

Full Length Research Paper

Traditional knowledge for modern ailments – plants used for the treatment of diabetes and cancer in Northern Peru

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Various cancers and tumorous conditions were treated by healers. A total of 47 plant species belonging to 42 genera and 30 families were documented and identified as anti-cancer and anti-diabetic herbal remedies in Northern Peru, with 31 plants used for diabetes treatment and 17 species used for conditions identified by local healers as cancer. Most species used were Asteraceae, followed by Gentianaceae. Asteraceae as the most important anti-cancer and anti-diabetic family was clearly over-represented in comparison to the overall medicinal flora. The majority of anti-cancer and anti-diabetic herbal preparations were prepared from the leaves of the employed plants. Leaves and stems were more often used than characteristic for the overall medicinal preparations found in the region, while whole plants were employed less frequently. This indicates that the local healers count on a very well developed knowledge about the properties of different plant parts. In almost 60% of the cases fresh plant material was used to prepare remedies, which differs little from the average herbal preparation mode in Northern Peru. Over 90% of the remedies were applied orally. This is significantly different from the regional average of application. Over half of all remedies were prepared as mixtures with multiple ingredients by boiling plant material either in water or in sugarcane spirit. Little scientific evidence exists to date to prove the efficacy of the species employed as anti-cancer and anti-diabetic remedies in Northern Peru. Only 38.71% of the plants found to be used for diabetes treatments and 17.65% employed as anti-cancer remedies or related species in the same genus have been studied at all. Traditional medicines are still the main and often only choice for a large part of the global population. The information gained on frequently used traditional remedies against cancer and diabetes related illnesses might give some leads for future targets for further analysis in order to develop new drugs. However, more detailed scientific studies are desperately needed to evaluate the efficacy and safety of the remedies employed traditionally.

Key words: Medicinal plants, ethnobotany, anti-cancer, anti-diabetic, blood sugar control.

INTRODUCTION

According to World Health Organization (WHO) about 180 million people worldwide suffer from diabetes, with over 80% of them living in low and middle income countries. This number is expected to double by 2030. In Peru, an estimated 5.5% of the population is effected by this condition, and minimal Western healthcare is available for treatment. Likewise, cancer is the cause of

about 13% of all deaths worldwide, with more than 70% of all cancers occurring in the developing world. Both diabetes and cancer impose a significant economic burden on individuals, families and the national economy. Traditional medicine is used globally and has rapidly growing economic importance (WHO 2009a, b; Wild et al., 2003). In developing countries, traditional medicine is often the only accessible and affordable treatment available. In Latin America, the WHO Regional Office for the Americas (AMRO/PAHO) reports that 71% of the population in Chile and 40% of the population in Colombia has used traditional medicine. In many Asian

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countries traditional medicine is widely used, even though Western medicine is often readily available. In Japan, 60 to 70% of allopathic doctors prescribe traditional medicines for their patients. In the US the number of visits to providers of complementary alternative medicine (CAM) now exceeds by far the number of visits to all primary care physicians (WHO, 1999a, b, 2002).

Complementary alternative medicine is also becoming more and more popular in many developed countries. Forty-two percent of the population in the US have used complementary alternative medicine at least once (WHO, 1998) and a national survey reported the use of at least one of 16 alternative therapies increased from 34% in 1990 to 42% in 1997 (UNCCD, 2000).

The expense for the use of traditional and complementary alternative medicine is exponentially growing in many parts of the world. The 1997 out-of-pocket complementary alternative medicine expenditure was estimated at US\$ 2.7 billion in the USA. The world market for herbal medicines based on traditional knowledge is now estimated at US\$ 60 billion (Breevort, 1998). Northern Peru is believed to be the center of the Central Andean Health Axis (Camino, 1992), and traditional medicinal practices in this region are still an important component of everyday life (Bussmann and Sharon, 2006; Bussmann, 2006; De Feo, 1992; Joralemon and Sharon, 1993; Polia, 1988; Sharon, 1978, 1980, 1994, 2000; Sharon and Bussmann, 2006). Traditional medicine is also gaining more and more respect by national governments and health providers. Peru's National Program in Complementary Medicine and the Pan American Health Organization recently compared complementary medicine to allopathic medicine in clinics and hospitals operating within the Peruvian Social Security System (Essalud, 2000). According to WHO (2002), the sustainable cultivation and harvesting of medicinal species is one of the most important challenges for the next few years.

MATERIALS AND METHODS

Plant collections

Plants in Peru were collected from field, markets and at the homes of traditional healers (curanderos) visited in August to September 2001, July to August 2002, July to August 2003, June to August 2004, July to August 2005, July to August 2006, June to August 2007, June to August 2008, March to April 2009 and June to August 2009 (Figure 1). The specimens were registered under the collection series "RBU/PL," "ISA," "GER," "JULS," "EHCHL," "VFCHL," "TRUBH," and "TRUVANERICA," depending on the year of fieldwork and collection location. Surveys were conducted in Spanish by fluent speakers. Surveyors would approach healers, collectors and market vendors and explain the premise for the study, including the goal of conservation of medicinal plants in the area. All were asked to participate but due to expected resistance, information could not be collected from everyone. From those who gave their prior informed consent, information was collected regarding their knowledge and inventory of medicinal plants. Vouchers of all specimens were deposited at the Herbario

Truxillensis (HUT, Universidad Nacional de Trujillo), and Herbario Antenor Orrego (HAO, Universidad Privada Antenor Orrego Trujillo). In order to recognize Peru's rights under the convention on biological diversity, most notably with regard to the conservation of genetic resources in the framework of a study treating medicinal plants, the identification of the plant material was conducted entirely in Peru. No plant material was exported in any form whatsoever.

Nomenclature

The nomenclature of plant families, genera and species follows the Catalogue of the Flowering Plants and Gymnosperms of Peru (Brako and Xarucchi, 1993) and the Catalogue of Vascular Plants of Ecuador (Jørgensen and León-Yanez, 1999). The nomenclature was compared to the Tropicos database. Species were identified using the available volumes of the Flora of Peru (McBride, 1936-1981), as well as Jørgensen and Ulloa (1994), Pestalozzi (1998) and Ulloa and Jørgensen (1993) and the available volumes of the Flora of Ecuador (Sparre and Harling, 1978-2009) and reference material in the herbaria HUT, HAO, QCA, LOJA and QCNE.

RESULTS AND DISCUSSION

Forty-seven plant species belonging to 42 genera and 30 families were used by curanderos in Northern Peru to treat cancerous conditions and diabetes symptoms. Most species used were Asteraceae (9 species, 19.15%), followed by Gentianaceae (3 species, 6.37%), and 7 families with 2 species each (4.25%). All other families contributed only one species each to the pharmacopoeia (Table 1). A complete overview of all plants encountered, including data on use-recipes and preparation, is given in Appendix 1. Asteraceae as the most important anti-cancer and anti-diabetic family is clearly over-represented in comparison to the overall medicinal flora, while most other medicinally important families are either under-represented or completely missing from the portfolio (Table 2 and Figure 2) (Bussmann and Sharon, 2006).

The majority of anti-cancer and anti-diabetic herbal preparations were prepared from the leaves of plants (30.77%), while the whole plant (20%), stems (20%) and flowers (6.15%) were used less frequently (Table 3). Leaves and stems were more often used than characteristic for the overall medicinal preparations found in the region, while whole plants were employed less frequently (Figure 3), (Bussmann and Sharon, 2006a). This indicates that the local healers count on a very well developed knowledge about the properties of different plant parts. In almost 60% of the cases fresh plant material was used to prepare remedies, which differs little from the average herbal preparation mode in Northern Peru (Table 4 and Figure 4). Over 90% of the remedies were applied orally, while the remaining ones were applied topically (Table 5). This is significantly different from the regional average of application (Figure 5). More than 50% of the remedies included multiple plants (Figure 6). Little scientific evidence exists to date to prove the efficacy of the species employed as anti-cancer and

Table 1. Plants used to treat diabetes and cancer in Northern Peru.

Family	Genera	Species	%
Asteraceae	8	9	19.15
Gentianaceae	1	3	6.37
Apocynaceae	2	2	4.25
Fabaceae	2	2	4.25
Geraniaceae	2	2	4.25
Moraceae	2	2	4.25
Poaceae	2	2	4.25
Rubiaceae	2	2	4.25
Campanulaceae	1	2	4.25
Adiantaceae	1	1	2.13
Amaranthaceae	1	1	2.13
Amaryllidaceae	1	1	2.13
Anacardiaceae	1	1	2.13
Annonaceae	1	1	2.13
Apocynaceae	1	1	2.13
Aquifoliaceae	1	1	2.13
Asphodelaceae	1	1	2.13
Cactaceae	1	1	2.13
Dioscoreaceae	1	1	2.13
Dipsacaceae	1	1	2.13
Ericaceae	1	1	2.13
Juglandaceae	1	1	2.13
Menispermaceae	1	1	2.13
Musaceae	1	1	2.13
Oleaceae	1	1	2.13
Polygonaceae	1	1	2.13
Rosaceae	1	1	2.13
Smilacaceae	1	1	2.13
Solanaceae	1	1	2.13
Indet.	1	1	2.13

Table 2. Comparison of diabetes and cancer medicines to the 10 most important plant families of the medicinal flora of Northern Peru (after Bussmann and Sharon 2006).

Diabetes and cancer	%	Medicinal flora of North Peru	%
Family		Family	
Asteraceae	19.15	Asteraceae	13.64
Fabaceae	4.25	Fabaceae	6.82
Lamiaceae	0	Lamiaceae	4.87
Solanaceae	2.13	Solanaceae	4.09
Euphorbiaceae	0	Euphorbiaceae	2.33
Poaceae	4.25	Poaceae	2.33
Apiaceae	0	Apiaceae	2.14
Lycopodiaceae	0	Lycopodiaceae	1.95
Cucurbitaceae	0	Cucurbitaceae	1.75
Rosaceae	2.13	Rosaceae	1.75

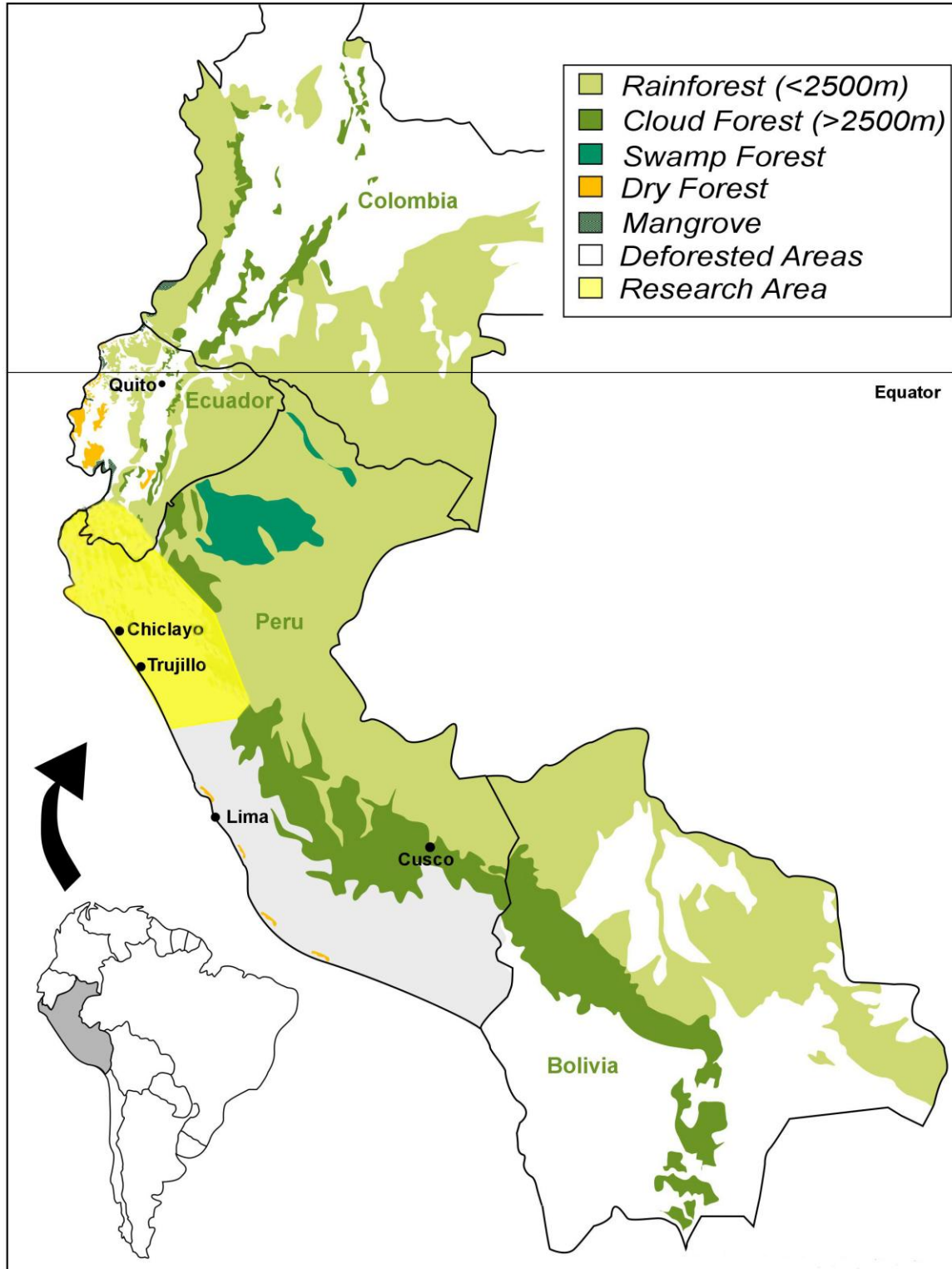


Figure 1. Research area.

anti-diabetic remedies in Northern Peru. Only 38.71% of the plants found as diabetes treatments and 17.65% employed as anti-cancer remedies or related species in

the same genus have been studied at all (Figure 7). *Scinus molle* is well known for the treatment of diabetes in Bolivia (Vandebroek et al., 2008) and showed promise

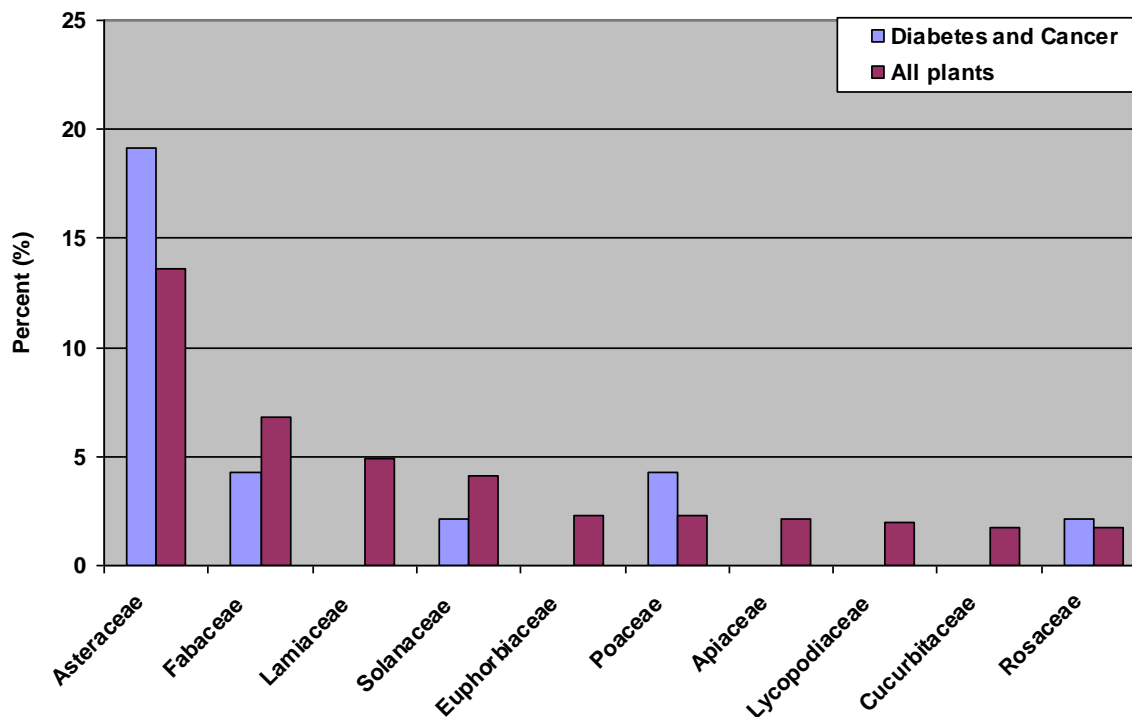


Figure 2. Most important plant families.

Table 3. Plant parts used.

Plant part	%
Leaves	30.77
Whole plant	20
Stems	20
Flowers	6.15
Seeds	4.62
Fruit	3.08
Root	7.7
Bark	6.15
Latex	1.53
Wood	0
Total	100

against cancer in Brazil (Saldanha et al., 2005). *Thevetia peruviana* (PMCID, 2006) and *Arctium lappa* (Ishihara et al., 2006) both showed promise in *in-vitro* cancer studies.

A wider variety of plants is used as diabetes treatments. *Musa* sp. and *Bidens* spp. are used for this purpose in the Caribbean and Peru (Lans, 2006; Bletter, 2007) and banana is also used in the Middle East (Azazieh et al., 2006). Mulberries (*Morus* sp.) have been found as diabetes remedy both in the Mediterranean (Azazieh et al., 2006) and Trinidad (Lans, 2006). *Mimosa* sp. is a traditional diabetes remedy in India (Sajem and

Gosai, 2006) and the Caribbean (Lans, 2006) and the latter author also reported on *Annona* sp. and *Aloe barbadensis* used for this purpose. *Aloe* has indeed shown some efficacy for diabetes treatment (Wang et al., 2007; Hays et al., 2008). Johnson (2006) found that the Giksan used *Achillea* sp. against diabetes. Bletter (2007) reported Cat's Claw (*Uncaria tomentosa*) as diabetes plant for the Ashaninka in Peru. *Rubus* sp. is used as anti-diabetic in Nepal (Bhattarai et al., 2006), and *Ficus* spp., *Smilax* spp. and *Olea europaea* have long been known as diabetes remedies in the Mediterranean and

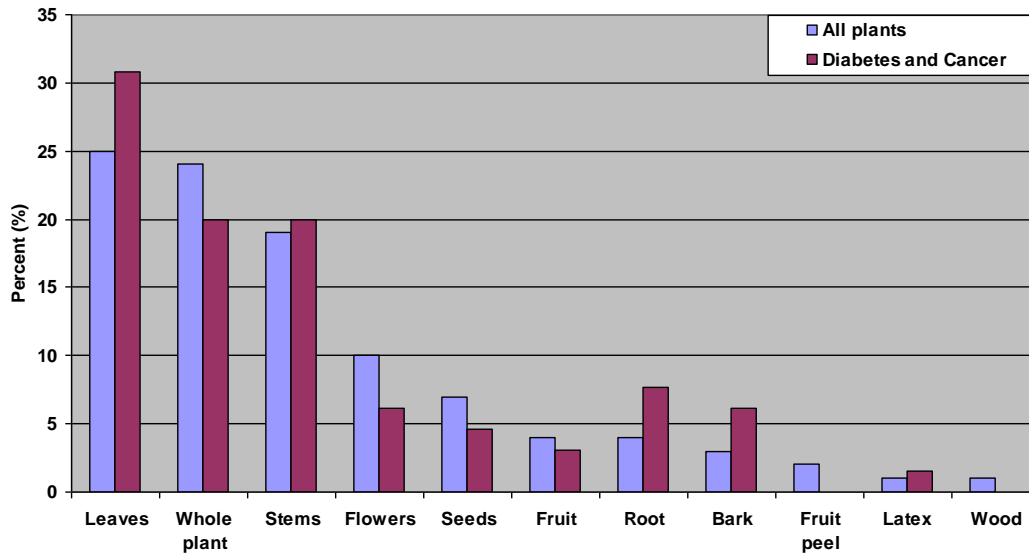


Figure 3. Plant parts used for treatment.

Table 4. Plant constitution.

Constitution	%
Fresh	59
Dry	41

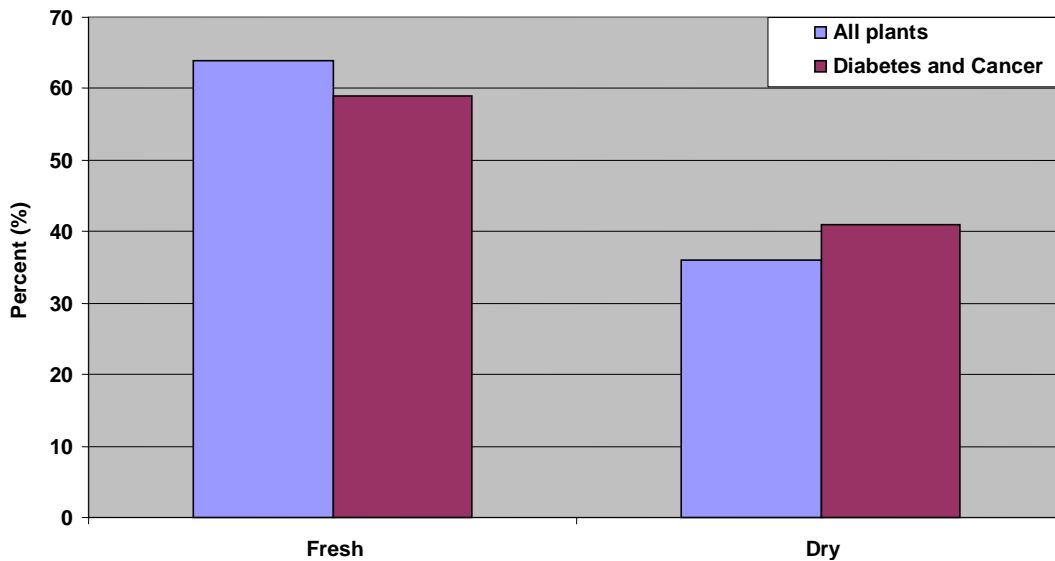


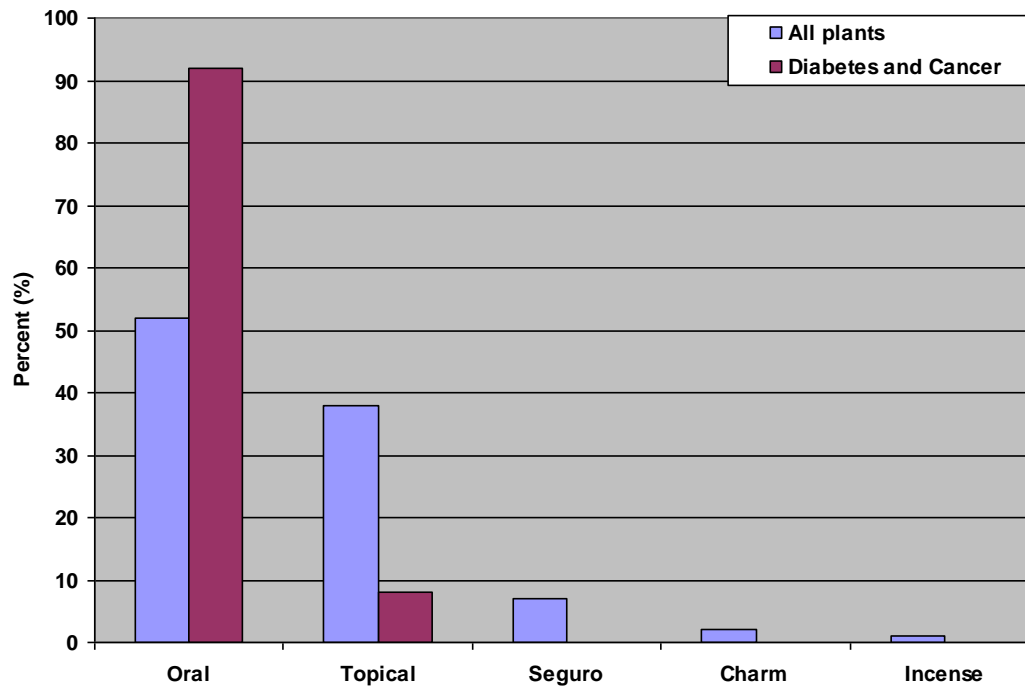
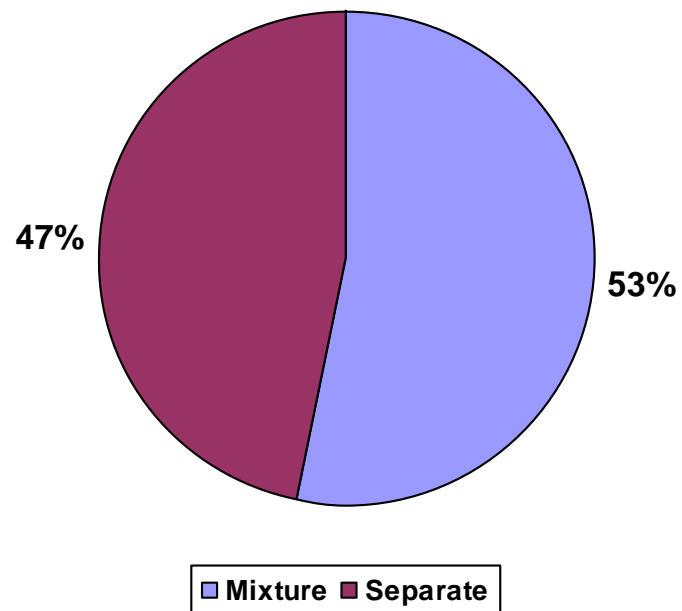
Figure 4. Plant constitution.

India (Azazieh et al., 2006; Prakash Kala et al., 2006). Olive has indeed shown to regulate glucose levels (Said et al., 2008). Other studies refer to Artichokes (*Cynara*

cardunculus) (Linde et al., 2001), Chickpeas (*Cicer arietinum*) (Cummings, 1973), *Ocimum* sp. (Aguiyi et al., 2000; Egsie et al., 2006), *Citrus* spp. (Jaiyesimi, 2000),

Table 5. Method of application.

Application	%
Oral	92
Topical	8

**Figure 5.** Mode of application.**Figure 6.** Mode of preparation.

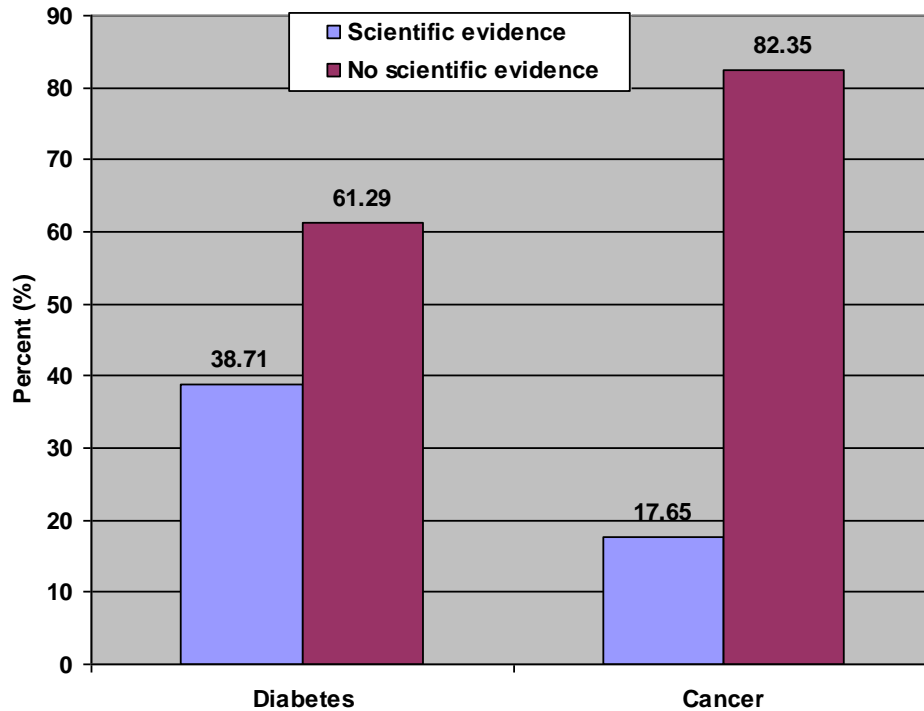


Figure 7. Evidence for efficacy.

Phyllanthus spp. (Ali et al., 2006), *Ficus* spp. (Ogunleye et al., 2003), Ginger and Banana (*Zingiber officinale* and *Musa x paradisiaca*,) (Ojewole, 2006; Ojewole and Adewunmi, 2003), Walnut (*Juglans regia*) (Azazieh et al., 2006; Said et al., 2008) and *Cestrum* sp. (Capen, 1980).

Conclusions

Cancer and diabetes related illnesses are amongst the fastest rising health problems on the globe. Although western medicine has made large advances in therapy, no “silver bullet” has been found to date. Traditional medicines are still the main and often only choice for a large part of the global population. The information gained on frequently used traditional remedies against cancer and diabetes related illnesses might give some leads for future targets for further analysis in order to develop new drugs.

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Appendix 1. Species encountered and used in Northern Peru diabetes and cancer.

Family/ Genus/ Species	Indigenous name	Plant part used	Admin.	Preparation	Use	Coll. #
Adiantaceae						
<i>Pellaea ternifolia</i> C. Chr.	Cuti Cuti, Cute Cute, Cute Cute Amarillo	Whole plant, fresh	Oral	5 g per 1 L of water, drink 3 times per day for 1 week.	Diabetes	EHCHL46, RBU/PL319, TruBH21, RBU/PL258, TRUBH21
Amaranthaceae						
<i>Iresine herbstii</i> Lindley	Colores, Timoras, Zangurache	Leaves, fresh	1. Topical 2. Oral	1. Fresh Leaves only, may use with Yonque, 7 Espiritus, and bully vinegar and contrahierba. As poultice, 3 times a week. 2. Boil 5 g per 1 L water with lancetilla, contrahierba, cachorillo, or chop, eat fresh. oral once a day for a week or drink 1 L daily, 1 month, always before breakfast.	1., 2. Cancer of the blood	ISA42, EHCHL114, ISA121
Amaryllidaceae						
<i>Eustephia coccinea</i> Cav.	Tumapara, Pomanpara, Puma Para, Para Para	Bark, fresh or dried	Oral	Boil 3-5 min, 5-10 g per 1 L of water mixed with flor blanca purenrosa, malva olorosa, drink 3 times per day for 8 days.	Cancerous wounds	RBU/PL313, GER71, EHCHL68
Anacardiaceae						
<i>Schinus molle</i> L.	Molle, Moy	Bark and Latex, fresh	Oral	Add 20 g of Bark Resin (approximately 5 cm) in 1 L of water. Boil the combination for 3 min. Take 1 cup, 4 times a day for 2 months or as needed.	Cancer, tuberculosis	EHCHL123, JULS196, GER13
Annonaceae						
<i>Annona muricata</i> L.	Huanabana, Graviola	Leaves, fresh	Oral	Boil 1/2 L of water with 10 leaves of huanabana and 10 g of amor seco, peel of pineapple, achote for 3-4 min. Drink cold, 3-4 cups a day for 1 month.	Cancer	GER2, EHCHL81
Apocynaceae						
<i>Thevetia peruviana</i> (Pers.) Schum.	Mailchin, Maichil, Camalonga, Cabalonga	Seeds, dried	Oral	Put together 1 seeds of cabalonga in 1 bottle of wine and let it sit for 8 days, one small wine glass once a day for 20 days or as needed.	Cancer	EHCHL162, TRUVan/Erica19, JULS187, EHCHL174, GER225
<i>Vallesia glabra</i> (Cav.) Link.	Cuncuno, Cun Cun	Leaves, fresh	Oral	Blend 15 leaves until you have an extract. Patient should drink cold solution. Drink only at 6 am. Do not eat anything sweet while on treatment. 1 small glass every morning for 30 days.	Diabetes	GER26

Appendix. Contnd.

Aquifoliaceae							
<i>Ilex guayusa</i> Loes	Guayusa, Agracejo, Citrodora	Leaves, dried	Oral	Tea, 5-10 g per 1 L water, 1 cup three times per day as needed, drink warm.	Diabetes	EHCHL130, JULS160	
Asphodelaceae							
<i>Aloe vera</i> (L.) Burm f.	Sabila, Zabala, Aloe, Hojas de Sabila, Aloe Vera	Leaves, fresh	1. Topical 2. Oral	1. Take a wide leaf. Take the spines out and cut the leaf longitudinally open. Get rid of the iodine secretion. Apply over inflamed area (hot) as poultice. 2 times a day for a week. For vaginal inflammation insert leaf, 2-3 deposits a day or as needed. One deposit at a time, leave it inside for 5 min take out that one and insert the next. In case of Hair loss apply to hair and skin. Juice can also be applied to eyes: Apply one drop on each eye. 1 drop every 2 days for 6 days. 2. 1 kg of herb, 1/2 kg of Honey, and three tablespoon of Pisco. Open the leaf longitudinally and extract the iodine secretion and the internal gel from the inside of the leaf. Consume the iodine secretion and the gel. 1-2 cups per day for a week to a month. Leaf can also be macerated in a bottle of alcohol.	1. Vaginal cancer 2. Diabetes, cancer	JULS274, GER22, EHCHL165, VFCHL10	
Asteraceae							
<i>Achillea millefolium</i> L.	Milenrama, Chonchon	Flowers and leaves, fresh	Oral	Boil 3-5 g per 1 L of water, drink 3 times per day for one week.	1. Diabetes	RBU/PL371, RBU/PL361, EHCHL56	
<i>Arctium lappa</i> L.	Lampazo	Seeds, dried	Oral	Boil for 5 min 1/2 L of water with 10 g of cadillo, amor seco, triñozo. Drink lukewarm. 1-2 cups 3 times a day for 20 days as needed.	Tumors	GER227	
<i>Baccharis genistelloides</i> (Lam.) Pers.	Simba Simba, Carceja, Karqueja, Cadillo	Whole plant, fresh	Oral	10 g per 1 L water, boil for 2 min only. Mixed with canchalagua, verbena, amor seco, cola de caballo, hierba del toro, campote, mal rubio. Take at breakfast and dinner, 1 L per day, for one week to one month.	Diabetes	EHCHL101, TRUBH10, RBU/PL255, JULS34, VFCHL36, EHCHL92	
<i>Baccharis glutinosa</i> Persoon	Chilco Macho	Leaves, fresh	Oral	Boil 1 L of water and 100 g of plant material. Drink mixture 3 times a day, for 1 month.	Diabetes	JULS135, GER29, GER198	
<i>Bidens pilosa</i> L.	Amor Seco, Cadillo, Morseco, Tres Esquinas, Karqueja	Whole plant, fresh or dried	1. Oral 2. Topical	1. 10 g per 1 L of water, combined with Chacur, unquia, flor de arena, espiga de maiz, cola de caballo, guanabana, pimpinela and las flores de azares. Drink 1 cup four times per day for one month. 2. Same mixture can be used as bath.	1., 2. Diabetes	JULS74, VFCHL25, EHCHL18, ISA127, GER1	
<i>Cynara cardunculus</i> L.	Alcachofa	Stems and leaves, fresh or dried	Oral	Boil 10 g per 1 L water, 5 min, 1 L per day or 3-4 four glasses per day.	Diabetes	VFCHL31, RBU/PL261, JULS94	
<i>Gnaphalium americanum</i> Mill.	Lechuguilla	Whole plant, fresh or dried	Oral	Boil 1/2 L of water with 10 g of Lechuguilla. Patient should drink lukewarm solution. 1 glass 2 to 3 times a day for 1 month.	Diabetes	JULS179	
<i>Schkuhria pinnata</i> (Lam.) Kuntze	Canchalagua, Canchalagua (Chica)	Whole plant, fresh	Oral	Boil 20 g per 1 L for 3-10 min. Mix with ortiga, lancetilla, culantrillo, panisara, purenrosa, boldo, berro, of flor blanca and canchalagua. Take 3 times per day (1l), 1 month. Blood purification: Tizana must sit out over night before drinking.	Diabetes	RBU/PL266, JULS42, VFCHL27, GER228	

Appendix Contnd.

<i>Smallanthus sonchifolius</i> (Poepp. & Endl) H. Rob.	Hojas de Yacon, Llacon	Leaves, dried	Oral	5 g per 1 L, drink Three times per day, total of 1 L a day.	Diabetes	EHCHL143
Cactaceae						
<i>Opuntia ficus-indica</i> (L.) Miller	Tuna	Fruits, fresh	Oral	Fruits Peeled and extracted. Drink the extract. Take 1 glass per day, as needed.	Diabetes	JULS263, GER3
Campanulaceae						
<i>Centropogon cf. cornutus</i> L.	Raínga	Leaves and Stems, dried	Oral	Boil 1 cup of water with 100 g of the plant. Drink cold. Once a day. It has to be followed by other treatments with other herbs.	Dissolve/remove tumors	GER78
<i>Centropogon cf. rufus</i> Wimm.	Trinoso	Leaves and Stems, fresh or dried	Oral	10 g of each of the following: Cadillo, amor seco, lampazo into 1/2 L of water and boil for 5 min. Drink lukewarm, 1/2 cup 3 times a day for 20 days or as needed.	Tumors	GER210
Dioscoreaceae						
<i>Dioscorea trifida</i> L.f.	Papa Madre, Papa Pacta	Tuber, fresh	1. Oral 2. Topical	1. Boil 1 L of water per 1/4 of a big tuber, for 5 min with flor blanca, purenrosa, pacharosa, 10 g of watercrest. drink lukewarm 3 to 4 times a day for 1 week or as needed. Especially for children 3 months - 5 years. 2. Boil 20 g per 1 L of water for 20 min. Combine with matico, malva, and tara. 1 L per day, 15 days.	1. Cancer of the Uterus 2. Cancer of the Uterus	JULS214, EHCHL40, JULS212, GER142, JULS213
Dipsacaceae						
<i>Dipsacus jallonum</i> L.	Cardo Santo	Whole plant, fresh	Oral	3-5 g per 1 L water, mix with herbs that are used for the same things. Drink 3 times per day.	Diabetes	EHCHL90
Ericaceae						
<i>Bejaria aestuans</i> L.	Pullunrosa, Cadillo, Payama, Purenrosa, Rosada, Hierba del buen querer, Hierba de la Postema	Flowers, leaves and stems, fresh or dried	Oral	5 g per 1 L, boil 5 min, used with flor blanca, papa madre, flor de arena, gauyusa, pasuchaca, malva, amor seco, berbena, llanten, cola de caballo, chumbiaura, palo de China, huaminga, quinuajiro. Drink 3 cups daily or 1 L per day for 1-3 months.	Diabetes	VFCHL22, JULS50, EHCHL39, ISA114, ISA43, JULS234, GER121
Fabaceae						
<i>Cicer arietinum</i> L.	Garbanzo	Seeds, dried	Oral	Boil 1 kg of garbanzo in 1 L of water for 5 min. Drink lukewarm, 1 cup a day for 15 days.	Cancer	GER46
<i>Mimosa nothacacia</i> Barneby	Uña de Gato de la Costa	Bark, dried	Oral	10 g of the Bark in 1 L of water, boil for 3-4 min. Drink cool, a cup 3 to 4 times a day as needed.	Cancer	JULS265, GER199
Gentianaceae						

Appendix Contnd.

<i>Gentianella bicolor</i> (Wedd.) J. Pringle	Corpus Way, Corposhuar, Hornamo Leon	Whole plant, fresh or dried	Oral	Boiled 2-3 min, 1 L daily as needed. Tea is very bitter.	Diabetes	EHCHL14, VFCHL5, RBU/PL304, JULS167
<i>Gentianella crassicaulis</i> J.S. Pringle	Violeta Genciana	Whole plant, fresh or dried	Oral	Boil 30 g per 1 L water, 3-5 min. Combine with pasuchaca, amargon, corpus way. 3-4 glasses per day for 15-30 days.	Diabetes	VFCHL7
<i>Gentianella graminea</i> (H.B.K.) Fabris	Sumaran, Chinchimali, Corpushuay	Whole plant, fresh or dried	Oral	20 g per 1 L water. 1l daily, 1 week, best with food, because it has a bitter taste. Drink cool while the patient is fasting. Exceeding dosage can lead to blindness.	Diabetes	EHCHL22, RBU/PL285, VFCHL8, JULS148
Geraniaceae						
<i>Geranium ayavacense</i> Willd ex H.B.K.	Puli Punchi, Pasuchaca, Miscamisca	Whole plant, fresh or dried	Oral	Boil 1 L water 3 min, then add 10 g Pasuchaca and 1/2 leaf of Nogal. Combine with culein and citrodora. 4 cups per day for life.	Diabetes	JULS48, EHCHL63, VFCHL6
<i>Geranium sesiliflorum</i> Cavanilles	Puli Punchi, Pasuchaca, Miscamisca	Whole plant, fresh or dried	Oral	Boil 1 L water 3 min, then add 10 g pasuchaca and 1/2 leaf of Nogal. Combine with culein and citrodora. 4 cups per day for life.	Diabetes	JULS48, EHCHL63 VFCHL6
Juglandaceae						
<i>Juglans neotropica</i> Diels	Nogal	Leaves, fresh	Oral	1 tablespoon with the pasuchaca, 1 L daily.	Diabetes	RBU/PL273, ISA67, EHCHL4, ISA123
Menispermaceae						
<i>Abuta grandiflora</i> (Mart.) Sand.	Abuta (male and female)	Root and Stems, fresh or dried	Oral	Boil 20-100 g with 1 L water for 4-5 min. Drink warm. Take 1 cup, three times a day. Take 3 days before and 3 days after menstrual period.	Diabetes	JULS88, RBU/PL312
Moraceae						
<i>Ficus carica</i> L.	Higo	Leaves and Stems, fresh or dried	Oral	Boil in 1 L of water 4 leaf for 3 min. Drink lukewarm, One cup 3-4 times a day as needed.	Diabetes	JULS165
<i>Morus alba</i> L.	Morera	Leaves and Stems, fresh or dried	Oral	Boil in 1 L of water 4 leaf for 3 min. Drink lukewarm, 1 cup 3-4 times per day or as needed, for life.	Diabetes	JULS197
Musaceae						
<i>Musa x paradisiaca</i> L.	Platano	Flowers, fresh	Oral	1. Boil 1 L water, then add 10 g platano. Cover and boil briefly. Remove, and let mixture sit for 3 min. Take 1 cup, 3 times a day, as needed. 2. Add 5 oz of plant material, 5 oz of port wine, 2 oz of Polen and 2 tablespoonfulls of honey. Drink the syrup. Take 1 tablespoon every 6 h for 1 month. 3. Cut the Platano trunk with a machete. Juice ("blood") will come out and is collected in a container. Place extract on top of the affected area (cover completely). 1 per day until the wound is healed.	Diabetes	JULS228, GER16

Appendix Contnd.

Myrtaceae						
<i>Eucalyptus citriodora</i> Hooker	Citrodora	Whole plant, fresh or dried	Oral	10 g per 1 L, boil 3 min drink beverage prepared. 3 times per day, for life.	Diabetes	JULS60
<i>Myrcianthes discolor</i> (H.B.K.) Vaughn	Lanche, Mirto	Whole plant, fresh	Oral	Boil 5 g per 1 L of water to create jelly or tea, drink breakfast, lunch, and dinner, 3 cups per day, for 1 month.	Memory, Cerebral	ISA34, EHCHL17, RBU/PL271
<i>Myrcianthes fragrans</i> (Sw) McVaugh	Lanche, Mirto	Whole plant, fresh	Oral	Boil 5 g per 1 L of water to create jelly or tea, drink breakfast, lunch, and dinner, 3 cups per day, for 1 month.	Memory, Cerebral	ISA34, EHCHL17, RBU/PL271
Oleaceae						
<i>Olea europaea</i> L.	Hojas de Olivo, Olivo	Leaves, fresh	Oral	Tea, 3 g per 1 L of water mixed with muña, corpus way, 3 times per day for 8 days	Diabetes	EHCHL86, JULS204
Poaceae						
<i>Cenchrus echinatus</i> L.	Abrojo, Cadillo	Whole plant, fresh	Oral	Boil 100 g abrojo, amor seco, lampazo, trinozo into 1/2 cup of water for 3 min. Drink 1/4 cup 1 time a day for 3 days.	Tumors	JULS89
<i>Cymbopogon citratus</i> (DC.) Stapf.	Cedron, Hierba Luisa, Maria Luisa	Leaves, roots and stems, fresh or dried	Oral	Boil 1 L of water, then add 5 g of Hierba Luisa. Let sit for 2 to 3 min. Add a little tequila. Stems have more alkaloids and more strength. Patient should drink hot solution. May consume with food best at breakfast.	Cancer	EHCHL16, VFCHL30, JULS181, GER25
Polygonaceae						
<i>Muehlenbeckia tamnifolia</i> (H.B.K.) Meisner	Chumbiauri, Chumbiauria	Root, fresh	Oral	4 kg per tub (16 L water), boiled 8 h down to 2 L and ingest orally, taken with Miel de Mexico. Mix with Hierba de Apostema, Hierba China. 1 small cup of tea mixed with 1 cup Miel de Mexico, in the evening, 1 month.	Cancer (early stages)	RBU/PL309, ISA30
Rosaceae						
<i>Rubus robustus</i> C. Presl.	Zarzamora, Moyaca, Zarza, Zarza Parrilla, Mora, Cushai	Flowers and leaves, fresh or dried	Oral	13 flower buds per cup boiled water, mixed with llatama. Drink 1 L per day, 1 month. Can also be inhaled.	Diabetes	EHCHL132(a), ISA41, ISA48, JULS47, EHCHL132(b)
Rubiaceae						
<i>Cinchona officinalis</i> L.	Cascarilla, Quinuagiro	Root, fresh	Oral	Boil with 3 tin pans of water, wait until it evaporates, leaving 1 tin. Can be combined with chumbiauria, zarzaparrilla, hierba de la postema, poleo de la China. 1 tablespoon per day.	Cancer	RBU/PL314, JULS127, ISA19, GER167
<i>Uncaria tomentosa</i> (Willdenow ex Roemer & Schultes) DC.	Uña de Gato, Uncaria Tormentosa, Una de Gato de la Selva	Leaves and stems, fresh or dried	Oral, Topical	Grind material. Better used dried. Boil 10 g per 1 L water, 10 min combined with chanca piedra, linaza, boldo, flor de overo, bolsa de pastor. Drink 1 L daily, three times per day for 15 days at least or as needed. Drink lukewarm. Solution can also be used in a poultice. Wash wound and apply soaked leaves.	AIDS, Cancer	VFCHL11, RBU/PL263, EHCHL103, JULS275, GER230
Smilacaceae						

Appendix Contnd.

<i>Smilax kunthii</i> Killip & Morton	Palo de la China (Blanco)	Bark, root and stems, fresh	Oral	Boil in 6 cans of water and wait until it evaporates, leaving 2 cans. Can combine with quinuagiro, with bee's honey. Mix with hierba de la postema. Take 1 tablespoon per day, in the evening.	Cancer (all types)	ISA20
Solanaceae						
<i>Cestrum auriculatum</i> L'Herit	Hierba Santa, Agrasejo	Leaves, fresh or dried	Oral	5 g per 1 L with corpus way, carqueja, and flor de overo. Drink 1 L per day.	Diabetes	JULS166, RBU/PL281, EHCHL172, ISA122, GER174, EHCHL102
Indet.						
	Huarate	Stems, dried	Oral	Boil 1 L of water, then add 10 g total of manzanilla, toronjil, pimpinela, hinojo, and the huarate stems. Let mixture sit for 2 min. Patient should drink lukewarm solution. 1 cup 3 to 4 times a day for one month. Also used by bad shamans for daño and burn anything that can trail it back to them.	Diabetes	JULS173