



Health Benefits and Cultivation Practices of Chia

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Chia (*Salvia hispanica* L.) is a herbaceous plant that belongs to the order Lamiales, family Lamiaceae, subfamily Nepetoideae, and genus *Salvia*. The chia plant is native to northern Guatemala and southern Mexico. It is considered a pseudocereal, mainly cultivated for its edible, hydrophilic Chia seed, grown and commonly used as food in several countries of western South America, western Mexico, and the southwestern United States.

The chia plant is about 1 m tall and has simple leaves, which measure 4 to 8 cm long and 3 to 5 cm wide, oval-elliptical shape, pubescent, and with acute apex. A chia seed is quasi-oval, with a length between 1 and 2 mm, a diameter between 0.8 and 1.3 and a width between 0.8 and 1.4 mm. It has a smooth and shiny peel and colouring that can be black, brown, gray, blackspotted, or white. The mucilage is present inside the epidermal cells of mature chia seeds and when they come into contact with water it immediately expands rupturing the primary cell layer that protrudes from these epidermal cells thus surrounding the seed, which increases its size and imparts a characteristic gel appearance to chia.

Chia Seeds and Health

- Weight Loss:** Chia seeds contain nearly 5 grams of fiber per tablespoon, and their high levels of omega-3-fatty acids and alpha-linoleic acid may be useful for weight loss. The seed can also be consumed as a gel when mixed with water. This causes it to digest more slowly in the body, potentially preventing hunger for a longer period.
- Treating diverticulosis:** High-fiber diets have been shown to decrease the prevalence in flare-ups of diverticulitis by absorbing water in the colon and making bowel movements easier to pass.
- Cardiovascular disease and cholesterol:** Increased fiber intake has been shown to lower blood pressure and cholesterol levels. Dietary fiber may play a role in regulating the immune system and inflammation. In this way, Chia may decrease the risk of inflammation-related conditions such as cardiovascular disease, diabetes, cancer, and obesity.
- Diabetes:** High-fiber diets are associated with a lower risk of developing diabetes, and eating high-fiber meals helps to keep blood sugar stable.
- Digestion and Detox:** A diet with adequate fiber prevents constipation and promotes regularity for a healthy digestive tract. Regular bowel movements are crucial for the daily excretion of toxins through the bile and stool.

Cultivation

Soil: Chia prefers sandy, well-drained soils with moderate salinity and with a pH ranging from 6 to 8.5. The crop can give good yields in well-drained, moderately fertile soils, it can also resist acid soils and moderate drought. For Sowing Chia seeds, you need fully moistured soil for seedling establishment, while the maturing Chia plant cannot resist wet soils during growth.

Climate: Chia is a drought-resistant crop, which can be grown in semi-arid environments. Minimum and maximum growth temperatures of this crop are 11–36°C, with an optimum range between 16 and 22°C. It is well known that this plant is very sensitive to low temperature, and it cannot produce seeds since it is killed by frost before flowers set.

Sowing: Traditional cultivation techniques of *S. hispanica* include soil preparation by disruption and loosening followed by seed broadcasting. In modern commercial production, a typical sowing rate of 2.5- 3 kilograms per acre and row spacing of 0.7–0.8 m (2.3–2.6 ft) are usually applied. Winter is the ideal time to plant and grow chia seeds and the very early spring, because it is considered as the short day plant and cannot grow in long day season. But they cannot tolerate frost and snow.

Propagation: Chia seeds are propagated from both seeds and seedlings, growing chia plant from seeds can be best job, prepare the soil for crop, just sprinkle seeds over the soil and stab them gently and cover them with soil. Watering should be done at regular intervals, chia seeds start sprouting within 7 to 10 days. After the seedlings grow up to 7-10 cm tall with 5-6 pairs of true leaves, thin them as they grow.

Irrigation: While being able to grow in dry conditions, *Salvia hispanica* L. benefits from rainfall events ranging from 300 to 1,000 mm during the whole growing season. Chia crop should be irrigated frequently for better yields. In Chia plantations, the crop may need, from eight to nine irrigations per growing season, depending on climatic conditions and rainfall.

Fertilization: Chia grows well in soils with a good amount of nutrients, while a low soil nitrogen content seems to strongly reduce yield. Chia seeds can be cultivated under low fertilizer application, the recommended fertilizer application is 40 kg/acre nitrogen or in some cases, no fertilizer is used.

Diseases and Weed management of Chia

- Chia crop is not affected by major pests or diseases affects Chia production. Essential oils in Chia leaves make more resistant against insects, making it suitable for organic cultivation. Virus infections, sometimes transmitted by white flies, may occur.
- Weeds can create a major problem during the early growing period of the Chia crop until its canopy closes, but because Chia is sensitive to most commonly used herbicides, mechanical weed control is preferred.
- Some viruses that infect the genus *Salvia* are Cucumber mosaic virus, Broad bean wilt virus, Mung bean yellow mosaic virus, Tomato yellow leaf curl virus, and other putative golden mosaic China virus. These viruses can affect the crop production to a greater extent. Take necessary action as soon as the crop is infected with these viruses.

Harvesting: *Salvia hispanica* L. seeds are harvested mechanically. In low input conditions, average yield is around 600 kg/ha but can be up to 1,200 kg/ha, while in high input conditions with irrigation and fertilization. During harvest a great problem is the scalarity of flowering and maturation: the central flower head matures and dries out while inflorescences on side branches are still green. Waiting until all seeds are dry can increase the risk of seed loss to rain, wind, or birds.

References

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