

Journal of Agricultural Sciences Research

ETHNOBOTANY OF EDIBLE LEAFY PLANTS IN TACOTALPA, TABASCO, MEXICO

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Abstract: In a diet based on corn, beans, squash and chili peppers, edible leaves provide a diversity of flavors and nutrients. In Mexico, several species known as “quelites” are cultivated or tolerated in the mountains of Tacotalpa, Tabasco. These species are known as “chayas”. Despite their importance, chayas have been little studied in southeastern Mexico. In this sense, ethnobotanical studies can contribute to develop sustainable management plans for this resource, so the purpose of this work was to know the perception that Ch’ol families have about the use of chayas in Cuitláhuac, Tacotalpa, Tabasco. Sixty-eight structured interviews and five semi-structured interviews were conducted, as well as tours of ecosystems and agroecosystems in the community. Due to the influence of the Tsotsil communities of Chiapas, Cuitláhuac chayas are also known as vegetables. The interviewees recognized 14 species of chayas corresponding to botanical families Solanaceae, Euphorbiaceae, Fabaceae, Piperaceae Asteraceae and Brassicaceae. The best known and most consumed species are *Cnidoscolus aconitifolius*, *Witheringia meiantha*, *Cnidoscolus chayamansa*, *Erythrina coralloides*, *Cestrum rasemosum*, *Solanum americanum*, *Piper auritum*, *Senna fruticosa*, and *Manihot esculenta*. They are regularly prepared boiled or fried, as a main ingredient or as an accompaniment. In addition to the edible use, the medicinal use of almost all species is mentioned. In the perception of the interviewees, chayas provide vitamins and are healthy. Most chayas are harvested from the bush or milpa, although some can be found in home gardens, and others are acquired through purchase. Chayas are an important element in the diet of the inhabitants of the Tabasco highlands, as they are widely consumed and valued because they represent a source of food and economy, are abundant, are rooted in the local culture, are useful for remedies, and are healthy.

Keywords: chayas, culture, food, ethnobotany, ethnobotany

INTRODUCTION

In a diet based on corn, beans, squash and chilies, the edible leaves provide a diversity of flavors and nutrients. In Mexico, several species known as “quelites” are cultivated or tolerated. The term quelite is used generically to refer to edible herbs, many of them wild and includes more than 500 species of herbaceous plants, shrubs and trees. Approximately 358 species are used as edible leaves and tips, most of which belong to 6 botanical families: Asteraceae, Apiaceae, Fabaceae, Amaranthaceae, Chenopodiaceae and Brassicaceae (BYE; LINARES, 2000).

Quelites represent an important potential for increasing food security and food sovereignty (EBEL et al., 2024), have a high sensory, emotional, cultural and social value; and are consumed for their flavor, aroma, texture and by habit, as well as being emotionally and socially rewarding. Moreover, compared to other foods, they are economical and environmentally friendly (BOURGES et al., 2013).

In some localities of Tabasco, uncultivated plants, known as monte, are classified according to their potential use and by their effects on the soil and the crop, i.e., they can be good or bad monte (ALTIERI, 2016). In this sense, Chacón and Gliessman (1982), in a study conducted in the Chontalpa region, found that farmers recognized 21 plants as “bad monte” and 20 as “good monte”, which serve as food, medicines, teas, for ceremonies and to improve the soil.

Although the term chaya is used to name the species *Cnidoscolus aconitifolius*, in the mountains of Tacotalpa, Tabasco, it is used to name all plants with edible leaves. These plants have nutritional, sociocultural and economic importance, since they ensure food in times of scarcity and the identity of the communities, in addition to contributing to the sustainability of ecosystems.

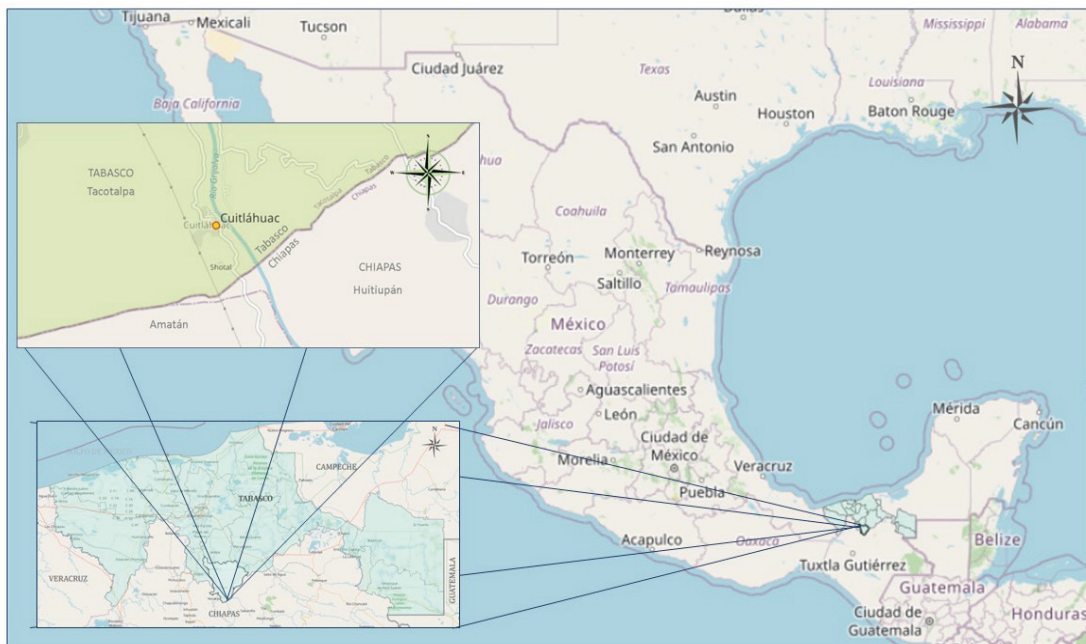


Figure 1. Location of Cuitláhuac, Tacotalpa, Tabasco. Source: Prepared by Octavio Zentella Gómez.

Some studies have been conducted to determine the species present in the milpas. Sánchez-Hernández (2012) mentions eight species used to prepare dishes in Pomoquita, Tacotalpa. Sánchez-Domínguez (2021) identifies 20 species including leaves used for food and as condiments in Buenos Aires, Tacotalpa. Despite their importance, chayas have been little studied in southeastern Mexico, unlike “quelites” in central Mexico and *Cnidioscolus aconitifolius* in the Yucatan Peninsula.

In this sense, ethnobiological studies are a complement to the development of natural resource management plans, since greater knowledge and evaluation of the traditional use and management of ecosystems and agroecosystems will be key to ensure the sustainable use of natural resources (CASTRO; MARTÍNEZ, 1999). The purpose of this work was to know the uses and importance of chayas in Chól families in Cuitláhuac, Tacotalpa, Tabasco.

MATERIALS AND METHODS

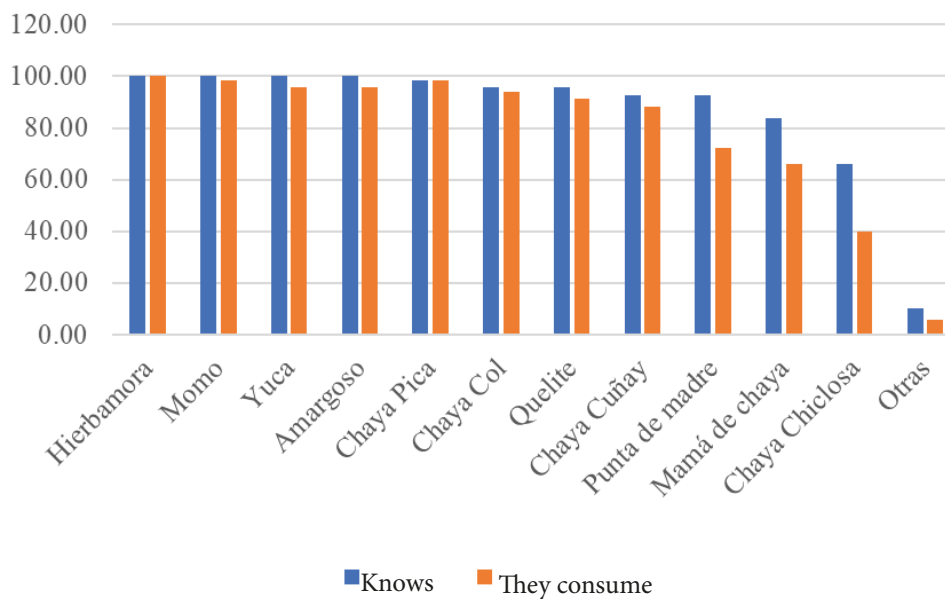
The work was carried out in the community of Cuitláhuac, Tacotalpa, Tabasco. Cuitláhuac is located at longitude 92°43'47.902" W and latitude 17°21'21.707" N at an altitude of 95 masl (Figure 1). This community was founded in 1910, approximately, by migrants from the neighboring state of Chiapas and has a total population of 698 inhabitants of which 68.77% live in indigenous Chól households, although only 40% of the population aged 3 and over is a Chól speaker (INEGI, 2020). Land tenure is of the ejido type and has an area of 786.033 hectares, which are used for agricultural activities mainly for livestock, milpa and agroforestry systems in the Sembrando Vida Program.

The research had an ethnobotanical focus, so 68 structured interviews were conducted to learn about the importance, species used, uses, and ways of acquiring and preparing chayas. A systematic probabilistic sample was used, applying the interview to household representatives (regardless of sex) every two occupied dwellings. Five semi-

Nombre científico	Nombre común	Nombre en ch'ol	Forma de vida	Forma de manejo*
Solanaceae				
<i>Solanum americanum</i> Mill.	Hierbamora	Cha'jäk	Harb	tolerated
<i>Witheringia meiantha</i> (Donn. Sm.) Hunz.	Cuñay	Axãñtye'	Harb	recolectar
<i>Jaltomata procumbens</i> (Cav.) J.L. Gentry	Mamá chaya	de Ña Cha'jäk	Harb	tolerated
<i>Cestrum racemosum</i> Ruiz & Pav	Amargoso	Ch'aj pimel	shrubby	recolectar
Euphorbiaceae				
<i>Cnidocolus aconitifolius</i> (Mill) I. M. Johnst	Chaya pica	Ek'	shrubby	cultivated
<i>Cnidocolus chayamansa</i> Mc. Vaugh	Chaya col	K'ällys	shrubby	cultivated
<i>Manihot esculenta</i> Crantz.	Hoja de yuca	Yopol ts'ijm	shrubby	cultivated
Fabaceae				
<i>Senna fruticosa</i> (Mill.) H.S	Quelite	K'ãñ-ej	tree	recolectar
<i>Erythrina coralloides</i> DC	Punta de madre	Moty'e	tree	fuelled
Asteraceae				
<i>Sinclairia discolor.</i> Hook. & Arn.	Chaya chiclosa, Juangoya	Tsuy	Harb	tolerated
<i>Sonchus oleraceus</i> L.	Chicoria		Harb	tolerated
Brassicaceae				
<i>Brassica juncea</i> (L.) Czern.	Mostaza		Harb	fuelled
<i>Brassica spp</i>	Coliflor		Harb	fuelled
Piperaceae				
<i>Piper auritum</i> Kunth.	Momo	Momoy	shrubby	tolerated

*Considerando la propuesta de Casas et al. (1994). Elaboración propia.

Table 1. Chaya families and species identified in Cuitláhuac, Tacotalpa, Tabasco. Source: Prepared by the authors.



Percentage of people who know and consume the chaya species found in Cuitláhuac, Tacotalpa, Tabasco.
Source: Prepared by the authors.

structured in-depth interviews were also conducted to recover knowledge about the uses and management of chayas, for which the interviewees were chosen considering that they were over 50 years of age, natives of the community and speakers of the Ch'ol language. In addition, the community's ecosystems and agroecosystems were visited to observe the presence of chayas and collect biological material.

The biological material was herborized in the Agroecology Laboratory of the Intercultural University of the State of Tabasco and identified taking into account local nomenclature, expert opinion and the Plants of the World Online database (POWO, 2024). Quantitative data were processed in a Microsoft Excel® sheet and analyzed in the statistical software SPSS ver. 19 and qualitative information was processed in Microsoft Word® and analyzed in Atlas ti software ver. 22.

RESULTS AND DISCUSSION

In Cuitláhuac, chayas are also known as vegetables, apparently due to the influence of neighboring Tsotsil communities in the neighboring state of Chiapas. Interviewees recognized 14 species of chayas belonging to five botanical families, of which the most represented are Solanaceae, Euphorbiaceae and Fabaceae, with four, three and two species, respectively (Table 1). It is important to note that this study only considered species whose leaves are used to prepare food, i.e., leaves used as condiments or complements were not considered.

The most known and consumed chayas are hierbamora (*Solanum americanum* Mill.), momo (*Piper auritum* Kunth.), yuca leaf (*Manihot esculenta* Crantz.), amargoso (*Cestrum rasemosum* Ruiz & Pav) and two species of *Cnidocolus*, chaya pica (*C. aconitifolius* (Mill) I. M. Johnst) and chaya col (*C. chayamansa* Mc. Vaugh) (Figure 2). In a study conducted in a Ch'ol community of Tacotalpa, Sánchez (2021) reports 20 species grouped in 10 botanical families, and as in this study, the most frequent were Solanaceae, Fabaceae and Euphorbiaceae.

Of the 14 species identified, only three are cultivated, the rest are encouraged, tolerated and collected (Table 1), for self-consumption and commercialization, regularly offered at home and in markets and markets in the municipal capital or larger communities (Figure 3).



Figure 3. Chayas marketed and consumed in Cuitláhuac, Tacotalpa, Tabasco. A. Cuñay, B. Hierbamora. C. Amargoso, D. Quelite. Source: Taken by the authors.

On the other hand, chicory (*Sonchus oleraceus* L.), wild cauliflower (*Brassica spp* L.) and mustard (*Brassica juncea* (L.) Czern.), species reported as “vegetables” in Tsotsil communities near Cuitláhuac (MORALES-VALENZUELA et al., 2022) and in the Altos de Chiapas region (SOLÍS-BECERRA; ESTRADA-LUGO, 2014), were mentioned. The people interviewed mentioned that these plants grow in cold climate conditions, but they are traded in this locality by inhabitants of neighboring communities.

Chayas are usually consumed boiled or fried (Figure 4), only momo and hierbamora are consumed raw, in the first case, the tender stalks are consumed to accompany pozol

(a drink made from corn and cocoa), in the second case, medicinal uses are attributed to them.

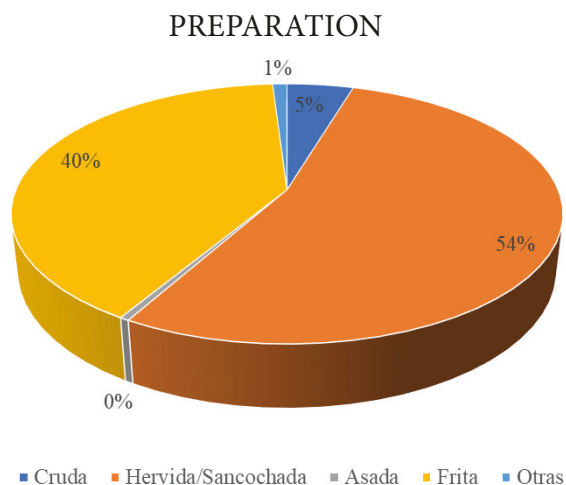


Figure 4. Forms of consumption of chayas in Cuitláhuac, Tacotalpa, Tabasco. Source: Prepared by the authors.

Chayas are used to prepare various dishes, either as the main ingredient or as an accompaniment (Figure 5). Interviewee 2 points out that:

“...you can eat them fried, you can also put the chaya pica in a beef broth, a chicken broth, to give it more flavor, we usually eat it more in broth with chili, but if you want to eat it in the afternoon, as lunch, you fry it with its chili, cilantro and chives, you can eat it in different ways”.

However, Interviewee 3 does not recognize that very elaborate dishes are prepared since he mentions that:

“No, we pick and peck the chaya, we cook it, we add chili, we add its flavor, and come on, we eat it with pozol. No, it is not a dish, the house is full of chaya, it is good for the body, for the stomach”.

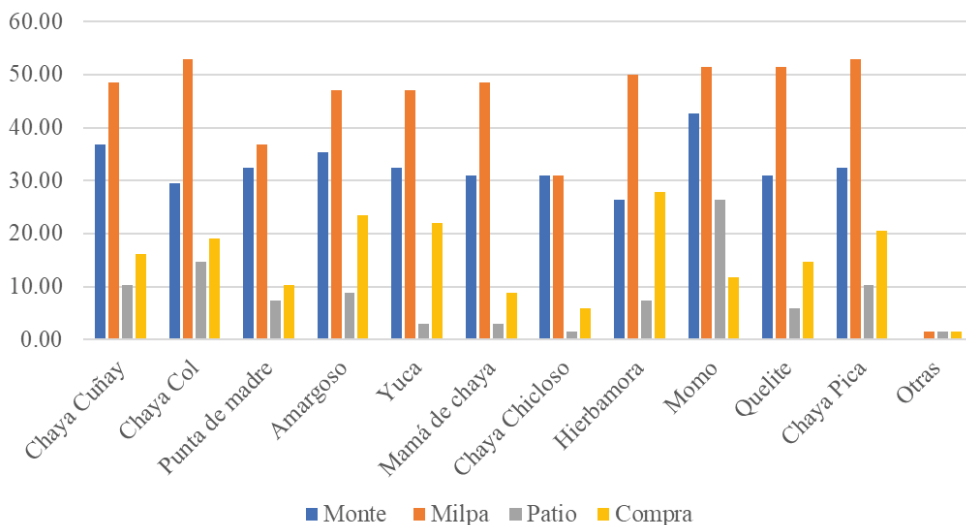


Figure 6. Percentages of forms of acquisition of the chayas found in Cuitláhuac, Tacotalpa, Tabasco. Source: Prepared by the authors.



Figure 5. Dishes made with chayas in Cuitláhuac, Tacotalpa, Tabasco. A. Chaya sancochada, B. Chaya frita. C. Chaya with meat. D. Chaya with egg. Taken by the authors.

In addition to the use as food, the medicinal use of almost all species and the contribution of vitamins were mentioned. However, in the in-depth interviews not much information was recovered in this regard, for example, Interviewee 3 states the following:

“...what you drink is the broth because all the juice of the chaya is concentrated there. At least the bitter one is very bitter, just like

right now when it is not raining, the bitter chaya leaf is very bitter and it is very good for us diabetics”.

Interviewee 2 recognizes the vitamin content and healthfulness of chayas:

“...it fills our stomach and feeds us, I believe that vegetables consume (sic) this, vitamins, that is why they are eaten, well. That is our food, usually the peasants eat almost everything that is eaten more is what one harvests, usually eat meat... little, when you can when you can't ...the bag is not enough, but it is better to eat herbs, it is healthier”.

In studies carried out in Tabasco by Ruiz-Carrera et al. (2004), edible leaves and tips are highlighted as the phytoresources with the highest percentage composition of macronutrients. Sánchez-Hernández (2012) reports high protein contents in *Cestrum racemosum* Ruiz & Pav, *Jaltomata procumbens* (Cav.) J.L. Gentry, *Piper aurantium* Kunth and *Sinclairia discolor*, Hook & Arn collected in Pomoquita, Tacotalpa, Tabasco.

Most chayas come from the bush or milpa, although some can be found in home gardens such as momo and chaya col, however, as mentioned above, they can also be acquired through purchase (Figure 6).

Although Bye and Linares (2000) point out that the consumption of quelites has decreased since the conquest, in this study, the people interviewed mentioned that it is difficult for the community to stop consuming it because it is deeply rooted. This was stated by Interviewee 2:

“...you can't stop consuming, we are used to it, no, we don't stop, everybody consumes chaya. If you don't have it, you buy it, you sell it.

Finally, the importance of chayas was identified because, for many families, they are their main source of food and a saving in their economy, they are an abundant food that is consumed out of habit, and they also serve as a remedy for illnesses and are healthy.

CONCLUSIONS

Chayas are an important element in the diet of the inhabitants of the Tabasco highlands, as they are widely consumed. Although many species of edible leaves can be mentioned, the 14 species found in Cuitláhuac are used as the main ingredient, either boiled or fried. Chayas are highly valued because they represent a source of food and economy, are abundant, are rooted in the local culture, serve as remedies and are healthy.

ACKNOWLEDGMENTS

The authors would like to thank Leonardo de Jesús Torrez Martínez for his contribution to the field work.

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