

Lab 3: Methods of Cultivation and Production of the most important Medicinal and Aromatic Plants

Chia Seeds:

Salvia hispanica L., is a biannually cultivated plant, is categorized under the mint family (Labiatae). It is native to some parts of Mexico and Guatemala. It has been used as a part of human food for about 5500 years. Currently, chia grows commercially in many countries including Mexico, Guatemala, Peru, Argentina, Australia, and the United States. The seeds are widely recognized as a nutrient-dense addition to healthy diets.

Plant Description

Chia can grow up to 3 to 4 cm height under dry environmental conditions and up to 60cm in its optimal growth condition. The leaves are thick and wrinkled texture dark green color and opposite arranged. They are deeply lobed with a thin cover of fine, soft, grayish hair on its surface. The plant has many stems which emerge from the base of the plant. Chia flowers are small (3-4mm) with small corollas pale blue to dark blue and fused parts that contribute to a high self-pollination rate. The seeds are small flattened ovals, about 1 mm in diameter, and their color range from brown, grey, black, and white.



Cultivation

Chia grows well in tropical and subtropical regions; it is intolerant to freezing at the early stages of growth. It thrives on light soils and benefits from good nutrition. Yields of these seeds are around 2880 kg/acre.

Chia Plant Care

Chia plants are easy to grow and low-maintenance once established, especially in hot regions.

Light

Chia plants do best in full sun. They're very tolerant of heat, even in the hottest days of summer.

Soil

These plants are very adaptable to a wide range of soil conditions. Their native regions tend to have sandy soil, but they'll do well in clay soils as well. Good drainage is important, however, as chia plants don't like to stay too wet.

If growing chia plants in pots, use a commercial growing mix with a bit of sand added, and use unglazed terracotta pots for good moisture absorption.

Water

Chia plants are very drought-tolerant. They benefit from regular watering until they're established, but after that may need little to no additional watering, as they tend to adjust to all sorts of conditions. They're known to be one of the first plants to re-emerge after a fire, an indication of their hardiness and adaptability.

Growing Chia Plants from Seeds

Usually grow in hot zones, and newly-developed strains of seed in America have shown promise for growing in even colder zones for commercial purposes.

Prepare soil bed in fall, and scatter seeds lightly over, just barely covering with soil. Water lightly each day until sprouts appear. Once established, chia plants should self-sow each fall. They're well-loved by pollinators (as many salvia flowers are), but they will also self-pollinate. The chia seeds will form in small seed heads beneath the flowers.

Storage

Whole Chia seeds and Chia flour can be stored in a cool, dry place, in storage for months.

Health benefits of Chia seeds

Chia seeds are an excellent source of vitamins, minerals, and powerful antioxidants. Chia seeds provide many essential nutrients, including

- Calcium
- Manganese
- Magnesium
- Selenium
- Copper
- Iron
- Phosphorus

Chia seeds are also an incredible source of alpha-linoleic acid (ALA), an omega-3 fatty acid that helps to promote a lower omega-6 to omega-3 fatty acid ratio a lower ratio is associated with reduced risks of chronic conditions such as heart disease, cancer, and inflammatory conditions.

It also contains quercetin, an antioxidant that can reduce the risk of developing several health conditions, including heart disease. The seeds also high in fiber, which can help to lower high blood pressure and, in turn, reduces risk of developing heart disease.

1.Reduced Free Radicals antioxidants found in chia seeds can help to fight free radicals in human body. Free radicals cause oxidative stress and cell damage. Eating foods rich in antioxidants may help to reduce risk of developing many health issues associated with free radicals, including heart disease, cognitive decline, and certain types of cancer.

2.Improved Blood Sugar Levels chia seeds are high in fiber. Studies show that fiber may help to reduce insulin resistance and improve blood sugar levels, reducing risk of metabolic syndrome and type 2 diabetes. Research has also found that bread containing chia seeds triggers a lower blood sugar response than traditional bread, which helps to prevent high blood sugar levels.

3.Reduced Inflammation chronic inflammation can lead to health conditions like heart disease and cancer. Caffeic acid, an antioxidant found in chia seeds, can help to fight inflammation in the body.

4. Healthier Weight Management A 1-ounce serving of chia seeds has 39% of your recommended daily allowance of fiber. The soluble fiber in the seeds absorbs water, causing them to expand in stomach and increases feeling of fullness.

5. Better Bone Health

Chia seeds have several nutrients that are vital for bone health, including magnesium and phosphorus. A single ounce of the seeds also contains 18% of the recommended daily allowance of calcium, which is vital for healthy bone, muscle, and nerve functioning. When compared gram for gram, chia seeds have more calcium than dairy products.

Cautions

1. Potential Choking Hazard. Dry chia seeds absorb water, which causes them to swell up and become gelatinous. Dry chia seeds can get stuck in throat, which poses a choking hazard. To avoid this risk, soak the seeds 5 to 10 minutes before use.

2. Interactions with Medication. Chia seeds help to reduce blood sugar and high blood pressure. When taking medications for diabetes or hypertension, eating too many chia seeds can cause severe dips in blood sugar levels and blood pressure, which may lead to other health complications.

3. Allergies. Although rare, chia seed allergies do occur in some people. Symptoms to watch out for include vomiting, diarrhea, and itching of the tongue or lips. Severe allergies can lead to anaphylaxis.

Production of mint

Name Spearmint - Scientific Name *Mentha spicata* - Family Labiatae (Lamiaceae)

Plant Description

It is herbaceous rhizomatous perennial plant growing 30-100 cm height. The stem is square-shaped with variably hairless to hairy stems. The leaves are 5-9 cm long and 1.5-3 cm broad, with a serrated margin. Spearmint produces flowers in slender spikes, each flower pink or white, 2.5-3 mm long and broad. The most important producing country is America - India - Morocco - Algeria - Egypt.

Appropriate Atmosphere

The different kinds of mint grow well under the heat of 20-35 C°. The most suitable temperature for growth and flowering 21-27 C°. Short day leads to a reduction of vegetative growth and oil content.

Appropriate Soil

Mint can be grown in all types of land clay or sand, with high fertility rate and good ventilation rich in organic matter.

Sowing Date

Mint can be grown throughout the year except in the cold months. Favors agriculture during the first half of February to end of March.

Cultivation

All mints prefer, and thrive near pools of water, lakes, rivers, cool, moist spots in partial shade. In general, mints tolerate a wide range of conditions, and can also be grown in full sun. Some mints can be propagated by seed. The most common and popular mints for cultivation are peppermint (*Mentha piperita*), spearmint (*Mentha spicata*).

Irrigation

Loving irrigation, approximately 20 irrigate per year in the sandy land. Irrigate every 7-10 days in summer, every 15-20 days in winter with consideration irrigation after mowing.

Harvesting

Harvesting of mint leaves can be done at any time. Fresh mint leaves should be used immediately or stored up to a couple of days in plastic bags within a refrigerator. Dried mint leaves should be stored in an airtight container placed in a cool, dark, dry area.

Harvest

To get dry leaves

3-4 mowing in the first year, 6 mowing in the following years. The first mowing begins in May and then every 30-40 days. Must mower begin at morning after the dew flew.

Dry leaves intact

Separate the leaves and place in the sun 3-4 hours and then complete the drying in the shade. Daily volatility, excluding exotic and yellow and then packed or stored in cartons.

To get the volatile oil

3mowing through (May - last July and Aug. - Oct). Carry fresh grass for steam distillation devices. Can also get the oil from the dry leaves or crushed leaves. Anhydrous sodium sulfate is used to get rid of water and then mobilize oil in a dark glass bottle.

Chemical Constituents

- **Menthol** from mint essential oil (40-90%) is an ingredient of many cosmetics and some perfumes.
- Menthol and mint essential oil are also much used in medicine as a component of many drugs, and are very popular in aromatherapy.
- Menthol is also used in cigarettes as an additive, because it blocks out the bitter taste of tobacco.

The Medicinal Importance of Mint

1. Fresh and dried leaves are used as a spice and added to tea.

2. Boiled leaves are used to treat nausea, heart palpitations and stimulate the liver and bile secretions and repellent gases and treat spasms to relieve nerves.
3. Essential oil used in the manufacturing Pharmaceuticals colds, cough and prevent diarrhea.
4. The oil which extracted from the mint enters in the food industry like pancakes, biscuits, perfume industry, soap and cosmetics.
5. Menthol extracted from the oil enters the Pharmaceutical Industry nerves and cigarette industry and tobacco.
6. Spirit mint can drink to treat colic and is added to drinking water.