



Ancestral Knowledge of the Clay Oven in the Traditional Bakery as a Contribution to the Family Economy of the Río Chico Parish



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Abstract

The research is about the recovery of the ancestral knowledge of the clay oven in the traditional bakery, to study the rescue of the ancestral knowledge of the clay oven in the traditional bakery as a contribution to the family economy of the Río chico parish. A field investigation was applied by applying an open interview to a knowledgeable person of the ancestral knowledge of the rurality of the Río chico parish, about the knowledge of the construction technique of the clay and adobe oven used in the manufacture of loaves, threads, and sweets in the community. The results were the description of the construction process, and the operation of the ancestral furnace is evidenced by photographs. Conclusions inherent to the importance of the recovery of ancestral knowledge as part of the montuvian peasant identity of the Manabí rurality and the Ecuadorian coast were reached, as it was part of several works referring to the rescue of traditional knowledge and ancestral knowledge of the Aboriginal peoples from which they come as manabitas.

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1 Introduction

Ancestral knowledge, in general, constitutes traditional knowledge of knowledge and practices conserved over time by native peoples, configuring a particularity of their varied identity between different nationalities of indigenous peoples and that have been transmitted by generations for centuries determining a Harmonic link with Pacha Mama considered as a central axis of ancestral knowledge (Villalba & Inga, 2021), thus it is also called traditional knowledge or knowledge that indigenous peoples, local communities have about relationships with their environment and are transmitted from generation to generation, usually orally, collectively constructed and transmitted from generation to generation (De la Cruz et al., 2005).

In Ecuador, the breadth of traditional knowledge includes gastronomic knowledge, coming from the aboriginal and indigenous culinary wealth of rural peasant communities, who have been able to transmit the ancestral wisdom regarding the cultivation of agricultural products that are a fundamental part of the preparation of food, from the basics to the most exquisite dishes (Unigarro, 2015), since "Ecuadorian gastronomy constitutes a body of knowledge, techniques and culinary uses that are applied to the local food product, transmitted for generations to preserve the tradition and culture of their towns" (Cardenas et al., 2016). In this same context, the definition of ancestral knowledge as "a total social fact, deducing that all fields of culture and organizations influence in some way this transmitted knowledge" is directly related to gastronomic culture and national cultural tourism and Furthermore when visiting unknown places and communities, the gastronomic aspect of these territories is linked, their traditional food as an identification of their intercultural wealth (Quiroz & Pacheco, 2016).

Likewise, in the province of Manabí, the inhabitants of pre-Columbian cultures, settled along the coast, used curious artifacts for cooking food, such as the clay oven and the wood stove, with certain similarities, but also marked differences, coinciding with the same purpose; Cultural and traditional custom that has crossed the border of rural communities to reach urban populated centers (Ramos, 2018). Both the clay oven and the wood oven were used to bake bread, tortillas, corviches and other delicious morsels of ancestral Manabi food, thus "in the past, bread was baked directly on the base floor and the flavor was better. Today, to obtain greater production, it is placed in cans" (Penafiel, 2015), as well as the well-known "seasoning of ancestral peoples was cooked in traditional clay ovens" (El Diario, 2017), also echoing the process that preceded the making of bread inherent to the sowing, grinding and obtaining of wheat flour, to later make the bread, as recounted by the Ecuadorian story that refers to a Franciscan monk bringing wheat and teaching the agricultural work of its cultivation to the indigenous communities (Fierro & Herrera, 2018).

Río chico is one of the peasant communities of the Manabi countryside, recognized for its gastronomy in the traditional salt and sweet bakery, one of these bakeries that persists over time, is owned by Mrs. Blanca Murillo, created by her master. husband, Don Miguel Eleodoro Murillo+ in 1957, owner of the ancestral clay and adobe oven, built by hand, in which the most delicious bread, donuts, and other sweet and savory delicacies are produced. Although the traditional oven in which they currently carry out their daily work does not count more than 20 years, it has endured several natural disasters such as the flood of 2016, days before the earthquake, and consequently, the earthquake of April 16 of the same year, which, despite being located very close to the Chico River, at the back of the bakery, and that the floodwater covered a third of the clay adobe oven, it did not suffer any type of deterioration, having also endured two earthquakes, the one in 1998 that had its epicenter in Bahía de Caráquez and the one in 2016 with its epicenter in Esmeraldas (Murillo, 2021).

By all the above, the Constitution of Ecuador, in its eighth section, article 385, inherent to science, technology, innovation, and ancestral knowledge, establishes that:

The national system of science, technology, innovation, and ancestral knowledge, in the framework of respect for the environment, nature, life, cultures, and sovereignty, will have as its purpose: 1. To generate, adapt and disseminate scientific and technological knowledge; 2. Recover, strengthen and enhance ancestral knowledge; 3. Develop technologies and innovations that boost national production, increase efficiency and productivity, improve quality of life and contribute to the realization of good living (del Ecuador, 2008).

Thus, in accordance with the above, several works born in the academy, such as those promoted by the Paulo Emilio Macías Higher Technological Institute, from the Contest for the recognition of creativity, knowledge, ancestral knowledge and technological innovation of the students "Crea Ingenios", have been rescuing knowledge in the framework of agro-food production as a form of contribution to food security, but also, tending to the

implementation of small businesses based on ancestral knowledge, including the ingredient of innovation in terms of its form and presentation, in this way knowledge has been recovered in the implementation of eras, cocoa paste production (Zambrano et al., 2019), traditional butter (Macías Zambrano et al., 2019), rennet organic, bark of the royal ceibo (Macías et al., 2019), sliding for drying cocoa (Castro & Zambrano, 2020), tagua salprietá, medicinal plants, Panela sweetener, corn sowing (Alecívar et al., 2021), black soap (Macías et al., 2021), extraction of earth honey, vegetable dye, ancestral looms, stick bean coffee (Sancán et al., 2021), breadfruit snacks (Jurado et al., 2021), achiote paste (Cevallos et al., 2021), hammock making, etc., one of the added values has focused on the production of incubator with photovoltaic energy backup, design of anti-theft mobile application, production of biogas from agricultural biomass, design of emergency alarm system, design of anti-theft facial recognition device, etc. The purpose of this study is to recover the ancestral knowledge of the clay oven for baking bread and sweets as a contribution to the family economy of the rural community of Río Chico.

2 Materials and Methods

For the construction of the furnace different materials were used as were: Savannah ground, mud, water, manure ass, black soil, burrito brick, broken glass, sand, cement, pulley, cow manure, as method sand used research field, by applying an open interview to Mr. Abel Murillo Murillo, owner of the San Martín bakery in Río Chico parish, created on November 15, 1957, by Mr. Eleodoro Murillo (+), about the construction of the clay oven ancestral used in the traditional bakery of bread and sweets from the riochicense and manabita countryside, in general.

3 Results and Discussions

In figure 1, the place of the investigation can be located, which was carried out in the Resbalón, as it is observed in the Río Chico community.



Figure 1. Location of the San Martín bakery
Source: Google Map

Interview

As a result of the interview, the production process of the clay and adobe oven used in the traditional Río Chico bakery was obtained, which can be seen in figure 2, the description of the flow chart is shown

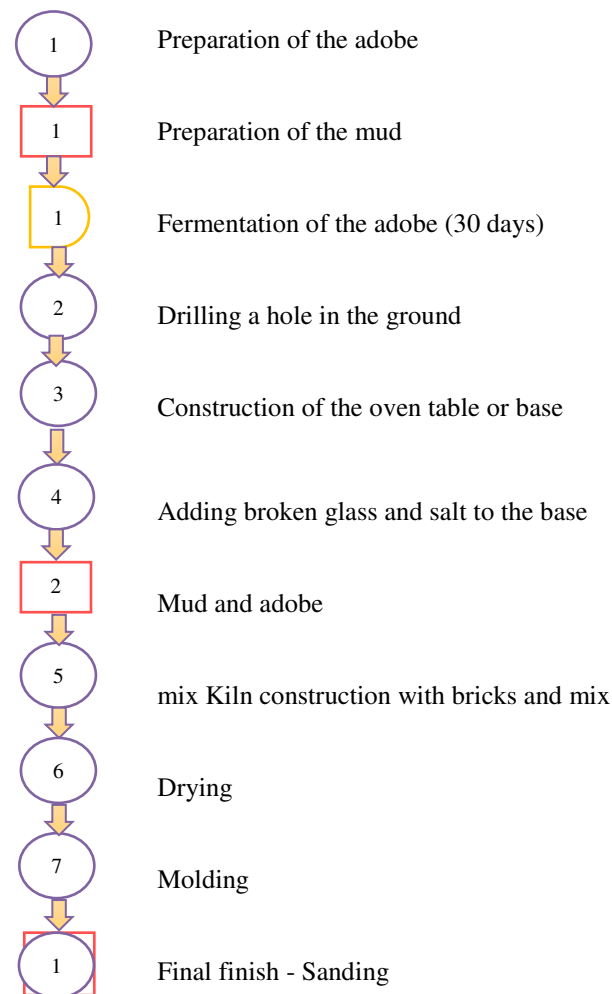


Figure 2. Flowchart of the construction process of the mud and adobe kiln

As shown, different materials were used for the construction of the adobe kiln, the chopped savanna, donkey manure, and black earth are needed, that is kicked (make a mixture in a hole in the ground), and remove the stirred mud in another place and wait for a month to ferment, to obtain the adobe in its optimal condition to be used; Once the adobe is ready, we start by making the table (the surface where the clay kiln or equine is built), the kiln is 1.40 m high and has a base of 4m, with a total area of 6m²; on the outside, it is made up of dull brick and adobe, while inside it is made up of a lot of sand, large amounts of coarse salt and, most importantly, broken glass to keep it warm, once the table is filled with These components are sealed with cement (He et al., 2009; Millogo et al., 2008; Widhiasthini et al., 2020; Párraga et al., 2018).

After this, the oven is shaped by placing three rows of borricones bricks (burritos), and begins to assemble, to reinforce the walls of the oven, concretos (small columns) are built, and the last closure also has the effect of closing with a pulley to be able to seal and marinate the oven. To culminate with the sealing of the furnace corner on the inside, cow manure adobe is used, which gives it the necessary seal so that the walls do not crack due to the effect of heat that easily reaches 90 ° C, this heat is conserved during the entire week of one day, reaching as low as 30 ° C (Murillo, 2021). In the images in figure 3, the before and after the oven was rebuilt are shown.



Figure 3. The then and now of the adobe clay oven

Source: The authors

Figure 4 shows the interior part of the adobe oven and figure 5 shows the products made in the traditional oven bakery.



Figure 4. Internal view of the adobe clay oven

Source: The authors The

The interior of the ancestral clay oven can be seen in the images, and the traditional salt threads are placed on the tin base, which constitutes a typical element of peasant food extended to urbanity.



Figure 5. Products made in the traditional clay oven bakery

Source: The authors

The results show the recovery of the ancestral knowledge of the construction of the traditional clay and adobe oven used in the bakery, taking as a case the San Martín bakery that still uses the clay oven to produce bread, donuts, and sweets, maintaining one of the autochthonous traditions of the Río Chico and manabita culture. As can be seen in the introduction and the results of this research, the works of (Alcívar et al., 2021); (Castro & Zambrano, 2020); (Macías et al., 2021); (Macías et al., 2019); (Macías et al., 2019); (Macías et al., 2019), show several works referring to the

recovery of ancestral knowledge in rural Manabi communities, showing the world valuable knowledge that can contribute to the economy of rural, marginal urban and urban families, inclusive (Brown, 2009; Bruschi et al., 2015; Asselman et al., 2007; Sablani et al., 2002). These traditions and knowledge when popularized in these times, not only enrich interculturality but also constitute a source of inspiration and revaluation of the aboriginal ethnic origin that identifies the Montuvian and mestizo people of the province of Manabí. This work of recovering one more ancestral knowledge is related to the precedents and those that will come later, and that will be part of the entire baggage of wisdom of the indigenous peoples of the coast and Ecuador as a whole (Brigante et al., 2020; Sogari et al., 2017).

4 Conclusion

Based on the research carried out, the conclusion is reached that one of the ancestral traditions of the Manabí countryside is the mud adobe oven, characterized by the neatness of its construction and the materials used in it, which provide it with that Unique distinctive that makes it so special, not only because the materials are extracted from the earth itself, but also because of the expertise that very few local people already have, with which this ancient production mechanism can be built (Jianu & Chiş, 2012; Boulet et al., 2010).

It was possible to recover the technique used to carry out the construction of the mud adobe kilns, using the application of an interview to a possessor of ancestral knowledge; This technique implies a lot of precision based on the knowledge transmitted from generation to generation, which implies how and when to extract the materials and use them in the manufacture of the oven, this ancestral technique guarantees that the clay oven can fulfill the purpose of baking and its long useful life, subsequently attending to provide the respective maintenance, otherwise, the implementation of the oven would constitute a resounding failure in the art of the ancestral bakery.

Conflict of interest statement

The authors declared that's they have no competing interests.

Statement of authorship

The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

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References

- Alcívar, J., Giler, L., Sancán, D., & Menoscal, G. (2021). The monoculture of corn (zea mayz) and its impact on fertility soil. *The mo International Journal of Chemical & Material Sciences*, 4 (1), 7-12.
- Asselman, A., Van Straten, G., Boom, R. M., Esveld, D. C., & Van Boxtel, A. J. B. (2007). Quality prediction of bakery products in the initial phase of process design. *Innovative Food Science & Emerging Technologies*, 8(2), 285-298. <https://doi.org/10.1016/j.ifset.2007.01.006>
- Boulet, M., Marcos, B., Dostie, M., & Moresoli, C. (2010). CFD modeling of heat transfer and flow field in a bakery pilot oven. *Journal of food engineering*, 97(3), 393-402. <https://doi.org/10.1016/j.jfoodeng.2009.10.034>
- Brigante, F. I., Mas, A. L., Pigni, N. B., Wunderlin, D. A., & Baroni, M. V. (2020). Targeted metabolomics to assess the authenticity of bakery products containing chia, sesame and flax seeds. *Food chemistry*, 312, 126059. <https://doi.org/10.1016/j.foodchem.2019.126059>
- Brown, M. (2009). Biscuits and bakery products. In *Science and Technology of Enrobed and Filled Chocolate, Confectionery and Bakery Products* (pp. 152-162). Woodhead Publishing. <https://doi.org/10.1533/9781845696436.1.152>
- Bruschi, V., Teuber, R., & Dolgoplova, I. (2015). Acceptance and willingness to pay for health-enhancing bakery products—Empirical evidence for young urban Russian consumers. *Food Quality and Preference*, 46, 79-91. <https://doi.org/10.1016/j.foodqual.2015.07.008>
- Cardenas, ER, Ronquillo, MF, Onofre, JM, & Gurumendi, KZ (2016). Production and marketing of cocoa and its impact on the socio-economic development of Milagro canton / Production and marketing of cocoa and its impact on the socio-economic development of Milagro canton. *Unemi Science* , 9 (17), 56-64.
- Castro, I. C. G., & Zambrano, T. Y. M. (2020). Cocoa Drying System Using Ancestral Sliding. *International Journal of Life Sciences*, 4(1), 42-49.
- Cevallos, C. E. S., Rodríguez, I. D. J., & Santana, L. D. C. G. (2021). Financial evaluation of annatto paste production from ancestral knowledge in Manta Blanca. *International journal of economic perspectives*, 15(1), 38-48.
- De la Cruz, R., Muyuy Jacanamejoy, G., Viteri Gualinga, A., Flores, G., Humpire, JG, Mirabal Díaz, JG, & Guimaraez, R. (2005). Elements for the sui generis protection of collective and integral traditional knowledge from the indigenous perspective.
- del Ecuador, C. (2008). Republic of Ecuador, Montecristi: Constituent Assembly. Retrieved from: https://www.oas.org/legal/pdfs/mesicic4_ecu_const.
- El Diario. (2017). Tradition with an ancient aroma. The Diary.
- Fierro, D., & Herrera, H. (2018). Analysis of the evolution of baking in the province of Carchi as a food heritage through the revaluation of its traditional techniques and preparations. *INNOVA*, 3 (8), 142-153.
- He, J., Lange, C. R., & Dougherty, M. (2009). Laboratory study using paper mill lime mud for agronomic benefit. *Process Safety and Environmental Protection*, 87(6), 401-405. <https://doi.org/10.1016/j.psep.2009.08.001>
- Jianu, C., & Chiş, C. (2012). Study on the hygiene knowledge of food handlers working in small and medium-sized companies in western Romania. *Food Control*, 26(1), 151-156. <https://doi.org/10.1016/j.foodcont.2012.01.023>
- Jurado, G., Andrade, Y., & Mera, C. (2021). Viability and artisanal production of bread fruit snacks from ancestral knowledge. *International Journal of Life Sciences & Earth Sciences*, 4 (1), 11-18.
- Macías Zambrano, TY, Zambrano Moreira, KN, Mera Plaza, CL, & Muñoz Farfán, R. (2019). Recovery of knowledge for the conservation of traditional Manabita white butter, in Caña Guadúa Tierna. *Caribeña de Ciencias Sociales* , (March).
- Macías, T., García, A., & Briones, J. (2021). The fruit of the pine nut (*Jatropha curcas*) in the production of traditional soap: Recovery of ancestral knowledge. *International Journal of Chemical & Material Sciences*, 4 (1), 1-6.
- Millogo, Y., Hajjaji, M., & Ouedraogo, R. (2008). Microstructure and physical properties of lime-clayey adobe bricks. *Construction and Building Materials*, 22(12), 2386-2392. <https://doi.org/10.1016/j.conbuildmat.2007.09.002>
- Murillo, AM. (2021). Knowledge of the adobe clay oven at Don Miguelito bakery. (E. Rodríguez, Interviewer)
- Párraga, W. E. R., Campos, M. S. A., & Hernández, E. H. O. (2018). Mechanical properties of artisanal bricks. *International research journal of engineering, IT & scientific research*, 4(4), 1-6.
- Penafiel, P. (2015). The traditional bread oven in the memory of Cuenca's society, from its origins to the present day. Cuenca: University of Cuenca.

- Quiroz, M., & Pacheco, H. (2016). Strategic plan for cultural tourism development in the Riobamba canton, Chimborazo province. Riobamba, Ecuador: National University of Chimborazo.
- Ramos, P. (2018). The clay oven of the Manabi countryside subsists in time. *The telegraph*.
- Sablani, S. S., Baik, O. D., & Marcotte, M. (2002). Neural networks for predicting thermal conductivity of bakery products. *Journal of Food Engineering*, 52(3), 299-304. [https://doi.org/10.1016/S0260-8774\(01\)00119-4](https://doi.org/10.1016/S0260-8774(01)00119-4)
- Sancán, S. L. P., León, Z. J. S., & Zambrano, T. Y. M. (2021). Feasibility of the production of traditional palo bean coffee: an ancestral vision in barranco colorado. *International journal of economic perspectives*, 15(1), 49-61.
- Sogari, G., Menozzi, D., & Mora, C. (2017). Exploring young foodies' knowledge and attitude regarding entomophagy: A qualitative study in Italy. *International Journal of Gastronomy and Food Science*, 7, 16-19. <https://doi.org/10.1016/j.ijgfs.2016.12.002>
- Unigarro, C. (2015). Food systems and food heritage. Transculturations in the Ecuadorian case. *Anthropology Research Notebooks*, (15), 21-34.
- Villalva, M., & Inga, C. (2021). Ancestral Gastronomic Knowledge And Cultural Tourism Of The City Of Riobamba, Province Of Chimborazo. *Chakiñan Journal of Social Sciences and Humanities*, (13), 129-142.
- Widhiasthini, N. W., Suryawati, P. I., & Pika, P. A. T. P. (2020). Bakery product choices and behavior change for different generations. *International Research Journal of Management, IT and Social Sciences*, 7(5), 188-195.
- Zambrano, T. Y. M., Castro, I. C. G., Plaza, C. L. M., & Farfan, R. M. (2019). Recovery of ancestral knowledge for production of traditional Manabí cocoa paste. *International Journal of Life Sciences*, 3(1), 71-78.
- Zambrano, T. Y. M., Vera, O. P. G., Plaza, C. L. M., & Farfan, R. M. (2019). Recovery of ancestral knowledge of the use of leaf and bark towards royal ceibo. *International Journal of Life Sciences*, 3(1), 41-47.