

Current Anthropology Volume 49, Number 2, April 2008

© 2008 by The Wenner-Gren Foundation for Anthropological Research. All rights reserved.

0011-3204/2008/4902-0005\$10.00

## **Reports**

### **Food Globalization and Local Diversity**

#### ***The Case of Tejate***

Daniela Soleri, David A. Cleveland, and Flavio Aragón Cuevas

Geography Department, University of California, Santa Barbara, CA 93106-4060, U.S.A. (soleri@es.ucsb.edu)/Environmental Studies Program, University of California, Santa Barbara, CA 93106-4160, U.S.A. (cleveland@es.ucsb.edu)/Instituto Nacional de Investigaciones Forestales y Agropecuarias, Campo Experimental Valles Centrales, Melchor Ocampo 7, Santo Domingo Barrio Bajo, Etlá, Oaxaca, Mexico (faragoncuevas@yahoo.com.mx). 1 XI 07

\*\*\*\*\*

### **On-Line Supplements**

(Online text with supplements:

<http://www.journals.uchicago.edu.proxy.library.ucsb.edu:2048/doi/full/10.1086/527562?cookieSet=1#apb>)

#### **Supplement A *Tejate's* Origins**

The people of Mesoamerica have been preparing and drinking frothy beverages made with maize and cacao for millennia. Cacao-based beverages were an important part of ancient diets in the region, consumed especially by the elite and thought to have been a key element in ceremonies, including those that established and maintained important social alliances (Henderson and Joyce 2006, 147-52). Mayan paintings from 1,300 years BP depict the preparation of frothy chocolate beverages by pouring the liquid from vessel to vessel from high above, aerating it to create the desirable surface foam (Coe and Coe 1996, 50, 116-17). Fourteen clay vessels from the mid-late Formative Mayan (1,750-2,600 years BP, following Evans 2004) archeological site of Colha in northern Belize were probably used to prepare the chocolate-based drinks consumed at the time (Hurst et al. 2002). Using new analytical techniques, researchers found theobromine, a compound unique to cacao among Mesoamerican plants, in the residues inside these spouted vessels, providing strong evidence that the native peoples of this region have been drinking cacao-containing beverages for over 2500 years.

The possibility that cacao and the other nonlocal *tejate* ingredients (*pixtle* and *rosita de cacao*) reached the Central Valleys of Oaxaca long ago is supported by archeological evidence that even during the Early Formative period (3,200-2,900 years BP) long-distance trade was occurring between the Mixteca people just NW of the Central Valleys and areas on both Pacific and Atlantic coasts (Evans 2004, 171), probably including or crossing zones where cacao, *pixtle*, and *rosita de cacao* were grown. There is circumstantial evidence that *tejate* may have been an important ceremonial beverage in ancient Zapotec culture. Vessel types associated with consumption of frothed cacao beverages by royal classes and for ceremonies among other cultures in the region (e.g., Mayan and Aztecan), are also present in the archeological record of the Zapotec civilization in the Central Valleys (Coe and Coe 1996; Powis et al. 2002).

The Aztec were drinking foam-topped beverages when the Spanish invaders arrived in the New World (Coe and Coe 1996, 87). In his extensive *Historia general de las cosas de Nueva España, 1547-82*, Sahagún (1988, 626) described the preparation of beverages by first grinding cacao beans and then regrinding them together with cooked maize, after which a stream of water was introduced in order to create a foam-topped beverage. He also noted the addition of other ingredients to these beverages including honey, flower water, and aromatic spices suggestive of those used in making *tejate* today.

### **Additional References Cited**

- Coe, M. D., and S. D. Coe. 1996. *The true history of chocolate*. London: Thames and Hudson.
- Evans, S. T. 2004. *Ancient Mexico and Central America*. London: Thames and Hudson.
- Henderson, J. S., and R. A. Joyce. 2006. Brewing distinction: The development of cacao beverages in formative Mesoamerica. In *Chocolate in Mesoamerica*, ed. C. L. McNeil, 140-53. Gainesville: University of Florida Press.
- Hurst, W. J., S. M. Tarka Jr., T. G. Powis, F. Valdez Jr., and T. R. Hester. 2002. Cacao usage by the earliest Maya civilization. *Nature* 418:289-90.
- Powis, T. G., F. Valdez, T. R. Hester, W. J. Hurst, and S. M. Tarka. 2002. Spouted vessels and cacao use among the Preclassic Maya. *Latin American Antiquity* 13:85-106.

## Supplement B

### Tejate Ingredients

The most common version of *tejate* is *tejate de pixtle*, made with maize dough ground from grain processed with ashes, with seeds of cacao (*cacao rojo*, also known as *cacao de chocolate*), *pixtle* (the seed of mamey), and the blossom *rosita de cacao* (Soleri and Cleveland 2007). *Tejate de pixtle* is the type of *tejate* sold in the regional markets of the Central Valleys. Other ingredients sometimes include *cacao blanco*, sugar, and coconut. All of the ingredients used, except coconut and sugar when these are added, are from plants that originated in the Americas, and are grown in the region by small-scale farmers. Coconut and sugarcane, though not native to the region, are also grown there today.

Maize is the only food crop used in *tejate* that appears to have been grown in the Central Valleys since the beginning of agriculture. The *Bolita* maize racial complex is predominant in the Central Valleys (Wellhausen et al. 1952, 186-88; Pressoir and Berthaud 2004; Aragón Cuevas et al. 2005, 2006). The white varieties are the most common, followed by yellow and black maize (F. Aragón-Cuevas, field notes; Aragón-Cuevas et al. 2006). San Antonio is a drier environment with generally lower maize yields than Santa Maria (tables 1 and B1).

While maize is grown by all of the households in our survey, other *tejate* ingredients are purchased in the weekly markets in the Central Valleys, most often from a *patlaxtlera* (a person who sells *patlaxtle* or *pataxte* [Young 1994]) (fig. B1). When used, coconut and granulated sugar are purchased in the markets and in small local stores, respectively.

*Pixtle* is the seed of the mamey, *Pouteria sapota* (Jacq.) H.E. Moore & Stearn (Sapotaceae), a tree native to southern Mexico and grown in Mesoamerica and the Caribbean for its sweet fruit (Morton 1987). While mamey are grown in some home gardens in the Central Valleys (Velasquez Morales et al. 1996), the *patlaxtleras* we spoke with obtained *pixtle* from the state of Tabasco, southwest of Oaxaca City.

Two species of cacao are commonly used in making *tejate* (Soleri and Cleveland 2007). Although still debated (Ogata, Gómez-Pompa, and Taube 2006), it has been suggested that the genus *Theobroma* had an original distribution through northern and central South America where substantial phenotypic variation developed (Motamayor et al. 2002). According to this interpretation, after domestication in the Amazon, seed of one type of *Theobroma cacao* L. (Sterculiaceae) (the species most frequently used for chocolate and commonly known as *cacao rojo*, *cacao de chocolate*, or *cacao criollo*) traveled north into Mesoamerica with human migrants. Today *cacao* is grown in different areas of the world, including the Mexican states of Tabasco and Chiapas, where the *patlaxtleras* we spoke with

go to purchase it. The other species of cacao sometimes used for making *tejate* is *T. bicolor* Humb. and Bonpl. (*cacao blanco*), also called *pataxte* or *patlaxtle* in Mayan areas, obtained from the same source as *cacao rojo*. Considered a semi-domesticated species, *cacao blanco* has a distribution from Mesoamerica through northern South America, although no precise center of origin is known (Kufer and McNeil 2006).



Figure B1. The *patlaxtlera* Doña Rosa Gonzalez in the Zaachila market selling ingredients for *tejate* and other frothed beverages (photo D. A. Cleveland, used with permission of subject).

*Rosita* (or *flor* or *florecita*) *de cacao* is the aromatic blossom of a large, long-lived evergreen tree, *Quararibea funebris* (La Llave) Vischer (Bombaceae). Unrelated to *cacao*, this tree is native to the low tropics of Veracruz, Oaxaca, and Chiapas, is called *cacahoaxochitl* or *cacaxochitl* in Nahuatl, and has been used medicinally and to flavor beverages in Mesoamerica for centuries (Rosengarten 1977). The sixteenth-century *Diccionario de Motul*

states that in Yucatán people used *rosita de cacao* in chocolate (Schultes 1941, 225). It is a key ingredient in the most popular forms of *tejate*, giving the beverage its distinctive aroma and complementing the flavors of the other ingredients. Although it is grown in several communities in the Central Valleys, the major local source of *rosita de cacao* is San Andrés Huayapam, northeast of Oaxaca City, where the trees are grown by many families in their home courtyards (Cervantes Servin n.d.; Velasquez Morales et al. 1996).

The origin of the domesticated coconut (*Cocos nucifera*) is still being investigated. Purseglove (1985, 444-50) believes that it was domesticated in Melanesia, reached western Panama before 1492, and western Mexico by 1540. Recent studies using microsatellite markers support Southeast Asia and the South Pacific as its centers of origin and diversity; later movement east occurred via human migration eventually reaching the Pacific coast of South America, where it was encountered by the Europeans when they invaded (Perera et al. 2000; Teulat et al. 2000). Cultivated sugarcane consists of several species (*Saccharum* spp.) that originated in South Asia and New Guinea, with most modern varieties being interspecific hybrids particularly with *Saccharum officinarum* as one parent (Purseglove 1985, 214-20; Lebot 1999; Denham et al. 2003; Nakamaya 2004). Europeans brought sugarcane to the Americas, where it was produced by slaves; it was also being grown in Mexico in the sixteenth century (Mintz 1985, 33). To sweeten maize drinks and other foods (Coe 1994, 125-26) before the arrival of sugarcane, Mesoamericans used sugar made from maguey (*Agave* spp.) or cornstalks, as well as honey (García Acosta 1990, 46-47).

**Table B1**  
**Characteristics of Study Communities in the Central Valleys of Oaxaca, Mexico**

Characteristic	Santa Maria	San Antonio
Elevation (m.a.s.l.)	1,490	1,780
Average annual precipitation (mm)	685	468
Predominant soil characteristics	Alluvial, sandy clay	Piedmont, gravel
District average maize yield (t ha <sup>-1</sup> )	0.76	0.45
Average sowing rate (seed ha <sup>-1</sup> )	47,000	40,000
Municipal population size (2000)	2,518	2,410
Predominant ethnic/linguistic group	Mestizo/Spanish	Zapotec/Zapotec

**Sources:** Soleri and Smith (2002); for maize yield, INEGI (2005); for sowing rate, D. Soleri, field notes, 1996–99.

## Additional References Cited

- Aragón-Cuevas, F., S. Taba, F. H. Castro-García, J. M. Hernández-Casillas, J. M. Cabrera-Toledo, L. O. Alcalá, and N. D. Ramírez. 2005. In situ conservation and use of local maize races in Oaxaca, Mexico: A participatory and decentralized approach. In *Latin American maize germplasm conservation: Regeneration, in situ conservation, core subsets, and prebreeding (Proceedings of a workshop held at International Maize and Wheat Improvement Center [CIMMYT], April 7-10, 2003)*, ed. S. Taba, 26-38. México, D.F.: CIMMYT.
- Coe, S. D. 1994. *America's first cuisines*. Austin: University of Texas Press.
- Denham, T. P., S. G. Haberle, C. Lentfer, R. Fullagar, J. Field, M. Therin, N. Porch, and B. Winsborough. 2003. Origins of agriculture at Kuk Swamp in the highlands of New Guinea. *Science* 301:189-93.
- García Acosta, V. 1990. *Los señores del maíz: Tecnología alimentaria en Mesoamérica*. México, D.F.: Consejo Nacional para la Cultura y las Artes/Pangea.
- INEGI (Instituto Nacional de Estadística, Geografía e Informática). 2005. *Indicadores del XII censo general de población y vivienda 2000*. <http://www.inegi.gob.mx/est/default.asp?c=5171> (accessed August 30, 2007).
- Kufer, J., and C. L. McNeil. 2006. The jaguar tree (*Theobroma bicolor* Bonpl.). In *Chocolate in Mesoamerica*, ed. C. L. McNeil, 90-104. Gainesville: University of Florida Press.
- Lebot, V. 1999. Biomolecular evidence for plant domestication in Sahul. *Genetic Resources and Crop Evolution* 46:619-28.
- Mintz, S. W. 1985. *Sweetness and power: The place of sugar in modern history*. New York: Penguin.
- Morton, J. F. 1987. *Fruits of warm climates*. Miami: Julia F. Morton.
- Motamayor, J. C., A. M. Risterucci, P. A. Lopez, C. F. Ortiz, A. Moreno, and C. Lanaud. 2002. Cacao domestication. 1. The origin of the cacao cultivated by the Mayas. *Heredity* 89:380-86.
- Nakamaya, S. 2004. Species-specific accumulation of interspersed sequences in genus *Saccharum*. *Genes and Genetic Systems* 79:361-65.
- Ogata, N., A. Gómez-Pompa, and K. A. Taube. 2006. The domestication and distribution of *Theobroma cacao* L. in the Neotropics. In *Chocolate in Mesoamerica*, ed. C. L. McNeil, 69-89. Gainesville: University of Florida Press.
- Perera, L., J. R. Russell, J. Provan, and W. Powell. 2000. Use of microsatellite DNA markers to investigate the level of genetic diversity and population genetic structure of coconut (*Cocos nucifera* L.). *Genome* 43:15-21.
- Purseglove, J. W. 1985. *Tropical crops: Monocotyledons*. Revised ed. Essex: Longman.
- Rosengarten, F., Jr. 1977. *An unusual spice from Oaxaca: The flowers of Quararibea funebris*. Botanical Museum Leaflets 25(7). Cambridge: Harvard University Press.
- Schultes, R. E. 1941. Economic aspects of the flora of northeastern Oaxaca, Mexico. Ph.D. diss., Harvard University.
- Soleri, D., and D. A. Cleveland. 2007. *Tejate: Theobroma cacao* and *T. bicolor* in a traditional beverage from Oaxaca, Mexico. *Food and Foodways* 15:107-118.

- Soleri, D., and S. E. Smith. 2002. Rapid estimation of broad sense heritability of farmer-managed maize populations in the Central Valleys of Oaxaca, Mexico, and implications for improvement. *Euphytica* 128:105-19.
- Teulat, B., C. Aldam, R. Trehin, P. Lebrun, J. H. A. Barker, G. M. Arnold, A. Karp, L. Baudouin, and F. Rognon. 2000. An analysis of genetic diversity in coconut (*Cocos nucifera*) populations from across the geographic range using sequence-tagged microsatellites (SSRs) and AFLPs. *Theoretical and Applied Genetics* 100:764-71.
- Velasquez Morales, L., R. Ramirez Julian, R. Ramirez Santiago, and S. Nuñez Velasco. 1996. *Estudio de huertos tradicionales de los Valles Centrales de Oaxaca*. Oaxaca: Instituto Tecnológico Agropecuario de Oaxaca.
- Wellhausen, E. J., L. M. Roberts, E. Hernández X., and P. C. Manglesdorf. 1952. *Races of maize in Mexico*. Cambridge: Bussey Institution of Harvard University.
- Young, A. M. 1994. *The chocolate tree: A natural history of cacao*. Washington, D.C.: Smithsonian Institution.

## Supplement C

### Making *Tejate*

The preparation of *tejate* begins with the grinding together of the *pixtle*, one or two types of cacao beans, and the *rosita de cacao*, all of which have been toasted on a *comal* (the flat griddle ubiquitous in Mesoamerican cooking hearths). Toasting brings out their individual flavors and also makes for easier grinding. These ingredients may be ground entirely on a metate or hand-milled first to achieve the correct, fine consistency (fig. C1). To the resulting *maza de pixtle* (*pixtle* dough) is added *masa blanca* (white dough), made by soaking and cooking dry maize with the ashes of certain plants (containing approximately 43% calcium carbonate) to make it easier to grind. Maize cooked with ashes in this manner to make *tejate* is called *cuanestle*. The *cuanestle* is rinsed to remove the pericarps and then ground until the dough is uniformly smooth and very fine, with as many as ten passes on the metate. The two *masas* (*pixtle* and *blanca*) are then ground together to ensure that they are well mixed (fig. C2).



Figure C1. Ingredients for *masa de pixtle* being ground on the metate (photo D. A. Cleveland).



Figure C2. Regrinding and combining *masa blanca* and *masa de pixtle* on the metate (photo D. Soleri).

Although *tejate de pixtle* is the principle type of *tejate* made in many communities and by *tejateras*, other types, such as *tejate de coco* (coconut), are also prepared. This *tejate* is made by combining *masa blanca* and *masa de coco* (very finely ground fresh coconut flesh) or the *masa blanca* and a combination of *pixtle* and *coco* masas.

The final step in the preparation of *tejate* is mixing the two doughs with cool water to produce a white froth-topped liquid. The mixture is placed in a cool, dry bowl and water poured over it in small increments, traditionally with a *jícara* (a serving and drinking bowl made from the fruit of *Crescentia cujete* or *C. alata*). As the water is introduced the person mixing the *tejate* uses her fingers to squeeze and then whip the dough and the water together, pressing against the side of the bowl. When *tejate* is made in the home, it may be slightly sweetened by dissolving sugar in water and slowly mixing this syrup into the liquid before the final frothing. Commercial *tejateras* often leave their *tejate* unsweetened, adding syrup to taste in customers' individual servings. The remaining water is added a little at a

time from a *jicara* held at arm's length above the bowl. The force of this stream of water helps incorporate air into the emulsion, and it is trapped by the fat from the *cacao* and the *pixtle* to produce the foam that is the sign of good *tejate*. This method of raising foam in a *cacao* beverage was depicted on a late Classic (1,400-1,100 years BP) Mayan vessel (fig. C3) and in early-colonial-period documents such as the Florentine Codex (reproduced in Henderson and Joyce 2006, 148).

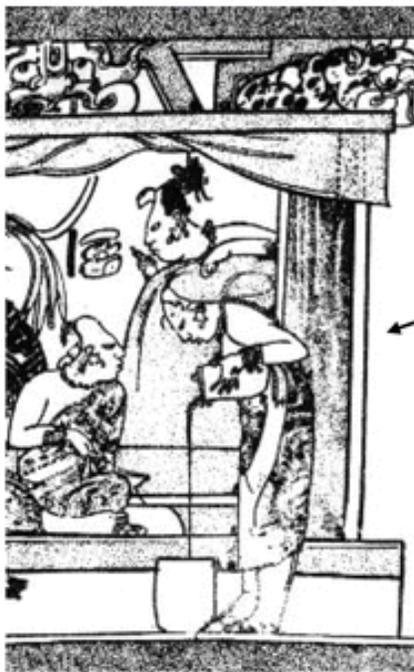


Figure C3. The "Princeton Vase," late Classic Maya, 1,300 years BP, showing presumed preparation of frothed cacao beverage by pouring liquid into liquid from a height (upper photo Justin Kerr, image K511).

The final mixing is a critical step for producing a good *tejate*, but it may also have broader social and cultural importance because it is the step observed by the many people who drink *tejate*, not just those who prepare it. In some households we spoke with the parents who recalled that when they were children most families would take their doughs and equipment to the field and mix and serve the *tejate* there, fresh for those working. One family recalled

the familiar “thunder” of women’s hands rapidly whipping the *masa* and water together against the walls of their bowls to prepare their *tejate*. In the home, *tejate* is often whipped immediately before serving in front of those who will be drinking it. In markets, the first group of customers waiting to buy a *jícara* of *tejate* will often watch *tejateras* as they mix their dough and water and raise the requisite foam.

Because of its refreshing but filling quality, people in rural areas may drink *tejate* during their workday and not eat or drink much else until work is over in the early afternoon. In communities such as San Antonio the final mixing and drinking of the *tejate* may still occur in the field during a midday break. Elsewhere *tejate* is served in the home compound to household members and hired laborers at the end of the workday in the late afternoon, along with the main meal. A serving *jícara* (fig. C4) is used to fill the typical red-painted and -decorated drinking *jícaras*, and some foam is added to each serving.



Figure C4. A serving *jícara* floats in a bowl of homemade *tejate* that is ready to be served (photo D. A. Cleveland).

### **Additional Reference Cited**

Henderson, J. S., and R. A. Joyce. 2006. Brewing distinction: The development of cacao beverages in formative Mesoamerica. In *Chocolate in Mesoamerica*, ed. C. L. McNeil, 140-53. Gainesville: University of Florida Press.