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# STEVIA- A SWEET HERB AGAINST DIABETES

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Botanical Name : *Stevia rebaudiana*

Family : Asteraceae

- *Stevia* is a perennial leafy green plant commonly known as sweet herb of Paraguay
- *Stevia* is a small shrubby perennial growing up to 65 to 75 cm tall with sessile, oppositely arranged lanceolate leaves serrated above the middle, flowers are small, white and arranged in an irregular cyme. *Stevia* is short day plant with critical length of 13 hrs.
- The plant is gradually gaining interest all over the world due to presence of zero calorie sweetener compounds such as Stevioside (8.0-11.0%) and Rebaudioside A (2-4%).

- In some countries upto 30% of their needed sugar is replaced by chemical-based (synthetic) stevioside like sweetness products.

## BENEFITS

- No calories and it is natural.
- pH and heat stable upto 200°C (392 °F).
- Does not affect blood sugar levels.
- Non-toxic and non-addictive sweetener.
- Non-fermentative and non- discolouring.
- Bactericidal activity.
- Potent: 250 to 300 times sweeter than sugar.
- Various medicinal uses.

## MEDICINAL USES

- **Hypoglycemic action:** Helpful for hypoglycemia and diabetes.
- **Cardiovascular action:** The long term use would have a cardio tonic action.
- **Antimicrobial action:** Inhibits the growth and reproduction of bacteria and other infectious organisms.
- **Digestive Tonic action:** Improves digestion, and overall gastrointestinal functions
- **Skin Problems:** Effective when applied to acne, seborrhea, dermatitis, eczema.

## CLIMATE AND SOIL

- *Stevia* is grown as a perennial in subtropical and mild temperate regions but must be grown as an annual in mid and high altitudes.
- This is a short day plant. The concentration of steviosides in the leaves increases when grown under long day conditions.
- Average maximum and minimum temperature should not exceed 10°-37°C during the active crop growth period; the crop thrives well in relative humidity ranging from 65 to 85 %.



- Stevia can tolerate rains but is prone to frost.
- Stevia can grow well on a wide range of soils. It performs better in well-drained red soil and sandy loam soil. The soil should be well prepared having good textured soil to support plant growth.
- Optimum supply of moisture and drainage is necessary for proper growth of the plant. Soil pH should be within the range of 5.5-7.5. Most of the soils good for vegetable are also suitable for Stevia cultivation.

### **PROPAGATION**

Stevia plants can be propagated from cuttings as well as through seeds. In many of the cultivars, seed germination rate is poor and crop raised through seedlings take more time to establish. Therefore, it is best grown through transplanting as an annual or perennial crop.

### **NURSERY RAISING**

- Nursery raising through seeds should be done in the month of February-March.
- Germination of seeds takes place within 10-15 days. Seeds can be sown in plastic trays, pots, wooden boxes or in raised nursery beds of size 1.25 m x 10 m having a good mixture of sand, soil and organic manure. Nursery should be irrigated with sprinkler daily in morning and evening for first five days and once a day during next five days. One month old seedlings of 5-7 leaves stage and 8-10 cm height become ready for transplanting.

### **VEGETATIVE PROPAGATION**

- Two saplings can be raised successfully by vegetative means using terminal cuttings of 10-15 cm height with 3-6 nodes.

- Stem cuttings should be taken from actively growing plants during the months of mild weather avoiding extreme cold or hot months.
- Lower leaves are trimmed to facilitate planting. Cuttings are raised in pots or poly sleeves. In nursery beds the cuttings are planted at 15 x 15 cm spacing keeping one node inside the soil. Cutting raised under partial shade.
- Under high humidity develops roots at faster rate within 8-10 days. Later on irrigation is done twice a week or as and when required. Spraying of Bavistin (0.1%) and Thiodan (0.25%) is done to keep the plants free from diseases and insect pest.

### **TRANSPLANTING IN FIELD**

- Rooted cuttings of 4-5 weeks old are transplanted in the field.
- Stevia is generally transplanted in the field during March-April and June-July avoiding periods of extreme climate.
- Land should be prepared by repeatedly ploughing and harrowing. Irrigation and drainage channels should be laid out as per the layout of the field.
- Transplanting is done in furrows at a spacing of 45 x 45 cm.

### **MANURES AND FERTILIZERS**

- Most like leafy vegetables, Stevia is fertilized through organic manures considering a low nutrients consuming plant.
- A well-rotted 25-30 t/ha farmyard manure application at the time of field preparation is sufficient to grow a successful crop.



## IRRIGATION AND DRAINAGE

- Stevie cannot tolerate drought, therefore frequent irrigation is required.
- First irrigation is given immediately after transplanting and another after 2-3 days.
- Subsequent watering is done weekly till onset of monsoon.
- However, actual numbers of irrigations are based on moisture holding capacity of the soil and occurrence of the natural precipitation.

## WEEDING AND HOEING

Removal of weeds can be done manually. Hence, two time hand weeding and one hoeing are sufficient to keep the weeds under control.

## HARVESTING

- Harvesting is done manually leaving 8-10 cm stem height from the ground level.
- A first harvest is taken 75-90 days after transplanting in the month of June-July.
- Subsequent second harvest is taken after 60-75 days of the first harvest in early September at the time of flower bud initiation.
- In case of late transplanting crop grown for single cut, harvesting is done after 3-4 months of transplanting and continues till flowering begins as the sweetener is maximum in the leaves till the plant flowers.
- Perennial crop may continue up to four years, once planted in the same field.
- Maximum amount of leaves are produced in 3<sup>rd</sup> or 4<sup>th</sup> years.

Flowering of the plant should be avoided and pinching of the apical bud should be done to enhance bushy growth of the plant with side branches

## YIELD

- Average fresh biomass yield of 25-30 ton/ha/ yr out of two harvest is obtained which give dry herb weight of 4-5 ton/ha/yr.
- Leaf powder being commercial part has a significant meaning in terms of its yield. Dried leaf yield of 13-16 q/ha can be separated from the total biomass yield.

## POST HARVEST PRACTICES

After harvesting, the whole plant is dried & the leaves are separated from the stems for further processing.

- The stems have very low concentrations of sweet glycosides and are removed to minimize processing cost.
- The dried leaves are powdered and stored in airtight containers or plastic bags in a cool place.
- Dried leaf powder can be directly marketed without further processing by the farmers.
- Water extraction of the dried leaves is followed by clarification and crystallization processes which facilitate production of stevioside and rebaudioside.
- Most commercial processes consist of water extraction, discoloration and purification using ion-exchange resins, electrolytic techniques, or precipitating agents.
- Most of the commercial processes are protected by way of patent and other IPR protection ways.

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Photo source:

<https://www.livescience.com/39601-stevia-facts-safety.html>



**Stevia leaves**



**Stevia leaves & its powder**



**Stevia cultivation in field**