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Caigua: Mini Cucumber with Modern Nutrition

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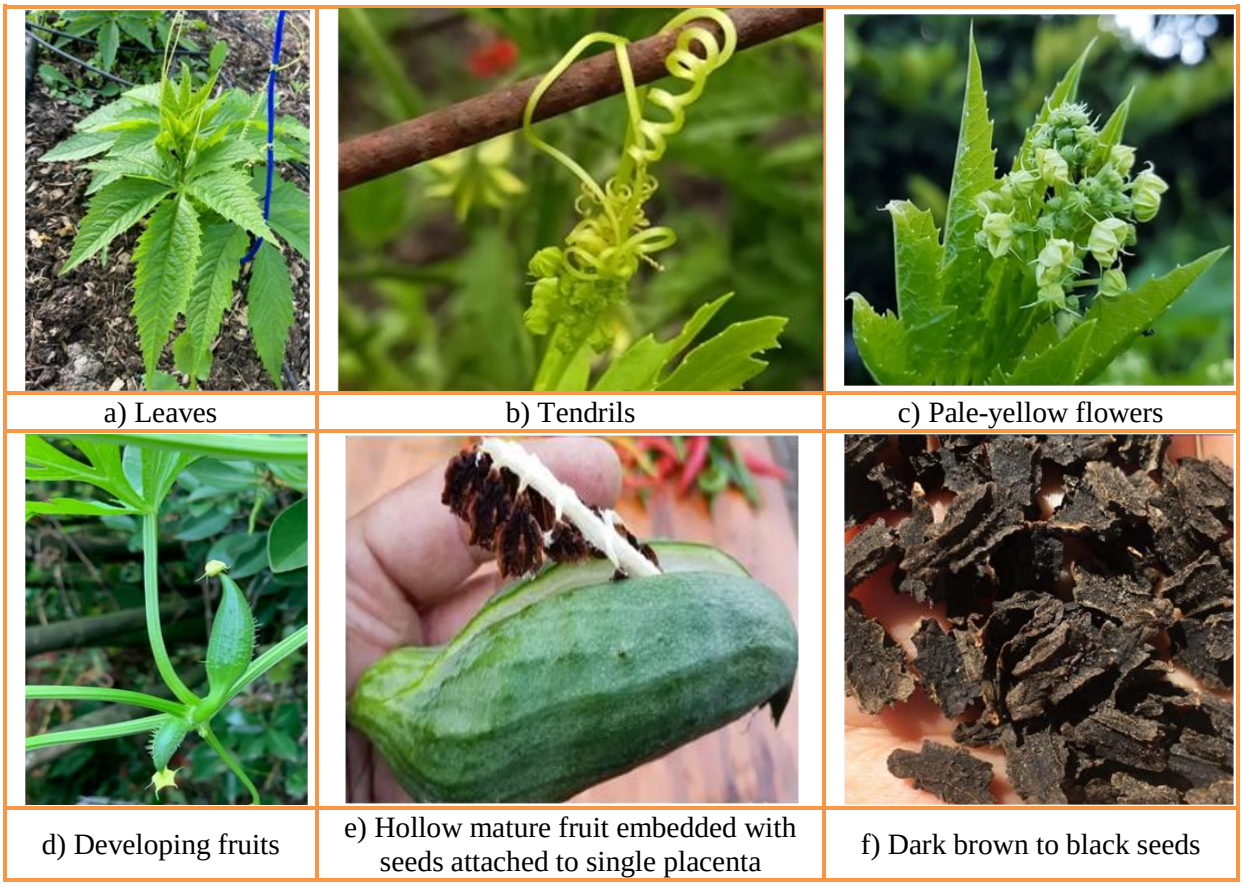
The (*Cyclanthera pedata* (L.) Schrad), commonly known as wild cucumber, caigua, stuffed cucumber, chuche karela, slipper gourd, lady's slipper, sparrow gourd, achocha, grimpant, pahadi karela, ram karela and meetha karela in various parts of India. It belongs to the family *Cucurbitaceae* and considered an exotic and underutilized climbing vine which occurs naturally in the hilly regions. It has chromosome number of 2n= 2x=32 and originated from South America, particularly from Andean region or Sierra where it is grown for its edible fruits as food. Presently, it is cultivated and has introduced in different countries of the world like Europe, Africa, Nepal, Bhutan and China. It is suitable for cultivation in tropical and subtropical climates and tolerates extreme hot and cold weather conditions. It requires hot and humid conditions with an average temperature of 15-18º C with 85-90% relative humidity and grows vigorously in semi-shade areas. It prefers well-drained sandy loam soil with pH of 6.5-7 for its optimum growth (Praanjal et al., 2025). The vine is propagated by seeds and sowing is done during March to April in the hills. The flowering commences from July to August and harvesting from September onwards which continues till November. The climbing growth of vine and soft-spined fruits are presented below in **Figure 1**.

Figure 1. An overview of Caigua climbing vine and fruits

The harvesting period begins from 90-120 days after sowing and persists for 50-60 days. This crop is commonly free from any kind of foliar diseases and pests. The fruits resemble the taste of cucumber and can be consumed raw or cooked. The fruits have shorter shelf-life which can be increased for 15-20 days by storing at 10-12ºC and at 85-90% relative humidity. The high temperature during storage leads to fruit splitting and yellowing, whereas cold temperature leads to chilling injury.

Botany and Reproductive Biology

It is an annual, shallow-rooted, herbaceous climbing vine that reaches to a height of 4-5m or more and bear tendrils. It has light to dark green alternate, palmate leaves which are lobbed with five pinnatifid segments and 4-8cm long petiole. It bears small pale-yellow colour monoecious flowers at the leaf axils which leads to cross-pollination mediated by insects. The flowers are pentamerous with star shaped corolla having five petals which are joined together (Orsini, 2018). The female flowers are fewer in number as compared to male flowers and borne on solitary axillary, with inferior, single-celled ovary, whereas the male flowers are present in a panicle of 20-40 flowers on a 15-20cm long peduncle. *C. pedata* has white to green colored ovoid shaped fruits with pepo (many-seeded berry) fruit type and are 10-15cm long, 8-10cm in width with curved ends. In mature fruits the mesocarp is thin, succulent and the endocarp is fluffy and white whereas ripe fruits are hollow from inside with brown to black colored seeds. The 10-12 seeds are present in each fruit which are roughly quadrangular and are attached to the single placenta (Shiwani et al., 2025). The old mature fruits are consumed after removing the seeds and boiling. The different parts of caigua plant are presented below in **Figure 2**.



a) Leaves | b) Tendrils | c) Pale-yellow flowers

d) Developing fruits | e) Hollow mature fruit embedded with seeds attached to single placenta | f) Dark brown to black seeds

Figure 2. Representation of Caigua

Nutritional importance

Caigua is an important cucurbitaceous vegetable which is rich in vitamins (thiamine, riboflavin, niacin), minerals, carbohydrates, protein and phenolic compounds. It has low content of sodium and high content of phosphorus, calcium, potassium and magnesium. The fruits of Caigua contains alkaloids, flavonoids, galacturonic acid, lipoproteins and digestive enzymes. The mineral composition of fruits is 152mg/100g of potassium, 19.4mg/100g phosphorus, 11.9mg/100g calcium, 8.4mg/100g magnesium, 0.91mg/100g sodium, 0.21mg/100g iron and 0.13mg/100g zinc (Oliveira et al., 2014). In the flour of caigua fruits, the total sugar content is 4.74g/100g and reducing sugar 3.12g/100g, whereas the total protein content is 0.4% (Rivas et al., 2013). Besides food, it is also used for medicinal purposes due to its health promoting effects.

Benefits and uses

- The Caigua has anti-inflammatory, hypocholesterolemia, hypoglycemic properties and all parts are used in different ways as food and to treat disorders.
- It helps decrease the LOX (Lysyl Oxidase) activity, thereby prevention of cancer and tumours.
- Dried seeds are used to cure intestinal parasitosis and seed infusions are helpful in controlling hypertension.
- Fruits are used to cure tonsillitis whereas fruit juice is used as diuretic, prevent high cholesterol, diabetes and atherosclerosis.
- Caigua fruits are low in calories and high in soluble fibre which promotes weight loss and fat metabolism.
- The roots have antiparasitic, hypotensive, analgesic, hypoglycemic and antidiabetic properties which are helpful in curing respiratory problems and maintains dental cleanliness.
- The immature fruits are consumed in various forms like raw, fried or stuffed with peppers, fish, meat or cheese and cooked.
- The fruits are also preserved in the form of pickles and sun-dried for future use.
- The capsules or caigua supplements made from fruits are available in the herbal shops which are helpful in lowering cholesterol and high blood pressure.
- Leaves and tender shoots are eaten raw as salad or cooked and used as greens.

Conclusion

Caigua is a potential vegetable crop that meets the nutritional and therapeutic needs of health-conscious consumers by providing all the essential vitamins, nutrients and dietary fiber. This crop is grown in the hills of Sikkim, West Bengal and Himachal Pradesh by rural households therefore, it is lesser known in other regions. Its cultivation should be promoted in the plains, which will help in strengthening the nutritional security and better crop utilization. The germplasm exploration, collection and conservation by conducting breeding programmes and research trials can benefit farmers, breeders as well as society. It provides a great opportunity for processing industries to make various food products and health supplements which can fulfill the modern nutritional needs of people.

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