A review of two thousand years of traditional medicine in Cajamarca, Peru: historical use of medicinal plants

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Review

Abstract

Background: In Peru, knowledge of traditional medicine dates back to pre-Inca times, such as “Cupisnique”, in northern Peru, where a complex system of traditional medicine was developed. With the arrival of the Spanish in Cajamarca in 1532, attempts were made to suppress these practices through evangelization; however, cultural resistance and the vastness of the territory favored their persistence, also integrating European elements.

Methods: A systematic review was conducted in scientific databases with broad coverage, such as Google Scholar and Web of Science (WOS), supplemented by physical libraries, with the aim of systematizing information related to the historical use and trade of medicinal plants in the department of Cajamarca, Peru.

Results: Results: The cultures that inhabited the Cajamarca valleys already practiced healing or shamanism, a tradition that has endured to the present day. During the colonial period, attempts were made to restrict traditional medicine, although species such as cinchona (*Cinchona* spp.) proved their therapeutic value. In the early and middle republican periods, interest was limited, but inventories and botanical studies were carried out. In the contemporary period, research in various scientific disciplines stands out. Markets supply Cajamarca and the Peruvian coast with medicinal plants, mainly of wild origin.

Conclusions: In the department of Cajamarca, the use of medicinal plants and traditional medicine originated in pre-Inca times and has endured throughout history. Today, it is reinforced by scientific contributions that highlight its cultural therapeutic, and economic value. It also plays a strategic role in supplying medicinal plant species to markets.

Keywords: Ethnobotany, Andean worldview, Shamanism, Preservation of knowledge, medicinal plants market.

Background

Throughout history, medicinal plants have been one of the main alternatives in health care (OPS 2019). Currently, it is estimated that 80% of the world's population uses traditional medicinal plants, constituting the first line of defense against diseases for millions of people (Ekor 2014). The preservation of plants acquires relevance, as it constitutes the natural source of the pharmaceutical industry, which is experiencing a growing demand (Davis & Choisy 2024). In addition, the use of these plants represents traditional health care knowledge rooted in time and as a resource to sustain poor populations in developing nations (Bussmann & Sharon 2006).

The use of medicinal plants in Peru has deep roots dating back to pre-Inca times. In the north of the country, cultures such as Cupisnique (first millennium BC), or at least until the Moche period (AC 100-800) developed a vast botanical knowledge, covering the departments of San Martin, Amazonas, Piura, La Libertad, Lambayeque and Cajamarca (Bussmann & Sharon 2009b). The department of Cajamarca has a long history of human occupation. During the Formative period (1500 BC-50 BC), important temples such as “Huacaloma” and “Layzón” were built. Later, the Cajamarca tradition developed (50 BC-1532 AD), characterized by the production of kaolin pottery and a solid agricultural base, which perfected the management of cultivated and wild species for both food and medicinal purposes (Watanabe 2001, 2002, 2010). It is estimated that before the conquest (1532 AD), the kingdom of “Caxamarca” was made up of six human groups or “huarancas”: Cuismancu (= Guzmango), Chuquimancu, Chonta, Pampamarca (= Bambamarca), Caxamarca (= Cajamarca), and Pomamarca. In this context, traditional medicine practices were an essential part of daily life, notably the magical-therapeutic use of black wool in rituals and in the treatment of fractures, pain, rheumatism, enuresis, and ailments associated with “susto” (Espinoza 2018). This ancestral knowledge about the healing properties of plants has been transmitted from generation to generation, preserved by shamans and healers, who, through sacred rituals, have used medicinal plants to treat illnesses and strengthen the connection between the body, mind and spiritual world (Schultes *et al*. 2000; Quirce 2010).

Traditional knowledge about medicinal plants in the Andes has withstood centuries of transformation, marginalization and persecution (Millones 2001). The arrival of the Spanish people in Cajamarca in 1532 marked a turning point in the Andean cosmovision, imposing a process of evangelization that attempted to eradicate shamanism and indigenous healing practices. However, traditional medicine managed to persist in secret and adapt to new sociocultural conditions. Thus, postcolonial shamanism would be the product of a syncretic process, in which two traditions and cultures were combined (Gareis 1989, 2004).
During the 18th century, Bishop Martínez Compañón documented more than 293 medicinal herbs used in the northern region of Peru, especially in the highlands of Cajamarca, reflecting the botanical wealth and ancestral knowledge of Cajamarca. This list includes some plants introduced from other continents (*Plantago major*, *Fraxinus* spp., *Borago officinalis*, *Portulaca oleracea*, *Oxalis corniculata*), as an example of the enriching effect that European culture had in this regard (Goicoetxea & Martínez 1991; Macera *et al.* 1997; Martínez 1789)).

The Department of Cajamarca, created in 1855 in the new republic of Peru, has been historically relevant for its natural wealth and traditional knowledge in the use of medicinal plants. From its beginnings, the health of the population was marked by diseases such as dysentery, pneumonia and intermittent fevers, recorded in the first statistical reports of the department (Saráchaga *et al.* 1981). At the end of the 19th century, botanical studies confirmed the presence of *Cinchona* species in the region, essential for the production of quinine to treat malaria (Gómez Pamo 1893). Later on, Weberbauer (1905), listed 21 medicinal species in Cajamarca, reinforcing the importance of the local flora in traditional medicine. This knowledge is also reflected in manuscripts such as that of María Iglesias (1889), which documents home remedies based on indigenous resources (Santolalla 2005).

There is no systematic analysis of historical sources—pre-Inca, colonial, republican, or contemporary—that trace the evolution of medicinal plant practices in Cajamarca. The lack of connection between past and present records, along with the scant documentation on the intergenerational transfer of knowledge, makes it difficult to understand the continuities and transformations in healing, shamanic, and ritual traditions. Furthermore, there is no systematization of the trade in medicinal plants sold in Cajamarca and the regions to which they are distributed. In this context, we ask the following questions: (1) What are the historical antecedents in the region related to traditional medicine and the use of medicinal plants? (2) What has been and what is the role of Cajamarca in the supply of medicinal plants locally and nationally?

Materials and Methods

Study area

The department of Cajamarca, located between 4°36' and 7°44' south latitude and 77°44' and 79°27' west longitude, is made up of 13 provinces (Figure 1) (Seminario *et al.* 2024) The department of Cajamarca is made up of the following ecoregions: The Equatorial Dry Forest (500-1,600 m a.s.l.), the Peruvian Pacific Coastal Desert (0-700 m a.s.l.), the Páramo (3,000-4,800 m a.s.l.), the Puna (3,500-4,800 m a.s.l.), and the High Yungas Forest (1,500-2,500 m a.s.l.) (the last three ecoregions are characterized by mountainous landscapes that represent 79.12% of the entire department) (Alcántara 2014; Britto 2017) . This geophysical diversity supports a range of functional ecosystems capable of providing key ecosystem services. These include provisioning services (water, food, wood, genetic resources, and medicinal plants), regulating services (carbon sequestration, climate regulation, and water control), supporting services (soil formation, nutrient cycling, and habitat for species), and cultural services (spiritual values, ancestral knowledge, and scenic beauty) (Alcántara 2014). The department of Cajamarca is part of the so-called northern Peruvian health axis, together with Piura, Amazonas, Lambayeque and La Libertad, regions that since ancestral times have shared knowledge, healing practices and a rich diversity of medicinal plants (Bussmann & Sharon 2006).

Three pre-Inca kingdoms emerged in the current department of Cajamarca: "The Bracamoros" (provinces of Jaén and San Ignacio), "the Guambos" (provinces of Santa Cruz, Cutervo and Chota) and "Cuismanco or Caxamarca" (provinces of Contumazá, Cajabamba, Cajamarca and Huamachuco) (Campos 2013). Cuismanco stood out for its favorable climate, productive agriculture and its works, which attracted the interest of pre-Inca and Inca rulers, who built palaces, temples and warehouses (Pereyra 1996). Its annexation to the Tawantinsuyo, the large Inca kingdom, would have occurred between 1456 and 1461 (Silva Santisteban 1972).

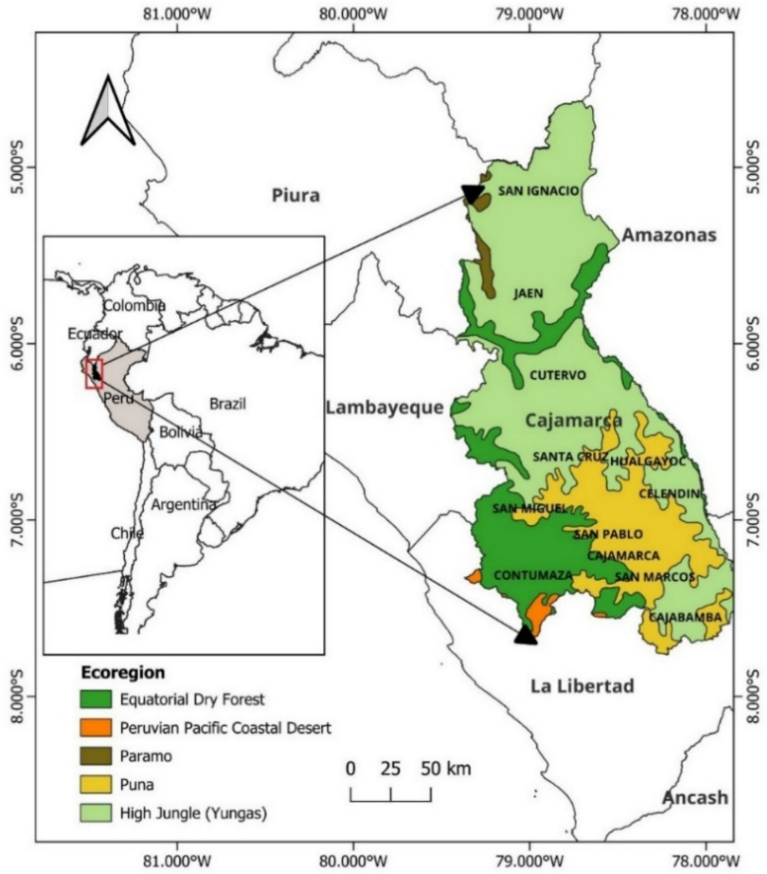

Figure 1. Location of the department of Cajamarca and its provinces.

In 2017, the department of Cajamarca had 1,341,012 inhabitants, making it the fifth most populated region in the country. Of this population, 64.6% lived in rural areas. The services sector accounts for 23.2% of the regional GDP, followed by mineral, oil, and gas extraction (20.6%) and livestock, agriculture, and hunting (11.9%) (INEI 2017).

Data collection

We compiled studies conducted in this region, using the following Boolean search string: (Cajamarca OR Peru) AND (medicinal plant OR traditional medicine OR traditional knowledge OR ethnobotany OR anthropology OR medicinal plants market OR trade) in English and Spanish. The sources consulted include scientific databases such as Google Scholar, Web of Science (WOS), Scopus and Science Direct and physical libraries. The initial search identified 509 records. After eliminating duplicates and excluding those unrelated to the study topic, a total of 78 records were obtained and considered for analysis (Figure 2). To meet the study's objectives, works that explicitly mention the department of Cajamarca (Peru) or consider it within broader regional analyses were included. For the first objective, research was selected that documents the use of traditional medicine and medicinal plants from different approaches, including archaeological, historical, anthropological, ethnobotanical, botanical, biological, ecological, taxonomic, and conservation studies. In relation to the second objective, studies were considered that examine the trade in medicinal plants, both in local markets and in their distribution to other regions. Studies focusing on pharmacological properties, phytochemical tests, and *in vitro* or *in vivo* assays were excluded from the analysis, as they do not fit the objectives of this article. Botanical nomenclature was verified using the Plants of the World Online database (powo.science.kew.org).

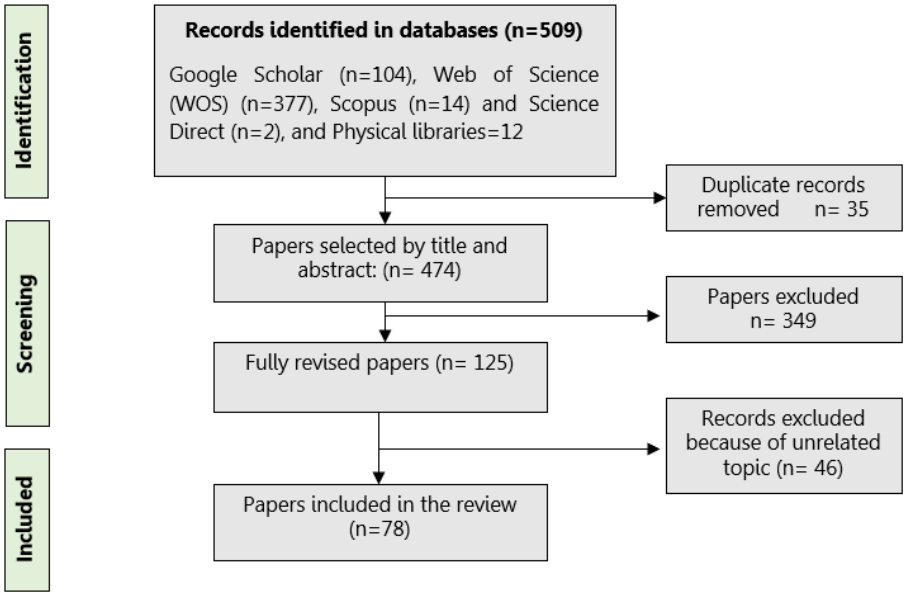

Figure 2. Search methodology and analysis of the traditional use of medicinal plants in Cajamarca.

Data analysis

To understand the historical trajectory of traditional medicine in the department of Cajamarca, an approximate periodization has been proposed that allows us to recognize the transformations of traditional Andean medicine over time. The pre-Columbian period (before 1532 DC) is reconstructed mainly from archaeological findings and early Spanish chronicles, which provide information on the ritual and symbolic dimension of medical practice (Elferink 2015). For later periods, reference was made to the study by Devoto (2016), who analyzes the history of traditional Andean medicine and served as the basis for deducing the following periods. Thus, the colonial period (1532-1821) is characterized by the recording of Andean medicine in colonial documents and its interaction with European medical tradition. The early republican period (1821-1900) marks the beginning of the incorporation of scientific medicine, which overlaps with traditional knowledge without completely displacing it. In the intermediate republican period (1900-1990), traditional medicine was marginalized to rural areas, although at the same time its documentation was promoted from various scientific disciplines. Finally, the contemporary republican period, symbolically inaugurated with the creation of the National Institute of Traditional Medicine (1990s), reflects a scenario of greater recognition, interdisciplinary research, and the presence of medicinal plants in urban areas, along with growing concerns about species conservation and cultural transmission.

Results

In this study, we analyzed a total of 78 sources that explore different aspects of traditional medicine in the department of Cajamarca. In terms of the historical periods covered by these publications, twelve refer to the pre-Columbian period, twelve to the colonial period, one to the early republican period, six to the intermediate republican period, and forty-seven to the contemporary republican period (Table 1).

Table 1. Studies considered in the review organized according to historical period

N°	Title	Main topic	Research area	Period	Reference
1	El reino de Cuismanco	Cuismanco was one of the first kingdoms in Cajamarca, centered on the oracle of Catequil. Cuismanco was incorporated into the Tahuantinsuyu in 1456 by the Inca Cápac Yupanqui	Archeology	Pre-Columbian	Silva Santisteban (1972)
2	Arqueología del norte peruano	It summarizes the archaeological evidence from northern Peru, highlighting Chimú, Lambayeque, Cajamarca, and Chachapoyas as regional cultural centers, addressing languages, ceramics, resource management, and interactions that gave rise to local cultural dynamics	Archeology	Pre-Columbian	Shady (1987)
3	Archaism or Tradition? The Decapitation Theme in Cupisnique and Moche Iconography	Decapitation in the art of the *Cupisnique* and *Moche* cultures, two cultures characterized by their art and beliefs	History, Archeology	Pre-Columbian	Cordy-Collins (1992)
4	El periodo formativo en el valle de Cajamarca	Study of the Archaeology of Cajamarca and the process of transformation of Cajamarca into a ceremonial center	Archeology	Pre-Columbian	Seki (1998)
5	Los chamanes, la ecoterapia y la conservación de las plantas medicinales	This study highlights the potential of ecotourism and shamanism in northern Peru, particularly in Cajamarca, where the “Baños del Inca” hot springs are used for therapeutic purposes, often complemented by medicinal plants in traditional practices	Traditional medicine	Pre-Columbian	Angulo (1999)
6	Una perspectiva del periodo formativo en la sierra norte del Perú	The formative period began with pottery (1800 BC) and ended around 100 BC, with notable excavations in Kotosh, Pampa de Ancash, and “Huacaloma” and “Kuntur Wasi” in Cajamarca	History, Archeology	Pre-Columbian	Onuki (2001)
7	Wari y Cajamarca	Cultural relationship between the Wari and Cajamarca cultures. Both cultures are known for their pottery, which represents different rituals and traditions	Archeology	Pre-Columbian	Watanabe (2001)
8	El reino de Cuismancu: orígenes y transformación en el Tawantinsuyu	Analysis of the Cuismancu culture in Cajamarca, highlighting its early development, rituals, oracles, and subsequent incorporation into the Inca domain	Archeology	Pre-Columbian	Watanabe (2002)
9	Continuidad cultural y elementos foráneos en Cajamarca, sierra norte del Perú: el caso del Horizonte Medio	Interrelation between the pre-Inca cultures of Cajamarca (“Huacaloma” developed between 1500-1000 B.C and “Layzón” between 250-50 B.C) and the *Wari* culture. The ceramics depicting different rituals and offerings are described, as well as animal remains and some tools used in agriculture	Archeology	Pre-Columbian	Watanabe (2010)
10	Caral-Supe y la costa norcentral del Perú. La cuna de la civilización y la formación del estado peruano	It describes the city of Caral, the north-central capital, characterized by temples, residences, work and musical instruments, as well as the discovery of cultivated plants and various species with multiple uses	Archeology	Pre-Columbian-recent	Shady (2001)

11	Chamanismo y plantas de poder en el mundo precolombino de la costa norte del Perú.	Shamanism in Ancient Peru reveals a close spiritual connection with nature, present in different northern cultures, visible in Mochica pottery and practices that spread as far as Cajamarca. In Nanchoc (Upper Saña Valley, Cajamarca), 8,000 years ago, there is evidence of coca and calcite consumption, while in Pacopampa, Kuntur Wasi, spatulas with representations of Anadenanthera were found.	Traditional medicine, anthropology	Pre-Columbian	Jordán (2015)
12	Quinología o tratado sobre el árbol de la quina, o "cascarilla"	Exploitation and traditional uses of the cinchona tree, present in Cajamarca and Ecuador, recognized for its historical medicinal value	Ethnobotany	Colonial	Ruíz (1792)
13	Descripción geográfica del partido de Cajamarca en la intendencia de Trujillo	The work covers the history, geography, demographics, fauna, and minerals of Cajamarca; section IV describes the uses of 46 medicinal plants and briefly mentions eleven other species	History, geography	Colonial	Lecuanda (1794)
14	Procesos por supersticiones en la provincia de Cajamarca en la segunda mitad del siglo XVIII.	Analyzes the judicial processes for superstitions in Cajamarca in the 18th century, showing the persistence of pre-Hispanic healing practices and rituals despite colonial campaigns of religious extirpation	History	Colonial	Dammert (1974)
15	Humboldt en el Perú. Diario de Alejandro Humboldt durante su permanencia en el Perú (agosto a diciembre de 1802)	The study analyzes Humboldt's journey through northern Peru, highlighting the biodiversity of Cajamarca and 48 plants used in the north for food and medicine, with an emphasis on *Cinchona*, *Polylepis*, *Agave*, *Datura*, and *Ceiba*	History, ethnobotany	Colonial	Vegas (1991)
16	Bosquejo histórico del corregimiento de Cajamarca	The study addresses the colonial formation of Cajamarca and highlights the presence of cascarilla trees, a medicinal species, located in the northwest of the department	History	Colonial	Pereyra (1996)
17	Religion and celebration in the Peruvian viceroyalty	The study analyzes Catholic evangelization during the Conquest, highlighting sacraments, symbols, festivities, and cultural expressions that, when fused with indigenous traditions, gave rise to a new mestizo religiosity	History	Colonial	Millones (2001)
18	Las confesiones de Don Juan Vásquez	Analyzes the confessions of Don Juan Vásquez, an 18th-century healer present in northern Peru, revealing his role in healing and religious syncretism	History	Colonial	Millones (2002)
19	El quadro del reyno del Perú (1799): un importante documento madrileño del siglo XVII.	Historical painting of Peru that shows the diversity of its three natural kingdoms, including medicinal plants such as cinchona and cinchona in the plant kingdom, along with species for everyday use	History, ethnobotany	Colonial	Del Pino & Gonzales-Alcalde (2011)
20	Historia de Bambamarca	The study examines the historical processes of Bambamarca in pre-colonial, colonial, and republican times, highlighting customs and traditions, and its founding in 1783 by Bishop Martínez Compañón of Trujillo	History	Colonial	Campos (2013)
21	Razón de las especies de la naturaleza y del arte del	III: Study of Trees, fructices, suffructices and vines. IV: Study of fruit trees, palms, flowers, and fruit herbs	History - ethnobotany	Colonial	Martínez (1789)

	obispado de Trujillo del Perú. Tomos III-V	V: This work displays a total of 293 watercolors of medicinal plants used in the northern region of Peru			
22	La pachaca de Pariamarca en el reino de Cajamarca. Siglo XV - XVIII	History of the Caxamarca kingdom and description of the traditions of the Andean society of *Pariamarca*	History	Colonial	Espinoza (2018)
23	World historical mapping and potential distribution of Cinchona spp. in Peru as a contribution for its restoration and conservation	The study examines the historical and current distribution of Cinchona in Peru, proposing priority areas for its conservation and restoration, highlighting its medicinal and ecological relevance	Conservation	Colonial-Contemporary Republican	García *et al*. (2020)
24	Tratado de materia farmacéutica vegetal: Vol. I	It addresses the bark of Rubiaceae, highlighting *Cinchona officinalis* and *C. umbellulifera* that grows in Jaén (Cajamarca), in addition to *C. scrobiculata* that grows in Cajamarca, Cusco and Carabaya	Traditional medicine, pharmacology	Early Republican	Gómez Pamo (1893)
25	Plantas útiles de los departamentos de Cajamarca, Amazonas y Loreto	The study classifies 21 medicinal plants used by the population, identifying species from the Cajamarca and Amazonian mountains, and those native to the Loreto mountains	History, ethnobotany	Intermediate Republican	Weberbauer (1905)
26	La medicina popular peruana. Contribuciones al folklore médico del Perú: Vol. I.	This early 20th-century treatise addresses traditional medicine using mineral, animal, and plant resources, including medical myths, mystical cures, and various clinical practices and medical specialties	Traditional medicine	Intermediate Republican	Valdizán & Maldonado (1922)
27	El mundo vegetal de los Andes peruanos. Estudio fitogeográfico	It displays the richness of the Peruvian Andes and the northern moors, such as Hualgayoc and Cajamarca, around 4,000 m above sea level, where numerous medicinal plants grow	History, Ethnobotany	Intermediate Republican	Weberbauer (1945)
28	Estadística física y política del departamento de Cajamarca. Año de 1855	The study addresses the demographics, economy, and society of Cajamarca, highlighting agricultural production and prevalent diseases. It also documents 47 medicinal plants along with cereals, vegetables, fruit trees, woods, and industrial species	Botany	Intermediate Republican	Saráchaga *et al.* (1981)
29	El folklore agrario de Cajamarca	The study records 318 diseases treated with 81 animal species and 33 plant species, detailing methods of preparation, therapeutic application, and associated traditional practices	History,Ethnobotany	Intermediate Republican	Iberico (1981)
30	El Folklore médico de Cajamarca	The study documents 95 diseases, addressing diagnosis, prognosis, and therapies based on minerals, animals, and 242 plants, traditionally classified as warm or cool within popular medical knowledge	History, ethnobotany	Intermediate Republican	Iberico (1984)
31	Los hombres de kishuar. La medicina en la tradición cajamarquina	The study addresses traditional peasant medicine in different provinces of Cajamarca, collecting testimonies from 68 informants on birth, child development, illnesses, and remedies, highlighting nine ancient ailments treated with 151 medicinal plants	Traditional medicine	Contemporary Republican	ASPADERUC (1991)

32	Estudio etnobotánico de los huertos familiares en Cajamarca	The study catalogs the flora of 51 family gardens between 2,100 and 3,500 meters above sea level, recording 19 medicinal plants with vernacular and scientific names and traditional uses in the “yunga”, “quechua”, and “jalca” zones	Ethnobotany	Contemporary Republican	Sánchez & Tapia (1992)
33	El cólera. Conversaciones campesinas sobre su presencia en Cajamarca	During the cholera epidemic in Peru (1991), Cajamarca recorded 8,600 cases; local healers reported traditional treatments using various medicinal plants and beverages	Traditional medicine	Contemporary Republican	INDEA (1993)
34	La medicina tradicional en Chota.	The study identifies 15 groups of conditions in Chota from traditional medicine, describing the preparation and application of remedies made from 107 medicinal plants recognized by their vernacular names	Ethnobotany	Contemporary Republican	Delgado (1995)
35	Medicina del campo	The study, based on the knowledge of healers from seven provinces in Cajamarca, documents 365 medicinal plants used to treat 80 conditions	Traditional medicine	Contemporary Republican	Leiva *et al.* (1995)
36	Formas tradicionales de planificación familiar rural. Estudios de base para la atención primaria de la salud	The study describes traditional family planning practices in ten locations in Cajamarca, recording 72 plants used for fertility, childbirth, postpartum care, breastfeeding, and control of various reproductive conditions in men and women	Traditional medicine	Contemporary Republican	Rodríguez & Castañeda (1995)
37	Diversidad florística de Contumazá	The study addresses the geography, climate, phytogeography, and endemic flora of Contumazá, classifying natural resources by use and describing 134 medicinal plants, their traditional applications, and, in some cases, therapeutic preparation	Ethnobotany	Contemporary Republican	Sagástegui (1995)
38	Tecnologías campesinas sobre salud humana	Fifty-four peasant technologies related to human health were compiled in various regions of Peru, with nine from Cajamarca standing out, based mainly on plant and animal resources	Traditional medicine	Contemporary Republican	INDEA (1997)
39	Homemade medicine from my great-grandmother Doña María Iglesias Pino	The manuscript, dedicated to María Iglesias' relatives, describes 19 common diseases, their causes, prevention, and cure, recommending local products, including 49 medicinal plants	Traditional medicine	Contemporary Republican	Santolalla (2005)
40	Los parientes silvestres de la arracacha (*Arracacia xanthorrhiza* Bancroft) y su uso en medicina tradicional en el norte del Perú	The study documents 21 traditional uses of arracacha and its wild relatives, highlighting treatments for fright, childbirth, postpartum complications, and menopause management	Ethnobotany	Contemporary Republican	Valderrama & Seminario (2002)
41	Aspectos etnobotánicos de las plantas medicinales en la ciudad de Cajamarca	Identification of medicinal plants sold in the Cajamarca city market	Ethnobotany, trade	Contemporary Republican	(Aldave-Ruíz 2003)
42	Etnobotánica del emoliente y otras bebidas de venta	In Cajamarca, the emollient appeared in the 1940s thanks to migrants. Over time, new beverages and a wide variety of plants emerged, valued for their nutritional, medicinal, and cultural significance.	Ethnobotany, trade	Contemporary Republican	Seminario (2004)

	ambulatoria en la ciudad de Cajamarca				
43	Traditional medicinal plant use in Northern Peru: Tracking two thousand years of healing culture	It documents the vast traditional knowledge of medicinal plants in northern Peru, highlighting their cultural and therapeutic value, with more than 500 species recorded in ancestral healing practices.	History, traditional medicine	Contemporary Republican	Bussmann & Sharon (2006)
44	Etnobotánica de la «valeriana» (*Valeriana* spp.) en la Jalca de Cajamarca	It documents the diversity of valerians in the Jalca region of Cajamarca, highlights new records, its traditional and commercial use, and warns of environmental risks that threaten the sustainability of the resource.	Ethnobotany, trade	Contemporary Republican	Ramírez *et al*. (2006)
45	Jalcas	This study describes the geography and floristic diversity of Jalca, a high mountain ecosystem between 3,200 and 4,200 meters above sea level in Cajamarca, highlighting medicinal species of economic importance	Biogeography, ecology	Contemporary Republican	Sánchez-Vega & Dillon (2006)
46	Health for sale: The medicinal plant markets in Trujillo and Chiclayo, Northern Peru	The study highlights the importance of traditional medicine in northern Peru, recording the diversity of medicinal plants in markets in Trujillo and Chiclayo, many of them from Cajamarca	Traditional medicine-trade	Contemporary Republican	Bussmann *et al*. (2007)
47	From garden to market? The cultivation of native and introduced medicinal plant species in Cajamarca, Peru and implications for habitat conservation	The Cajamarca city market houses a wide variety of medicinal plants, which, in addition to supplying local demand, are also sold to Trujillo and Chiclayo. It also shows that some species are being cultivated	Ethnobotany, trade	Contemporary Republican	Bussmann *et al*. (2008)
48	From Sierra to Coast: Tracing the supply of medicinal plants in Northern Peru - A plant collector's tale	Northern Peru is an Andean hub for health based on medicinal plants. In Cajamarca, many species are harvested in the wild and some are transported to coastal markets, highlighting the economic and ecological fragility of this trade	Ethnobotany, trade	Contemporary Republican	Revene *et al.* (2008)
49	Markets, healers, vendors, collectors: The sustainability of medicinal plant use in northern Peru	The study reveals that the markets of Trujillo and Chiclayo depend largely on wild plant species, many of which originate from the mountains and jungle, highlighting their fragility and the risk of overexploitation	Ethnobotany, Trade	Contemporary Republican	Bussmann & Sharon (2009a)
50	Shadows of the colonial past - Diverging plant use in Northern Peru and Southern Ecuador	The study analyzes the traditional use of medicinal plants in northern Peru and southern Ecuador, highlighting their ancestral origins in the Cupisnique culture and their continued use to the present day	Ethnobotany, Traditional medicine-	Contemporary Republican	Bussmann & Sharon (2009b)
51	Plantas medicinales del norte Perú	The study describes the morphological characteristics, origin, distribution, conservation status, and medicinal uses of 50 species used in northern Peru	Ethnobotany, ecology	Contemporary Republican	Vásquez *et al.* (2010)

52	Estado y factores de riesgo de la biodiversidad de especies vegetales medicinales en el Centro Poblado de Combayo, Cajamarca.	The study analyzes Combayo (3,264 meters above sea level) as a collection center for 58 medicinal plants, highlighting its regional trade and the threats posed by mining, agriculture, livestock, and extraction	Ethnobotany, trade	Contemporary Republican	Seminario & Sánchez (2010)
53	Plantas medicinales del Perú. taxonomía, ecogeografía, fenología y etnobotánica.	The study documents 774 medicinal species in Peru, 530 of which are found in Cajamarca, incorporating vernacular names, morphology, eco-geography, and valuable ethnomedical information on parts used, preparations, and therapeutic applications	Ethnobotany	Contemporary Republican	Mostacero *et al.* (2011)
54	Especies medicinales de Cajamarca I: Contribución etnobotánica, morfológica y taxonómica.	El estudio describe 56 especies medicinales de Cajamarca, organizadas por familias botánicas, destacando sus usos y aplicaciones en la medicina tradicional practicada en la región	Ethnobotany	Contemporary Republican	Sánchez (2011)
55	La diversidad biológica en Cajamarca. Visión étnico-cultural y potencialidades	This study highlights the remarkable biological diversity of Cajamarca, highlighting the importance of the medicinal species present in the high Andean mountains (Jalca)	Biology, cultural, ethnobotany	Contemporary Republican	GRC (2012)
56	The globalization of traditional medicine in Northern Peru: From shamanism to Molecules	The study documents the traditional use of medicinal plants in northern Peru, evaluating their efficacy, toxicity, and sustainability, and highlighting the cultural, therapeutic, and ecological importance of these species in the region	Traditional medicine, complementary medicine, alternative medicine	Contemporary Republican	Bussmann (2013)
57	Plantas medicinales de los páramos de Cajamarca	Use of medicinal plants from the paramos or jalcas (high mountains of Cajamarca)	Ethnobotany	Recent	Sánchez (2014)
58	Plantas medicinales de los Andes y la Amazonia. La flora mágica y medicinal del Norte del Perú	This comprehensive study identified more than 500 species of medicinal plants in northern Peru, analyzing their ethnobotany, uses in traditional medicine, historical transformation, and sustainability challenges in local markets	Ethnobotany, traditional medicine, trade, Ecology	Contemporary Republican	Bussmann & Sharon (2015)
59	Biología de *Valeriana pilosa* R. & P. (Valerianaceae): una especie en peligro de extinción de las altas montañas de Perú.	The biology and ecology of Valeriana pilosa in the high mountains of Cajamarca is described. This species is threatened by overexploitation and is of great importance in traditional Andean medicine	Biology, ecology	Contemporary Republican	Seminario *et al.* (2016)
60	Plantas comercializadas por herbolarios en el mercado del	The study documents traditional knowledge and use of plants in the Cajabamba market (Cajamarca), recording 123 species (85 medicinal), their conservation status, medicinal value, family representation and cultural transmission	Ethnobotany, trade	Contemporary Republican	Castillo-Vera *et al*. (2017)

	distrito de Cajabamba (Cajamarca, Perú)				
61	Etnobotánica de las plantas medicinales expendidas en los mercados de Cajamarca y San Marcos.	The study in Cajamarca recorded 470 medicinal species, their uses and therapeutic value, as well as their state of conservation, highlighting changes in trade, collection, and distribution to other regional markets	Ethnobotany, trade	Contemporary Republican	Orrillo-Mejía (2018)
62	Caracterización del mercado de plantas hortícolas (medicinales, aromáticas y hortalizas) en la ciudad de Bambamarca	The study characterized the horticultural plant market in Bambamarca, recording 100 fresh and dehydrated species, highlighting their diversity, use in emollients, family consumption, endemic species, and conservation categories	Ethnobotany, trade	Contemporary Republican	Cruzado (2018)
63	Mapa de vegetación de Cajamarca. Potencialidad de la vegetación para el uso de plantas medicinales	The study characterizes the Cajamarca region in terms of its physical and bioclimatic diversity, cataloging 188 medicinal plants with names, therapeutic uses, active ingredients, and context.	Ecology, biogeography, Ethnobotany	Contemporary Republican	Galán de Mera *et al.* (2018)
64	Características del acopio de plantas medicinales en el mercado de la ciudad de San Marcos - Cajamarca	The study analyzed the collection of medicinal plants in San Marcos, recording 37 species and 510 tons per year, highlighting volumes, prices, stakeholders, and threats to their conservation	Ethnobotany, trade	Contemporary Republican	Malca (2019)
65	Distribución bioclimática de plantas medicinales y sus principios activos en el departamento de Cajamarca (Perú)	The study analyzes the distribution of medicinal plants and active ingredients in Cajamarca using a bioclimatic approach, revealing patterns associated with altitude, rainfall, and temperature, useful for identifying new species of therapeutic interest	Ecology and biochemistry	Contemporary Republican	Galán de Mera *et al.* (2019)
66	Yo soy ayahuasca	The author, originally from Jaén (Cajamarca), shares his experience as a shaman and his use of ayahuasca, recounting healings and experiences that reveal the spiritual complexity of traditional medicine	Traditional medicine	Contemporary Republican	Gonzales (2019)
67	Aspectos taxonómicos y avances en el conocimiento del estado actual del árbol de la quina (*Cinchona officinalis* L.)	The study confirms the presence of *Cinchona officinalis* (medicinal species) in Piura and areas of Cajamarca, differentiating it from related species, and concludes that it faces threats that justify its classification as Endangered, proposing sustainable conservation measures	Conservation, ecology	Contemporary Republican	Huamán *et al.* (2019)
68	Status of Research on Medicinal Plants in the Cajamarca's Region, Peru	This study analyzes the state of research on medicinal plants in Cajamarca, highlighting their diversity, traditional uses, local markets, and conservation issues	Ethnobotany, trade, conservation	Contemporary Republican	Seminario *et al.* (2019)

69	Importancia cultural de la flora silvestre de la provincia de Cajabamba, Cajamarca, Perú.	This study in Cabrero (Cajabamba, Cajamarca) identified 179 species of wild flora, of which 131 are medicinal, highlighting emblematic species deeply valued in traditional practices	Ethnobotany	Contemporary Republican	Castillo *et al*. (2019)
70	Conocimientos tradicionales de las plantas medicinales de las jalcas de Cajamarca y Celendín	The study records 243 medicinal species in the Jalca and high Quechua of Cajamarca, recording their different uses and medicinal properties	Ethnobotany	Contemporary Republican	Lucio & Torres (2019)
71	Cultura y ciencia de plantas medicinales de las jalcas de Cajamarca	The study highlights the importance of Cajamarca's jalcas as strategic ecosystems, linking biodiversity, water, and medicinal plants with traditional and scientific knowledge to promote conservation and sustainable development.	Ethnobotany	Contemporary Republican	Torres & Lucio (2019)
72	Collection, storage and market of medicinal plants: A case in Peru	The study reviews the collection and trade of medicinal plants in Cajamarca, highlighting their economic importance and ecological threats	Trade	Contemporary Republican	Seminario *et al.* (2020)
73	Biología y ecología de cuatro especies medicinales de Gentianella recolectadas para el mercado en la Región Cajamarca, Perú	Description of the ecology, biology, and total flavonoid content of *G. crassicaulis, G. Gramínea*, *G. dianthoides*, and *G. bicolor*	Biology-ecology	Contemporary Republican	Seminario *et al*. (2021)
74	Factores asociados a los cambios en las bebidas nutracéuticas de venta ambulatoria en la ciudad de Cajamarca	The study analyzes the dynamics of street medicinal drinks in Cajamarca (2004-2018), recording changes in species, carts, and demand, influenced by socioeconomic factors and the Peruvian gastronomic boom	Ethnobotany, Trade	Contemporary Republican	Seminario *et al.* (2023)
75	Exploración del potencial medicinal de un bosque montano del Norte del Perú	The study in the “El Infiernillo” montane forest (Chugur, Cajamarca) recorded 50 medicinal species, their phytochemical components, highlighting their therapeutic, commercial and conservation value	Ethnobotany, conservation	Contemporary Republican	Montoya *et al.* (2024)
76	Riqueza y uso de la flora medicinal de la Región Cajamarca (Norte del Perú): Un compendio de 1988 a 2022	The compendium of 49 studies on the medicinal flora of the department of Cajamarca records 1,115 plant species, their distribution, endemism and conservation status, providing an essential basis for monitoring and sustainable management	Ethnobotany, conservation	Contemporary Republican	Seminario *et al.* (2024)
77	Plant-based veterinary practices in Peru: a review of traditional ethnoveterinary knowledge and phytochemical components	The study reviews ethnoveterinary medicine in Peru, recording 189 medicinal species used mainly in cattle and alpacas, their therapeutic uses and phytochemical compounds	Ethnoveterinary	Contemporary Republican	Silva *et al.* (2024)
78	*Tara spinosa* (Molina) Britton & Rose: botánica, distribución, adaptaciones, silvicultura y usos.	Comprehensive study of the tara tree covering its taxonomy, related genera, vernacular names and place names, morphology, distribution, ecology, forestry, traditional uses, and chemical composition, which forms the basis for modern applications	Biology-ecology	Contemporary Republican	Villena *et al.* (2024)

The cultures that developed in the Cajamarca valleys between 1500 BC and 1532 DC, such as Huacaloma, Kuntur Wasi, Cupisnique, Cuismanco, and Caxamarca (Silva Santisteban 1972; Seki 1998; Watanabe 2010), maintained close relations with cultures on the Peruvian coast. This interaction is evidenced by archaeological and ceramic remains linked to cultures such as Wari (Watanabe 2001; Watanabe 2010), Mochica (Cordy-Collins 1992), Chimú, Paracas, and Nasca, grouped together under the name "cultures of northern Peru" (Jordán 2015; Shady 1987; Shady 2001). These contacts fostered the exchange of agricultural practices and the development of knowledge of traditional medicine (Silva Santisteban 1972; Watanabe 2002). In this context, knowledge was transmitted and safeguarded by healers and shamans, central figures in social and spiritual life, recognized as guides with special gifts (Angulo 1999; Jordán 2015). According to Bussmann *et al.* (2006), healing altars or "mesa" maintain a deep ritual tradition to this day by integrating "objects of power"—such as seashells, pre-Columbian ceramics, staffs, and stones—combined with Christian symbols. These spaces, set up in houses, courtyards, or high-altitude lagoons, accompany purification rituals using holy water, perfumes, flowering baths, and the ingestion of plant extracts such as "chamico· (*Datura ferox*), "floripondio" (*Brugmansia* spp.), "san Pedro" (*Echinopsis pachanoi*), tobacco (Nicotiana tabacum), and coca (Erythroxylum coca). In addition, "vilca" (*Anadenanthera peregrina*, *A. colubrina*), "ulluchu" (*Guarea* sp.), "huarango" (*Prosopis* sp.), quina (*Cinchona* spp.), and corn (*Zea mays*) (Jordán 2015).

In the Peruvian Andes, shamanism has endured more than five hundred years of marginalization and persecution (Espinoza 2018; Millones 2001). The arrival of the Spanish in Cajamarca in 1532 marked the beginning of the colonial period and an intense campaign of evangelization, during which shamans and healers were persecuted for being considered an obstacle to religious expansion (Dammert 1974; Millones 2002). However, the vastness of the territory and indigenous resistance allowed these practices to continue, many of them in secret and even integrating European elements (Gareis 2004). It was in this context that the first colonial records of traditional medicine emerged, such as the watercolors of Martínez Compañón, who illustrated 293 medicinal species, including coca (*E. coca*), "cinchona" bark (*Cinchona officinalis* L.), chamomile (*Matricaria chamomilla* L.), and lemon balm (*Melissa officinalis* L.) (Martínez 1789). Illustrations were also made of representations reflecting the diversity of the three natural kingdoms, including plants of great value, such as cinchona (Del Pino & Gonzales-Alcalde 2011). To these were added botanical descriptions of Cajamarca (Lecuanda 1794) and Humboldt's observations on species such as *Cinchona* sp., *Polylepis* sp., *Agave* sp., *Datura* sp., and Ceiba sp., (Vegas 1991). "Cascarilla" or "cinchona" acquired a crucial role in the treatment of malaria, generating massive exploitation that between 1752 and 1796 reached more than 8.5 million kilograms exported, which involved the felling of some 11 million trees (Ruíz 1792; Díaz *et al*. 2016), a situation that subsequently prompted studies on its distribution and conservation (García *et al.* 2020).

During the early republican period (1821-1900), traditional medicine in Cajamarca was documented through inventories that highlighted the pharmaceutical value of various medicinal species (Gómez Pamo 1893). During the intermediate republican period (1900-1990), multiple research projects were carried out to identify medicinal plants and their applications in Peru, with Cajamarca appearing as a particularly relevant setting (Weberbauer 1905; 1945; Valdizán & Maldonado 1922). Studies focused exclusively on the department also emerged, dedicated to the diagnosis and treatment of diseases through the use of medicinal plants (Saráchaga *et al.* 1981; Iberico 1981; 1984).

In the contemporary republican period (1990-present), significant advances have been made in the study of traditional medicine and the use of medicinal plants throughout the department of Cajamarca, based on ethnobotanical and anthropological approaches. This research has covered provinces such as Cajamarca (Sánchez 2011), Chota (Delgado 1995), Contumazá (Sagástegui 1995), and Cajabamba (Castillo-Vera *et al.* 2017; Castillo 2019), as well as in the region's jalcas, Andean ecosystems located above 3,000 m a.s.l., which are home to a remarkable diversity of medicinal plants (Lucio and Torres 2019; Montoya Quino *et al.* 2024; Ramírez *et al.* 2006; Sánchez-Vega & Dillon 2006; Sánchez 2014; Seminario & Sánchez 2010; Seminario *et al.* 2016; Torres & Lucio 2019). Other studies cover the entire department or several provinces (ASPADERUC 1991; Galán de Mera *et al.* 2018; 2019; GRC 2012; Leiva *et al*. 1995; Sánchez & Tapia 1992; Seminario *et al.* 2019; 2024) or focus on the northern region of Peru, including Cajamarca (Bussmann and Sharon 2006; 2009b; Bussmann 2013; Vásquez *et al.* 2010), as well as national studies that mention the department (INDEA 1993; 1997; Gonzales 2019; Mostacero *et al.* 2011; Rodríguez & Castañeda 1995; Santolalla 2005; Silva *et al.* 2024). An important contribution from this period is the analysis of medicinal plant markets, such as those in the city of Cajamarca (Aldave-Ruíz 2003; Bussmann *et al.* 2008; Orrillo-Mejía 2018; Revene *et al.* 2008; Seminario *et al.* 2020), in the city of Bambamarca (Cruzado 2018), in the city of Cajabamba (Castillo-Vera *et al.* 2017), and in the city of San Marcos (Malca 2019), as well as specific studies on the trade of emollients in Cajamarca (Seminario 2004; Seminario *et al.* 2023). The regional markets in the north in which Cajamarca participates have also been described (Bussmann *et al*. 2007; Bussmann and Sharon 2009a; Bussmann & Sharon 2015). Finally, research has been conducted focusing on specific species such as "arracacha" (*Arracacia xanthorrhiza* Bancroft) (Valderrama & Seminario 2002), "cinchona" (*C. officinalis*) (Huamán *et al.* 2019), "taya" (*Tara spinosa*) (Villena *et al.* 2024), and several species of *Gentianella* spp. (Seminario *et al.* 2021).

Cajamarca: Medicinal Plants Supply Center for Local Markets and the Peruvian Coast

The trade in medicinal plants and nutraceutical beverages (emollients), made from medicinal species, has been recorded in markets in Cajamarca, San Marcos, Bambamarca (Hualgayoc), Cajabamba, and in high Andean jalcas such as Combayo. The number of herbalists and species varies between provinces, with the city of Cajamarca standing out for having the greatest diversity, which is related to the size of its market and its population of approximately 250,000 inhabitants (INEI 2017). These plants supply not only local markets but also coastal cities such as Trujillo, Chiclayo, Piura, Chimbote, and Lima, in addition to flows from provinces to Cajamarca (Table 2). This dynamic confirms the findings of Bussmann *et al.* (2007), who identify Cajamarca as a key supplier of the most commercially traded medicinal species in the cities of Trujillo and Chiclayo.

Table 2. Features of medicinal plant markets in the department of Cajamarca.

Market location	**Features**									
	Herbalist	Species sold	Botanical families	Processed products stores	Condition	Species in artisanal extracts	Collection centers	Species stockpiled for other markets	Destinations	Reference
City Cajamarca	19	305	94	3	Fresh/dry	N/A	8	64	Chiclayo, Trujillo	Aldave-Ruíz (2003)
High mountains (Jalca) of the provinces of Cajamarca and San Marcos	28	1	N/A	N/A	Fresh	N/A	N/A	1	Cajamarca, Chiclayo and Lima	Ramírez *et al*. (2006)
City of Cajamarca and "Baños del Inca" (emollient market)	138	58	38	N/A	Fresh/dry	39	N/A	N/A	Cajamarca	Seminario (2004)
City of Cajamarca (Revilla Pérez market)	28	42	23	N/A	Fresh	N/A	1 (Revilla Pérez market)	N/A	Chiclayo and Trujillo	Bussmann *et al.* (2008)
High mountains (Jalca) of the provinces of Cajamarca	1	38	23	N/A	Fresh	N/A	1	38	Chiclayo	Revene *et al.* (2008)
Town of Combayo, Encañada district, Cajamarca province	N/A	58	27	NA	Fresh	N/A	15	20	Chiclayo, Sullana and Lima	Seminario & Sánchez (2010)
City Cajabamba	60	85	49	N/A	Fresh	N/A	N/A	N/A	Cajamarca and Trujillo.	Castillo-Vera *et al.* (2017)
City Cajamarca	27	470	126	129	Fresh/dry	26	14	57	Chiclayo, Trujillo, Piura and Lima	Orrillo-Mejía (2018).

City San Marcos	N/A	18	N/A	N/A	Dry	N/A	4	N/A	Chiclayo, Trujillo, Piura and Lima	Orrillo-Mejía (2018).
City Bambamarca-Hualgayoc Province	27	47	19	N/A	Fresh	N/A	N/A	N/A	Chiclayo	Cruzado (2018)
City of San Marcos	11	37	22	N/A	Dry		4	37	Chiclayo, Piura, Tumbes, Border with Ecuador, Chimbote, Lima, Nuevo Cajamarca, Huánuco, Huancayo, Tacna	Malca (2019)
City of Cajamarca (emollient market)	254	43	26	N/A	Fresh/dry	56	N/A	N/A	Cajamarca	Seminario *et al.* (2023)

N/A: Not available

In the last two decades, eleven non-native medicinal species from other continents have been incorporated into the Cajamarca city market, of which nine are successfully cultivated (Table 3) (Seminario *et al*. 2019; Seminario *et al*. 2020).

Table 3. Medicinal species incorporated into the market and cultivation in the city of Cajamarca

Comercial name	**Scientific name**	**Family**	**Origin**
Chía*	*Salvia hispánica* L.	Lamiacea	Mesoamerica
Moringa*	*Moringa oleífera* Lam.	Moringaceae	India
Alpiste	*Phalaris canariensis* L.	Poaceae	Mediterranean
Nín o nen*	*Azadirachta indica A.Juss.*	Meliaceae	India and Burma
Arándano*	*Vaccinium corimbosum* L.	Ericaceae	North America
Noni*	*Morinda citrifolia* L.	Rubiaceae	Southeast Asia
Jamaica (flor de)	*Hibiscus sabdariffa* L.	Malvaceae	Egypt, Sudan
Estevia*	*Estevia rebaudiana* Bertoni	Asteraceae	Paraguay
Gingo*	*Ginkgo biloba* L.	Ginkgoaceae	China
Lechero africano, planta de la vida*	*Synadenium grantii* Hook.f.	Euphorbiaceae	Africa/South America
Planta de insulina*	*Chamaecostus cuspidatus* Nak	Costaceae	Brazil

Source: Adapted from Seminario *et al* (2019; 2020), * Cultivated in Cajamarca.

The ten most commonly collected species vary depending on the city; however, those that appear repeatedly in at least two provinces include *Matricaria chamomilla*, *Desmodium molliculum*, *Valeriana pilosa*, and *Minthostachys mollis*. Most of the most commercially traded species come from wild collection (Table 4). This trend coincides with that reported by Bussmann *et al.* (2015) in various departments in northern Peru, where much of the plant material available in markets comes from direct extraction from natural populations. Although this practice maintains tradition, it poses a risk of overexploitation, especially in the case of medicinal species that are rare in the northern region (Bussmann & Sharon 2009a).

Discussion

As the results of this study show, traditional healing or shamanism has deep roots dating back to pre-Inca times in the cultures of northern Peru. Healing practices or shamanism remain prevalent, and many of the plants used in ancient times (Jordán 2015) continue to be part of current practices (Bussmann *et al.* 2006). This practice was not exclusive to the Andean region, as it was also present among the Aztecs in Central America and in various Amazonian peoples, where characteristic plants with hallucinogenic and medicinal properties were used in different healing rituals (Quirce 2010). These so-called “plants of the gods” are toxic species that, when administered in appropriate doses, offer therapeutic properties. They are widely distributed throughout the world and their use has been recorded in many cultural traditions. In recent years, contemporary society has begun to recognize more clearly the relevance of these species, both in the historical and symbolic configuration of peoples and in their potential therapeutic value and applications in modern medicine (Schultes *et al.* 2000).

Although the studies reviewed show that during the colonial period traditional medicine practices in northern Peru were suppressed or persecuted (Millones 2001, 2002), a comparison with southern Ecuador reveals significant differences. Both regions share cultural backgrounds and similar flora, with an overlap of species; however, while the Peruvian colonial administration showed greater tolerance, in Ecuador traditional medicine became illegal, limiting healers' experimentation with new species introduced by Europeans. In contrast, this greater tolerance allowed Peruvian healers to explore the regional flora in search of remedies (Bussmann *et al.* 2015). This could partly explain the continuity of traditional medicine and the diversity of medicinal plant species in the department of Cajamarca to this day. In recent decades, these practices have been strengthened in Peru by initiatives such as the National Institute of Traditional Medicine and the Ministry of Health (Devoto 2016), as well as by international frameworks—the Alma-Ata Declaration and the Convention on Biological Diversity—that promote the articulation between traditional medicine and biodiversity conservation (Bussmann et al. 2015).

Table 4. Ten most collected species by city, with their commercial and scientific names

	City Cajamarca	City Cajamarca	Town of Combayo, Encañada district, Cajamarca province	City Bambamarca- Hualgayoc Province	City San Marcos
1	"Manzanilla" *Matricaria chamomilla* L.	"Manzanilla" *M. chamomilla*	*Perezia multiflora* *	"Yerba buena" *Mentha piperita* L.	"Pul" *Coreopsis senaria* S.F.Blake & Sherff). *
2	"Valeriana" *Valeriana pilosa* Ruiz & Pav. *	"Valeriana" *V. pilosa* *	*Senecio canescens* *	"Orégano" *Origanum vulgare* L.	"Flor blanca" *Iresine weberbaueri* Suess). *
3	"San pedro" *Echinopsis pachanoi* (Britton & Rose). *	"Pie de perro" *Desmodium molliculum* (Kunth). *	*Satureja nubigena* *	"Chamcua" *Minthostachys mollis mollis* (Benth.) Griseb. *	"Purenrrosa" *Bejaria resinosa* Mutis ex L.f.). *
4	"Eucalipto" *Eucalyptus globulus* Labill	"Ciprés" *Cupressus macrocarpa* L.	*Huperzia crassa* *	"Paico" *Dysphania ambrosioides* (L.).	"Lanche" *Myrcianthes sp.* *
5	"Berro" *Nasturtium officinale* R. Br. *	"Escorzonera" *Perezia multiflora* (Humb. & Bonpl.) Less. *	*Matricaria chamomilla*	"Ruda" *Ruta graveolens* L.	"Pie de perro" *Desmodium molliculum H.B.K.* *
6	"Laurel" *Laurus nobilis* L.	"Apio" *Apium graveolens* L.	*Puya fastuosa* *	"Salvia" *Salvia sagittata* Ruiz & Pav. *	"Chancua" *Minthostachys mollis* (Benth.) Griseb. *
7	"Flor blanca" *Iresine weberbaueri* Suess. *	"Supiquehua" *Stachys arvensis* L. *	*Halenia* spp. *	"Canchalagua" *Schkuhria pinnata* (Lam.) Kuntze ex Thell. *	"Romero blanco" *Clinopodium sericeum (C.Presl ex Benth.) Govaerts.* *
8	*Tanacetum* sp. "Manzanilla macho" *	*Cynara scolymus* L. Alcachofa	*Gentianella* spp. *	"Pie de perro" *Desmodium molliculum* (Kunth) DC. *	"Zarcilleja hoja grande" *Brachyotum radula* Triana *
9	"Chinchimalí" *Gentianella graminea* (Kunth) Fabris. *	"Nogal" *Juglans neotropica* Diels. *	*Valeriana pilosa* *	"Matico" *Piper aduncum* L. *	"Isphingo" *Achyrocline alata* (Kunth) DC. *
10	"Andacushma" *Geranium spp.* *	"Menta" *Mentha x piperita* L.	*Urtica urens**	"Cola de caballo" *Equisetum bogotense* Kunth. *	"Chilca" *Aristeguietia discolor* (DC.) *
Reference	Aldave-Ruíz (2003)	Orrillo-Mejía (2018).	Seminario & Sánchez (2010)	Cruzado (2018)	Malca (2019)

*** Wild species**

A growing preference for the use of medicinal plants and other local resources in the prevention and treatment of diseases is observed among the urban population of Cajamarca. This trend is due to several factors: the high cost and limited access to conventional medicine, the side effects of some drugs, the greater dissemination of the value of traditional and complementary medicine, as well as its promotion in the media (Seminario *et al.* 2020). This phenomenon is not unique to Cajamarca. Widespread commercialization of medicinal plants has also been recorded in other urban markets in the country: in Lircay, Huancavelica, 72 species have been identified; in Ayacucho, 53; and in Áncash, 132 (Castañeda *et al.* 2021), In the markets of Trujillo and Chiclayo 400 species of medicinal plants (Bussmann & Sharon 2009 a). Similarly, in the Amazon region, the city of Iquitos stands out for the presence of around 500 species for medicinal use, of which 134 are actively marketed in local markets (Galy *et al.* 2000).

Special attention must be paid to the sustainability and conservation of medicinal species sold in the department of Cajamarca, as most of them are obtained from wild populations and come mainly from the high Andean areas of the territory (Castillo-Vera *et al*. 2017; Orrillo-Mejía 2018; Malca 2019; Ramírez *et al.* 2006). However, these ecosystems are seriously threatened by anthropogenic activities such as livestock farming, agriculture, forest fires, and the expansion of mining (Ramírez *et al.* 2006; Seminario & Sánchez 2010; Seminario *et al.* 2016; 2021). Adding to this environmental pressure is the fact that many of these species are sold in local markets at low prices, which does not reflect their cultural, ecological, or therapeutic value and limits the generation of incentives for sustainable management and conservation practices (Orrillo-Mejía 2018; Cruzado 2018).

Conclusions

Historical and current evidence confirms that Cajamarca has a long tradition of medicinal plant use, with roots dating back to the pre-Inca period and showing remarkable continuity to the present day. These practices, initially linked to shamans and healers, survived colonial persecution and during the period of the republic, in addition, contributions from science are integrated. Today, traditional medicine persists in both rural and urban areas. As a future challenge, it is necessary to assess the permanence of shamans and healers, whose numbers seem to have declined considerably.

The Cajamarca market has established itself as a benchmark in the trade of medicinal plants, not only for the region but also for other departments in the country. This market offers a wide variety of species, including some introduced and currently successfully cultivated. Cajamarca also plays an important role in supplying plants to markets on the northern coast, mainly to Trujillo, Chiclayo, Piura, and Lima. reflecting its importance in the dynamics of the medicinal plant trade.

Declarations

List of abbreviations: Not applicable
Ethics approval and consent to participate: Not applicable - this is a literature review.
Consent for publication: Not applicable
Availability of data and materials: Data are available from the corresponding author.
Conflict of interest: The authors declare that they have no conflict of interest.
Author Contributions: WS, JFS, GISO, ASC conceptualized the work. WS, JFS, GISO, ASC, DAS collected, analyzed the data and prepared the draft manuscript. WS, JFS, GISO, ASC, JFMQ, reviewed and edited the manuscript. WS, JFS, DAS reviewed, proofread the final edit of the manuscript. All authors approved the final version of the manuscript.

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