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RECOVERY OF THE TRADITIONAL "ALISAR" CONSTRUCTION TECHNIQUE IN MORELOS, MEXICO

RECUPERACIÓN DE LA TÉCNICA CONSTRUCTIVA TRADICIONAL "ALISAR" EN MORELOS, MÉXICO

RECUPERAÇÃO DA TÉCNICA CONSTRUTIVA TRADICIONAL "ALISAR" EM MORELOS, MÉXICO



Figure 0. Tlecuil on the singular parapet of Metepec, Morelos. Source: Preparation by the Authors in 2024.

Artigo financiado pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)

ABSTRACT

The traditional construction technique known as alisar is the result of the wisdom of the inhabitants of Metepec, Morelos, Mexico, and the surrounding region. It is used to build and repair the cuezcomate (barn) and the tlecuil (fire pit) using local materials such as ash, nejayote, and earth. Despite its singular nature, this technique is at risk of disappearing because it is not being passed on to future generations and lacks documentation. Its recovery could provide long-term, sustainable continuity for adobe housing and improve the living conditions of families. The objective of this research is to recover the traditional construction technique of alisar to ensure the continuity of spaces and places within an adobe house in Metepec, Morelos. In the methodological process, analytical tools from architecture, vernacular architecture, and ethnography are employed. These contribute to the theoretical and descriptive basis of traditional construction techniques, the characterization of local traditional knowledge, the practical application of the traditional alisar technique, and the process to pass this technique on. The results show how the described technique represents a sociocultural, traditional, and sustainable response for the continuity of traditional architecture in its material and intangible dimensions, as well as for the generation of new construction alternatives in the region.

Keywords: vernacular architecture, adobe house, traditional knowledge, culture, sustainability

RESUMEN

La técnica constructiva tradicional de alisar es producto de la sabiduría de los habitantes de Metepec, Morelos, México y la región, se utiliza para construir y cuidar el cuezcomate y el tlecuil a partir del uso de materiales locales como ceniza, nejayote y tierra. A pesar de su singularidad, esta técnica corre el riesgo de desaparecer por la pérdida de transmisión y ausencia de registro. Su recuperación podría otorgarle a la casa de adobe una continuidad duradera y sustentable y mejorar las condiciones de habitabilidad de las familias. El objetivo de esta investigación pretende recuperar de manera integral la técnica constructiva tradicional de alisar para la continuidad de los espacios y lugares de la casa de adobe de Metepec, Morelos. En el proceso metodológico se emplean herramientas de análisis de la arquitectura, arquitectura vernácula y etnografía, las que contribuyen al sustento teórico y descriptivo de las técnicas constructivas tradicionales, la caracterización del conocimiento tradicional local, la puesta en práctica de la técnica tradicional de alisar y sus procesos de transmisión. Los resultados muestran cómo la técnica descrita representa una respuesta sociocultural, tradicional y sustentable para la continuidad de la arquitectura tradicional en su dimensión material e inmaterial y la generación de nuevas alternativas constructivas en la región.

Palabras clave: arquitectura vernácula, casa de adobe, conocimiento tradicional, cultura, sustentabilidad

RESUMO

A técnica construtiva tradicional conhecida como alisar é fruto da sabedoria dos habitantes de Metepec, Morelos, no México, e da região; ela é utilizada para construir e conservar o cuezcomate (granário tradicional de origem náuatle) e o tlecuil (fogão tradicional de lenha), a partir de materiais locais, como cinza, nejayote (água residual da nixtamalização do milho) e terra. Apesar de sua singularidade, essa técnica corre o risco de desaparecer devido à perda de transmissão e à ausência de registros. Sua recuperação poderia assegurar a continuidade duradoura e sustentável das casas de adobe e melhorar as condições de habitabilidade das famílias. O objetivo desta pesquisa é recuperar de maneira integral a técnica construtiva tradicional de alisar, visando a continuidade dos espaços e locais das casas de adobe de Metepec, em Morelos. No processo metodológico, são empregadas ferramentas de análise da arquitetura, da arquitetura vernacular e da etnografia, que contribuem para a fundamentação teórica e descritiva das técnicas construtivas tradicionais, a caracterização do conhecimento tradicional local, a aplicação prática da técnica tradicional de alisar e seus processos de transmissão. Os resultados mostram como a técnica descrita representa uma resposta sociocultural, tradicional e sustentável para a continuidade da arquitetura tradicional em suas dimensões material e imaterial, bem como para a geração de novas alternativas construtivas na região.

Palavras-chave: arquitetura vernacular, casa de adobe, conhecimento tradicional, cultura, sustentabilidade

INTRODUCTION

In Mexico, vernacular architecture, its typologies, and traditional construction techniques are manifestations of diversity and cultural richness; they represent the most genuine human wisdom in creating their habitat. Traditional construction knowledge supports vernacular expressions and allows the materialization of constructive techniques such as the adobe system, tapial, bajareque, and terrado (Prieto, 1978; Guerrero Baca, 2014; Vizcarra de los Reyes, 2020), as well as unregistered local techniques. This knowledge is millenary, transmitted and inherited from generation to generation, and represents "the cornerstone from which the vernacular heritage is sustained" (Sánchez Suárez, 2020, p. 84).

Traditional constructive knowledge, together with constructive techniques, is in danger of disappearing due to a lack of understanding of their multidimensional characteristics of habitability, the imposition of modern construction cultures, the loss of transmission, and the absence of records. Metepec is a community in the northeastern region of the state of Morelos, in Mexico. It has a total population of 2,942 inhabitants, is rural, and its residents use the constructive technique of smoothing, or *alisar*, to build and maintain the *cuezcomate* (barn) and the adobe house's *tlecuil* (fire pit), using local materials and everyday products. However, the continuity of this technique is at risk due to the aforementioned factors. The *cuezcomate* is located in the center of the courtyard of the adobe house. It is used to store corn and symbolizes a sacred place. On the other hand, the *tlecuil*, or fire pit, is located inside the kitchen of the same name. It is used to prepare corn tortillas and daily meals for families.

The theoretical approach of the traditional construction technique of smoothing (*alisar*) is framed within traditional knowledge and vernacular architecture. Those who enrich the concept of traditional knowledge are the works of the World Conference on Science (United Nations Educational, Scientific and Cultural Organization [UNESCO], 1999), Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO, 2003), Pérez Ruiz and Argueta Villamar (2011), Acuña Castrellón (2013), Valladares and Olivé (2015), Amescua Chávez, Topete Lara and Rebollo Cruz (2024), Sánchez Suárez (2020), Vizcarra de los Reyes and Hernández Spinola (2020), and the Letter on Philosophical Thought in Cultural Heritage (2024). The World Intellectual Property Organization (2020) recognizes traditional knowledge as the living body of knowledge, created, maintained, and transmitted from one generation to another within a community. The works that explain vernacular architecture and its diversity of expressions are Prieto (1978), Sánchez Suárez (2006), Sánchez Suárez (2020), Guerrero Baca (2014), Herrera Rivas and Medina Márquez (2018), Vizcarra de los Reyes (2020), Herrera Rivas, Hernández Sánchez and De La Torre Sánchez (2024) and Herrera Rivas, Hernández Sánchez and De La Torre Sánchez (2025).

Accordingly, the traditional construction technique of *alisar* is a product of the inhabitants' wisdom; it is used to build and maintain the *cuezcomate* and the *tlecuil*, using local materials such as ash, nejayote, and earth. The ash is

solid waste produced by the combustion of wood in the tlecuil; the nejayote is a yellow substance obtained from the nixtamalization process¹; and the yellow earth is from the local clay soil. The full recovery of the technique could ensure lasting, sustainable continuity for adobe housing in Metepec, Morelos. This research aims to comprehensively recover the traditional *alisar* construction technique to ensure the continuity of the spaces and places of adobe housing in Metepec, Morelos. The relevance of this study lies in the need to improve the deteriorating conditions of living spaces, enhance the knowledge of the inhabitants to enable them to generate their own sustainable construction strategies, and enrich the theory and methodology of vernacular architecture in local contexts.

The document is structured in three sections. In the first, traditional construction techniques are presented in a theoretical and conceptual way. In the second, the cuezcomate and the tlecuil of Metepec, Morelos, are characterized through the architectural survey, registration, and identification of architectural, structural, and constructive components. In the third, the smoothing (*alisar*) constructive technique for cuezcomate and the tlecuil is presented, along with the processes of its teaching. The most important results show that the recovery of the smoothing technique represents a socio-cultural, traditional, and sustainable response to the continuity of the adobe house and the generation of new constructive alternatives in the region.

Linking built heritage

Traditional construction knowledge is a component of Intangible Cultural Heritage (ICH); the Convention for the Safeguarding of the Intangible Cultural Heritage of the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2003) refers to it in the field of traditional craft techniques. Valladares and Olivé (2015) state that traditional knowledge has been generated, preserved, and applied by communities to understand and solve social and environmental problems. Despite these particularities, due to their non-scientific origin, science, academia, and governments have disqualified them.

The World Conference on Science, organized by UNESCO (1999), considers traditional knowledge to be an understanding of the world that has contributed to science and technology and should be preserved, protected, and promoted. It should be noted that women are the backbone in the construction of the tradition and transmission of this knowledge, and the Charter on Philosophical Thought (UNESCO, 2024) has ratified this statement.

More precisely, Vizcarra de los Reyes (2020) recognizes the constructive traditions of the world, products of place-specific physical conditions and culture. In this line, Sánchez Suárez (2020) indicates that constructive knowledge is the cornerstone on which vernacular heritage is sustained.

¹ Ancestral traditional process of cooking corn with hydrated lime and water to make tortilla dough in Mexican gastronomy.

On the other hand, vernacular architecture encompasses diverse construction systems and traditional techniques. Vizcarra de los Reyes (2019) interprets it as the living cultural memory that evolves within its cultural contexts. Throughout Mexico, different vernacular expressions are identified such as the adobe house, Mayan house, flooring, cuezcomates, zincolotes, tlecuils, bread ovens and steam rooms (Prieto, 1978; Sánchez Suárez, 2006; Sánchez Suárez, 2020; Guerrero Baca, 2014; Herrera Rivas & Medina Márquez, 2018; Vizcarra de los Reyes, 2020; Herrera Rivas, Hernández Sánchez & De La Torre Sánchez, (2024) and Herrera Rivas, Hernández Sánchez & De La Torre Sánchez (2025). The traditional technique is the construction technology and the subsistence pillar of vernacular architecture (Sánchez, 2006). The unique construction techniques of vernacular architecture include the adobe system, the tapial, the bajareque, the roof, stone masonry set in earth, and mixed systems derived from these.

The adobe technique involves molding sun-dried clay blocks to build load-bearing structures such as walls, arches, vaults, and domes (Guerrero Baca, 2014). The adobe pieces for structural walls are bonded with rope and embers. The adobe blocks are rectangular and wedge-shaped. The latter are used for circular spaces such as the cuezcomate, the temazcal, and the bread oven. The sizes of the adobe blocks are $0.62 \times 0.28 \times 0.09$ m, $0.60 \times 0.40 \times 0.09$ m, and $0.45 \times 0.35 \times 0.09$ m. The tapia technique is a rammed-earth method for building load-bearing walls, in which layers of earth are poured into formwork (Vizcarra de los Reyes, 2020). The bajareque technique is a structural system comprising dividing walls built from a network of plant material covered with earth (Guerrero Baca & Ramírez Rodríguez, 2024). According to Sánchez Suárez (2006), it is a dividing palisade built of sticks on which a mixture of earth and water or mud is placed. From the techniques described, a mix of techniques emerged to meet collective and family needs. Many of them have not been documented to date, posing a risk of disappearance. This is the case of the cuezcomate in Metepec, Morelos, which uses the technique of weaving red grass into a rope, then coating it with layers of a mixture of earth, water, and ash.

METHODOLOGY

The research is based on grounded theory and participatory action research. The first involves collecting and analyzing data related to the study problem to explain the phenomenon through interpretative processes (Strauss & Corbin, 2002; Martínez Isidro et al., 2022). The second puts the possible solution into practice through knowledge exchange among actors, according to Usher and Bryant (1992) and Fals Borda (2007). Data collection techniques use tools from architecture, vernacular architecture, and ethnography.

This research's methodology comprised three stages. In the first stage, a conceptual and descriptive review of three traditional construction techniques is presented: adobe, bajareque, and tapial. The second stage describes the traditional construction knowledge of Metepec, Morelos, to characterize the



cuezcomate and the tlecuil, through the architectural survey, registration, and identification of architectural, structural, and constructive components of four tlecuils and thirty-one cuezcomates. 8 in-depth interviews were also conducted with four owners of tlecuils and four of cuezcomates. In the third section, the traditional *alisar* construction, or smoothing, for the conservation of four cuezcomates and four tlecuiles in disrepair is presented, identifying the processes involved in recovering this technique.

Traditional constructive knowledge in Metepec, Morelos

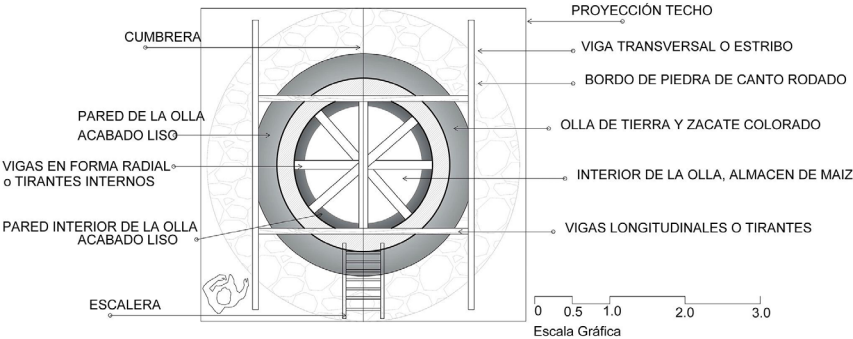
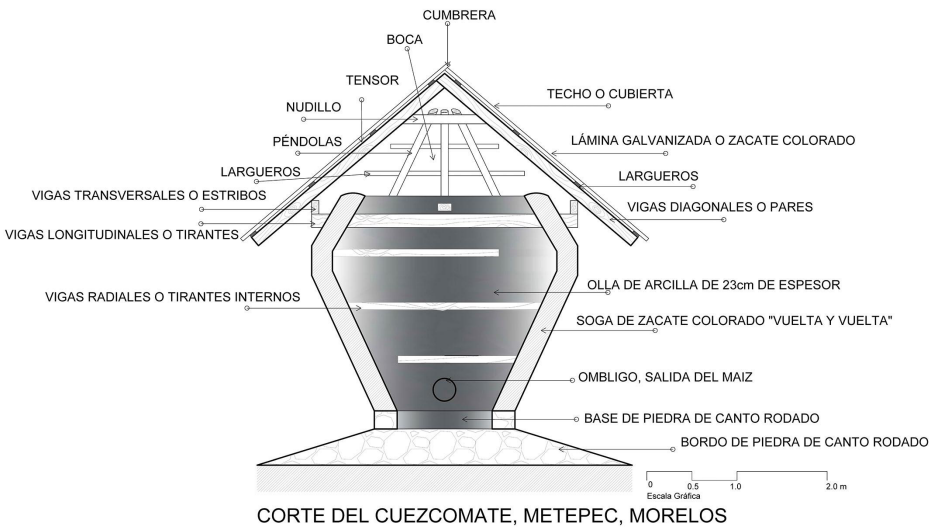
Metepec is a community in the state of Morelos. It is distinguished by its adobe houses, with cuezcomates in the heart of the courtyards and tlecuils in the kitchens. Both are built with traditional construction techniques. The cuezcomate is the central and articulating component of the adobe house's spatial layout. It is considered a place because of its symbolic value. Currently, there are 31 cuezcomates in good condition, and according to the inhabitants of Metepec, it is where they keep their corn (Figure 1).

Alpuche (Alpuche Garcés, 2008; Alpuche Garcés, 2015) recognizes the cuezcomate as a storage place and element of Mesoamerican origin. Structures of this type have been located in Chihuahua, with "la Cueva de la Olla" being recognized as the oldest in Mexico (National Institute of Anthropology and History [INAH], 2025), and in the valleys of Mexico,

Figure 1. Cuezcomate located in the center of the courtyard of the adobe house. Source: Prepared by the Authors in 2023, Metepec, Morelos.

Figure 2. Cross section of the components of the cuezcomate, Metepec, Morelos. Source: Prepared by the Authors in 2023.

Figure 3. Plan view of the Cuezcomate, Metepec, Morelos. Source: Prepared by the authors in 2023.



Toluca, Puebla, Tlaxcala, and Morelos. The Metepec cuezcomate is located in the center of the courtyard of the adobe house; the courtyard covers 132 m², of which 9 m² is the cuezcomate. The use is intended to store up to sixty-five loads of corn² obtained from sowing maize on six hectares of land. Filling the cuezcomate with corn brings a sense of pride because it will provide food for the family, which consumes 3,000 tolls of corn annually.

The cuezcomate is circular, like a clay pot. Symbolically, it is considered the protective mother of corn according to Alpuche Garcés (2015). Its round shape and smooth finish follow the constructive and structural system. This also prevents the entry of insects and rodents, thereby protecting the corn kernels.

² 65 loads of corn are equivalent to 6,500 tolls, 9,750 kilograms, or 9.75 tons. Producing 65 loads of corn requires an area of 60,000m². Information obtained from the inhabitants of the community of Metepec, Morelos.

The structural characteristics and construction improvements have allowed it to remain stable for more than a hundred years, despite the area's seismic activity. The components that structure the shape of the kitchen are the side, the base, the pot, and the roof (Figure 2 and Figure 3).

The wall is a buttress at the base of the Cuezcomate; it provides stability,

resistance to thrusts, and protection from environmental factors such as rain and humidity. Its shape is circular, with a slope of approximately 20%, and it is built with boulder stone set with mud.

The circular base is made of boulder stone masonry set in mud, has an approximate diameter of 1.60 m, reaches a height of 70 cm, and stands on firm ground.

The pot is where the corn is stored. Its structure is woven from red grass into a rope that follows the base's circular shape. The thickness of the pot's wall is approximately 23 cm, and its total height is 3 m. The diameter of the pot's base is 1.60 m. The first two-thirds have a diameter of 3 m, and the last third has a diameter of 2.30 m. The pot's internal structure consists of beams or internal wooden braces placed radially, recessed into the pot's wall. The separation between each beam is 50 cm. Its main role is to reinforce and unite the structure.

The ceiling is the roof of the cuezcomate. It has a wooden structure with two sides. The base consists of two longitudinal cedar beams that run through the pot's walls, joined by two transverse beams or buttresses that form a quadrangular or rectangular base. The diagonal or paired beams are placed on the buttresses, connected by a joint, which gives shape to the frame. This triangular piece is placed at 60 cm intervals and is joined to crossbeams at 60 cm intervals. In each section of the roof slope, a diagonal tensioner is installed, allowing the crossbeams to be joined to the pairs. On the side behind the mouth of the cuezcomate, three queen posts are placed at the joint, allowing it to be connected to the base of the frame. To cover the roof, red grass is used and has currently been replaced by zinc-coated sheets. The total height of the cuezcomate ranges from 4.50 m to 6 m.

The term *tlecuil*, from Nahuatl, means "home"; its origin dates back to the boom of pre-Hispanic cultures, as noted by Quiroz Carranza and Cantú Gutiérrez (2012). Currently, it is located inside the kitchen of the Tlecuil. The surface of this space is 14 m². The tlecuil rests on the base, called the parapet, which serves as a table, and together they comprise an area of 1.8 m². This space is used to make corn tortillas, prepare food, and for family meal-related activities (Figure 4). It symbolizes the family union and the warmth of home and life; it is the woman's place, and she decides where to build it, as well as its shape, size, materials, and finish. The tlecuil consists of the following components: parapet, neck, chair, and hotplate.

The tlecuil is where the fire and the family's hearth are found. It has a C-shaped setup with adobe pieces and a height between 20 cm and 28 cm; the thickness is 15 cm, the diameter ranges from 50 cm to 70 cm, and the mouth from 30 cm to 35 cm. The hotplate is placed on top of the tlecuil, and the neck is centered.

The parapet is the tlecuil's base and is used as a table for eating and for



Figure 4. Tlecuil on the singular parapet of Metepec, Morelos.
Source: Preparation by the Authors in 2024.

storing kitchen utensils, such as the grinding stone, tortillera, bread basket, pots, jars, and earthenware pot. Its height is 45-55 cm, length is 1.50 m, and width is 80 cm. It is built with adobe placed on rope or headers; the central space is filled with earth and pieces of fired red clay. The final finish with a uniform appearance is called smoothing or *alisar*; women manually carry out this technique by mixing ash, nejayote, and water.

The neck is the center of the tlecuil; it is recognized as the navel. It is an earthen jar buried below the parapet; its diameter is 10 cm, and its depth is 15 cm. The role of this neck is to maintain the place's warmth, store embers, and facilitate lighting the fire.

The small wooden chair is used to sit next to the tlecuil and parapet. Every woman who occupies this place does so as they prefer, considering their anthropometric characteristics.

The hotplate is made of fired red clay; it is large, with a diameter of 55 cm; there are also small (35 cm), medium (45 cm), and jumbo (60 cm) sizes. Before use, it is cured to prevent leaks and the tortilla from sticking to it. For

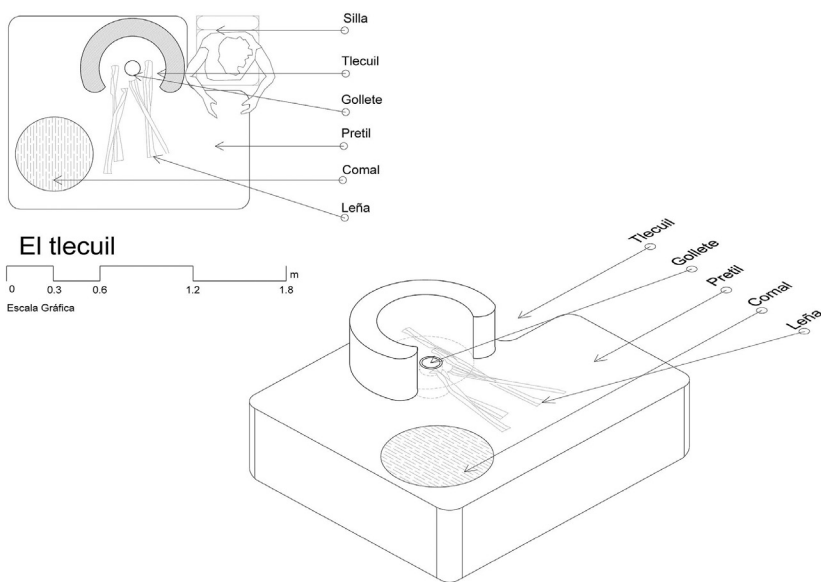


Figure 5. Views of the Tlecuil, Metepec, Morelos. Source: Prepared by the Authors in 2023.

this, it is heated, and lime dissolved in thick water is spread over the entire surface (Figure 5).

The Alisar Technique

The *alisar* traditional construction technique is used to provide a final finish to newly built cuezcomates and tlecuiles, and to repair those in disrepair in Metepec, Morelos. This technique improves their physical and aesthetic conditions and is intended to support the family's food preparation. Using ash, nejayote, earth, and water, the main tools for this intervention are the hand and vegetable fiber.

Smoothing the cuezcomate contributes to its upkeep, helping prevent severe deterioration caused by environmental, biological, and mechanical factors. This technique, performed by all the family, is applied to the cuezcomate's base and pot, giving the surfaces a uniform, smooth appearance. It is typically performed every 10 years or when fractures, fissures, or significant detachments occur. Today, cuezcomates are no longer built, so the technique is used exclusively for their conservation.

The materials required to smooth the cuezcomate are yellow earth, ash, nejayote, and water. The earth is yellow, free of organic residues, and is taken from the region's earth banks. The ash is obtained from burning firewood in the tlecuil. The nejayote is the yellow liquid from nixtamal, a product of cooking corn with lime and water, while the water needs to be free of impurities. The exact amounts of the mixture's components vary with the cuezcomate's size. To smooth a cuezcomate that stores sixty-five loads of corn, the average size seen in the community, five earthen jars, one of ash, 19 liters of nejayote, and 35 liters of water are required. The storage volume of one jar is 19 liters; the ratio of earth, ash, and nejayote is 5:1:1.

Figure 6. Assessing the cuezcomate’s conservation.
Source: Prepared by the Authors in 2025.

Figure 7. Cracks and detachment of earth fragments in the cuezcomate’s pot. Source: Prepared by the Authors in 2025.

Figure 8. Dancing on a mixture of earth, ash, and nejayote. Source: Prepared by the Authors in 2025.





Figure 9. Final finish of the cuezcomate's pot. Source: Prepared by the Authors in 2025.

Additionally, 60 liters of nejayote are used to moisten, seal, and give the cuezcomate its final finish.

The smoothing process for the cuezcomate begins by cleaning the cover, pot, and base. Organic residues and external pathogenic agents are removed to assess the state of conservation and identify environmental, biological, and mechanical deterioration that triggers fissures, cracks, fractures, erosion, and the breaking off of earthen fragments (Figure 6 and Figure 7).

After the materials are collected, the mixture is prepared. The materials require the yellow earth and the ash to be sieved through a 1mm mesh, and the nejayote to be strained through a 2mm mesh to ensure purity. Once these criteria have been met, the earth-ash-nejayote mixture is prepared at a 5:1:1 ratio. To prepare the mixture, the people in charge of this intervention dance on the earth barefoot to ensure the homogeneous integration of all components (Figure 8).

The surface of the cuezcomate to be intervened in is then wet with nejayote. The cracks, fractures, fissures, and detached earthen fragments are filled with the earth-ash-nejayote mixture. This is then allowed to dry for about an hour. Once this stage is completed, the uniform, final finish is applied to the pot's entire surface. The mixture is diluted with nejayote and spread by hand (Figure 9). To finish, a coat of nejayote, a liquid, is applied for final sealing. The intervention starts at the top and continues to the bottom to prevent runoff.

Smoothing the tlecuil is done by the women who live in the adobe houses. They are the ones who make decisions regarding its construction, design, and care. This process is carried out in the days leading up to traditional festivals and celebrations, and when deterioration warrants

Figure 10. Tlecuil and deteriorated parapet. Source: Prepared by the Authors in 2023.

Figure 11. Fine ash-nejayote mixture, 1:1 ratio. Source: Prepared by the Authors in 2023.

Figure 12. Tlecuil with its smoothed parapet in the adobe house. Source: Prepared by the Authors in 2023.



it (Figure 10). After the intervention, the tlecuil is left with a uniform, smooth, clean, and aesthetically pleasing parapet.

The materials required to smooth the tlecuil are ash, nejayote, and water. The processes and characteristics are the same as those described above for smoothing the cuezcomate. Smoothing a tlecuil with an average surface area of 12 m² requires 2 containers of ash, 40 liters of nejayote, and water; the amount of the latter may vary. The storage volume of the container is 19 liters; the ash-nejayote ratio is 1:1. The tools used to perform this action are a hand, a shovel, a 1-mm mesh, and 19-liter containers.

To start smoothing the tlecuil, two mixtures of ash-nejayote are prepared, one coarse and one fine. The first is used to fill the erosion, deformations, cracks, and fractures. Its preparation requires ash sieved through a 2 mm mesh and mixed with nejayote in a 1:1 proportion. The second is used to fill fissures and give the parapet and tlecuil their final finish. The ash is sieved through a 1-mm mesh and mixed with the nejayote at a 1:1 ratio (Figure 11).

The tlecuil and its parapet are then cleaned to remove contaminating residues. This allows assessing the state of conservation and identifying environmental and mechanical deterioration, including erosion, deformation, fissures, cracks, fractures, detachments, and settlement. The affected areas are then wetted to fill and level the cavities and slumping. Erosion, detachments, deformations, cracks, fractures, and fissures are treated with a coarse-and-fine mixture. This is then allowed to dry for about an hour.

When the surface is properly leveled, compacted, and dry, the first coat of the final finish is applied to the entire surface with the coarse mixture. The second coat is applied with the fine mixture. The entire surface of the tlecuil and the parapet is covered. Finally, to seal the smoothing, the fine mixture is diluted in nejayote and applied to the parapet and the tlecuil (Figure 12). To conclude, the hotplate is cured with slaked lime water, applied with a vegetable fiber. This is used to clean and seal the fired red clay hotplate.

Both actions took place at the family and academic levels. At the family level, the teachers of traditional knowledge passed on the technique to their sons, daughters, and grandchildren through voluntary involvement and collaboration. The children got involved by observing and playfully repeating what adults did. At the academic level, bachelor's degree students in architecture from the "Archiquitzin" and "Weaving Heritage" groups collaborated and learned the technique through their participation and the teaching of traditional knowledge teachers.

In general, vernacular architecture topics have historically been

CONCLUSIONS

excluded from architectural theory and academia. On the other hand, methodological approaches to research related to the topic tend to analyze it from a disciplinary perspective by dissociating the physical components that characterize it as materials, constructive techniques, and structure from the sociocultural ones, which include cultural practices, knowledge, and symbols. This way of researching has led to subjective assertions that it is an exhausted field; however, an interdisciplinary vision shows that it is a dynamic field of constant interpretation, as it is closely linked to the social and cultural dimensions.

The consulted documents on vernacular architecture showed that there are still gaps in the literature explaining the traditional architecture of each region of Mexico, and that there are unidentified and undocumented expressions that undermine the knowledge, understanding, and valuation of this architecture.

Traditional construction knowledge has addressed the ways of inhabiting premises of different cultural groups through the materialization of traditional constructive techniques such as smoothing and the use of adobe, tapial, bajareque, and roofing systems. This knowledge, due to its non-scientific origin, continues to be dismissed by scientific, academic, and governmental spheres, despite its validity, as it is applied to solve economic, cultural, social, and environmental problems in communities.

The results of this research allowed us to identify that the smoothing technique in Metepec, Morelos has a millenary origin taken from traditional construction knowledge, is passed on from generation to generation, and is structured by knowledge of the environment, local construction materials, and conservation processes. This technique is evident at the regional level in Morelos; however, the cultural richness of Metepec allowed the research to focus on the cuezcomate and tlecuil of adobe houses.

The smoothing technique is used to build, maintain, and improve the surfaces of the adobe house before traditional religious and significant family holidays. The management, use, and acquisition of materials for this technique, the products of food preparation, and the natural environment support the reaffirmation of its sustainability across the economic, social, environmental, and cultural dimensions. The implementation of the smoothing technique contributed to improving living spaces in disrepair, reactivating their use, appropriating and transmitting traditional knowledge, and developing strategies for conserving their cultural heritage.

Finally, it is essential to continue research and recover traditional constructive expressions in a comprehensive, horizontal manner, so that the residents can rehabilitate their spaces, recover their traditional knowledge, improve their living conditions, and generate new sustainable construction alternatives at different scales to reverse the current environmental crisis.

Conceptualization, F.B.H.R.; Data Curation, F.B.H.R., A.H.S. and C.E.D.L.T.S.; Formal analysis, F.B.H.R.; Acquisition of financing, Secretariat of Science, Humanities, Technology and Innovation (SECIHTI), Distinguished Autonomous University of Puebla (BUAP); Research, F.B.H.R.; Methodology, F.B.H.R., A.H.S. and C.E.D.L.T.S.; Project management, F.B.H.R.; Resources, Secretariat of Science, Humanities, Technology and Innovation (SECIHTI), Distinguished Autonomous University of Puebla (BUAP); Software, AutoCAD, ArcGIS; Supervision, A.H.S. and C.E.D.L.T.S.; Validation, A.H.S. and C.E.D.L.T.S.; Visualization, A.H.S. and C.E.D.L.T.S.; Writing - original draft, F.B.H.R.; Writing - revision and editing, F.B.H.R.

CONTRIBUTION OF AUTHORS CRediT

Study taken from the research project "Learning processes of traditional family architecture Archiquitzin. Girls and boys as protagonists in the continuity of the Adobe House: Metepec, Morelos" of the Benemérita Autonomous University of Puebla, funded by the Secretariat of Science, Humanities, Technology and Innovation (SECIHTI).

ACKNOWLEDGMENTS

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