

Unconventional food plants (PANC)

Unconventional food plants (PANC) are plants that have one or more food parts that are not part of everyday life, that are not usual or globalized and that do not have a structured production chain. They are regional species, in general maintained by the farmers themselves, and remarkably rustic, adapted to different growing or management conditions, tolerant to pests and diseases and resilient to climatic adversities, often of spontaneous occurrence such as purslane (*Portulaca oleracea* L.), sow thistle (*Sonchus oleraceus*) and slender amaranth (*Amarantus viridis*).

They have outstanding nutritional potential, such as the outstanding content of protein and minerals in Barbados gooseberry (*Pereskia aculeata*), omega-3 in purslane, iron in tannia (*Xanthosoma sagittifolium*), selenium in cariru (*Talinum esculentum*, Jacq.), lutein in nasturtium, and there is still much to be researched. They also have recognized culinary, gastronomic and cultural value. Due to these characteristics, they are fundamental for food and nutrition sovereignty and security, for the mitigation of social inequalities and for coping with the effects of climate change. Due to its climatic and cultural diversity, Brazil has a rich heritage of PANC, being many of them native species, some said naturalized and some exotic cultivated such as lamb's ear (*Stachys byzantina*), sorrel (*Rumex acetosa*) and pepino dulce (*Solanum muricatum*).

Many are restricted to backyards and home gardens, sometimes in an edible garden concept or productive landscaping. Some, however, have economic and cultural importance such as Barbados gooseberry, toothache plant (*Acmella oleracea*), roselle (*Hibiscus sabdariffa*), malabar spinach (*Basella alba*), tannia and fameflower (*Talinum paniculatum*). Despite this potential, due to changes in the standard of living of modern society, with globalization and the verticalization of cities, there was a reduction or even abandonment of once common species, such as the mangarito (*Xanthosoma riedelianum*), arrowroot (*Maranta arundinacea*), ahipa (*Pachyrhizus ahipa*) and Guinea

arrowroot, being replaced by species with structured production chains, often in the form of processed or ultra-processed food.

More recently, there has been an increasing trend in the search for a healthier and more diverse diet, with the appreciation of local or regional food and in a context of agro-ecological production. In response to the demands of society, the Brazilian Agricultural Research Corporation (Embrapa) has been working intensively with the theme of PANC, maintaining a collection of PANC vegetables since 2006 and developing several works to optimize production systems on an agro-ecological basis, with agronomic evaluation, nutritional characterization and study of the useful life of PANC vegetables.

The PANC are plant species that have at least one edible part not common in food, underutilized or neglected, unknown by most of the population, with limited distribution, restricted to certain locations or regions, often exerting influence on local food and culture.

The malabar spinach (*Basella alba*) is a leafy, herbaceous vegetable, belonging to the botanical family Basellaceae, native to India and Southeast Asia, widespread throughout the tropical regions of the planet. In Brazil, it is common in Rio de Janeiro, and is often found in fairs and greengrocers. It is a climbing plant, vigorous, with thick leaves, making several successive harvests from 60 days of sowing. The chopped leaves are eaten sautéed or cooked briefly, often with eggs sticking to the leaves, in addition to being in stews or in dishes with various meats and, when still tender, as raw salad. The thick stalks can also be chopped and sautéed to enrich the rice and beans. Most typical dish: malabar spinach with scrambled eggs.

The toochache plant (*Acmella oleracea*), plant of the botanical family Asteraceae, is a leafy, herbaceous vegetable, considered naturalized in the Amazon. It is a herbaceous perennial, with prostrate growth, reaching 20 to 40 cm in height, with successive harvests starting 45 days after planting. The leaves and especially the inflorescences are

rich in spilanthol, a substance with anesthetic properties that cause slight damping of the mucous membranes and salivation. Toothache plant is a symbol of Amazonian cuisine, consumed in the typical dishes pato no tucupi (duck in tucupi sauce), tambaqui no tucupi (black pacu in tucupi sauce), fish stew and especially in “tacacá”, accompanying tucupi and cassava gum and salted shrimp.

The mangarito (*Xanthosoma riedelianum*) or tayaó (in Guarani language) is native to Brazil and was part of the diet of the Indigenous people when the Portuguese colonizers arrived. Very appreciated in the past, nowadays it is practically unknown, found sporadically at fairs in the cities of the interior of Minas Gerais or in the PANC food circuit. It belongs to the Areacea family, being a perennial plant that regrows in spring and goes into dormancy in drought or cold. It produces edible tubers, a larger central one (main corm) and dozens of smaller lateral tubers (secondary corms), quite caloric, which give “substance”. The leaves of the mangarito are edible, always braised, but it is the rhizomes that represent a true culinary delicacy of special taste, cooked, fried, sautéed, acquiring a particular brownish taste when prepared with the peel. Also special is mangarito in creams or purees. In rural areas it was common in the afternoon snack or breakfast mangarito cooked or roasted with molasses.

Barbados gooseberry (*Pereskia aculeata*), a plant native to tropical America, including Brazil, belonging to the Cactaceae family, one of the few cacti with developed leaves. It is a perennial plant, with characteristics of a semi-erect to prostrate scrambling vine when it grows without the presence of bulkheads, with succulent large leaves. The flowers and fruits are edible, but the main food is the leaves, considered the “green meat” for the high content of minerals, especially iron, magnesium, zinc, manganese and calcium, and proteins with an interesting amino acid profile. It is often planted as a living fence due to the presence of stiffened trichomes, type of thorns, but also in agricultural crops on trellis with tutoring or in rows making successive and staggered pruning for many years, each pruning being a harvest. Widely used in Minas Gerais cuisine in the circuit of historical cities, accompanying free-range chicken, pork ribs or

other stewed meats, the leaves can be prepared in whole or finely chopped as cabbage, thus giving greater creaminess to the dishes due to the greater release of its mucilage. Salted pies, farofas (type of flour), dumplings, etc. are also prepared from it., as well as using still tender young leaves in salads. In Sabará the annual festival of Barbados gooseberry takes place.

Tannia (*Xanthosoma taioaba*) is a herbaceous perennial, reaching between 1.0 and 2.0 m in height, depending on the variety and location, native to the Americas, including Brazil. However, when the leaves are cut for food, their height is around 0.8-1.0 m. It forms a main rhizome, large in size, and lateral ones, smaller. It is widely planted in southeastern Brazil, especially in Espírito Santo, Rio de Janeiro and Zona da Mata de Minas Gerais, generally in humid lowlands. The harvest of leaves begins from 60 days after planting, when 25 to 30 cm, and can however produce leaves with 80 cm or even more. The leaves are always consumed braised or cooked, never raw due to the contents of calcium oxalate crystals that cause itching, discomfort and inflammation of the mucous membranes, but which degrade with heating. It is common to remove the first cooking water. Older or yellowed, half-dried leaves concentrate calcium oxalate more.

The roselle (*Hibiscus sabdariffa*), is a plant of the Malvaceae family, is distributed throughout the world as a raw material for hibiscus tea, but it is in West Africa, where it originates, and especially in Brazil, specifically in Maranhão, brought by the enslaved that it assumes greater importance as a leafy vegetable. Vigorous shrub, which can reach up to 3 m in height, while a vegetable, is kept lower by successive cuts (crops). The yellowish-white flowers are also edible, and the calyxes, the outer part of the fruits, fleshy and red, are the raw material, in addition to tea, for juices, jams, sweets, etc. It is planted at the beginning of the rainy season by seeds and the harvest begins between 75 and 90 days for leaves and 150 to 180 days for flowers and fruits. The leaves are rich in fiber, protein and vitamin C. Tea has digestive effect and antioxidant properties. The leaves are eaten in salads when young and tender, or in stews with rice or dried fish. In

Maranhão cuisine, it is the main ingredient of the typical “arroz de cuxá”, made with rice, dried shrimp and rosella (cuxá).

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Embrapa Vegetables