

Unit 2 - Medicinal Plants Used in Pre-Columbian History of Peru

Reading

1. Introduction

The history of pre-Columbian villages was characterized by war, outbreaks, natural phenomena, food scarcity and various diseases. Shamans and healers were responsible for restoring the individual and collective health of these villages (1).

According to Andean pre-Columbian conception, health was the complete equilibrium between body, spirit, and nature, while disease occurred due to their imbalance. Shamans and healers were essential for an integral care of disease in this worldview (cosmovision).

Shamans performed “medical-magical-religious” rituals in compliance to the pre-Columbian worldview. Also, they would integrate nature in their healing rituals, due to their vast knowledge on several varieties of native plants with healing properties, found in almost all the American continent.

Evidence of Shaman presence and variety in work has been found in Paleopathology studies (2) by direct observation of mummified or bone remains (3), ceramic interpretation, goldsmithing and the narratives of Spanish and mestizo chroniclers. Shaman roles were healing with medicinal plants, performing surgeries, trephinations, bone remodeling of the cranium (deformations), childbirth, war wound healing, treating infectious diseases and even chaperoning death. Also, Shaman priests made offerings (4,5).

Shamans used various medicinal plants in pre-Columbian medicine. Mainly, psychoactive plants for rituals and medicinal plants for general healing.

Psychoactive plants were consumed as beverages prepared by the Shamans, who knew the effects of these plants and their exact doses for each disease (6). These preparations had 2 main purposes: cure and widen the consciousness state of both the Shaman and patient to be cured. These rituals were accompanied by chanting (icaros) and dances that contributed to modify the perception through “bodily, auditory and visual sensations or cognitive impacts”, plus the entrance to profound planes for self-knowledge (7).

The use of psychoactive plants in pre-Columbian medicine was fundamental. As they were considered sacred due to their healing powers, they would help both Shaman and patient widen their consciousness state and sensibility, so they could see further beyond physical disease (7).

In healing rituals, Shamans prepared beverages from psychoactive substances to reach a trance state. They achieved the “detachment of their souls from their bodies, allowing their rise to heaven or descent to hell”. This power to freely move through the supernatural worlds was recognized by the people, allowing Shamans to “conduct the souls of their patients” (8).

Shamans achieved specialization in a progressive manner, learning about the use of medicinal plants, including hallucinogenic plants (for curative purposes only) (9), animals, metals and similar others to ascend



to superior categories until reaching the title of “spiritist Shaman”, who capable of contacting a parallel universe (10).

Ancient Peruvians left testimonials in their ceramics on the communication of Shamans with spiritual forces and their profound respect to animals and nature. Shaman roles were various, accomplishing the important “physician – patient” dynamic by carefully listening to the problems and dramas in each person, curing a variety of physical and spiritual (mental) ailments. They would accompany death by providing comfort to patients and supporting them, because in pre-Columbian times death was viewed as a natural process or a normal stage of life which would only transform (11) and therefore in some cases required support to part peacefully (4, 7, 11),

2. Funeral and Ayahuasca rituals existed in the midst of the main rituals performed by healing Shamans

Funeral ritual: Shamans delivered integral care to the dying and consolation to their families. These rituals were related to the conservation of the body, including the mummification process if the dead belonged to the upper class of society. In Shamanic world, both life and death had great relevance and there were rituals for both. The importance of death laid in the fact that it was viewed as an opportunity to return to mother earth for a later rebirth. The study of archeological remains has revealed that mortuary practices varied upon the social status of the person: some were buried in simple tombs, while others were buried in ostentatious tombs. Upper-class individuals were wrapped in blankets (“fardos”). These pre-Columbian customs extended beyond the Inca period, with Shamans preserving these traditions through – out history (4,7,11).

Ayahuasca ritual: Ayahuasca is a mixture of plants served as a beverage, used by Shamans in their rituals (12). It would be prepared prior to the ritual, consisting of a mixture of *Banisteriopsis caapi* stems, *Psychotria viridis* bush leaves or *Diplopterys cabrerana* leaves (12,13,14,15).

Several studies have revealed the active compounds of these plants. Currently, it is known that *Banisteriopsis caapi* stems contain B-carbolines, such as harmine, tetrahydroharmine (THH) y harmaline, all with inhibitory properties of monoamine oxidase (antidepressant) (12,13). Bush leaves of *Psychotria viridis* contain tryptamine N, N-dimethyltryptamine (DMT) “agonist of the receptor sites of 5-HT-2A and sigma-1, which is also associated to antidepressant, anxiolytic and psychoactive effects” (12). *Diplopterys cabrerana* leaves containing tryptamine N, N-dimethyltryptamine (DMT) “agonist of the receptor sites of 5-HT-2A and sigma-1, which is also associated to antidepressant, anxiolytic and psychoactive effects” (14,15).

Several current studies verified the therapeutic properties of Ayahuasca over psychological processes. One specific study showed that 4 sessions of Ayahuasca intervention can be as effective than an 8 weeks MBSR intervention (16). In 2020, Gonzalez published a follow-up study of 50 shipibos (Peruvian Amazon Indigenous) who participated in the ritual of Ayahuasca and were grieving due to the death of a family member. This sample received ayahuasca. The research team used “B. caapi stems (rich in harmine, tetrahydroharmine and harmaline) combined with P. viridis leaves (rich in N, N-dimethyl-tryptamine) for several hours. The analysis was done through Energy Control (energycontrol-international.org) using liquid chromatography – mass spectrometry (LC-MS). A sample of ayahuasca contained 2 mg/ml of N, N-DMT, 2 mg/ml of harmine, 0,37 mg/ml of harmaline and 1 mg/ml of tetrahydroharmine. Another sample contained



Project number: 2018-1-ES01-KA203-050606

2 mg/ml of N, N-DMT, 2 mg/ml de harmine, 0,65 mg/ml of harmaline and 2 mg/ml of tetrahydroharmine” (17). This study concluded the ritual use of Ayahuasca has therapeutic value by reducing the severity of grief. Acceptance and decentering are both psychological processes that mediate the improvement of grief symptoms (17).

Ayahuasca was also used in pre-Columbian medicine to cure depression and modern research has confirmed its therapeutic effects.

An experimental study analyzed possible antidepressant effects of Ayahuasca in primate models with depression. The methodology of the study consisted of inducing the primate models into depression and then intervening with Ayahuasca. “While living with their families, juvenile marmosets (8 males; 7 females) were observed on alternate days for four weeks during a baseline phase. This was followed by 8 weeks of an induced depressive state protocol, the social isolated context (IC), in which the animals were monitored in the first and last weeks. Subsequently, five males and four females were randomly selected for treatment, first with a single administration of saline vehicle (1.67 mL/300 g of body weight, via gavage), followed by a single dose of ayahuasca (1.67 mL/300 g of body weight, via gavage). Both phases lasted 1 week, and the animals were monitored daily. A third week of sampling was called the tardive-pharmacological effects phase. In all phases the marmosets were assessed for behavior, fecal cortisol levels, and body weight” (18). This study showed a beneficial effect in depression treatment, contributing to “the validation of ayahuasca as an antidepressant drug and encourage new studies on psychedelic drugs as a tool for treating mood disorders, including for adolescents with early-onset depression” (18).

Another study showed Ayahuasca works modulating plasma cortisol, which is a relevant finding since cortisol is also involved in the etiology of depression and patients with major depressive disorder, show a constant alteration in cortisol levels in plasma and saliva (19, 20). Also, the same studies suggest Ayahuasca is well tolerated and is not addictive (21).

Finally, an important chapter on pre-Columbian medicine is the use of medicinal plants, which is an important legacy for current and future generations, providing great challenges in research.

Pre-Columbian healers in Peru used several medicinal plants. Current proof is more than 1400 registered native medicinal plant species in the country, many of which are used in traditional medicine. Healers used plants through progressive observation of their healing properties and passed this knowledge on to next generations.

Pre-Columbian towns had a great baggage of knowledge on medicinal plants, which was passed on through several generations. The Peruvian state has the duty to safekeep and protect this information through the National Centre of Integral Health, who constantly reviews therapeutic effects of plants (23),

Evidence of use of medicinal plants will be shown including the scientific name of each native plant (22).

The most important plants used in the pre-Columbian world were Coca, Willca and San Pedro (also known as Wachumay) (24).

Coca was one of the main plants used, since it served as anesthesia in cranial surgery. It was also used as analgesic and antipyretic (24).



Maca (*Lepidium meyenii*), is a Peruvian medicinal plant, with high nutritional value, that grows at high geographic altitude (> 4000 meters) and was used by pre-Columbian population, as shown in the works of Spanish and Peruvian chroniclers who recorded its use by the Incas (25). The findings on Maca use reveal “effects of maca on sexual function, spermatogenesis, female reproductive function, memory, depression and anxiety, and energy as well as effects on benign prostatic hyperplasia, osteoporosis and metabolic syndrome. Its anti-aging effect is also discussed as well as its safety in consumption” (25).

Another present study reveals the beneficial effect of Maca on the treatment of Benign Prostate Hypertrophy (26).

Among the many plants used to cure the pre-Columbian population some had great impact such as Quinoa, which was initially used to treat unspecific fever but is currently a renowned antimalaric; Coca, whose main alkaloid cocaine is the source for local anesthetics, and “Ipecacuana” which was used by our healers as an antiemetic and in the treatment for intestinal amoebiasis (1).

Malnutrition was prevented by the pre-Columbian population using several varieties of Quinoa (*Chenopodium quinoa*) and Amaranto or Kiwicha (*Amaranthus caudatus*) (27).

The healthy nutritional condition of pre-Columbian population was due to the “complementary system” and “brotherhood law”, enforced by the Incas in which mutual assistance was mandatory. This warranted crops and harvests for those in need, such as the ill, disabled and warriors. The “brotherhood law” enabled work in the lands of those in need by their neighbors. The “complementary system” enabled availability of food for consumption from all regions in the empire (28).

3. Conclusions

Pre-Columbian medicine served the population, treating disease in a holistic way. Healer Shamans and priest Shamans were responsible for preserving health in the worldview of their people.

Shamans had an important understanding of disease, not only of the diagnosis, but also of the treatment. They were respected by their knowledge but also by their communication skills with their patients. Shamans actively involved their patients as stakeholders in their own diagnosis and treatments.

In order to make a diagnosis, Shamans used sacred plants, considered hallucinogenic by current science, complemented by the patient’s feelings and thoughts. These plants, allowed a connection to the spiritual world.

Shaman treatment aimed to restore balance between body, mind, and spirit of the patient with his environment, and was also compassionate by chaperoning death.

Pre-Columbian medicine had within its reach an unrivaled natural wealth of medicinal plants, which allowed it to support the restoration of health.

Pre-Columbian healers also handled the complex art of diagnosis, physical examination, assertive communication with patients and family, ritual-based treatments, and medicinal plant management that can only be transmitted through practice from generation to generation.



Pre-Columbian medicine also developed the art of surgery, trepanations, extraction of poison and others that to date still amaze humanity.

Therefore, it is necessary for our future generations of doctors to value the history of our pre-Columbian medicine and what it represents for its people.

References

- Pamo Reyna Oscar. Medicina Prehispánica. En Alarcón Graciela, Espinoza Luis, Pamo-Reyna Oscar, Eds. Medicina y Reumatología Peruanas: historia y aportes. Lima, Comité Organizador PANLAR 2006.
- Jordán, Régulo G. Franco; Régulo, G. Chamanismo y plantas de poder en el mundo precolombino de la costa norte del Perú. Perspectivas latinoamericanas, 2015, p. 1-40.
- Verano, John, Lombardi, Guido P., Paleopatología en Sudamérica andina. Bulletin de l'Institut français d'études andines [Internet]. 1999;28(1): Retrieved from: <https://www.redalyc.org/articulo.oa?id=12628104>
- Frisancho Velarde Óscar. Concepción mágico-religiosa de la Medicina en la América Prehispánica. Acta méd. peruana [Internet]. 2012 Abr [citado 2020 Mayo 16] ; 29(2): 121-127. Accessed at: http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1728-59172012000200013&lng=es.
- Hermida Bustos, Enrique. Paleopatología en la cerámica precolombina malformaciones, deformaciones o anomalías en las culturas: Valdivia, Chorrera, Guangala y la Tolita. Diss. Universidad Internacional SEK, 2011 Tesis de Maestría en conservación y administración de bienes Culturales. Ecuador.
- Apuntes de Medicina Tradicional. La racionalización de lo irracional. Fernando Cabieses.
- Llamazares, Ana María. "Occidente herido: el potencial sanador del chamanismo en el mundo contemporáneo." (2013).
- Carlos Musso. Medicina chamánica: su análisis desde una perspectiva científica. Rev. Hosp. Ital. B.Aires 2015; 35(4): 142-144
- Quirce Balma, Carlos M., El chamanismo y las drogas enteogénicas/alucinatorias del mundo precolombino. Revista Costarricense de Psicología [Internet]. 2010;29(43):1-15. Retrieved from: <https://www.redalyc.org/articulo.oa?id=476748707005>
- Javier Ullán De La Rosa. El chamanismo entre los indios Ticuna Del Amazonas: Entre la Religión, la Magia y la representación dramática. [Antropológicas, 1999, no 3](#), Universidad Complutense – Madrid. España
- Mario Siddhartha Portugal Ramírez. Ñatitas Festivity: Reflections on Dead-body's Image as Cultural Resistance. Repique, enero 2017. Num 1e-ISSN 2550-6676.
- Prodigioso Perú Profundo. Chamánico, Cósmico, Simbólico. Francis Devigne
- González, D., Cantillo, J., Pérez, I. et al. Therapeutic potential of ayahuasca in grief: a prospective, observational study. Psychopharmacology **237**, 1171–1182 (2020). <https://doi.org/10.1007/s00213-019-05446-2>
- Escobar Cornejo Guillermo Saúl, Ramos Vargas Luis Fernando. La ayahuasca bajo los ojos del mundo. Rev Med Hered [Internet]. 2018 Oct [citado 2020 Abril 7] ; 29(4): 268-269. Accessed at: http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1018-130X2018000400013&lng=es. <http://dx.doi.org/https://doi.org/10.20453/rmh.v24i2.604>.
- Domínguez-Clavé E, Soler J, Elices M et al (2016) Ayahuasca: pharmacology, neuroscience and therapeutic potential. Brain Res Bull 126:89–101. <https://doi.org/10.1016/j.brainresbull.2016.03.002>
- Soler J, Elices M, Franquesa A, Barker S, Friedlander P, Feilding A, Pascual JC, Riba J (2016) Exploring the therapeutic potential of ayahuasca: acute intake increases mindfulness-related capacities. Psychopharmacology 233:823–829. <https://doi.org/10.1007/s00213-015-4162-0>



- González D, Carvalho M, Cantillo J, Aixalá M, Farré M (2017) Potential use of ayahuasca in grief therapy. *Omega (Westport)* 1:30222817710879. <https://doi.org/10.1177/0030222817710879>
- Da Silva Flávia S., Silva Erick A.S., Sousa Jr. Geovan M. de, Maia-de-Oliveira João P., Soares-Rachetti Vanessa de Paula, de Araujo Draulio B. et al . Acute effects of ayahuasca in a juvenile non-human primate model of depression. *Braz. J. Psychiatry* [Internet]. 2019 Aug [cited 2020 May 2]; 41(4): 280-288. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1516-44462019000400280&lng=en. Epub Nov 08, 2018. <https://doi.org/10.1590/1516-4446-2018-0140>.
- Galvão AC, de Almeida RN, Silva EA, Freire FA, Palhano-Fontes F, Onias H, et al. Cortisol modulation by ayahuasca in patients with treatment resistant depression and healthy controls. *Front Psychiatry*. 2018; 9:185.
- Khan S, Khan RA. Chronic stress leads to anxiety and depression. *Ann Psychiatry Ment Health*. 2017; 5:1091.
- Fabregas JM, Gonzalez D, Fondevila S, Cutchet M, Fernandez X, Barbosa PC, et al. (2010) Assessment of addiction severity among ritual users of ayahuasca. *Drug Alcohol Depend*. 2010;111:257-61.
- Flora Etnomedicinal dela región Amazonas, Peru. Flor Teresa García Huamán.
- Santiváñez Acosta, Rocío, and Jorge Cabrera Meléndez. "Catálogo florístico de plantas medicinales peruanas." (2013).
- Gonzales Gustavo F, Villaorduña Leonidas, Gasco Manuel, Rubio Julio, Gonzales Carla. Maca (*Lepidium meyenii* Walp), una revisión sobre sus propiedades biológicas. *Rev. perú. med. exp. salud publica* [Internet]. 2014 Ene [citado 2020 Abril 2]; 31(1): 100-110. Accessed at: http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1726-46342014000100015&lng=es.
- Jordán, Régulo G. Franco; Régulo, G. Chamanismo y plantas de poder en el mundo precolombino de la costa norte del Perú. *Perspectivas latinoamericanas*, 2015, p. 1-40.
- Vásquez-Velásquez, Cinthya, et al. Inflammatory pathway employed by Red Maca to treat induced benign prostatic hyperplasia in rats. *Andrologia*, 2020, vol. 52, no 3, p. e13516.
- SALAVERY, Oswaldo. La comida en el antiguo Perú: haku mikumusum (¡ vamos a comer!). *Revista peruana de medicina experimental y salud pública*, 2012, vol. 29, p. 409-413
- Sociedad Peruana de Derecho Ambiental. *Agrobiodiversidad, Seguridad Alimentaria y Nutrición: Ensayos sobre la Realidad Peruana*.2015. ISBN: 978-612-4261-07-7

