

FENNEL

Botanical name of fennel is *Foeniculum vulgare*. It is a stout and aromatic spice crop which is commercially cultivated as an annual herb. In Hindi, fennel is known as 'saunf' and in Tamil it is known as 'perungeerakam'. Major production centers of fennel in India are Rajasthan, Andhra Pradesh, Punjab, Madhya Pradesh, Uttar Pradesh, Gujarat, Karnataka, and Haryana.

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 flavouring agent in baking and confectionary industries. 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 is extensively used in cure of colic pains also. Fennel seeds alone or in combination with sugar are used as a mouth freshener in India.

Climatic

Cool and dry climate is best for the cultivation of fennel crop. Dry and cool weather during the seed set increases seed yield as well as the quality of the produce.

Soil

Fennel can be cultivated in all types of soils that are rich in organic matter. Shallow sandy soils are not suited for fennel cultivation. 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.

Commercial Varieties

RF 101

Tall, erect and with stout stem; long, and 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.

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.

Sowing

Ideal sowing time for fennel is Mid-September to mid-October. Delay in sowing reduces the yield. Seed rate required for direct sowing is 10–12 kg/ha. Sowing should be done deep in rows with spacing of 45–60cm apart. The field is irrigated after sowing.

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.

Fertilization Schedule

At the time of field preparation FYM (farmyard manure) is added @ 10–15 tons/ha. Afterwards, apply 90kg N/ha in three equal splits– first as basal dose along with 40kg/ha P₂O₅, second and third applications at 30 and 60 days after sowing.

Weed control

Weed infestation is a serious problem in commercial cultivation of fennel crop. 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. Pre-emergence application of Pendimethalin @ 1.0kg/ ha supplemented with one hand-weeding 50 days after sowing controls weeds effectively.

Irrigation

First irrigation is done soon after seed sowing and thereafter 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 as water stress during this phase may adversely affect the seed formation and grain yield.

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.

Yield

On an average, fennel yields 9–10q/ha.

PESTS

Aphids:

Spray 1.6 ml Monocrotophos or 2 ml Dimethoate per liter of water.

Caterpillars (*Helicoverpa sp.* and *Spodoptera sp.*)

Spray 1.6 ml Monocrotophos or 2 ml Quinolphos or 2.5 ml of Chloripyriphos in one liter of water twice in 10-15 days interval.

DISEASES

Damping off

Drenching with Copper oxy chloride @ 3g/lt of water.

Powdery mildew

Spray 3 gm Wettable sulphur or Kerathane 1 ml or 1 gm Carbendazim per liter.

Blight :

Spray Mancozeb @ 2.5 g/l.

CUMIN

Cuminum cyminum.

In India, it is known as 'Jeera' or 'Zeera' in Hindi. It is an important spice used in Indian kitchens for flavoring various food preparations. The flavor of cumin seeds is due to the presence of a volatile oil. In indigenous varieties of cumin, this volatile oil is present up to 2.5–3.5%. Cumin seeds are extensively used in various ayurvedic medicines also especially for the conditions like obesity, stomach pain and dyspepsia. Nutritional value of cumin seeds is as follows: 17.7% protein, 23.8% fat, 35.5% carbohydrate and 7.7% minerals. In India, cumin is mainly cultivated in western Indian states like Rajasthan and Gujarat.

Climatic Requirements

Moderate sub-tropical climate is ideal for cumin cultivation. Moderately cool and dry climate is best. Cumin crop does not stand high humidity and heavy rainfalls.

Soil Requirements

Well-drained, loamy soils that are rich in organic matter are best for cumin cultivation. For commercial cultivation of cumin, a field in which cumin crop has not been taken up at least during last 3 years should be selected.

Commercial Varieties

RZ 19

A tall variety of cumin with erect stems, pink flowers and bold pubescent grains; tolerant to wilt as well as blight; matures in 120–140 days with an average yield of 5.6 q/ha.

RZ 209

An erect-growing variety of cumin with pink flowers and bold, grey, pubescent grains, resistant to wilt and blight diseases; matures in 140–150 days with an average yield of 6.5 q/ha.

Fertilizer Schedule

10–15 tons of farmyard manure/ha is added at the time of land preparation. Afterwards, a dose of 20kg P₂O₅/ha should be applied at the time of sowing, 30 kg N/ha may be applied as top P₂O₅ dressing either in single dose 30 days after sowing or in 2 equal splits.

Weed control

Weed is a severe problem in cumin cultivation. Weeding at 30 and 60 days after sowing is necessary. Thinning should also be done during first hoeing and weeding to remove the excess plants. Chemical weed control by the application of herbicides may also be practiced. Application of pre-emergent Terbutryn or Oxadiazone @ 0.5–1.0kg/ha or pre-plant Fluchloralin or pre-emergent Penimethalin @ 1.0kg/ha is very effective.

Irrigation

A light irrigation is done soon after sowing and thereafter second irrigation should be applied 8–10 days after first irrigation. Depending upon the soil type and climatic conditions the subsequent irrigations may be given at 15–25 intervals. Last heavy irrigation must be given at the time of seed formation. Avoid irrigation at the time of active seed filling because it increases the incidence of powdery mildew, blight and aphid infestation.

Harvesting

Field is cleaned and wilt affected plants are uprooted before harvesting. Harvesting is done by cutting the plants with sickle. The plants are stacked on clean threshing floor for sun-drying. After drying, seeds are separated by light beating with sticks by winnowing.

Yield

An average yield of 5 q/ha is obtained under proper management. Improved varieties may yield up to 7 – 8 Q/ha.

Coriander

Coriander (*Coriandrum sativum L.*) is an annual herb, mainly cultivated for its fruits as well as for the tender green leaves. It is native of the Mediterranean region. In India, it is grown in Andhra Pradesh, Tamil Nadu, Karnataka, Rajasthan and Madhya Pradesh. Major portion is though consumed locally; a small quantity is being exported now. The fruits have a fragrant odour and pleasant aromatic taste. The odour and taste are due to the essential oil content, which varies from 0.1 to 1.0 % in the dry seeds. These essential oils are used for flavouring liquors, coca preparations in confectionary and also to mask the offensive odours in pharmaceutical preparations.

The dried ground fruits are the major ingredients of the curry powder. The whole fruits are also used to flavour foods like pickles, sauces and confectionary. The young plants as well as the leaves are used in the preparation of chutney and are also used as seasonings in curries, soups, sauces and chutneys. It has medicinal properties too. Fruits are said to have carminative, diuretic, tonic, stomachic and aphrodisiac properties.

Coriander belongs to the family Apiaceae. It is a smooth, erect annual herb 30 to 70 cm high, lower leaves broad with crenately lobed margins, upper leaves finely cut with lineary lobes, flowers small, white or pink in compound terminal umbels, fruits – schizocarp, globular, yellow-brown, ribbed, 2 seeds, ripe seeds are aromatic

Climate and Soil

It is a tropical crop and can be grown throughout the year (except very hot season i.e. March-May) for leaf purpose, but for higher grain yield it has to be grown in specific season. A dry and cold weather free from frost especially during flowering and fruit setting stage favours good grain production. Cloudy weather during flowering and fruiting stage favours pest and disease incidences. Heavy rain affects the crop. As an irrigated crop, it can be cultivated on almost all types of soils provided sufficient organic matter is applied. Black cotton soils with high retentivity of moisture is best under rainfed conditions. For raising a rainfed crop, the land is ploughed 3 to 4 times following rains and field must be planted immediately to break the clods and to avoid soil moisture. For irrigated crop the land is ploughed twice or thrice and beds and channels are formed.

Sowing

In the North and Central parts of India and Andhra Pradesh, it is mostly grown as a Rabi season crop and hence sowing is done between middle of October and middle of November. In certain pockets of the above area, late kharif crop is sometimes sown in August-September. In Tamil Nadu, as an irrigated crop, coriander is raised in June-July and September-October. A seed rate of 10 to 15 kg per hectare is required. Seeds stored for 15 to 30 days record better and early germination than freshly harvested seeds. Seeds soaked in water for 12 to 24 hours before sowing also enhances better germination. The seeds are split into two halves by rubbing and generally done in rows spaced at 30 to 40 cm apart with 15 cm between hills. Soil depth should not exceed 3.0 cm. Three to five seeds are sown in seeds are broadcast and covered with country plough. Germination takes place in 10 to 15 days.

Manures and fertilizers: 10 tonnes of FYM is applied at the time of preparation. 30 kg of nitrogen, 30 kg P2O5 AND 20 Kg of MOP is recommended.

Irrigation

First irrigation is given 3 days after sowing and thereafter at 10 to 15 days interval depending upon the soil moisture available in the soil.

Interculturing

The first hoeing and weeding are given in about 30 days. Thinning the plants is also attended simultaneously, leaving only two plants per hill. Depending upon the growth one or two more weeding are done.

Harvesting and yield

The crop will be ready for harvest in about 90 to 110 days depending upon the varieties and growing season. Harvesting has to be done when the fruits are fully ripe and start changing from green to brown colour. Delaying of the harvest should be avoided lest shattering during harvest and splitting of the fruits in subsequent processing operations. The plants are cut or pulled and poled into small stacks in the field to beating with sticks or rubbing with hands. The produce is winnowed, cleaned and dried in partial shade. After drying, the produce is stored in gunny bags lined with paper. The rainfed crop yields on an average 400 to 500 kg/ha and the irrigated crop 600 to 1200kg/ha.

Plant protection

At the seedling stage coriander is often attacked by the leaf eating caterpillars and semi-loopers and at the flowering stage by the aphids. Spraying the crop with methyl demeton (0.05%) is recommended to control the aphids but a flowering stage

Powdery mildew (*Erysiphe polygoni*) is a serious disease, which ruin the crop if allowed unchecked in the initial stage itself. Spraying wettable sulphur 0.25% or 0.2% solution of Karathane twice at 10 to 15 days interval is recommended.