

Lecture 2: Cultivation and Production of the most important Medicinal and Aromatic Plants

Black seeds *Nigella sativa*

Plant Description

Black seeds, *Nigella sativa*, it is an annual flowering plant in the family *Ranunculaceae* native to eastern Europe and western Asia.

It develops taproot after seedling. It has a stiff, erect, branching stem that grow from 20 to 30cm sometimes to 60 cm in height. The stems bear fine, deeply divided greyish-green leaves.

The flowers are delicate, and usually colored pale blue to greyish-blue and white, with five to ten petals, numerous stamens, and five or six elongated fused carpels.

The fruit is a large and inflated capsule composed of three to seven united follicles, each containing numerous slightly compressed seeds. The seeds are tear dropped shaped (triangular or pyramidal), stony, hard, bright black color.

Cultivation of Black Seeds:

Black seeds need soaked clean water (room temperature, 20-26 C) for 2 hours in order to break the seed dormancy period, then immediately seeded in a shade. They prefer mixture of soil, sand and compost or manure in a ratio of 1: 1: 1.

When the seeds begin to germinate, transfer to a bright place. Seed shoots out 9 - 14 days and first harvest starts 60 - 94 (Day after Planting).

Watering Black seed plants should be done carefully so that the plants are not damaged, both leaves and stems. The application of fertilizer is done with the dosage



and method of using fertilizer which is adjusted with the instructions on the package of each fertilizer.

If the plants grow imperfectly or damaged or die, then immediately replanting seeds is done.

Harvesting and Storage of Black Seeds:

Black seeds harvesting can be done in 60 – 94 days after planting and it should be by late summer. Once the seeds are completely dry, store them all in airtight containers or bags. Seeds can be stored throughout the entire year.

Uses of Black Seeds:

1. Ornamental Use:

Black seed plants are sometimes grown as an ornamental for its attractive flowers, dried and used in flower arrangements and bouquets. It can add a nice scent as well as a pop of color and accent to the bouquet.

2. Culinary Use:

Nigella seeds are widely used as a spice and condiment in Indian and Middle Eastern cuisine. They can be dry-roasted and used to give a smokey, nutty flavor to curries, vegetables, and beans.

3. Medicinal Use:

The main importance of black seeds is its medicinal uses. It is a traditional medicine in many places and is an esteemed herbal remedy for a wide variety of sicknesses. Hence, in Islamic and middle eastern culture called Blessed Seed. Some of the benefits are below:

- i. Researchers found that just two grams daily of black seed could result in reduced fasting blood sugar levels, decreased insulin resistance, and increased beta-cell function in the pancreas hence it can treat type 2 diabetes.
- ii. Epilepsy – Published in Medical Science Monitor, a study found black seed to be effective at reducing the frequency of seizures in children who resisted conventional treatment. Black seed indeed has anti-convulsive property.
- iii. Cancer: Colon Cancer –black seed has been found to have anti-cancer properties, inhibiting the growth of colon cancer cells specifically.

Brain Cancer –thymoquinone from black seed can induce cell death in glioblastoma cells. Glioblastoma is one of the most aggressive brain tumors of all. Leukemia and Oral cancer–thymoquinone have also been shown to induce apoptosis in leukemia cells and oral cancer cells. Breast Cancer – thymoquinone extract from nigella sativa reduced breast cancer tumor growth and increased apoptosis (cell death) in breast cancer cells.

- iv. Brain Damage from Lead – A study published in Experimental and Toxicologic Pathology indicates black seed is able to dampen and reverse damage to the brain sparked by lead toxicity.

Side Effects of Nigella seeds:

Using herbal remedies sometimes cause unpleasant side effects:

- i. Allergic Reaction: Black seed can cause allergic rashes in some people. It can also cause stomach upset, vomiting, or constipation. When applied to the skin: Black seed oil or gel is possibly safe when used short-term however it can cause allergic rashes in some people.
- ii. Organ damage: There's some concern that taking too much black seed oil could harm the liver and kidneys.

Cumin *Cuminum cyminum*

Plant Description

It is an annual plant in the *Apiaceae* family grows to 30-50 cm height, with a slender, branched stem which is 20-30 cm tall and has a diameter of 3 to 5 cm with grey or dark green color. Each branch has 2 to 3 sub-branches. The leaves are 5-10 cm long, pinnate or bipinnate, with thread-like leaflets. The flowers are small, white or pink. Fruit is a lateral fusiform or ovoid 4-5 mm long, containing two pericarps with a single seed.

Cumin "seeds" are actually the small dried fruit. Cumin is hotter to the taste, lighter in color. The



seeds come in three colors: amber, white or black. The most important producing countries are Egypt - Syria - Iran - India

Storage of Cumin

Store in an airtight container and place in a dry, cool area, away from light. Flavor and aroma can be retained for up to six months.

Appropriate Atmosphere

Cummins can grow best in Egypt because of the moderate atmosphere and dry weather. In winter does not grow well because the temperature is low and high humidity. Appropriate temperature 28-35 C° accompanied with low humidity 60-70%.

Appropriate soil

The best land to growing cumin is clay light with a good aeration. Cummins bear salinity and alkalinity light but prefer temperate lands. Heavy clay land leads to suffocation and wilt (fall). Sandy land facilitates the fruit ripening as a result of thirst which decreases the production.

Sowing Date

Seeds are planted during October, November and early planting must be taken best fruits from the previous crop or stored for a period of not more than two years also must be identical to the mature class and free of exotic seeds.

Cultivation Parameters

Cumin is grown from seeds; the seeds needs 5 C° for emergence, an optimum of 20-30 C° is suggested. Soaking the seeds for 8 hours before sowing enhances germination. For an optimal plant population, a sowing density of 12-15 kg/ha is recommended .

Cumin is vulnerable to frost damage, especially at flowering and early seed formation stages. Methods to reduce frost damage are spraying with sulfuric acid (0.1 %), irrigating the crop prior to frost incidence, setting up windbreaks or creating an early morning smoke cover.

Cumin has a short growth season of 100-120 days. Cultivation of cumin requires a long, hot summer of three to four months. Upon low temperatures leaf color changes from green to purple. High temperature might reduce growth period and induce early ripening.

Irrigation

Cumin sensitive to increase the water that causes the plants wilt and dry. Cumin requires 3-4 irrigations during the growth period then will be irrigate each month during the period of vegetative growth and more than a month during the flowering and fruit set and irrigation avoided during fruit ripening .

Fruit Harvesting

Cut the plants early in the morning when fruits become yellowish brown color and then transported to selected area .The plants placed above, plastic sheeting and left for a day to a week until fully dry.

Knock the plant to screen the fruit then fruits packed in sacks and stored in a ventilated place free of moisture. Each hectare produces about 600-700 kg dry fruits that suits marketing, and is harvested by hand.

Production of essential oil

Oil is obtained from fruits or crushed by full steam extraction. A ton of fruit crushed produces 15-18 kg of essential oil.

The Medicinal Importance of Cumin

1. Fruits used as spice and add to the bread and meat products, fish and cheese.
2. Fruits contain 5-7 % oil extracted by steam.
3. Volatile oil used as repellent for gases and analgesic for colic and appetizing in some food industries.
4. Oil is used as massage for the treatment of rheumatic heart disease and prevents some cancers and helps heal wounds, to kill microbes.
5. Cummins prevents diarrhea in newborns.
6. In veterinary medicine is given to animals in cases of abdominal cramps, bloating and generation of milk.