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Medicinal plants uses of the Tacana, an Amazonian Bolivian ethnic group

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Abstract

We present the results of an ethnopharmacological investigation of a Bolivian lowland ethnic group, the Tacana. The Tacana have a long tradition of exchange with highland communities. Though facing rapid acculturation, highlighted by the loss of the Tacana language among the younger generations, the knowledge and uses of medicinal plants are still alive. Of the approximately 450 different plant species collected during this survey, 33% had medicinal uses. We present an overview of the traditional Tacana ethnomedicine and pharmacopoeia. © 2000 Published by Elsevier Science Ireland Ltd. All rights reserved.

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1. Introduction

The Tacana are a group of original inhabitants of lowland forest at the base of the last foothills of the Cordillera Oriental of the Andes in Iturralde Province, Department of La Paz, Bolivia (Fig. 1). The Tacana language is part of the Tacana linguistic family, which includes several ethnic groups. Many of these groups are either acculturated or in risk of extinction: the Tacana, the Ese'ejja, the Araona, the Toromona (still nomads), the Reyesano, and the Cavineño (Diez Astete, 1991). The Tacana have the highest population of these groups — approximately 5000 people living in small communities in the eastern

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part of Iturralde Province. Their lands are delimited by the Beni River to the east, the Madidi River to the north, and the last slopes of the Andes to the west (Diez Astete, 1991). Since the 17th century the Tacana population has been settled into 'reduciones' by Franciscan missionaries (Wentzel, 1989). The Tacana are now completely sedentary, define themselves as agriculturists, while also dedicated to fishing and hunting.

Due to their geographical situation in between the highland altiplano and the Amazonian lowlands, the Tacana have a long tradition of contact and trade with the altiplano Quechua people. In the 19th and early 20th centuries, coca, quinine bark, cacao, rice and various tropical forest products were traded with the Quechua. Forest products included uhuahua flowers (*Chamaedorea angustisecta*), yuruma bark (*Aniba canelilla*) various palm oils, aqui aceite oil (*Copaifera* spp.), pid'ui sap (*Clarisia biflora* R. and P. and *Batocarpus costaricensis* Standley and Williams), tamarind fruit, Brazil nuts, feathers and animals skins. The Tacana traded these goods for salt, animals and their products (fat, meat and cheese), flour, bread, cloth, alcohol, metal, and trinkets (Wentzel 1989). Until 1950 an annual international fair was held in the Andean town of Pata, located near the Peruvian border, and provided a forum for the Tacana to sell or exchange their products.

Although the ethnobotany of some Amazonian groups in South America has been well documented (Schultes and Raffauf, 1990; Balée, 1994), the ethnobotany of the Bolivian Amazonian groups is poorly known. The little work conducted in this area includes studies on the Chácobo (Boom, 1987; Bergeron, 1992; Bergeron et al., 1997) and the Mosetenes (Vargas Ramirez and Quintana Peñandra, 1995; Vargas Ramirez, 1996). Several explorers of the Amazonian area of Bolivia briefly mentioned Tacana plant names and uses in their travel diaries (Armentia, 1897; Balzan, 1892a,b; D'Orbigny, 1945). An important ethnographic study on the Tacana was conducted by Hissink and Hahn (Hissink and Hahn, 1961, 1984). In this study they compiled Tacana myths and the uses of plant and animal species of cultural significance. Additional ethnobotanical information was gathered by Wentzel (1989) as a part of an anthropological study of the Tacana. With the exception of Moraes et al. (1995), documenting the Tacana's use of palms, the ethnobotanical studies did not include voucher plant specimens. A quantification of the Tacana's use of trees and lianas for construction, cultural objects, firewood, food, medicine, and technology was detailed in a prior study (DeWalt et al., 1999). Additionally, two books have been written for the Tacana communities (Bourdy, 1998a,b). In this paper, we present the ethnopharmacology of the Tacana.

2. Methodology

We conducted field work with the Tacana between 1995 and 1997. We followed two different methodologies to compile ethnopharmacological information. First, we tagged and identified all trees, lianas, and palms over 10 cm diameter at breast height (dbh) in two permanent 1 ha plots. We interviewed Tacana men and women in the plots by asking them for the names and uses of each tagged tree. The plots are located in late secondary or primary forest within a 45-min walk of the communities of Santa Fé and Buena Vista. Details of the locations and characteristics of the plots are found in DeWalt et al. (1999). Second, we collected vegetative samples in a variety of other ecosystems in the area: savannahs, riversides, old fields, pastures, and home gardens in and around the communities of Alta Marani, Buena Vista, Macahua, San Pedro, Santa Fé, and Santa Rosa de Maravillas. Using the fresh samples we asked Tacana informants for usage, and encourage them to speak freely about the plant's uses. Four herbarium samples were collected per species to deposit in the National Herbarium of Bolivia and the Missouri Botanical Garden. Twenty-one informants from various communities participated in the survey. Our results were cross-checked among informants in our database and verified during a 4-day workshop with 12 older Tacana at the termination of the study.

3. Results and discussion

3.1. Overview of Tacana ethnomedicine

Like other Amazonian groups the Tacana possess a rich cosmology involving their environment. The Tacana can be described as a 'Society of Nature' for which complex stories of the relationship between humanity, plants, animals and gods exist (Descola, 1994; Oldham, 1996). In their compilation of Tacana myths, Hissink and Hahn (1961) recorded one that began: "after a while, a man died...from his legs was born the 'bibosi' tree, from his arms the 'black bibosi', from his guts the vines, from his testicles and his penis the palm tree 'sayal' with fruits like testicles. From his lungs and his heart was born 'pajajaja' the forest papaya; from his back, the bees 'eaua guasa' which share their honeycomb with the termites, from his kidney the 'budhubudhuy' stem, from his backbone the bambu 'penene'....His blood became the latex of the 'bibosi' tree, from his urine was born a gigantic lake in the mountains, from his nails the snails, from his fingers the 'noa' herb...from his head, the star 'uena etuaji,' which can be seen at the sunrise, and does not move nor pulse" (Xenia Villavicencio translation).

The Tacana do not see the universe as constituted by neutral objects which can be manipulated with impunity by humans to satisfy their needs. Many stories relate to spirits and their interactions with animals, men, and plants including their revenge imparted on humans for over-harvesting resources (Hissink and Hahn, 1961). As a result of the profound changes faced by the Tacana in the past 2 centuries and the progressive and inexorable death of the older people, these beliefs are almost completely obsolete. The existence of shamans in Tacana society is heavily guarded and denied by most Tacana. One informant indicated that one shaman still performs curing and divination with ayahuasca (*Banisteriopsis caapi* (Spruce) Morton). 'Curanderos' (in local Spanish) from other parts of Bolivia, especially the altiplano, are said to visit the Tacana and cure by the means of Quechua rituals.

Until 1960 or 1970, the Tacana used ayahuasca, like many other western Amazon Basin indige-

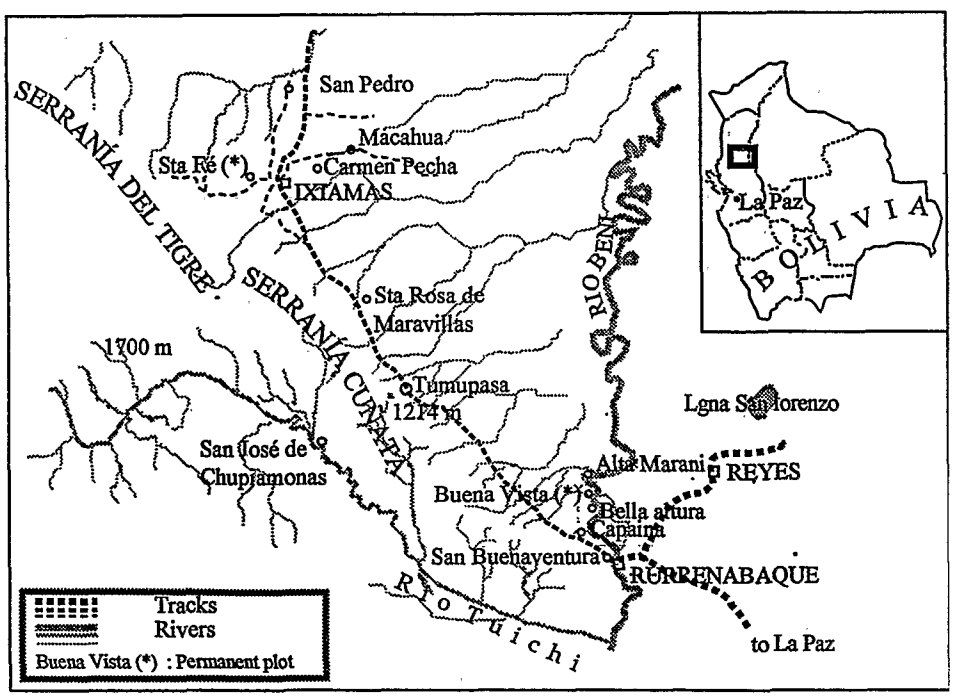

Fig. 1. Localization of the study.

nous groups (Schultes, 1957; Prance, 1970; Pages Larraya, 1979; Luna, 1984; Schultes and Raffauf, 1990; Desmarchelier et al., 1996). Hissink (1960) documented that ayahuasca use was imported from Peru via the town of Maldonaldo. Thus, ayahuasca use was not traditionally practised by the Tacana, but was apparently welcomed and rapidly disseminated among the communities. This appropriation reflects one of the characteristics of Tacana ethnomedicine: they incorporated elements of Amazonian, highland, and European origin (Hissink and Hahn, 1956, 1961; Hissink, 1964a,b; Hissink and Hahn, 1984). Ayahuasca use is/was performed to cure physical and spiritual ailments, for initiation purposes, to ensure successful animal hunting, and to help in predicting the future. The ayahuasca was also drunk in order to find the lost spirit of a person. Children comprised the majority of the subjects for this healing as they are said to be more sensitive to the action of spirits.

The Tacana also perform curing and divination ceremonies with cahuascha. This name describes both the plant used (an undetermined Cyperaceae species) and the special recipient made from balsa wood (*Ochroma pyramidale* (Cav. ex Lam. Pers.) and plaited young leaves of the ad'une palm (*Astrocaryum gratum* Kahn and Millan) to store it. Although information about the specific Tacana use of this species is lacking, species of Cyperaceae (generally incompletely identified) are also reported to be used in other Amazonian tribes for their hallucinogenic properties (Vickers, 1984; Schultes and Hofmann, 1993; Schultes and Raffauf, 1990; Chaumeuil, 1998). The strongly scented powdered root of the cahuascha plant can be substituted or mixed with powdered tobacco leaves (puruma, in Tacana) and coca leaves (*Erythroxylum coca* var. *coca* Lam.). These three plants are also highly estimated for their medicinal properties.

Shamans are/were consulted for diseases supposedly caused by other shamans or by offended tree or water spirits. Diseases are suspected to be of supernatural origin if a patient is not cured after repeated administrations of different medicinal plants or if his/her general condition is deteriorating quickly. Evil shamans may introduce disease-causing objects into bodies of a person who has provoked jealousy or envy. The Tacana also believe that malevolent spirits dwell in canopy trees such as *Dipteryx odorata*, *Ceiba samauma* (C. Martius) Schumann and *Ficus* spp. Walking by these trees or cutting them down may cause illness. Water and tree spirits can cause different diseases, characterized by a wide range of symptoms. The most frequently mentioned illness is called mal viento (in local Spanish). It is characterized by recurring fever, vomiting, and diarrhea. The spirits can also steal souls, which are called back through special ceremonies involving cahuascha or ayahuasca. When performing healing practices, shamans are said to use special plants, different from those used at the more basic level of popular medicine, usually strongly scented species (e.g. garlic-scented plants such as *Mansoa alliacea*, *Gallesia integrifolia*, and *Protium* sp.) and used together with reciting songs, deep breathing, and blowing tobacco-smoke.

'Curanderos' from other parts of Bolivia, and traveling in the area, also use divination to cure illnesses. Their healing techniques are those associated with the altiplanic culture and include lecture in coca leaves, ingestion and aspersion of alcohol, and manipulation of collpa (a Quechua word, designating a mineral substance mixed with urine).

When the disease is thought to be of 'natural origin', each family uses its own vegetable or animal recipes. The use of medicinal plants is still alive among the Tacana perhaps because collection, preparation, and administration of medicinal plants are shared by all community members : some members have gained a great knowledge of plants and their medicinal uses and have become considered as specialists.

Patients may eventually go to the local dispensary if his/her family has the finance or if no positive result has been gained from the use of medicinal plants and/or consultation of the shaman/curandero. However, for the Tacana, modern medicine is still largely unavailable because of the lack of transportation and the price of drugs.

3.2. Tacana pharmacopoeia

During this study we collected 450 different plant species (Chávez de Michel et al., 1997). One hundred and eighty five different species were collected in the permanent plots, 178 of them had a Tacana name and 112 (61%) were designated as useful. Over the 450 species, the Tacana identified 150 (33%) species as having medicinal uses (Table 1).

3.2.1. Repartition of plant uses

The majority of species were used to cure gastrointestinal disorders, such as stomach aches, diarrhea, dysentery, and intestinal cramps. Among the 65 species used to cure these kinds of disorders, 10 were specifically mentioned for use against intestinal worms.

Fifty species were designated for relieving skin afflictions (boils, fungal diseases, infected wounds).

Twenty-five species were used for gynecological disorders and 10 for uterine hemorrhage (during pregnancy or after birth). During this survey the majority of our informants were male, and we never worked with midwives, thus, we strongly suspect that the number of medicinal species used for gynecological problem is greater.

Fourteen species were indicated as febrifuges, but only one species was specifically mentioned for treatment of malaria. The low incidence of malaria in the zone (Drew, N., 1997, personal communication to GB) may explain the lack of malarial remedies. Also, the symptom 'fever' was considered in a broad sense, and, therefore, possibly correspond to a range of diseases, including malaria. Additionally, the Tacana described the use of 11 species for liver problems or pain, which are symptoms closely related to chronic malaria. Thus, these species may also be considered to be effective against malaria.

The Tacana also used 12 species for rheumatic disorders and 10 species to cure leishmaniasis, a protozoan-caused disease with a high incidence rate in the zone (Lepont et al., 1992). Ten species were used to counteract the venom of snake bites.

In a broad sense this repartition of uses reflects the health status of the zone. In a survey conducted by CORDEPAZ in 1976 and UNICEF in 1986, the most frequently reported diseases were, in order of importance, the following: acute and chronic gastrointestinal problems, skin afflictions, respiratory problems (especially among children), and fever (Wentzel, 1989). In these studies, leishmaniasis was only briefly discussed. It is likely that the incidence has increased dramatically, perhaps due to the intense logging activities performed in the last decade in the zone (Lepont et al., 1992).

The number of plants used to cure respiratory infections is disproportionately low in relation to its incidence in the zone. The Tacana use only 12 plant species to cure respiratory problems, only six of them being used orally. The primary remedies used against cough, bronchitis, and related ailments are oils ingested or applied directly by massage into the chest, and the most noted remedy is the oil extracted from a palm larva, called tuyutuyu in Tacana (*Rhynchophorus palmarum*), which is found in the fallen trunks of *Attalea phalerata*. This larva oil is said to be more effective than any of the palm oils for this purpose. Other remedies used to cure respiratory disorders are from the latex of at least six different species, five of them belonging to the genera *Sapium*, applied as a poultice on the thorax and back.

Considering all the species used for medicinal purposes, two palm oils, from *Attalea phalerata* and *Jessenia bataua* seeds, appear as local panacea administered internally, by spoonful, and externally, by massage, both used for a wide range of diseases.

3.2.2. Preparation of remedies

Most of the vegetal remedies are based on the preparation of a single plant. Notable exceptions concern the remedies used to stop diarrhea: a number of species are used together, depending upon their availability, *Psidium guajava* fruit and/or leaves, *Anacardium occidentale* leaves and/or fruits, *Chamaedorea angustisecta* flowers, *Erythroxylon coca* var. *coca* leaves, *Aniba canelilla* bark, *Pimpinella anisum* L. seeds, *Persea americana* Miller var. *americana* bark or grated seeds, *Mussatia hyacinthina* and *Triplaris americana* bark... Another exception is the case of remedies

Table 1
Tacana's medicinal plants and uses

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Acanthaceae St'rame *Justicia boliviana* Rusby (GB1799)	Diarrhea with vomiting	Aerial parts	Infusion	Internal
Amaranthaceae Turu id'ene Iresine diffusa H.B.K. ex Wiildenow (GB1526)	Paralized leg	Leaf	Mashed	External
	Knee trauma	Leaf	Mashed	External
Amaranthaceae Cayu ina *Anacardium occidentale* L. (GB1524)	Diarrhea	Leaf+fruit	Decoction	Internal
	Dysentery	Seed	Toasted, in decoction	Internal
	Cough	Seed	Toasted, in decoction	Internal
Anacardiaceae Mud'ud'uqui *Astronium lecointei* Ducke (SD297), or[a]	Uterine hemorrage	Bark	Decoction	In the vagina
Astronium urundeuva (Allem.) Engl. (GB1834)	Wounds, traumas, broken limbs	Bark	Decoction	External
	Stomach ulcer	Bark	Decoction	Internal
Apocynaceae Aquipabi *Aspidosperma aff. rigidum* Rusby (GB1684)	Appendicitis	Bark	Deception/syrup	Internal
Apocynaceae Bashi pasha	Liver pain	Bark	Decoction/syrup	Internal
Himatanthus sucuuba (Spruce ex Muell. Arg.) Woodson (GB1611)	Boils, wounds, splinter	Latex	Crude	External
	Respiratory ailments	Latex	Crude	External
	Traumas, bruises	Latex	Crude	External
Apocynaceae Quiapu *Peschiera cymosa* (Jacquin) Dugand (GB1729)	Conjunctivitis	Latex	Crude	In the eye
Araceae Umere pana *Anthurium oxycarpum* Poeppig (GB1679)	Scabies, spots	Leaf	Squeezed for juice	External
Araceae Repepe ina *Monstera sect. marcgraviospsis* sp. nov (SD391)	Boils	Leaf	Heated on flame	External

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Araceae Ahuad'a ehuat'ri junu *Monstera subpinnnata* (Schott.) Engler (SD430), or	Pain in the legs	Leaf	Mashed	External
	Boils	Leaf	Mashed	External
Philodendron camposportoanum G. Barroso (SD475), or *Syngonium podophyllum* Schott. (SD427), or	Snake bite	Root	Decoction	Internal
Araceae Papi *Philodendron undulatum* Engler (SD480)	Ringworm, dermatitis	Hanging root	Mashed +lime juice	External
Araliaceae *Dendropanax arboreus* (L.) Decne and Planch (GB1731)	Dissenter	Bark	Decoction	Internal
	For emaciated people	Bark	Decoction	Internal
Arecaceae Ad'une *Astrocaryum gratum* Kahn and Millan (GB1708)	Back pain	Root	Decoction	Internally
Arecaceae Tumi *Attalea phalerata* C. Martius (SD331)	Anemia	Root	Decoction	Internal
	Diarrhea	Root	Decoction	Internal
	Intestinal infection	Root	Decoction	Internal
	Headache	Seed	Oil	External
	Kidney pain	Seed	Oil	Internal, external
	Fever	Seed	Oil	External
	Boils, wounds, burns	Seed	Oil	External
	Respiratory ailments	Seed	Oil	Internal, external
Arecaceae Uhuahua *Chanaedorea angustisecta* Burret (SD21)	Diarrhea	Flower	Infusion	Internal
	Abdominal pain	Flower	Infusion	Internal
	Stomach ache	Flower	Infusion	Internal
	Vomits	Flower	Infusion	Internal
	Uterine hemorrage	Flower	Toasted, in infusion	Internal
	Irregular menses	Flower	Toasted, in infusion	Internal
	Snake bite and sting ray	Leaf bud	Mashed	External

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Arecaceae Ehuid'a *Euterpe precatoria* C. Martius (SD325)	Anemia	Root	Decoction	Internal
	Diabetes	Root	Decoction	Internal
	Liver pain	Root	Decoction	Internal
	Kidney pain	Root	Decoction	Internal
	Fortificant	Fruit mesocarp	'Milk'	Internal
Arecaceae Macuri *Jessenia bataua* (C. Martius) Burret (SD330)	Liver pain	Seed	Oil	Internal
	Fever	Seed	Oil	Internal
	General aching of the body	Seed	Oil	Internal+massages
	Measles	Seed	Oil	Internal, external
	Bronchitis and lung ailments	Seed/mesocarp	oil, or 'milk'	Internal
Arecaceae Ji *Socratea exorrhiza* (C. Martius) H.A. Wendl. (SD828)	To increase the size of penis	Root	Mashed	External
	Leishmaniasis	Root	Mashed	External
	Pimps, wounds, scabies, skin itching	Root	Mashed	External
	Snake bites	Root	Mashed	External
Asteraceae Huira huira* *Achyrocline satureioides* (Lamarck) DC. (GB1815)	Diarrhea	Flower	Infusion	Internal
	Cough, bronchitis	Flower	Infusion	Internal
Arecaceae Tavimad're eina *Mikania cordifolia* (L. f.) Willdenow (SD22)	Snake bite	Aerial parts	Mashed for juice	Internal
Arecaceae Chiveru *Pluchea sagittalis* (Lamarck) Cabr. (SD433)	Stomach ache	Aerial parts	Decoction	Internal
	Liver pain	Aerial parts	Decoction	Internal
	Kidney pain	Aerial parts	Decoction	Internal
	Vesicle problem	Aerial parts	Decoction	Internal
Arecaceae Cahuara *Tesseria integrifolia* Ruiz and Pavon (SD498)	Leishmaniasis	Leaf	Mashed	External
	Snake bite	Bud	Mashed	External

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Arecaceae Ahycha ahycha *Vernonanthura patens* (H.B.K.) H. Rob. (GB1805)	Conjunctivitis	Inside of stem	Squeezed for juice	In the eye
Bignoniaceae Junu pasha *Callichlamys* sp. (SD364)	Diarrhea	Leaf	Infusion	Internal
Bignoniaceae Cheperequi *Jacaranda glabra* (A. DC) Bureau and Schumann (GB1522)	Leishmaniasis	Leaf	Mashed	External
	Scabies, skin itching	Leaf	Decoction	External
Bignoniaceae Jù junu *Mansoa alliacea* (Lamarck) A. Gentry (SD562)	Abdominal pain, intestinal parasites	Bark	Decoction	Internal
	Fever	Bark+leaf	Decoction	Internal
	Rheumatic pain	Leaf	Mashed	External
Bignoniaceae Buata *Martinella obovata* (H.B.K.) Bureau and Schuman (GB1604)	Conjunctivitis	Bulb	Squeezed for juice	In the eye
Bignoniaceae Chamairu *Mussatia hyacinthina* (Standley) Sandwith (GB1540)	Diarrhea	Bark	Decoction	Internal
	Abdominal pain	Leaf	Infusion	Internal
	Stomach ache	Leaf	Infusion	Internal
	Wounds	Bark	Powdered, mixed With urine, and saliva	External
Bignoniaceae Bihua junu *Tanaecium nocturnum* (Barbosa-Rodriguez) Bureau and Schuman (GB1756)	Intestinal parasites	Bark	Decoction	Internal
	Diarrhea/dysentery	Leaf	Decoction	Internal
	Wounds	Leaf	Powdered	External
	Trauma	Leaf	Powdered	External
	Leishmaniasis	Leaf	Mashed	External
Bignoniaceae Junu huid'ud'u *Tynanthus cognatus* (Cham.) Miers (AS59), or *Tynanthus schumanianus* (O. Kuntze) A. Gentry (GB1600)	Conjunctivitis	Inside of fruit	Squeezed for juice	In the eye

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Bombacaceae				
Bata				
Cavanillesia sp.	Contraceptive	Bark	Decoction	Internal
(SD358)	General fortificant	Bark	Decoction	Internal+bath
Bromeliaceae				
Ejige sayu				
Aechmea sp.	Headache	Leaf	Crude	External
(SD481)	Pimples	Leaf, sap	Mashed	External
Burseraceae				
Yarita				
Protium glabrescens Swart.	Paralysis of the face	Resin	Crude	Inhalation
(SD846)	Headache	Resin	Crude	Inhalation
	'Mal viento'	Resin	Crude	Inhalation
	Inflammation of the eye lid	Resin	Crude	External
	Boils	Resin	Crude	External
	Rheumatic pain	Resin	Crude	External
Burseraceae				
Yuhua				
Protium aff. Apiculatum Swart.	Ant's bite	Resin	Crude	External
(SD170)	Alteration of the vision	Resin	Crude	External (on the eye lid)
Cactaceae				
Matusha tidha				
Opuntia ficus indica (L.) Miller	Liver pain	Leaf	Mashed for juice	Internal
(SD479)	Vesicle pain	Leaf	Mashed for juice	Internal
Caricaceae				
Papaya*				
Carica papaya L.	Intestinal parasites	Seed	Mashed with water	Internal
	Heart pain	Male flower	Infusion	Internal
	Ear pain	Root	Squeeze for juice	In the ear
	Galactogeno	Mature fruit	Crude	External (on the breast)
	Pimples and spots	Mature fruit	Crude	External
Caricaceae				
Pajajaja				
Jacaratia digitata (Poeppig and Endl.) Soms-Laub., or	Appendicitis	Inner bark	Decoction	Internal
Jcaratia spinosa (Aublet) A. DC.	Liver pain	Inner bark	Decoction	Internal
(SD172)	Vesicle pain	Inner bark	Decoction	Internal
	Bloody urine with fever	Inner bark	Decoction	Internal
Chenopodiaceae				
Paicu				
Chenopodium ambrosioides L.	Intestinal parasites	Leaf	Infusion/juice	Internal
(SD465)	Diarrhea	Leaf	Infusion/juice	Internal
	Intestinal infection	Leaf	Infusion/juice	Internal
	Cystitis	Leaf	Infusion/juice	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Crassulaceae Nadhunadhu *Kalanchoe pinnata* (Lamarck) Persoon (GB1529)	Ear pain	Leaf	Juice	In the ear
	Fever	Leaf	Mashed	External
	Swellings	Leaf	Mashed	External
	Mumps	Leaf	Heated on flame	External
	Boils	Leaf	Heated on flame	External
	Headache	Leaf	Heated on flame	External
Cucurbitaceae Gemi *Cucurbita* spp.	Intestinal parasites	Seed	Crushed with water	Internal
Cucurbitaceae Etibeini junu *Momordica charantia* L. (SD469)	Scabies, skin itching	Leaf	Mashed	External
Cyatheaceae Atarisi *Alsophila* sp. (AR323)	Boils, stingray	Bud	Mashed	External
Cyperaceae Cahuascha Undetermined (GB1817)	Headache	Root	Mashed	External
	Kidney pain	Root	Decoction	Internal
Dilleniaceae Jama yatsi *Curatella americana* L. (GB1581)	Snake bite	Bark	Decoction	Internal, external
Equisetaceae Iba quedha *Equisetum giganteum* L. (SD499)	Appendicitis	Root	Decoction	Internal
	Kidney pain	Root	Decoction	Internal
	Vesicle pain	Root	Decoction	Internal
Euphorbiaceae Tanuri nuri *Chamaesyce hirta* (L.) Millspaugh (GB1730)	Stomach ache	Aerial parts	Infusion	Internal
Euphorbiaceae Huaca janidhe *Jatropha curcas* L. (AS111)	Conjunctivitis	Latex	Crude	In the eye
	Poisoning	Leaf	Infusion	Internal
	Ringworm, fungus, scabies	Sap	Crude	External
	Purgante	Seed	Macer. in alcohol	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Euphorbiaceae D'rata *Phyllanthus acuminatus* M. Vahl. (GB1722)	Ringworm	Leaf	Mashed	External
Euphorbiaceae Tahua dhahua *Ricinus communis* L. (SD468)	Poisoning	Seed	Toasted, in decoction	Internal
	Wounds, pimples, swelling	Leaf	Heated in palm oil	External
	Whooping cough	Leaf	Heated on flame	External, on the breast
Euphorbiaceae Bashi pasha *Sapium laurifolium* (Richard) Grisebach (SD718), or *Sapium marmierii* Huber (SD888), or *Sapium* spp. (SD99, SD199, SD193)	Boils, wounds	Latex	Crude	External
	Splinter under skin	Latex	Crude	External
	Respiratory ailments	Latex	Crude	External
	Traumas, bruises	Latex	Crude	External
Fabaceae Schascha tid'i *Acacia farnesiana* (L.) Willdenow (GB1802)	Stomach ache	Flower	Infusion	Internal
	Ear pain	Flower	Squeezed for juice	In the ear
Fabaceae Dherequi *Amburana* sp.	Abdominal pain	Bark	Decoction	Internal
	Kidney pain	Bark	Decoction	Internal
	Rachitis	Bark	Decoction	External (bath)
Fabaceae Nuriri aqui *Bowdichia virgiliodes* H.B.K. (GB1820)	Dissenter	Bark	Decoction	Internal
	Malaria	Bark	Decoction	Internal
	Leishmaniasis	Bark	Powdered	External
Fabaceae Tad'e dheve *Caesalpinia pluviosa* DC. (AS43)	Diarrhea	Bark	Decoction	Internal
Fabaceae Aqui aceite *Copaifera reticulata* Ducke (SD767)	Amygdalitis	Sap	Crude	Internal
	Cancer of the uterus	Sap	Crude	Internal
	Liver pain	Sap	Crude	Internal
	Male impotency	Sap	Crude	Internal
	Vaginal infection	Sap	Crude	Internal
	Wounds	Sap	Crude	External
Fabaceae Mahui *Dipteryx odorata* (Aublet) Willdenow (SD166)	Furunculosis	Sap	Crude	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Fabaceae Cuat'rui				
Erythrina dominguezii Hassler (AS172), or	Wounds hemorrage	Bark	Decoction	Internal
Erythrina poeppigiana (Walpers) Cook (AS173)	Uterine hemorrage	Bark	Decoction	Internal
	Cough	Bark	Decoction/syrup	Internal
Fabaceae Yurahuay				
Ormosia sp. (GB1694)	Contraceptive	Seed	Toasted, in decoction	Internal
	Dissenter	Seed	Toasted, in decoction	Internal
Fabaceae Mamuri aqui				
Senna hirsuta (L.) Irwin and Barneby (SD470), or	Ringworm, skin itching	Leaf	Mashed	External
Senna reticulata (Willdenow) Irwin and Barneby (GB1545)	Ringworm, skin itching	Leaf	Mashed	External
Flacourtiaceae Hueruru				
Lunania parvifolia Spruce ex Bentham (GB1605), or	Deformation of baby's head	Leaf	Decoction	External (bath)
Tetrathylacium macrophyllum Poeppig (GB1539)	General body pain	Leaf	Decoction	Internal + bath
	Swelling of the body	Leaf	Decoction	Internal + bath
Gentianaceae Shapura schacha				
Irbalchia alata (Aublet) P. Maas (GB1517)	Leishmaniasis	Leaf	Mashed	External
Hippocrateaceae Panu				
Salacia impressifolia (Miers) A.C. Smith (SD15)	Kidney pain	Bark	Syrup	Internal
	General fortificant	Bark	Macer. in alcohol	Internal
	General body pain	Bark	Decoction	Internal
	Male impotency	Bark	Macer. in alcohol	Internal
	Flu	Bark	Syrup	Internal
	Rheumatic pain	Bark	Macer. in alcohol	Internal
Icacinaceae Curarina*				
Leretia cordata Vell. Conc. (GB1598)	Purge	Bulb	Grated + water	Internal
Lamiaceae Tapebe				
Hyptis mutabilis (Richard) Briquet (GB1813)	Fever	Aerial parts	Decoction	External (bath)
	Cystitis	Root	Decoction	Internal
	Larva of Dermatobia under skin	Leaf	Mashed	External
	Pimples	Leaf	Mashed	External

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Lamiaceae				
Nahuarau				
Ocimum micranthum Wiildenow (SD477), or	Fever	Leaf	Infusion	Internal+bath
Ocimum sp.	General fortificant	Leaf	Infusion	Internal+bath
	Rachitis	Leaf	Infusion	External
	'Susto'	Leaf	Infusion	External
Lauraceae				
Yuruma				
Aniba canelilla (H.B.K.) Mez (GB1541)	Abdominal pain	Bark	Decoction	Internal
Malvaceae				
Mat're				
Bixa orellana L. (GB1905)	Chickenpox	Leaf	Decoction	External+bath
Huapeshe				
Gossypium barbadense L. (AS110)	Ear pain	Seed	Mashed, for juice	In the aching ear
Judhú				
Sida rhombifolia L. (GB1784)	Boils	Leaf	Mashed	External
Meliaceae				
Cuabad'u				
Cedrela fissilis Vell. Conc.	Diarrhea	Bark	Decoction	Internal
(AS66), or	Bruises	Bark	Decoction	Internal
Cedrela odorata L.	Post partum hemorrage	Bark	Decoction	Internal
(SD771)	Post partum	Bark	Decoction	Internal
	Scabies, skin itching	Bark	Decoction	External
Meliaceae				
Buinapaqui				
Guarea aff. Guidonia (L.) Sleumer (SD139)	Intestinal parasites	Bark	Decoction	Internal
	Diarrhea	Bark	Decoction	Internal
Meliaceae				
Erei				
Swietenia macrophylla King	Leishmaniasis	Seed	Mashed	External
	Abortion	Seed	Mashed+water	Internal
Meliaceae				
Shapuraqui				
Trichilia inaequilatera Pennington (SD237), or	Liver pain	Bark	Decoction	Internal
Trichilia pleeanea (Adr. Juss.) C. DC.	Lung pain	Bark	Decoction	Internal
(SD536)	Kidney pain	Bark	Decoction	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Monimiaceae				
Monimiaceae T'rebuqu *Siparuna asperula* (Tulasne) A. DC. (GB1505), or *Siparuna guianensis* Aublet (GB1509)	Flu	Leaf	Decoction	External
T'rebuqui *Siparuna tomentosa* (Ruiz and Pavon) A. DC. (GB1471)	Bites of a worm	Fruit	Mashed	External
Moraceae Tahua *Cecropia polystachya* Trécul (GB1525)	Back pain Kidney pain	Leaf bud Leaf bud	Decoction Decoction	Internal Internal
Moraceae Shite midha *Coussapoa ovalifolia* Trécul (SD454), or *Ficus guianensis Desvaux* (SD541), or *Ficus killpii* Standley (SD244), or *Ficus paraensis* (Miquel) Miquel (AS50), or *Ficus pertusa* L. f. (SD547)	Appendicitis Hernia Traumas, broken limbs, bruises	Bark strip	Mashed, and Cooked with salt and urine	External
Moraceae Maja *Ficus insipida* Willd. ssp. insipida (SD724), or *Ficus maxima* Miller	Intestinal parasites	Latex	in water	Internal
Moraceae Nui *Pseudolmedia laevis* (Ruiz and Pavon) J.F. Macbride (GB1588)	Ant's bite	Resin	Crude	External
Myrsinaceae Huapid'iqui *Myrsine umbellata* Martius (GB1776), or *Myrsine olgophylla* Zalbruckner (GB1733), or *Stylogine ardisioides* (H.B.K.) Mez (GB1498)	Rheumatic pain	Leaf	Infusion	External, internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Myristicaceae				
Naiqui				
Otoba parvifolia (Markgraf) A. Gentry (SD632)	To increase blood quality	Resin	In hot water	Internal
	Flu	Resin	In hot water	Internal
	Rheumatic pain	Resin	In hot water	Internal
Myrtaceae				
Buhué				
Psidium guajava L.	Diarrhea	Leaf+fruit	Decoction	Internal
(AS14)	Conjunctivitis	Leaf	Chewed for juice	In the eye
Phytolaccaceae				
Bua				
Gallesia integrifolia (Sprengel) Harms	Intestinal parasites	Bark	Decoction	Internal
(GB1701)	Diarrhea	Bark	Decoction	Internal
	Stomach ache	Bark	Decoction	Internal
	Scabies, dermatitis	The whole tree	Soap	External
Phytolaccaceae				
Dhajaja				
Petiveria alliacea L.	Intestinal parasites	Root	Decoction	Internal
(SD885)	Diarrhea	Root	Decoction	Internal
	Rheumatic pain	Root	Macer. in alcohol	Internal
Piperaceae				
Piperaceae				
Tudha				
Piper aduncum L.	Kidney pain	Leaf bud	Infusion	Internal
(GB1466)	Fever	Leaf	Decoction	External+bath
Tudha				
Piper callosum Ruiz and Pavon	Anuria	Leaf bud	Infusion	Internal
(GB1494)				
Piperaceae				
Anu caperi				
Piper darienense C. DC	Tooth ache	Root	Sap	On aching tooth
Piperaceae				
Tudha				
Piper heterophyllum Ruiz and Pavon	Kidney pain	Leaf bud	Infusion	Internal
(GB1538)	Fever	Leaf	Decoction	External (bath)
Piperaceae				
Tudha				
Piper hieronymi C. DC.	Kidney pain	Leaf bud	Infusion	Internal
(GB1537)	Fever	Leaf	Decoction	External (bath)
Piperaceae				
Tudha				
Piper laevilimbum C .DC.	Leishmaniasis	Leaf	Decoction	External
(SD10)	Stomach ulcer	Leaf	Infusion	Internal
	Gynecological disorder	Leaf	Infusion	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Richi ina				
Piper peltatum L.	Swelling, bruises	Leaf bud	Mashed	External
(GB1688)	General pain, vomiting, inapetencia	Root	Decoction	Internal
	Boils, wounds, bruises	Leaf	Heated on flame	External
Piperaceae				
Tudha				
Piper sp.	Stomach ache	Leaf	Infusion	Internal
(GB1575, GB1583, GB1612,	Wound hemorrage	Leaf	Infusion	Internal
GB1617)	Cancer of the uterus	Leaf	Infusion	Internal
	Wound	Leaf	Decoction	External
Piperaceae				
Tudha				
Piper tumupasense Yuncker	Scabies, skin itching	Leaf	Decoction	External
(GB1657)				
Poaceae				
Cahuayu tidha				
Andropogon bicornis L.	Kidney pain	Root	Decoction	Internal
(SD497)				
Bue				
Gynerium sagittatum (Aublet) P. Beauv.	Boils, wounds, skin fungus	Leaf buds	Mashed	External
(SD26)				
Polygonaceae				
Anani				
Triplaris americana L.	Intestinal parasites	Bark	Decoction	Internal
(SD124)				
	Diarrhea	Bark	Decoction	Internal
	Stomach ache	Bark	Decoction	Internal
	Childbirth	Bark	Decoction	Internal
Polypodiaceae				
Atarisi				
Campyloneurum fuscosquamatum Lellinger (GB1607)	Wounds	Leaf	Mashed	External
Polypodiaceae				
D'ru tidha				
Polypodium decumanum Willd.	General pain, vomits, inapetencia	Rhizome	Decoction	Internal
(GB1552)	Eyes problem	Rhizome	Mashed for juice	In the eyes
Rubiaceae				
Aqui mati puji				
Coussarea cornifolia (Benth.) Benth. And Hook.	Diarrhea	Leaf	Infusion	Internal
(GB1520)				

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Polypodiaceae				
Polypodiaceae Bereu quid'a *Uncaria guianensis* (Aublet) Gmelin (SD248), or *Uncaria tomentosa* (Willdenow ex Roemer and Schultes) DC. (SD12)	Stomach ailment	Root+bark	Decoction/syrup	Internal
	Liver pain	Root+bark	Decoction/syrup	Internal
	Kidney pain	Root+bark	Decoction/syrup	Internal
	Intestinal problem	Root+bark	Decoction/syrup	Internal
	Rheumatic pain	Root+bark	Decoction/syrup	Internal
	Irregular menses	Bark	Decoction	Internal
Polypodiaceae Bereu quid'a *Uncaria tomentosa* (Willdenow ex Roemer and Schultes) DC. (SD12)	Vomiting	Sap	Crude	Internal
Rutaceae Huabuquere schascha *Erythrochiton fallax* Kallunki (GB1715)	Tooth ache	Flower	Crude	Applied on the aching tooth
Rutaceae Yuruma huana *Galipea longiflora* K. Krause (SD17)	Dissenter	Bark	Decoction	Internal
	General fortificant	Bark	Decoction	Internal
	Leishmaniasis	Bark	Powdered	External
Sapindaceae Sululu *Sapindus saponaria* L. (SD484)	Scabies, skin itching	Fruit	Mashed	External
Sapindaceae At'ra *Serjania elliptica* Rusby (AS123)	Ringworm	Sap	Crude	External
Scrophulariaceae Bacua et're *Scoporia dulcis* L. (SD488)	Swelling from bruises, traumas	Root	Decoction	Internal
	Respiratory ailments	Root or leaf	Decoction/juice	Internal
Smilacaceae Papa huana *Smilax* sp. (GB1474, GB1680, GB363)	Pain in the back	Bulb	Decoction	Internal
	Kidney pain	Bulb	Decoction	Internal
	Dark urine	Bulb	Decoction	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Solanaceae Jatani *Brugmansia arborea* (L.) Laghereim (GB1630)	Fever	Leaf	Infusion	External (bath)
	Swellings	Leaf	Mashed	External
	Leishmaniasis	Leaf	Mashed	External
Solanaceae Tumu junu *Lycianthes asarifolia* (Kunthe and Boucher) Bitter (GB1711)	Boils	Leaf bud	Mashed	External
Solanaceae Tomatillo* *Physalis angulata* L.	Fever	Root	Decoction	Internal
(GB1709), or	Flu	Root	Decoction	Internal
Physalis pubescens L. (GB1816)	Rheumatic pain	Root	Decoction	Internal
Sterculiaceae Shushequí *Helicteres pentandra* L.	Post partum hemorrage	Leaf	Decoction	Internal
(GB1514)	Hemorragic menses	Leaf	Decoction	Internal
Sterculiaceae Mura, cuashe *Theobroma cacao* L.	Headache	Leaf	Mashed	External
(SD329)	Scabies, skin itching	Bark or leaf	Decoction	External
Sterculiaceae Chocolatillo* *Theobroma speciosum* Willdenow ex Sprengel	Headache	Leaf	Mashed	External
(SD788)	Scabies, skin itching	Bark or leaf	Decoction	External
Streliziaceae Japaina *Phenakospermum guyanense* (Richard) Endlicher	General body pain	Inner stem	Decoction	Internal
Tiliaceae Pud *Heliocarpus americanus* L. (GB1801)	Lymphatic glands swelling	Leaf bud	Mashed	External
	Ant's bite	Leaf bud	Mashed	External
	Sting ray	Leaf bud	Mashed	External
	Childbirth	Leaf bud	Mashed for juice	Internal

Table 1 (Continued)

Family Tacana name Scientific determination (herbarium number)	Medicinal indication	Part used	Mode of preparation	Way of administration
Tiliaceae Rid'a rid'ay *Triumfetta althaeoides* Lamarck, (GB1771), or *Triumfetta semitriloba* Jacquin (GB1512)	Kidney pain	Root	Decoction	Internal
Ulmaceae D'rije badhu quid'a *Celtis iguanea* (Jacquin) Sargent (SD396)	Kidney pain Vesicle pain All body swelling	Root Root Leaf	Decoction Decoction Decoction	Internal Internal External (bath)
Verbenaceae Huahuirá *Aloysia virgata* (Ruiz and Pavon) A.L. Juss. (GB1543)	Cough	Leaf	Infusion	Internal
Verbenaceae T'rudi tidha *Bouchea boliviana* (O. Ktze) Moldenke (GB1624)	'Aire' Shivers	Leaf Leaf	Decoction Mashed	External External
Verbenaceae Rid'a rid'ay *Priva lappulacea* (L.) Persoon (SD483)	Snake bites	Root, leaf	Decoction	Internal, external
Verbenaceae T'rudi tidha *Stachytarpheta cayennensis* (L.C. Richard) M. Vahl (SD47)	Measles To 'regulate' blood, in case of boils And pimples	Whole plant Whole plant	Mashed+water Mashed+water	Internal Internal
Verbenaceae Etid'equi *Vitex cymosa* Bertero ex Sprengel (GB1587), or *Vitex pseudolaea* Rusby (GB1703)	Diarrhea Scabies, skin itching	Bark The whole tree	Decoction Soap	Internal External
Zingiberaceae Budhubudhuy *Costus scaber* Ruiz and Pavon (GB1718)	Urine with blood Fever	Stem Stem	Decoction Mashed+water	Internal External
Zingiberaceae Shaute uja *Zingiber officinale* L. (GB1550)	Diarrhea Abdominal pain Flu Rheumatic pain Lesion in the mouth	Rhizome Rhizome Rhizome Rhizome Rhizome	Decoction Decoction Decoction Mashed Mashed	Internal Internal Internal External Applied locally

[a] or: All designated species can indifferently be used for the indications described.

* No tacana name was indicated for this plant, the name is a local spanish name.

used to cure kidney trouble, occurring with or without fever, for which various plant parts are mixed together: *Smilax* spp. tubers, *Persea americana* var *americana* leaves, *Equisetum giganteum* roots and aerial parts, *Andropogon bicornis* roots, and *Cecropia polystachya* buds.

Remedies are prepared according to the way they are administered and the part of plant used. When remedies are administered orally, their mode of preparation depends upon the part of plant used. An infusion is prepared from soft buds, leaves, or flowers. A decoction is generally prepared from grated bark, seeds or roots by boiling them in a large amount of water for a long time, until the water is reduced by half. Medicinal syrups are also commonly prepared by again boiling the previous decoction with sugar, and sometimes with the adjunction of maize or rice flour, the latter ingredients are especially used in case of diarrhea or dysentery.

Although the majority of the remedies taken orally are 'cooked', a few are administered raw, the part of plant used being grated and mashed with water. The mixture is then sieved to obtain a 'juice' which can be drunk. For example, most of the remedies used internally to alleviate snake-bite pain are prepared with raw material, because this type of emergency case generally occurs far from the houses, and the administration of the remedy cannot be delayed.

In the case of topical or external administration different modes of preparation have been recorded. The selected part of the fresh plant can be simply mashed, crushed or grated: the resulting paste is fixed onto the affected area by a piece of cloth or strip of Moraceae species. In the case of latex or resinous sap, it is simply applied on the skin, and covered by a cloth, or paper. It is generally said that this poultice will fall off by itself when the sickness is cured. Also, and this is particularly notable in cases of eye irritation or ear ache, the juice from the selected part of the plant (previously heated on a flame) is squeezed directly into the eye, or the ear. A bath can also be prepared by throwing a bunch of leaves into a great amount of boiling water, completing it with cold water. In the case of boils, plant leaves may be previously heated over a flame or soaked in warm palm oil before being applied on the skin, thus supposedly inducing a quicker maturation.

Preparation of soaps with medicinal properties was also recorded. In general, these soaps, rich in alkaline salts, are said to be useful against any dermatitis, parasites of the skin such as scabies, and are also useful for dandruff. These soaps are made from the ashes of felled and burned trees. The ashes are distilled with boiling water, and the resulting extract is then concentrated and mixed with cow or pig's grease and few papaya (*Carica papaya*) leaves. The mixture is heated in a big saucepan until it forms a paste, which once cold, is then molded in the form of a soap and kept in maize leaves.

3.2.3. Way of administration and dosage of the remedies

The way of administration may vary according to the disease. For example, gastro-intestinal disorders (such as intestinal worms, diarrhea, dysentery, vomiting, stomach ache, abdominal pain, appendicitis, liver and vesicle pain) are always treated internally, (the only exception being a poultice made out of Moraceae strips in case of what is called 'appendicitis'), and this is also the case for the remedies used for gynecological purposes, or for uro-genital ailments (kidney pain, anuria, cystitis, colored urine, infection of the genitals...). It is also interesting to note that all hemorrhages (uterine, internal or wound hemorrhage), are treated orally, only two closely related species (*Anacardium* spp.) being administered locally, by the introduction into the vagina of a piece of cloth or cotton-wool previously impregnated with a bark decoction.

On the other side, all dermatological afflictions, including those caused by parasites such as leishmaniasis, scabies, ringworm, *Dermatobia* larva, etc., are treated locally, the part of plant being grated and reduced to powder, or mashed and applied as a dressing on the affected part of the body, or being administered in the form of a bath. Only one remedy, the sap of *Dipteryx odorata* was quoted as being administered orally, in the case of a strong attack of furunculosis, in order to 'purify' the blood.

For other ailments, the correlation is not that strict, and in a few cases (rheumatic pain, snake bites, remedies used as general fortifiants) it is recommended to follow a treatment with both oral and internal administration of the same preparation .

The recommended dosage varies with the disease and plant species used. Two broad approaches are used, however. For the first, the prepared remedy replaces water or chicha (a refreshing and nutritious drink) and the sick person has to drink it whenever thirsty. This administration is mainly recommended for cases of diarrhea, but also for kidney ailments or to induce urination. For the second, the patient has to drink a certain amount of the prepared liquid three times a day. The amount varies from one small glass (50 ml) to one cup (250 ml). Few treatments are given with single doses, and most are general anthelmintics.

4. Conclusion

The knowledge and use of medicinal plants is still very much alive with the Tacana despite the rapid acculturation and deterioration of their language. Thirty-three percent of the collected species were designated as medicinal: this amount only includes species that we could determine to the generic level. Additionally, we did not include in this study the uses of cultivated crops such has manioc, maize, coca, citrus, avocado, nor did we quote the remedies from animal or mineral origin. Therefore, the number of medicinal species used by the Tacana is much greater than that documented here.

The rich Tacana pharmacopoeia, (in term of number of remedies, diversity in the galenic forms used) aiming to cure or alleviate a wide range of symptoms or disease seems to provide an adequate response to the main health problems encountered along the Andean piedmont and Amazonian lowlands (Bourdy, 1998a,b).

Nevertheless, this impressive knowledge is in danger of becoming extinct. Traditional transmission of knowledge from parent to child is deteriorating along with the use of the Tacana language. Though an indigenous movement is working to reverse this situation, the monolingual education of children in Spanish and boarding of older children away from the communities is furthering this dramatic break in tradition.

Yet, the constant interest and support manifested among the Tacana communities for this ethnobotanical–ethnopharmacological survey evidenced that this subject is still valued. The concept of valorization of medicinal plants, linked with a recognition and valorization of the traditional knowledge, is perceived as fundamental by the Tacana.

Therefore, we think that the biological validation of the traditional use of medicinal plants could be justified, not only because medicinal plants represent an efficient, cheap, and available alternative to the occidental pharmaceutical remedies, but also because their use is completely in accordance with the cultural context of the Amazonian societies.

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