-25 days
- Water stress must be avoided during flowering and seed formation
- Over irrigation cause lodging problem



istockphoto.com



## Weed control

- First hoeing and weeding is recommended at 30 days after sowing.
- Both mechanical and chemical control of weeds can be practiced.
- If herbicides are used for weed control, Pendimethalin is most effective.





## Varieties:

➤ RF 101

➤ RF 129

➤ RF 35

➤ Gujarat Fennel 1

➤ CO 1

## COMMERCIAL VARIETIES

- **RF 101** : Tall, erect with stout stem; long, bold grains; matures in 150-160 days; average yield is 15.5 q/ha
- **RF 125** : Short plants with compact umbels; long, bold grains; matures in 110-130 days; yield is 17.3 q/ha of seed
- **RF 35** : Tall, spreading plants with medium-sized, hairless and green seeds; tolerant to sugary disease, leaf-spot and leaf-blight; matures in 225 days; average yield of 12.8 q/ha.
- **Gujarat Fennel 1** : Tall and bushy plants with oblong, medium-bold and dark green seeds; tolerant to sugary disease and leaf-spot; matures in 225 days; average yield is 16.5 q/ha; suitable for early-sowing; tolerant to drought.
- **Co 1** : Medium tall plants with diffused branching; matures in 220 days with an average yield of 5.67q/ha; suitable for drought-prone, waterlogged, saline and alkaline conditions; suitable for hilly areas.

## TOP COUNTRIES

Country	Production (Tonnes per year)
<a href="#">India</a>	110,000
<a href="#">Mexico</a>	49,688
<a href="#">China</a>	40,000
<a href="#">Iran</a>	30,000

Pakistan even not come into top-41 producing countries

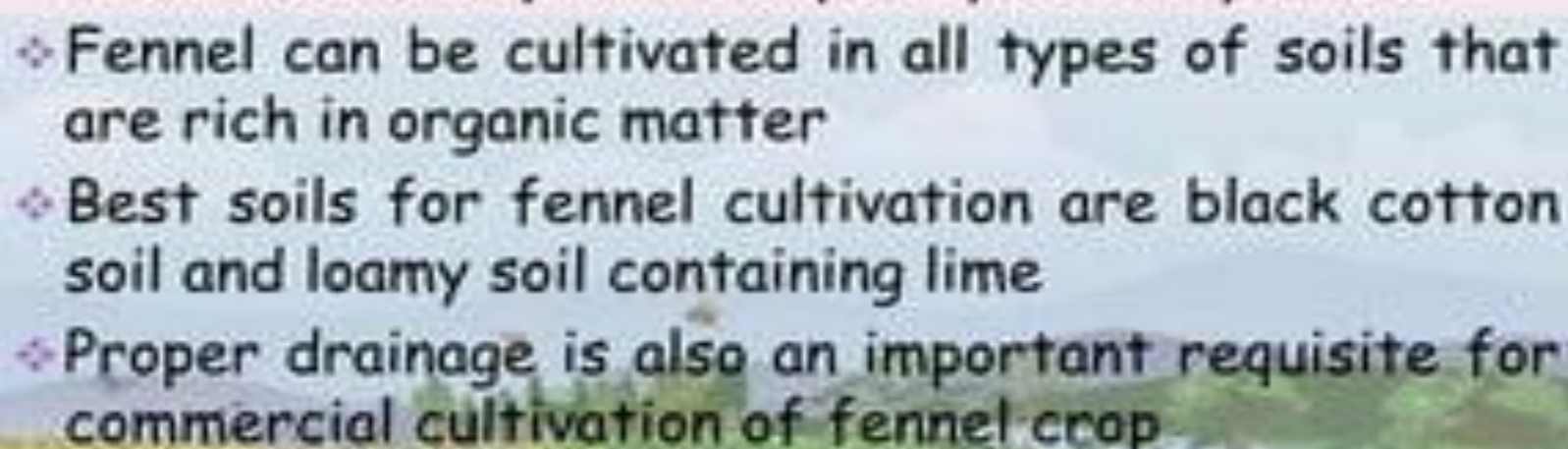


## ORIGIN AND DISTRIBUTION

- ❖ It is indigenous to the shores of the Mediterranean but has become widely naturalized in many parts of the world, especially on dry soils near the sea-coast and on riverbanks
- ❖ India is top producer of fennel seeds in the world
- ❖ Fennel is known in various names in different parts of the country. In Hindi, fennel is known as 'saunf'
- ❖ Major production centers of fennel in India are Rajasthan, Andhra Pradesh, Punjab, Madhya Pradesh, Uttar Pradesh, Gujarat, Karnataka, and Haryana



## SOIL AND CLIMATE REQUIREMENTS

- ❖ Cool and dry climate is best for the cultivation of fennel crop
  - ❖ Dry and cool weather during the seed set increases seed yield and quality of the produce
  - ❖ Fennel can be cultivated in all types of soils that are rich in organic matter
  - ❖ Best soils for fennel cultivation are black cotton soil and loamy soil containing lime
  - ❖ Proper drainage is also an important requisite for commercial cultivation of fennel crop
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## CULTIVATION PRACTICES

- ❖ Fennel seeds can be directly sown in the main field or seedlings can be raised in nursery beds and later transplanted in the main field

### DIRECT SOWING

Sowing time : Mid-September to mid-October

Seed rate : 10-12 kg/ha (Direct sowing)

Spacing : 45-60cm (row-row)

### TRANSPLANTING

Seedlings are raised during June or July on well-prepared nursery beds. Afterwards, 7-8 weeks old seedlings are transplanted in the field in August

**HARVESTING** : Fennel matures in 170-180 days. Harvesting is done by plucking the umbels when seeds are fully developed and mature but still green. Harvesting duration lasts for a month with plucking being done 2/3 at 10 days intervals.

**YIELD** : On an average, fennel yields 9-10q/ha





## Harvesting

- Fennel matures in 170-180 days;
- Harvesting is done by plucking the umbels when seeds are fully developed and mature but still green.
- Harvesting duration lasts for a month with plucking being done twice or thrice at 10 days intervals.



Fennel seeds ready to harvest

## POST HARVEST MANAGEMENT

### ❖ **Drying of Fennel Seeds**

Harvested umbels are dried in sun for 1-2 days and then in shade for 8-10 days. Care must be taken not to sun-dry the umbels too long as long exposure of seeds to the sun reduces the quality of the produce.

### ❖ **Cleaning and Grading**

After drying, fennel seeds are cleaned with the help of vacuum gravity separator or spiral gravity separator. Cleaned seeds are then graded based on its quality and then packed in jute bags for marketing.

### ❖ **Storage**

Dried and clean seeds are stored in jute bags in damp-free aerated store

## Nutritional breakdown of fennel






Carbohydrate	52g
Calories	73
Calcium ca	1196.00 mg
Potassium	1694.00 mg
Niacin	6.05 mg
Iron	18.54 mg
Magnesium	384 mg
Vitamin A	4.5%
Dietary Fibers	40 g
Cholesterol	0



[squarespace.com](http://squarespace.com)



## HEALTH BENEFITS OF FENNEL

	Reduces symptoms of non-ulcer dyspepsia & flatulence	Acts as laxative & relieves from constipation	
	Useful in treating respiratory disorders	Facilitates digestion & cures diarrhea	
	Maintains healthy levels of cholesterol	Eliminates bad breath	
	Reduces high blood pressure	Reduces risk of breast & liver cancer	
	Protects eyes from premature aging & macular degeneration	Strengthens the immune system & treats anemia	
	Increases brain function	Useful in treatment of Renal Colic	

## OTHER BENEFITS AND USES

- ❖ Fennel water is commonly given to infants as medicine
- ❖ The root of fennel plants may be used as a purgative
- ❖ Fennel seeds are used as stimulant and as a carminative
- ❖ Fennel seeds alone or in combination with sugar are used as a mouth freshener in India.



## USES OF FENNEL OIL

Essential oil extracted from fennel seeds is used for manufacturing cordials and as a fragrant agent in toiletries such as soaps and shampoos. Fennel oil is extensively used as a flavoring agent in baking and confectionary industries.



## Importance:

- Essential oil extracted from fennel seeds is used as a fragrant agent in toiletries such as soaps and shampoos.
- Fennel oil is extensively used as a flavoring agent in baking and confectionary industries.





## Medicinal Importance:

### 1. Helps Regulate Blood Pressure:

- Increased the nitrite content in saliva
- Source of potassium, which helps to control the BP

### 2. Reduce Water Retention:

- Helps to flush out excessive fluids as it works as a diuretic



[food.ndtv.com](http://food.ndtv.com)

### 3.Heart health

significant amounts of fiber. Fiber decreases the risk of heart disease as it helps reduce the total amount of cholesterol in the blood.

### 4.Fennel Seeds Reduce Asthma Symptoms :

Fennel seeds and their phytonutrients help clear sinuses.



## 5.Helps Purify Blood:

The essential oils and fiber in these seeds are considered very useful to flush out toxins and sludge from our bodies, thus helping to cleanse the blood.

## 6.Improves Eyesight:

Fennel seeds contain Vitamin A, which is important for eyesight.



[caxshoney.com](http://caxshoney.com)

## CHEMICAL CONSTITUENTS

The major constituent of fennel oil is **anethole** (80%)

It contains not more than 10% estragole and not more than 7.5% fenchone

Other constituents include alpha pinene, beta myrcene, beta pinene, bitter fenchone, camphene, estragole (methyl-chavicol), fenchone, limonene, p-cymen, and safrole.

Furthermore, sweet fennel contains other nonvolatile constituents such as flavonoids and coumarins

## Summary:

- Perennial, aromatic herb
- India is top producer of fennel
- Reduce Asthma Symptoms, improve heart health, regulate BP
- Feathery & aromatic leaves, umbels flowers, elliptical seeds
- Dry & cool climate crop grows fine on well drained & loamy soils
- Sown through both direct and transplanting method
- Proper irrigation, weed & pest management is required
- Fully developed and mature but still green seeds are harvested



THANK YOU

