

Ethnomedical field study in northern Peruvian Andes with particular reference to divination practices

Vincenzo De Feo*

Dipartimento di Scienze Farmaceutiche, Università degli Studi di Salerno, Via Ponte don Melillo, I-84084 Fisciano (Salerno), Italy

Received 8 July 2002; received in revised form 20 December 2002; accepted 20 December 2002

In memory of Dr. Richard Evans Schultes.

Abstract

The results of a field study carried out in August and September 1988, in the northern Peruvian Andes are described. The area of investigation extends from Ayabaca City (about 2900 m above sea level) to Haughtiness Lagunas (about 3800 m above sea level) in the Ayabaca District, Department of Piura.

This is the first time that this location has been the subject of an ethnobotanical investigation. We have collected 46 plant species, belonging to 20 families, used in the treatment of various diseases. For each plant, we report the common/local names, the crude drug formulation, method of preparation, dosage and claimed toxicity. The disease concept of this Andean population concerning the “hot” and “cold” aspects of diseases and the plants to treat them, is also discussed. Very important appear to be the use and knowledge of psychoactive plants, in particular “cimoras,” *Brugmansia* and *Trichocereus* species.

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Keywords: Medicinal plants; Traditional medicine; Northern Peruvian Andes; Hallucinogens

1. Introduction

The use of medicinal plants has always been a part of human heritage. Over the centuries, every population has developed its knowledge in recognizing, harvesting, and using plants to cure infirmities. One can still find this situation in communities that are culturally and geographically isolated, where it is difficult or impossible to find medical doctors who practice “official” medicine, and in those countries still economically emerging, where there are very few medical and social facilities due to the limitation of economic factors. In these areas, the treatment of diseases is based essentially, and sometimes exclusively, on medicines that have a natural origin; among these, vegetal drugs constitute the majority.

The recognition and the use of medicinal plants is an untouchable heritage of most preliterate cultures. Therefore, in the past centuries, and presently in some cultures, the practice of using plants for medicine has assumed a “sacred” characteristic: it is secretly kept and conveyed by priests and other religious figures, who are very knowledgeable about

herbs and who combine their botanical, phytotherapeutical and toxicological knowledge with religious elements and rituals based on magic, superstition and ancestral beliefs (De Feo, 1992).

In rural communities of the Andes, the herbalist or “curandero,” the individual who is knowledgeable about all healing and harmful plants, assumes a primary role. He is considered a priest, an intermediate figure between our world and the world of the spiritual forces. At the same time he is also a therapist and an expert on all healing plants, psychotropic plants (used to awaken religious spirits or to gain an altered state of mind) and harmful plants (Polia, 1988). There is a daily contact between the priest and the plant world, from which he receives most of his remedies; hence, his power over the rest of the community.

The shamanic culture in the Andean area of Peru is very old. Its origins certainly predate the Columbian eras and, since then, have been enriched by continuous intercultural and interethnic relationships. In relatively recent times, it has also been enriched by the Spanish and the other European contacts and by academic medicine. Still today, this culture is alive and often represents the only medical practice that a population can refer to daily. This makes the “curandero”

* Tel.: +39-089-962824; fax: +39-089-962828.

E-mail address: defeo@unisa.it (V. De Feo).

the only medical doctor available to the Andean population to treat illnesses.

This research has been conducted in a high-altitude lake area, that stretches from the City of Ayabaca (about 2900 m above sea level) to the Prieta lake, in northern Peru.

It is important to underline that this area is a sacred zone, claimed to be very effective for therapeutic-magic rituals, due to the presence of particularly strong spiritual forces (Polia, 1988; De Feo, 1992).

The extension of the area studied is about 20 km² and is situated between 79°38' and 79°28' west longitudes and between 4°42' and 4°46' south latitudes. The vegetation cover is commonly known as "Ceja de la montaña" and is characteristic of inland Cordilleras; it is made up primarily of bamboos and ferns and extends all the way up to 3700–4000 m. In the specific area of our study, however, the vegetation is somewhat different because most of the year the area is under fog banks and because there are many lagoons, near which small swamps are often found (Weberbauer, 1911). However, in the area of our study the vegetation is similar to that of humid forest in the lower tropical mountains with bushes, small evergreen trees, epiphytes and herbaceous plants (Ferreya, 1960; Tosi, 1960; Weber, 1969; Schnell, 1987).

The principal and typical species found in this vegetation are *Weinmannia ayavacensis* (Cunoniaceae), *Streptosolen jamesonii* (Benth.) Miers (Solanaceae), *Viburnum ayavacense* HBK. (Caprifoliaceae), *Monnina salicifolia* R. et P. (Polygalaceae), *Bomarea ayavacensis* Kränzl (Amaryllidaceae), *Oreopanax* sp. (Araliaceae), *Hesperomeles lanuginosa* R. et P. (Rosaceae), *Oreocallis grandiflora* (Lam.) R. Br. (Proteaceae), and species belonging mainly to the families Melastomataceae, Ericaceae, Gentianaceae and Asteraceae.

2. Methodology

Information was gathered through interviews with the population in the study area, chiefly with the "curanderos," and through participation in the harvesting, preparation and administration of the vegetal drug in therapy.

Much importance and care were given to the recording of data, in order to assure the separation of cultural-anthropological information from ethnobotanical data.

A set of voucher herbarium specimens (identified by initials and listed in parentheses following common names in this paper) has been deposited in the herbarium of the Museo de Historia Natural "J. Prado" of the Universidad Nacional Mayor de San Marcos in Lima, while another set is deposited in the Pharmaceutical Botany Chair at the University of Salerno, Italy.

Taxonomic determinations were performed at the herbarium of the Museo de Historia Natural, Lima, with the help of MacBride's *Flora of Peru* (1938–1981) and Ferreyra's *Flora del Peru—Dicotiledoneas* (1986) and by comparison with the rich collections of exiccata of this herbarium and that of the Facultad de Farmacia y Bioquímica, Universidad Nacional Mayor de San Marcos, Lima.

3. Results

Forty-six plants belonging to 20 families were collected during the field study. A list of these plants (alphabetical order by family) is presented below. For each of these plants, the following information is given: the botanical name, the local name, coded voucher specimen number, and observations on the prescription and the dosage form of the crude drug preparations.

Amaranthaceae

I. herbstii Hook.

"Cimora señorita" (DF/P/88/33)

The leaves, whole or ground, are used externally against eczemas, sores and pimples. A cataplasm made from the leaf decoction (approximately 30 g in 1 l of water) is also used in treatment of these ailments. The plaster is applied externally for one night and its effects are interrupted, the next morning, with the "arranque" (see *Tibouchina longifolia*, Melastomataceae).

In the Cujate District (about 3200 m above sea level) the plant is known as "Sangurache negro" and the leaf and flower decoction (about 50 g in 1 l of water) is used as an antipyretic, in a dosage of 2 cups a day.

Anacardiaceae

Schinus molle L.

"Molle" (DF/P/88/49)

A leaf and fruit decoction (about 40 g in 1 l of water) is prescribed for oral administration, 2–3 cups a day, to treat respiratory disorders and rheumatism. Externally, the same decoction is prescribed as a hot cataplasm or liniment.

Asteraceae

Aristiguetia pseudarborea (Hieron.) K. et R.

"Pajaro bobo" (DF/P/88/42)

A leaf decoction (about 40 g in 1 l of water) is used as a vaginal douche in case of infections, inflammations and white secretions. The same decoction is used as a remedy in treatment of hepatic inflammations, and as an antipyretic.

Chuquiraga jussieui J.F. Gmelin

“Chiquiragua” (DF/P/88/4)

A preparation made by soaking the leaves and flowers in a woman’s or lamb’s milk is drawn-in through the nasal mucosa to cure hepatic disorders.

Externally, the shredded plant is applied to skin eruptions caused by metabolic and hepatic disorders.

Diplostephium foliosissimum Blake

“Poleo del Inca” (DF/P/88/8)

An infusion of the whole plant (about 40 g in 1 l of water, 2–3 cups a day or more) is drunk to calm intestinal and gastric pains. An alcoholic tincture of the whole plant (about 50 g in 1 l of alcohol for 1 h, 20–30 drops a day) is filtered and used to treat hypotension and systemic debilitation.

Gynoxys sp.

“Congona” (DF/P/88/9)

A leaf tincture (approximately 100 g in 1 l of alcohol) is used externally to massage the whole body in case of low blood pressure, psychological depression, and sight and respiratory problems. This tincture can be also applied through the nasal mucous membrane, a method called “shingada.” For the same complaints, 2–3 cups of leaf infusion (about 50 g in 1 l of hot water) can be administered.

The plant tincture and infusion are also prescribed as sedatives for colic pains, along with “Cola de caballo” [*Equisetum bogotense* HBK. or *E. giganteum* L.] and “Gramma dulce” [*Cynodon dactylon* (L.) Pers.].

G. oleifolia Muschler

“Congona grande” (DF/P/88/12)

The plant is used to regulate arterial pressure and to treat respiratory problems. A decoction is prepared by boiling approximately 50 g of leaves in 1 l of water for 15 min; the dosage is 2 cup a day by mouth.

For the same disorders, others prescribe a more concentrated decoction (about 100 g of leaves in 1 l of water) externally, by massage and friction on the whole body.

Loricaria sp. 1

“Cacho de venado” (DF/P/88/6)

The alcoholic leaf and branch tincture is employed externally to treat low blood pressure, by massaging energetically on the whole body.

The same tincture is used orally as an expectorant, mucolytic and antipyretic (2–3 small cups a day).

Loricaria sp. 2

“Corona de Cristo” (DF/P/88/5)

The upper parts of the plant are soaked in plenty of sugared water and employed to treat physical and psychological weakness and anemia (2–3 cups a day).

The same preparation and dosage are prescribed in cases of menstrual irregularities.

Salmea scandens (L.) DC.

“Huayme-huayme” (DF/P/88/48)

This plant is claimed to be effective in the treatment of female sterility: 2–3 cups a day of a fresh leaf infusion (about 50 g in 1 l of water) are administered by mouth.

Senecio elatus HBK.

“Hornamo amarillo” (DF/P/88/16)

This plant is claimed to cause hallucinations and is used in preparations together with “San Pedro” (*Trichocereus pachanoi* Britt. & Rose or *Thevetia peruviana* Britt. & Rose).

An infusion of its aerial parts is used as a strong ritual purge.

S. ericaefolius Benth.

“Romerillo” (DF/P/88/1)

The plant is used as a general tonic to ease weakness and as a cardiotonic. The upper parts of the plant are soaked in fresh water; the dosage is 3 cups a day, sweetened with white sugar or honey.

Boraginaceae

Myosotis sp.

“Buena esperanza” (DF/P/88/46)

A whole plant infusion (30–40 g in 1 l of water) is used as a general tonic in cases of physical debility (2–3 cups a day).

Bromeliaceae

Puya sp.

“Achupalla del oso”

A fresh leaf decoction (about 30 g in 1 l of water, 2–3 cups a day) is given orally to treat menstrual irregularities. The orange sap that exudes from the leaf base is used to treat stomach acidity and in cases of inflammation.

Cactaceae

T. pachanoi Britt. & Rose

“San Pedro,” “Achuma” “Huachuma”

This is the most important plant in Andean shamanism. It is the object of special ceremonies at crop time at the time of preparing the drug. It has hallucinating properties (Schultes and Hofmann, 1973) and is utilized in rituals. A decoction is made by placing rounded pieces of stem or trunk in water (about 200 g in 1 l of water) and is boiled for several hours, until the volume of water is reduced to 1/4 of the initial volume. The dosage by mouth is 3 cups of cooled decoction during the ritual (“mesada”) and may be given only by the “curandero.”

Trichocereus peruvianus Britt. & Rose (“San Pedro” or “Aguacolla” or “Gigantón” or “Huando”) has a similar use and is claimed to produce the same effect.

When a preparation of “San Pedro” is ingested, the next day the individual is prohibited from drinking alcoholic beverages.

Caprifoliaceae

Sambucus sp.

“Tilo” (DF/P/88/35)

The leaf and flower decoction (about 30 g in 1 l of water) is prescribed as an expectorant and mucolytic (3 cups a day) in cases of colds, bronchitis and all respiratory problems.

Clusiaceae

Hypericum strictum HBK.

“Poleo verde” (DF/P/88/2)

A decoction of the plant tops in half-a-liter of water is taken in cases of anemia. One cup of a well sweetened decoction is taken by mouth, twice a day, morning and night.

Ericaceae

Befaria cinnamomea Lindl.

“Payama” (DF/P/88/19)

A leaf and flower decoction is used as a vaginal douche, apparently to act as an antiseptic. The leaf and flower infusion, however, is taken orally (2–3 cups a day) for menstrual irregularities.

Gentianaceae

Halenia umbellata (R. et P.) Gilg

“San Juan amarillo” (DF/P/88/13)

A whole plant decoction (about 30 g in 1 l of water, boiled for 15 min, sweetened with honey) is valued in pediatrics as an anthelmintic.

Gentianella sp.

“Huancoya” (DF/P/88/18)

The macerated obtained by soaking the whole plant in cold water for 1 h is used to treat diseases of domestic animals as a general tonic: externally, it is applied as washings and baths and internally given at a dose of 2–3 big cups a day.

G. bicolor (Wedd.) Fabris

“San Juan negro” (DF/P/88/17)

The plant decoction (about 30 g in 1 l of water, boiled for 15 min) is used as an anthelmintic at a dose of 3 cups a day.

Lamiaceae

Coleus blumei Benth.

“Cimorilla,” “Timorilla” (DF/P/88/24)

The shredded leaves are employed topically on inflamed areas, either of traumatic or rheumatic origin.

This plant is claimed to be very toxic, therefore its internal use is prohibited: its effect is usually interrupted by the “arranque” (see *T. longifolia*, Melastomataceae).

S. sagittata R. et P.

“Cahuina,” “Suburón” (DF/P/88/40)

An alcoholic tincture of the whole plant is used as a massage in cases of rheumatic pains.

The infusion (about 20 g of plant tops in 1 l of water, 2–3 cups a day) is taken to relieve headaches and gastric pains.

Lycopodiaceae

Huperzia sp. 1

“Cabello del bosque” (DF/P/88/37)

The juice obtained from pounded fresh plant is applied as a rub on the scalp to strengthen the hair and help its growth.

Huperzia sp. 2

“Huaminga” (DF/P/88/7)

About 50 g of the whole plant is ground and placed in 1 l of boiling water, until the volume of water is reduced to one-fourth its initial volume; once cooled, a cup of this decoction is injected as a drastic purgative.

A less concentrated decoction is employed as a vermifuge, the dosage being 2–3 cups a day for 2 days.

Melastomataceae

Miconia alypifolia Naud.

“Hierba del susto” (DF/P/88/20)

A leaf decoction (about 50 g in 1 l of water) is taken as a general tonic and for the treatment of respiratory disorders. The dosage is 2–3 cups a day orally. At the same time, the breast and shoulders may be rubbed with the same decoction.

T. cymosa Cogn.

“Huishco,” “Flor de gallinazo” (DF/P/88/45)

A flower and leaf decoction is used as an emetic, especially in cases of poisoning. The dosage is 1 cup a day.

T. longifolia (Vahl) Baill.

“Palo del susto,” “Palo del espanto” (DF/P/88/10)

This plant is prescribed for the treatment of a condition called “susto” or “espanto,” a complex pathology in which psychosomatic problems, originating from phobic factors, produce profound biological and psychological weakness.

The leaves are soaked in water (approximately 50 g in 1 l) and then filtered. The dosage is 2–3 cups a day for a week along with a strictly vegetarian diet.

After this period, one has to interrupt the plant’s effect (“cortar”) by drinking a mixture of water with corn, sugar, drops of “Limón agrio” [*Citrus aurantifolia* (Christm.) Swingle] and white rose petals. This preparation is called “corte” or “arranque.”

In the treatment of respiratory disorders, 2–3 cups a day of a leaf decoction (approximately 30 g in 1 l of water) are taken. Externally, the leaves are used as a vulnerary.

Onagraceae

Ludwigia peruviana (L.) Hara

“Arirumba amarilla” (DF/P/88/44)

A whole plant decoction (about 30 g in 1 l of water) is prescribed (2–3 cups a day) to treat inflammations of the gastric mucosa and in treatment of headaches.

Piperaceae

Piper acutifolium R. et P.

“Matico,” “Hierba del soldado” (DF/P/88/38)

A decoction of the fresh leaves (about 50 g in 1 l of water) is employed as a wash (antiseptic) for sores and wounds and in douches for vaginal infections.

Orally, the decoction, in a dosage of 2 cups a day, is indicated in the treatment of gastritis and menstrual irregularities.

Polypodiaceae

Pteridium aquilinum Kühn in Decken

“Aragaya” (DF/P/88/52)

This plant is valued as a vermifuge and as an antipyretic.

Pityrogramma calomelanos Link

“Gara gara” (DF/P/88/51)

The tincture of the leafy branches (approximately 30 g in 1 l of alcohol, for 15 days) is used as a wash (antiseptic) and as a vulnerary for recalcitrant wounds and sores.

Rosaceae

H. lanuginosa R. et P.

“Lancillo” (DF/P/88/15)

A concentrated leaf decoction (about 200 g in 1 l of water) is used externally in the treatment of pulmonary disorders, by application to the shoulders.

Orally, a hot leaf decoction (about 50 g in 1 l of water, then wine added and allowed to boil for 15 min) is prescribed orally to treat the same ailments. The dosage is 2–3 cups a day.

Rubiaceae

Arcytophyllum nitidum (HBK.) Schlecht

“Hierba de la estrella,” “Trencilla de plata,” “Trencilla de la señorita” (DF/P/88/3)

The whole plant is soaked in water and filtered; this preparation is prescribed for eye washes in cases of disturbed vision.

Solanaceae

Brugmansia arborea (L.) Lagerheim

“Misha león” (DF/P/88/32)

The fresh leaves or their alcoholic tincture (approximately 20 g in 1 l of alcohol) are used as a vulnerary and to cure pimples and other skin eruptions.

It is claimed to be toxic if ingested and is considered the strongest “Misha” (*Brugmansia* spp.). The plant, like other species of *Brugmansia*, is often grown in the sacred gardens of the “curanderos.” It is also known as “Misha oso” (DF/P/88/25).

The leaves, whole or shredded, are also valued externally, by applying them to aching areas, in cases of rheumatic inflammations or other traumas.

B. arborea (L.) Lagerheim hybrid

“Misha galga” (DF/P/88/23)

This plant is used externally to relieve pains, in cases of traumatic and rheumatic inflammations. The effect of this and all other “mishas” can be interrupted by using the “arranque” or “corte,” which may be given orally or externally by rubbing on affected body parts. This plant is also claimed to have hallucinating properties. It is often grown around the city of Ayabaca and is known as “Misha oso” (DF/P/88/31). The vapors of the leaf decoction are used as a vaginal cleanser (antiseptic). The plant is claimed to be toxic if ingested.

B. aurea Lagerheim

“Misha galga” (DF/P/88/28)

The leaves, applied externally on aching body parts, are claimed to relieve pains. It is also used to treat headaches, by absorption of the tincture (made of 2 flowers and 1 leaf in 1 l of alcohol) through the nasal mucosa and at the same time by rubbing the head and limbs with the same preparation.

The plant is considered as one of most potent “mishas.” Because of its claimed high toxicity, the plant is rarely used.

B. candida (Pers.) Safford hybrid

“Misha curandera” (DF/P/88/26)

The fresh leaves and the tincture (about 100 g of leaves and branches in 1 l of alcohol, for 8 days) are used. The plant is valued as an analgesic against traumatic or rheumatic pains. The fresh leaves are placed on the aching part of the body for 8 days, changing them every so often to keep the heated part moist (when dry, the leaves lose most of their curative properties).

The tincture is also used to relieve headaches by absorption through the nasal mucosa (“shingada”) and simultaneously by rubbing the head and limbs with the same preparation; these administrations are to repeated three times a day for 3 consecutive days.

B. insignis (Barb.Rodr.) Lockwood hybrid

“Misha rastrea” (DF/P/88/27)

The leaves, whole or shredded, are used to relieve pains in cases of traumatic or rheumatic suffering, by applying them locally on the aching part.

The leaf tincture is used magically only by the “curandero” to find lost things (“rastrear”) and, in some cases, to create an altered state of mind. It is claimed that one can get the same effect by drinking a “San Pedro” decoction and cross-tying 2 leaves of this “misha” on the back of the head.

The plant’s effect may be interrupted by the “arranque,” but it may not be taken internally, because of its toxicity.

B. sanguinea (R. et P.) D. Don

“Misha toro” (DF/P/88/22)

This plant is used externally (toxic internally) to relieve pains, especially in cases of arthritic inflammations and cramps. The ground leaves are wetted with alcohol or perfume and applied on the affected area overnight. Following this application, one must stay on a 5-day diet without fats or meat. In addition, during this period, the patient should stay out of water (keep dry).

The pulverized leaves are used as a vulnerary on sores and wounds.

The tincture (2 leaves soaked in 1 l of alcohol, for 15 days) is claimed to have hallucinogenic effects when absorbed through the nasal mucosa (“shingada”).

Some “curanderos” call this plant “Misha toro curandera” (DF/P/88/30) and use it during the ritualistic ceremonies to help in divination.

B. suaveolens (Willd.) Bercht. et Presl

“Misha colambo” (DF/P/88/29)

The leaves, whole or shredded, sometimes mixed with tobacco leaves (“Tabaco” = *Nicotiana tabacum* L.;

“Tabaco cimarrón” = *N. paniculata* L.), are used as a vulnerary for sores, ulcers and wounds that wouldn’t heal.

The leaf decoction (approximately 100 g in 1 l of water, boiled for 30 min until the preparation becomes green) is used externally in cataplasms as an anti-inflammatory on traumatized body parts.

The vapors of this decoction are used as a vaginal cleanser (antiseptic) in cases of dysmenhorrea and white secretions. The plant is claimed to be toxic if ingested.

B. versicolor Lagerheim

“Misha del Inca” (DF/P/88/34)

It is the only “misha” taken internally. One cup of the tincture (2 flowers and 1 leaf in 1 l of alcohol) is prescribed as a sedative and general analgesic at bed time. It is claimed to have hallucinogenic properties; therefore, its effects have to be stopped in the morning by the “arranque.”

The whole plant or the shredded leaves are applied locally, in cases of muscular pains of traumatic or rheumatic origin.

Solanum oblongifolium HBK. var. *soukupii* Macbr.

“Tululuche” (DF/P/88/39)

Two or three cups a day of a leaf infusion (about 15 g in 1 l of water) are prescribed for colds and bronchitis; a more concentrated leaf decoction is used as an animal poison.

S. jamesonii (Benth.) Miers

“San Juan” (DF/P/88/50)

In pediatrics the plant is used as an anthelmintic. A whole plant decoction (approximately 20 g in 1 l of water, boiled for half-an-hour) is administered on empty stomach, then, one must take a purgative, usually “Huaminga” (see *Huperzia* sp.).

Valerianaceae

V. adscendens Trel.

“Hornamo morado” (DF/P/88/67)

The aerial parts of the plant are added to “San Pedro” decoction to enhance its hallucinogenic power. A decoction of the whole plant is claimed to act as a drastic purge.

4. Observations on disease concept

In the Andean folk medicine of northern Peru, medicinal plants (and all other plants) are divided into two groups: plants with “hot virtues” and plants with “cold virtues.”

Following this division a distinction is also made as a consequence, between infirmities which are either “hot” or “cold.”

“Hot infirmities” are claimed to be cured by “cold” plants and a “cold” vegetarian diet, while “cold infirmities” are claimed to be cured by “hot” plants and foods. For example, rheumatism, bronchitis and malaria are considered “cold” diseases which are to be cured with “hot” herbs. Stomach

acidity (indigestion) and inflammation are to be cured using “cold” remedies, being “hot” diseases. Some psychological problems, such as hysterical manifestations, are believed to be caused by an excess heat in the brain and in the blood stream; they are to be cured using “cold” remedies. The “susto,” a psychosomatic pathology, in which phobic events lead to a state of general organic debilitation, and other infirmities, which results in the loss of “vital forcem,” are to be cured by “hot” remedies.

“San Pedro,” “mishas,” “cimorilla” and other plants that produce hallucinations are unanimously classified as “hot” plants. Based on this concept, we present below a classification of some vegetables, remedies and things used

in the Andean popular medicine as either “cold” or “hot” species.

Studies are under way to determine further the underlying reasons for this classification. In fact, this system is not limited to medicinal plants, but encompasses all other plants.

4.1. Plants and things considered “hot” (“calientes”)

All hallucinogenic plants: San Pedro [*T. pachanoi* Britt. & Rose, *T. peruvianus* Britt. & Rose]; all mishas [*Brugmansia* spp.]; Misha colambo [*B. suaveolens* (Willd.) Bercht. et Presl.], Misha curandera [*B. candida* (Pers.) Safford hybrid], Misha del Inca [*B. versicolor* Lagerheim], Misha galga [*B. arborea* (L.) Lagerheim hybrid, *B. aurea* Lagerheim], Misha león [*B. arnorea* (L.) Lagerheim], Misha oso [*B. arborea* (L.) Lagerheim, *B. arborea* (L.) Lagerheim hybrid], Misha rastrera [*B. insignis* (Barb.Rodr.) Lockwood hybrid], Misha toro [*B. sanguinea* (R. et P.) D. Don], Misha toro curandera [*B. sanguinea* (R. et P.) D. Don]; Cimora [*Sanchezia* sp.]; Cimora lanza [*Iresine* sp.]; Cimora león [*Acalypha macrostachya* Jacq.]; Cimora oso [*Coleus* sp.]; Cimora señorita [*I. herbstii* Hook.], Cimorilla [*C. blumei* Benth.], Tabaco [*N. tabacum* L.]; Tabaco cimarrón [*N. paniculata* L.].

All purgative plants: Hornamo amarillo [*S. elatus* HBK.]; Hornamo morado [*V. adscendens* Trel.]; Huaminga [*Hupzia* spp.].

All magical “varas” (“canes”) and plants (De Feo, 1992): Ajo aspe [not identified]; Ajosquiro [not identified]; Chiquir huande [*Aiphanes* sp.]; Chonta [*Bactris* sp., *Iriarte* sp.]; Guayacan [*Tababuya impetiginosa* Standl.]; Hualtaco [*Loxopterygium huasango* Spruce]; Membrillo [*Cordia* sp.]; Palo huaco [not identified]; “Montañasas:” Bejuco de la montaña [not identified]; Camalonga [*T. peruviana* (Pers.) Schum.]; Huarmi [not identified]; Huayme-huayme [*S. scandens* (L.) DC.]; Piri-piri [*Cyperus* spp.].

Medicinal plants: Cahuina [*S. sagittata* R. et P.], Congona [*Gynoxys* sp.], Hierba del susto [*M. alypifolia* Naud.], Molle [*S. molle* L.], Palo del espanto [*T. longifolia* (Vahl) Baill.], Poleo del Inga [*D. foliosissimum* Blake], San Juan amarillo [*H. umbellata* (R. et P.) Gilg], San Juan negro [*G. bicolor* (Wedd.) Fabris], Tululuche [*S. oblongifolium* HBK. var. *soukupii* Macbr.].

All things forbidden in ritual diet: garlic, Ají [*Capsicum annum* L.], onion, common salt, pork fat [“manteca de chanco”].

The following aromatic and food plants: basil; peas; almendra [*Caryocar* spp.]; anise; celery; coffee; clove; bean; fennel; orange; mango; chamomile; marjoram; nutmeg; paico [*Chemopodium ambrosioides* L.]; parsley; rosemary; balm-mint; cinnamon.

The scented waters “Agua cananga” and “Agua florida;” the alum; puma and bear fats (“Cebo de león” and “Cebo de oso”); the sukstroke (“Locura de calor”); the calumny (“Difamación”); the man; non-Christian tombs (“Huacas gentileñas”); the hen; the goat milk; the puma; the *Agave*

honey (“Miel de Mexico”); the goat cheese; the cow cheese; all bitter foods (“Todas cosas amargas”).

The following ailments: tuberculosis; stomach acidity; all inflammations.

4.2. Plants and things considered “cold” (“frias”)

The medicinal plants: Limón agrio [*C. aurantifolia* (Christm.) Swingle]; Limón dulce [*C. limon* (L.) Burm. f.]; Payama [*B. cinnamomea* Lindl.]; Chiquiragua [*C. jussieui* J. F. Gmelin]; Achupalla del oso [*Puya* sp.]; Sangurache negro [*I. herbstii* Hook.]; Maiz blanco [*Zea mays* L.]; Matico [*P. acutifolium* R. et P.]; Llantén [*Plantago* spp.]; Cola de caballo [*E. bogotense* HBK., *E. giganteum* L.]; Tabaco moro [*N. rustica* L.]; Grama dulce [*Cynodon dactylon* (L.) Pers.].

The following aromatic and food plants: rice; barley; chirimoya [*Annona cherimolia* Miller]; apple; melon; nut [*Juglans neotropica* Diels.]; avocado; potato; papaya; banana; sage; tomato; wheat; grapefruits; yuca [*Manihot utilisima* Pohl.]; zambumba [*Cucurbita* spp.]; lime; apple.

The following ailments: “susto;” wind ailment (“aire de viento”); bronchitis; rheumatism; cold; cold ailments (“locuras del frio”); pneumonia; malaria.

The river and lagoon waters (“agua de corriente” and “agua de laguna”); the ritual waters, “agua del Carmen,” “agua de San Pablo;” the cane alcohol; the perfumes; the snake fat (“cebo de macanche”); the women; the iron; the gold; the silver; the copper; the rabbit; the guinea-pig; the dog; the pig; the sheep; the cat; the duck; the turkey; all snakes; all fishes; all sweet foods (“todas cosas dulces”); bee’s honey; oil; sugar; the cow milk; the butter.

5. Discussion and conclusions

The use of medicinal plants and phytotherapy is a phenomenon of primary importance in the medical practices of the high-Andean zones. This study is the first study ever conducted on the medical ethnobotany of the lake area of Ayabaca, where most diseases are treated with phytotherapy. In most cases the people uses native plants along with some naturalized and cultivated species.

Some medicinal plants, particularly the “mishas” (*Brugmansia* spp.), grow wild around the towns and are cultivated by the healers (“curanderos”) in their gardens of magic and medicinal plants. In this study, the Asteraceae and the Solanaceae are the most represented families in medicinal flora.

Ancestral beliefs and magical rituals accompany the prescription of the vegetal remedies. Medicinal plants enter into the Andean cosmovision, in which they possess a beneficent spirit, who exerts the cure. Some interesting notations are related to these observations. For example, before gathering medicinal plants, the “curandero” offers to the plant perfumes (“florecimientos”) and tobacco smoke (“fumes”) to propitiate the spirit of the plant.

The most important therapeutical and sacred time for Andean healers is constituted by the nights of Tuesday and Friday, during a magic/therapeutic rite, the “mesada.” Through the consumption of hallucinogenic plants, chiefly the “San Pedro” cactus (*T. peruvianus* Britt. et Rose, *T. pachanoi* Britt. et Rose), the “curandero” reaches altered states of consciousness and, in this shamanistic trance, diagnoses the illness and prescribes vegetal remedies. “San Pedro” cactus represents a central plant in Andean folk medicine: Saint Peter (San Pedro in Spanish) is responsible for opening the doors of the Paradise, the cactus permits to the “curandero” the enter in the world of the supernatural forces to see the causes of illnesses and the plants that may help in the cure. The Andean “curanderos” associate the action of this psychotropic plant with a supernatural depersonalization or dissociation of body and spirit; this conception has been reported for other cultures (McLaughlin, 1973). The “San Pedro” cactus contains the alkaloid mescaline and its derivatives and other phenethylamine derivatives (Poisson, 1960; Agurell, 1969; Crosby and McLaughlin, 1973; Jimenez, 1973; Pardanani et al., 1977; Smith, 1977; Shulgin, 1979; Pummangura et al., 1982; Davis, 1983; Gennaro et al., 1996) with well known hallucinogenic properties (Klüver, 1966; Shulgin, 1973). *T. peruvianus*, on a weight basis probably exceeds peyote (*Lophophora williamsii*) as a source of mescaline (Shulgin, 1979). Alkaloid level can be quite variable from cactus to cactus. Some of the San Pedro compounds are sympathomimetics. Other compounds have no apparent effects when ingested alone. It is possible, however, that in combination with the mescaline they exert a synergistic influence that alters the qualitative aspects of the hallucination. Mescaline is the key hallucinogenic alkaloid in San Pedro cacti. This compound exerts its main action in a stimulation of the visual and visuo-psychic areas of the cortex (Klüver, 1966) and is known for its visual hallucinations (Goodman et al., 1996), producing an altered state of consciousness. It is interesting to note that in traditional practices, for 2–3 h after “San Pedro” administration, it is severely forbidden to see lights: this finding is well correlated with literature that report a photophobia following the ingestion of mescaline (Shulgin, 1973).

The ritual use of “San Pedro” cacti is very old: representations of the cacti have been found in Chavin engraved stones and textiles, Nazca, Moche and Chimú ceramics (Schultes and Hofmann, 1979). The plant was utilized as a hallucinogen by Nazcas (Dobkin de Rios and Cardenas, 1980).

The curanderos of the northern Peruvian Andes use the term “San Pedro” indifferently both for *T. peruvianus* and *T. pachanoi*, although a folk taxonomy exists of the cacti ritually used. The wild “San Pedro” is preferred to cultivated cactus, due to its stronger properties. Sometimes, cacti with little spines are known as “San Pedro legitimo” (true “San Pedro”) and used only in curative rituals, whereas cacti with longer spines, known as “San Pedro cimarrón” (wild “San Pedro”) are use in sorcery. Branched “San Pedro” cactus is known as “San Pedro femina” (female) and non-branched

specimens as “San Pedro macho” (male). “San Pedro” is a “hot species” and its hallucinogenic properties derive from its “hot” characteristics, for this reason “San Pedro mishu,” variegated “San Pedro” with flowers both white and red in color, is the hottest, and therefore the most potent, “San Pedro.”

The cacti are known also as “gigantón,” “aguacolla” and “huando,” three terms related to its size (“huando,” from the quechua “wantuq,” high); “huacuma,” related to the quechua term “kachum” (cactus) (Cabieses Molina, 1990) or to the Spanish term “achumarse” (to get inebriated); “remedio,” “cardo,” “cardo santo,” “yerba,” “palo,” “paja.”

Another type of taxonomy of “San Pedro” cacti is related to the number of ribs: cacti with 4 or 7 ribs are claimed to be stronger in curative rituals; specimens with 5 ribs are claimed to be effective in protection rites; 12 ribs are characteristic of cacti useful in divination.

The “San Pedro” folk uses were previously reported (Friedberg, 1960, 1963; Dobkin de Rios, 1968, 1969; Polia, 1988; Davis, 1983) and correlated with the use of other psychodysleptic plants used by natives of North America (Diaz, 1979). The decoction of the plant is used with some ritual purposes: (a) shamanistic diagnosis of the illnesses; (b) divination in past and future times; (c) location (“rastreo”) of peoples and things lost in time and/or in the space; (d) prescription of ritual therapies.

Ritual rules control all the phases of “San Pedro” preparation and administration. For collecting the plant, the curandero respects the lunar cycle and observes the site in which the cactus grows (the wild “San Pedro” is more potent than the cultivated cactus; the plant growing on the rocks is more potent than the cactus growing in the soil; “San Pedro” cacti living in arid zones are stronger than cacti living in humid sites; cacti growing near fire have lost their potency). The cactus is analyzed in relation to the color of flowers, to the presence of spines, ribs, cut color; special offering and ritual formulas are made to the plant in order obtain the favour of the plant spirit. The knife and the people that pick the cactus need to be ritually pure. The ritual purity consists in the abstention from salt, ají (*C. annuum* L.), garlic, onion, blood and pork fat and from sex. During the preparation of the decoction the “curandero” observes rituals about purity of the knife used to cut the cactus, the pot and the water used for the decoction. The time of the ritual administration appears to be very important: the best results will be obtained on Tuesday and Friday, from sunset to midnight. Sometimes, other magic plants can be added to the “San Pedro” decoction: *Brugmansia* species (to enhance the hallucinogenic power of the “San Pedro” decoction) or “purgas,” to ritually expel “bad spirits” form the patient’s body. If the decoction falls down on the fire the plant will lose its properties. The people that prepare the decoction need to be ritually pure.

The “curandero” takes the decoction and a single cup of the San Pedro decoction is passed repeatedly in a clockwise direction, until each patient has drunk these cupfuls.

The vomiting and diarrhoea caused by “San Pedro” administration are considered as a signal that the power of the plant has caused the expulsion of the illness. Generally, the “curandero” does not show this effect, maintaining control (Chiappe et al., 1985). At the end of the ceremony, after shamanistic diagnosis, the “curandero” blows over everyone, by mouth and by a brush of leaves of maize, a preparation, called “corte” or “arranque,” composed by only “cold” ingredients, able to counteract the hot power of the cactus. The “corte” is also drunk. In the day after the “San Pedro” administration it is severely forbidden to bathe, to see fire, to eat salt, onion, garlic, ají, pork fat, animal blood.

The “San Pedro” session represents a syncretic ritual, in which it is often difficult to distinguish one tradition from the other.

Probably, the real effectiveness of “San Pedro” administration can be attributed to a synergism between pharmacological and cultural factors. In my first “mesada,” I drunk “San Pedro” decoction, but I had not any hallucinogenic effect. After 2 weeks of “immersion” in Andean culture and practices, after drunken decoction, I saw lights.

Very few reports are available in ethnobotanical literature on the other hallucinogenic plants, normally used in association with “San Pedro.” For the first time in this study we identified some plants, important in magic/curative beliefs of northern Peruvian Andes: the “hornamo amarillo” as *S. elatus* HBK. (Asteraceae); the “hornamo morado” as *V. adscendens* Trel. (Valerianaceae); the “huaminga” as *Huperzia* sp. (Lycopodiaceae), previously reported by Friedberg (1963) as a *Lycopodium* species. Our research permitted us to identify different plants known by the name of “cimora,” belonging to different genera: “cimora” as *Alternanthera* sp. (Amaranthaceae); “cimora oso,” as *Coleus* sp. (Labiatae); “cimorilla,” as *C. blumei* Benth. (Labiatae); “cimora señorita,” as *I. herbstii* Hook. (Amaranthaceae), known also as “Singurache negro;” “cimora león,” as *Acalypha* sp. (Euphorbiaceae); “cimora macanche,” as *Sanchezia* sp. (Acanthaceae); “cimora lanza,” as *Iresine* sp. (Amaranthaceae), together with two unidentified species: “cimorilla dominadora” and “cimora colambu.”

The term “cimora” appears to be a generic term, referring to “algo malo,” something bad. We present for first time a classification of “cimoras,” magical-curative plants for which previous studies have not performed the botanical identification. In fact, Davis (1983) stated that “an outstanding ethnobotanical problem associated with the Huancabamba cult yet adequately to be resolved concerns the botanical meaning of the term cimora.” In previous reports, Cruz-Sanchez (1948) suggested that cimora was the term applied to a particular intoxicating blend of plants in addition to San Pedro. Friedberg (1960) disagreed with Cruz-Sanchez and stated that “cimora is not a drink with a cactus, but is a plant of Amaranthaceae, in the genus *Iresine*.” The anthropologist Sharon (1972) and Dobkin de Rios (1968, 1969, 1977) simply repeated Friedberg’s early determinations without reference to new voucher speci-

mens. Schultes and Hofmann (1992) consider cimoras as a beverage made up of a number of plants. In the northern Peruvian Andes, “cimora oso” is used to cure “hot pain,” mixed with vinegar, alcohol and tobacco. Schultes and Hofmann (1973) reported two *Coleus* species as hallucinogens. “Cimora macanche” (*Sanchezia* sp.) is considered a powerful “cimora” and young Peruvian people use *Sanchezia* species as inebriants; in literature a report is available on an unidentified species of *Sanchezia* supposed to have hallucinogenic effects when smoked (Schultes and Raffauf, 1990). Possible central nervous system effects are reported also for several species of *Alternanthera* (Girault, 1984; Bianchi and Samorini, 1993). *I. herbstii* was reported as an additive of ayahuasca (Bianchi and Samorini, 1993), as an ingredient of San Pedro decoction, with possible hallucinogenic properties (Schultes and Hofmann, 1973) and as specific remedies for mental illnesses (Friedberg, 1960). The “cimorilla dominadora” is used in black magic. The effects of “cimoras” are to be interrupted by the “arranque.”

The “purgas” constitute another group of species, used for their ritual and magical properties. These plants, acting as drastic purges, are claimed to be useful in expelling “bad spirits” from the patient body. Among the three “hornamo” species used by Huancabamba curanderos (Polia, 1988), we identified “hornamo amarillo” as *S. elatus* HBK. (Asteraceae), and “hornamo morado,” as *V. adscendens* Trel. (Valerianaceae). “Hornamo morado” was reported by Davis (1983) as a one of the most important curative plant of the lagoons area, sometimes added to San Pedro preparation. “Hornamo amarillo” is claimed to have powerful magic effects; the plant is reported as an additive to the San Pedro preparation, and other *Senecio* species are known for their hallucinogenic properties (Schultes and Hofmann, 1973) and used as peyote (Schultes, 1937; Diaz, 1979). The genus contains pyrrolizidine alkaloids (Raffauf, 1970; Diaz, 1979), active on the central nervous system (Robins, 1991). We identified a “huaminga” species, of seven present in Huancabamba area, as a *Huperzia* sp. (Lycopodiaceae); Friedberg (1959) identified the plant as *Lycopodium* sp. and Girault (1984) reported *L. reflexum* Law. as a magic plant, used against ritual witchcrafts. The literature reports that huperzine A, an alkaloid isolated from a Chinese species of *Huperzia* was found to be active on central nervous system, improving short- and long-term memory in patients of cerebral arteriosclerosis with memory impairment (Zhu, 1981).

Our research group, at Salerno and Naples Universities, have carried out some phytochemical and pharmacological studies on these plants to evaluate their traditional uses. From *S. elatus* we isolated some pyrrolizidine alkaloids (Aquino et al., 1996) that are known to possess deliriant properties (Schultes and Hofmann, 1973; Diaz, 1979). The aqueous extract of *V. adscendens* showed a marked CNS depressant activity (Capasso et al., 1996; Capasso and De Feo, 2003) and a significant effect in inhibiting the GABA uptake and in decreasing the intracellular content of amino acid neurotransmitter in crude synaptosome of rat (De Feo and Faro,

2003). The water extract of *I. herbstii* acts as a neurosedative (De Feo et al., 1996; Capasso and De Feo, 2003). Methanolic and water extracts of “huaminga” (*Huperzia* sp.) exerted a marked diarrhoea promoting activity (Autore et al., 1994).

The data recorded on the uses of the “mishas” (*Brugmansia* spp.) are very important. The folk and ritual uses of two *Brugmansia* species (*B. insignis* and *B. suaveolens*) have been documented in several zones of the Amazonic forest (Rivier and Lindgren, 1972; Schultes and Hofmann, 1973; Hunziker, 1979; Lockwood, 1979; Schultes, 1979; McKenna et al., 1986; Cabieses Molina, 1990; Bianchi and Samorini, 1993). In Andean zones, the ritual use of *B. sanguinea* and *B. aurea* was reported by Schultes (1955, 1979) and Bristol (1969), in the Sibundoy Valley, Colombia. All *Brugmansias* used in Andean zone appear to be cultigens and their ritual use has been documented in Mochica, Moche and Nazca ceramics (Cabieses Molina, 1990). The plants show great variability in their morphology and some difficulties in their identification, due to the fact that *Brugmansia* trees cross-breed very easily; on the other hand “curanderos” search for specimens with larger or stranger leaves (Friedberg, 1963; Bristol, 1969; Schultes, 1979). The rarer cultivars are owned by and cultivated in magical gardens of “curanderos.”

Brugmansia trees contain tropane alkaloids (Evans, 1979), with well known activities on central and peripheric nervous systems (Diaz, 1979; Schultes, 1979).

Our data showed a real ethnobotanical culture developed by the traditional healers of the northern Peruvian Andes about the use and the properties of the “mishas.” They know the various species of *Brugmansia*, their morphology, their chemical and pharmacological activities. In their folk systematics, the shamans associate the potency of each “misha” with names and virtues of animals (“oso” = bear; “león” = lion; “colambo” = snake; “galga” = hunting dog; “toro” = bull) that best feature the myths of pre-Colombian cultures, and/or with therapeutic/magic properties (“rastrea,” from “rastreo” = to see things lost in the space and in time; “curandera,” from “curo” = to treat ailments). It is important to note that, due to the strong toxic properties of “mishas,” its use is reserved only to “curandero.” Generally, the “mishas” are therapeutically used as topic antiinflammatories and anti-rheumatics, but their major use is “to dream” (induce hallucinations). Moreover, the leaves of *Brugmansia* species are tied on forehead “para ver” (to see). The obtention of altered states of consciousness is often obtained by topical application of the leaves of “mishas;” in recent literature it is possible to found such effects following transdermal applications of tropane alkaloids (Wilkinson, 1987; Ziskind, 1988). It is interesting to underline that in the European Middle Ages, the witches used Solanaceae species, rubbing these plants on their broomsticks before climbing upon them, thus achieving in their peculiar way a sensation of flight.

Some *Brugmansia* species are used in black magic (Polia, 1988). The use of “mishas” is strictly reserved to

“curanderos,” due to their strong “hot” properties and the idea that *Brugmansias* are bad or dangerous is still prevalent. Only in particular cases, the “curandero” add “mishas” to the San Pedro decoction, in order to enhance its hallucinogenic effects. As for all hallucinogenic species the use of *Brugmansia* imposes a ritual diet; the effects of “mishas” can be interrupted by the “corte.”

We recorded only information about the most potent “misha:” the “misha del Inga Rey” and about other “mishas,” but it was impossible to collect these species, because of the ritual fear that “curanderos” have for these species.

We have chemically and pharmacologically studied the leaves of *B. arborea* and isolated three tropane alkaloids with a significant spasmolytic activity (Capasso et al., 1997; Capasso and De Feo, 2003) and a significative reduction of morphine withdrawal in vitro (Capasso and De Feo, 2002).

Among hallucinating plants, different species of tobacco (*Nicotiana* spp.) are used in curative and magical rituals; very often *N. glauca* Graham is used, known for its neurostimulant and hallucinating properties (Cabieses Molina, 1990). Peruvian curanderos used “tabaco moro” (*N. rustica* L.) to cure, “tabaco blanco” (*N. tabacum* L.) to perform a propitiatory “shingada,” and “tabaco cimarrón” (*N. paniculata* L.) for its stronger effects. In the New World tobacco was employed in sacred magical and medicinal context and its use has been documented in tribal and curative ceremonies. The plant is considered to be trance-inducing amongst many Latino-American tribes (Wilbert, 1987) and the use for its hallucinogenic effects has been documented (Schultes, 1972a,b,c,d; Wilbert, 1972; Furst, 1976; Janiger and Dobkin de Rios, 1976; Plotkin et al., 1980). The ayahuasca sessions are always accompanied by its use. In the leaves nicotine, pyridine and pyrrolidine alkaloids, and, in low quantities and particularly in the smoke, β -carboline alkaloids (Poindexter and Carpenter, 1962; Janiger and Dobkin de Rios, 1976) are present (Bianchi and Samorini, 1993).

The administration of an alcoholic infusion of tobacco leaves through nasal mucosa (“shingada”) or as a snuff powder is documented for South America (Friedberg, 1963; Wassen, 1972). The literature yields convincing clinical evidence that nicotine and scopolamine are effective following nasal applications (De Smet, 1985; Elferink, 1983). Probably, the “shingada” is used in order to avoid the vomiting caused by the oral administration of the tincture; furthermore in this way the active principles probably arrive more rapidly to the central nervous system. Sometimes, perfumes and a decoction of San Pedro are added to the infusion on tobacco leaves.

Generally, the effects of hallucinogenic remedies are stopped by using the “arranque” or “corte” (“to cortar” = to cut), a preparation made by perfumes, magic plants and white flowers; it will be very interesting to understand the real pharmacological effectiveness of this preparation.

Among the other species, without magic (=psychodysleptic?) properties, some species are also known and used in

other areas of Andes, with different therapeutic purposes, but most of the plants considered in this research have been noted for the first time for their ethnomedical uses. In fact, a comparison with ethnobotanical data available for Peru showed that only for few plants have reported therapeutic uses (Herrera, 1940; Girault, 1984; Soukup, 1987; Alarco de Zandra, 1988; De Feo, 1992; Velasco-Negueruela et al., 1995). The vernacular names of the plants reported in this study are generally new: some names, recorded in this study, indicated other plants in different parts of Andes.

There are no phytochemical and/or pharmacological studies for most of these species. We have carried out phytochemical and pharmacological researches on some of these plants. From *G. oleifolia* Muschler we have isolated kauranoid diterpenes (Catalano et al., 1993); *A. nitidum* (HBK.) Schlecht contains a series of substances with antibacterial activity (De Feo et al., 1992); the non-polar constituents of *D. foliosissimum* Blake have also been characterized (Senatore et al., 1991); from *B. cinnamomea* Lindl. were isolated a set of flavonoid compounds, some of which displayed in vitro anti-HIV activity (Aquino et al., 1996). On the other hand, a survey from Chemical Abstracts reveals that only few among the reported species have been studied phytochemically and/or pharmacologically.

Very interesting is the fact that many plants are used to cure the respiratory diseases that are common in populations leaving at high altitudes. Plants with antiseptic and anthelmintic properties are also common.

Many of properties ascribed to the reported plants are primarily superstitious or magical, and one can find some similarities with the Doctrine of Signatures of the European Middle Age. For example, the “cabello del bosque” [*Huperzia* sp.], an epiphytic species, is claimed to act in hair growth; the “huayme-huayme” [*S. scandens* (L.) DC.], whose leaves are similar to female genital external organs, is claimed to promote the fertility in women and is used in love magic (“guayanche”).

The dosage and the prescription of the vegetal remedies are very specific, showing a complete knowledge of the possible toxic activity of the medicinal species used.

It is interesting to note that many plants with hallucinating activity are assumed by absorption through the nasal mucous (“shingada”). In my experience, the “shingada” was very painful. It constitutes a very ancient ritual practice, usually made by using tobacco leaves soaked in cane alcohol and has been documented in some Peruvian civilizations (Schultes and Hofmann, 1973; Wilbert, 1987; Cabieses Molina, 1990; Torres et al., 1991).

Through observations made during the field study, one can hypothesize a synergism and potentiation deriving by the use of cane alcohol, very much used by the shamans during the rituals. Very particular is the prescription of soaked plants in woman's and lamb's milk, as in the case described for *Chuguiraga jussieu*. All other prescribed formulations (decoction, infusion, tincture) are usual.

The “hot” and “cold” classification for plants and diseases seems never to have been studied before, and it appears important to probe into this subject as well as into the use of vegetal remedies to psychosomatic discomforts, for example the fright or “susto,” that really affects the Andean people (Polia, 1988; De Feo, 1992).

This ethnobotanical research surely showed the deep knowledge by healers and people of northern Peruvian Andes about medicinal plants, particularly about those with hallucinating properties and the linkage between the Andean people and the nature. Hallucinogenic species are associated with supernatural and the dissociation of body and spirit, experienced under the influence of hallucinogens, is a basic concept in religious system. Thus, psychoactive plants are used in rituals intimately associated to religion.

Further studies are needed to save a cultural heritage that nowadays risks being lost forever.

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