



Chaya, Spinach tree, Chay, Kikilchay

Cnidoscolus chayamansa

Chaya is an attractive shrub and a good source of nutritious green leaves and shoots. It requires little maintenance and produces large amounts of tasty greens for years. It is an outstanding vegetable for enhancing family nutrition in many parts of the Pacific region.

Characteristics

Chaya belongs to the Euphorbiaceae family. It is native to the Yucatan peninsula of Mexico, where it grows naturally in thickets and open forests. It is widely cultivated in Mexico and Central America, often planted in hedges and home gardens.

It has been introduced to southern Florida and Hawaii. In Hawaii, the wild relative of chaya (*C. acontifolius*) was introduced, but its food quality is inferior to that of *C. chayamansa* and it tends to become weedy.

Chaya is a shrub, 10-20 ft (3-5 m) tall, with a thick and succulent main stem 4 inches (10 cm) in diameter. The side branches are uniformly 1 inch (2-3 cm) in diameter with dark green, palmately lobed leaves up to 9 inches (22 cm) wide.

Its stems and petioles contain a white latex fluid that can be irritating to the skin. Flowering seldom occurs, and the plant rarely produces seed.

Chaya varieties vary from smooth to hairy leaves and petioles. The wild varieties are hairy, causing skin irritation when touched. The most widely cultivated varieties of Chaya are almost free of stinging hairs, as a result of long years of selection by farmers.



Environmental Requirements

Chaya is well suited to the hot and humid tropics. The plants tolerate heavy rainfall and periodic drought. Leaf shedding will occur during drought stress, but the plants will recover when the rains return. It is not well suited to dry areas, unless irrigation is applied.

A wide range of soil types are suitable for chaya cultivation, although well drained loams are generally considered preferable. Waterlogged soils are moderately tolerated. Low soil pH (5-6) will not limit growth.

It can be grown in full sun or partial shade. Plants grown under partial shade will produce large and tender leaves.





Uses and Preparation

Chaya's young shoots and tender leaves are cooked and eaten as a green vegetable or added to soups and stews. Older leaves can be chopped and added to soups and stews as well.

The leaves and shoots must never be eaten raw. Always make sure that chaya is completely cooked.

Chaya leaves contain toxic hydrocyanic glycosides, but cooking inactivates them. The hydrocyanic glycosides will become inactive after 1 minute in boiling water or when the leaves and shoots become soft.

Chaya is most likely suitable for canning, freezing or drying for local and export markets.

Freezing and canning of 3-4 minute blanched, chopped leaves is successful. Can the chaya leaves in 2% salt and 0.2% citric acid at 176° F (80° C), seal, sterilize at 176° F (80° C) for 30 minutes, and cool.

Nutritional Value

Everyone in the family should eat some green leaves everyday. Children, pregnant women and nursing mothers especially need the protein, vitamins and minerals found in green leaves.

For many children, green leaves are the sole source of vitamin A, an essential vitamin in preventing blindness. Chaya leaves are an outstanding source of vitamin C.

Green leaves also contain phytochemicals, thousands of chemical tongue twisters like sulforaphane, genistein and indole-3-carbinol, which are the new frontier in cancer-prevention research.

Serving a variety of green leaves will keep the whole family healthy.

Serving Size: 1/2 cup (100g) fresh leaves

	Actual Quantity	% Daily Value USDA, 2000 Calorie Diet
Protein	7.4 g	14.8 %
Calcium	330 mg	33 %
Iron	9.3 mg	51.7 %
Vitamin A	1357 IU	27 %
Vitamin C	205 mg	342 %

Source: Bittenbender, UH-Horticulture Department, Honolulu, HI

Propagation

Chaya is propagated only by stem cuttings. To prepare cuttings take a 6-12 inch (15-30 cm) length section of a woody stem containing 2-3 nodes. Cuttings can be taken from either the top or the bottom portion of a stem, but it must be woody. Cuttings from the top portion of the stems have less problems with rotting during the rooting process. The soft, green growing tips should be avoided.

Remove all leaves and air dry the cuttings in the shade for 3-4 days before planting. This will allow the cut ends to seal, making them less susceptible to rotting.

Cuttings can be planted directly in the ground, or in nursery containers and transplanted to the field. Cuttings planted directly in the ground are more susceptible to rotting.

Cuttings should be planted with 1-2 nodes beneath the soil and kept moist. It is important not to overwater the cuttings, because this will increase rotting.

Cuttings are ready for transplanting when mature leaves are produced. Edible greenery is produced within 3-5 months.





Establishment

Transplanting is best done at the beginning of the rainy season to ensure high survival and good growth.

A thorough watering is important before transplanting. Containers should be carefully lifted and spiraled roots should be cut so that all roots are growing downward.

The planting hole must be deep enough to allow the roots to hang down vertically. Adding compost or green manure in the planting hole will provide needed nutrients for good establishment.

Soil should be firmly packed around the plant after transplanting. Mulch placed around the transplant will reduce soil moisture loss and help to control weeds.

Transplants can also be planted in an established legume living groundcover. Perennial peanut (*Arachis pintoi*) is an ideal living groundcover for vegetables due to its non-twining habit. Planting into a living groundcover is particularly favorable on sloping lands to prevent erosion and control weeds.

Transplants are spaced about 25 inches (60 cm) apart to form a dense hedge. To form a dense patch, transplants can be spaced 3 x 3 feet (1 x 1 m) apart.

Management

Chaya is kept to a height of 4-5 ft (1.5 m) for easy harvesting. Continuously harvesting the tender shoots and young leaves for consumption will keep the plant at the desired height.

The plant can be cut back periodically to a height of 20 inches (50 cm) to promote the production of tender shoots and young leaves. The plant residue can be left around the base of the plant for soil enrichment and weed control.

Nitrogen can be a limiting factor on poor soils. When nitrogen is limiting, the leaves become pale green or yellow. Local sources of organic matter, such as kitchen residues, nitrogen fixing tree trimmings and compost, placed around the plant periodically will help maintain a lush green growth.

Planting Systems

Chaya is an attractive shrub and can be used as an edible landscape plant around home dwellings.

A few plants will provide beauty and enough nutritious leaves and shoots for the entire family. It can be planted in hedgerows around home dwellings or along walkways.

Chaya grows well under shade, making it an ideal species for agroforestry systems. For example, it can be grown as an understory species in association with fruit trees and palms.

For commercial production, chaya hedgerows can be planted 3-6 ft (1-2 m) apart with 25 inches (60 cm) between plants within the hedgerow.

Alternate rows of nitrogen fixing tree hedgerows can be planted to provide green manure for chaya fertilization.

Pests and Diseases

Once established, few pests have been observed damaging chaya. Leaf damage by the tomato hornworm has been reported. Under waterlogged conditions, soft rot from *Erwinia* species can attack the stem tips.

Rotting of the cuttings can occur at the upper cut portion during rooting cause by *Thanatephorus cucumeris*, *Glomerella cingulata*, and *Botryodiplodia theobroma*. The same organisms may also destroy the bottom portion of cuttings, if conditions are too wet.





Further Reading

National Academy of Sciences. 1975. Underexploited Tropical Plants with Promising Economic Value. National Academy of Sciences, Washington DC.

Oomen, H.A.P.C. and G.J.H. Grubben. 1978. Tropical Leaf Vegetables in Human Nutrition. Communication 69. Department of Agriculture Research. Royal Tropical Institute, Amsterdam.

Sources of Planting Material

It is important to distribute only the chaya varieties with smooth leaves and petioles. The wild chaya varieties have stinging hairs that cause skin irritations when touched.

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