

Antibacterial activity of northern-peruvian medicinal plants

Actividad antibacteriana de plantas medicinales del norte del Perú

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Abstract

Bacterial infections and inflammation are among the ailments treated by traditional healers. The World Health Organization has expressed high interest in traditional medicine, and it is important to demonstrate scientifically that remedies employed in folk medicine are indeed therapeutically active. In this communication we report on antibacterial assays for 171 plant species, conducted under simple laboratory conditions in a private clinic in Trujillo, Peru. The aim of the study was to scientifically test if plants used in traditional medicine for the treatment of infections showed indeed antibacterial activity. Extracts of samples of 171 species were screened for antibacterial activity against *Staphylococcus aureus* and *Escherichia coli*, using agar-diffusion method. 14 species tested as traditional water extracts and 78 species extracted in ethanol showed activity against at least one of the bacteria. Simple laboratory conditions can be applied to validate the antibacterial properties of plants used in traditional medicine. While folk-medicinal uses can provide clear leads for scientific trials, many plants traditionally used against infections did not show any antibacterial activity, while plants used for different purposes yielded substantial activity. To make the most of these leads plant uses have to be very carefully documented however. What has to be taken into account is, that most traditional remedies are prepared as cocktails of different plants, where plant compounds possibly enhance and complement each other, and bioassays need to be extended to cover such compound preparations.

Key words: Bioassays, antibacterial activity, *Staphylococcus aureus*, *Escherichia coli*

Resumen

Las infecciones y las inflamaciones están entre las dolencias más tratadas por los curanderos. La Organización Mundial de la Salud ha expresado su interés en la medicina tradicional, y es importante demostrar científicamente que estos remedios son de hecho efectivos. En el presente trabajo damos a conocer los análisis antibacterianos en 171 especies de plantas medicinales, conducidos bajo condiciones de laboratorio en una clínica privada de Trujillo, Perú. El objetivo del estudio era probar científicamente si las plantas usadas en medicina tradicional demostraban una eficaz actividad antibacteriana. Los extractos de 171 especies fueron enfrentados contra *Staphylococcus aureus* y *Escherichia coli*, usando el método de difusión en agar. 14 especies fueron probadas como extractos acuosos y 78 especies como extractos alcohólicos, demostrando su actividad al menos contra una de las bacterias. Las plantas medicinales pueden proporcionar las guías para los ensayos científicos, sin embargo muchas de las plantas usadas contra infecciones no demostraron ninguna actividad antibacteriana, mientras que las usadas para diversos propósitos rindieron actividad substancial. Los ensayos se documentaron cuidadosamente, sin embargo se debe considerar que estos remedios tradicionalmente se preparan como mixturas de diversas plantas en donde los compuestos se complementan unos con otros por lo que las pruebas biológicas necesitan ser ampliadas para cubrir tales preparaciones.

Palabras claves: Bioensayos, actividad antibacteriana, *Staphylococcus aureus*, *Escherichia coli*

Background

Peru is a country rich in biodiversity. For millennia native traditional healers have used the rich flora to cure ailments. The same plants are still being used today. Traditional medicine continues to be very popular since a large part of the population has either no access to, or no resources from Western medicine. Bacterial infections and inflammation are among the ailments treated by traditional healers. Since the World Health Organization has expressed high interest in traditional medicine, it is important to demonstrate scientifically that remedies employed in folk medicine are indeed therapeutically active (Baker *et al.*, 1995; Cox & Balick, 1994; Elisabetsky & Castilhos, 1990; Farnsworth *et al.*, 1985; Munoz & Sauvain, 2002; Schultes, 1994).

Plants with potential antibacterial activity have recently come to the attention of Western scientists, and various studies have reported that some are bioactive (Perumal Samy & Ignacimuthu, 2000). Potentially active compounds have been isolated from a few of the plants tested (D'Agostino *et al.*, 1995 a,b; Okuyama *et al.*, 1994; Rodriguez *et al.*, 1994; Umana & Castro, 1990).

Plant species from the Cordillera Blanca, one of the high-altitude areas of Peru, have been studied in recent years for their antimicrobial, anti-cancer, and wound healing activities (Neto *et al.*, 2002; Hammond *et al.*, 1998; Lee *et al.*, 1999; Villegas *et al.*, 1997). However, despite the fact that the center of healing traditions in Northern Peru is located in the Trujillo/Chiclayo coastal region, no studies have been undertaken in this area so far.

In this communication we report on antibacterial assays for 171 plant species with a wide range of traditional uses (Additional File 1), conducted under simple laboratory conditions in a private clinic in Trujillo. The goal of the investigation was to validate the medicinal use of these plants.

Materials and Methods

Plant Material

Five hundred and twelve species of medicinal plants were collected in the Peruvian departments Lambayeque and La Libertad in the field, in markets of the coastal cities Trujillo and Chiclayo, and around the homes and in gardens of traditional healers (*curanderos*) of the region. Fieldwork was conducted in August-September 2001, July-August 2002, July-August 2003, June-August 2004, July-August 2005, July-August 2006 and June-August 2007.

Vouchers of all specimens were deposited at the Herbario Truxillense (HUT, Universidad Nacional de Trujillo), and Herbario Antenor Orrego (HAO, Universidad Privada Antenor Orrego Trujillo). Recognizing Peru's rights under the Convention on Biological Diversity, especially 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.

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 (Bussmann & Sharon 2006, 2007).

The nomenclature of plant families, genera, and species follows the Catalogue of the Flowering Plants and Gymnosperms of Peru (Barko & Zarucchi, 1993). Species were identified using the available volumes of McBride (McBride, 1936-1981), as well as other sources (Jørgensen & Ulloa Ulloa, 1994; Pestalozzi 1998; Ulloa Ulloa & Jørgensen; 1993) and reference material in the herbaria HUT and HAO.

Ethnobotanical data were collected from plant vendors while purchasing materials in local markets (mostly Mercado Mayorista and Mercado Hermelindas in Trujillo and Mercado Moshoqueque and Mercado Modelo in Chiclayo) and by

accompanying local healers (*curanderos*) to the markets when they purchased plants for curing sessions and into the field when they were harvesting. In addition, plants were collected by project members in the field, and - together with the material purchased in the markets - taken to the homes of *curanderos* to discuss the plants' healing properties, applications, harvesting methodology, and origins (Alexiades, 1996). At the homes of *curanderos*, the authors also observed the preparation of remedies, and participated in healing rituals. Plant uses were discussed in detail with informants, after seeking prior informed consent from each respondent.

From the complete plant inventory (Bussmann & Sharon, 2006, 2007) one hundred seventy one species were selected for bioassays. The selected plants encompassed the most often mentioned species used traditionally against infections (including infectious diseases, wounds, colds, bronchitis, kidney- and urinary infections, post-partum infections etc.), as well as plants used against gastro-intestinal problems (especially diarrhea) because it was assumed that these plants would most likely show activity against the bacterial strains tested. In addition, other frequently used species were selected for random testing. Additional File 1 gives an overview on all species and their traditional uses.

Preparation of Extracts

Plant material was dried at 37°C for three days. After drying, the material was ground with a simple meat grinder. Fifty grams of plant material were submerged in 500ml of ethanol for seven days. To produce a traditional water extract for comparison, the plant material was boiled for 5 minutes and then left submerged for one day. After maceration, the alcohol extracts were filtered and the solvent was then evaporated using a hot water bath at 70°C. The resulting residue was used for bioassays. The water extracts were applied without further treatment. The antibacterial activity of the plants was determined by using an agar diffusion method.

Bacteria

Many laboratories in developing countries lack access to commercial grade bacterial strains. Demonstrating that simple techniques can be used for bioassays, bacterial samples obtained from patients treated at the clinic where testing was conducted were used for the assays. This approach has the additional benefit that plant material can be directly tested against bacterial strains prevalent in the local population. *Staphylococcus aureus* (Gram-positive) was isolated from a Laryngitis sample. Both patients were walk-ins and not hospitalized. Two lines of the Gram-negative species *Escherichia coli* were isolated from urinary tract infection samples. The bacteria were incubated on nutrient agar until clean lines could be cultivated. The identification of the bacteria followed (Barrow & Feltham, 1993). A direct classification of the strains was beyond the technical means of the laboratory. However, the isolates are kept in culture to allow reproduction of the results or further detailed analysis of the strains used.

Bioassays

The antibacterial activity of the crude plant extracts was determined using an agar-diffusion method (Koneman *et al.*, 1997). Bacterial strains were produced as described above. Bacterial cultures were grown on 5% sheep red blood agar (SBA) and then inoculated onto Mueller-Hinton Agar (PML) for testing.

Following the initial incubation organisms were suspended in 10 ml of distilled water and their concentration equilibrated to a 0.5 McFarland standard. Using a sterile cotton swab, each sample was transferred onto Mueller-Hinton Agar. Six mm lank paper disks were then saturated with each plant extract, dried, and applied to the agar surface. Disks with Amikacin and distilled water were applied as controls. Amikacin was used because it was the only antibiotic available with efficacy against both *Escherichia coli* and *Staphylococcus aureus*. Disks with distilled water (for water assays) and disk first

saturated with Ethanol and then dried (for Ethanol assays) were used as negative controls. Plates were incubated overnight at 37°C. After 24 h, zones of inhibition appearing around disks were measured and recorded in mm. At least three repetitions were run for each assay. The Amikacin control showed an inhibition zone of at least 7mm after 24h exposition in all assays tested. Plant species showing at least the same activity were considered anti-bacterially active.

Results and Discussion

Additional File 2 shows the results of the antibacterial assays of bioactive plant extracts. Fourteen of the plants extracted in water, and 68 of the alcohol-extracts showed antibacterial properties. Most plants were mainly active against *Staphylococcus aureus*.

Only fourteen (8.3%) of the 171 species extracted in water showed bioactivity. Thirteen species proved active against *Staphylococcus aureus*, while only one species showed significant activity against *Escherichia coli*. Sixty-eight (40.7%) of the 171 alcohol extracts tested showed bioactivity, with 75 species active against *S. aureus* and 8 species against *E. coli*.

Many species used traditionally for wound disinfection, post partum care and infections of the uro-genital tract proved to show indeed activity against *S. aureus*. These species included Peruvian indigenous species like *Eustephia coccinea*, *Schinus molle*, *Alnus acuminata*, *Dioscorea trifida*, *Acacia macacrantha*, *Caesalpinia paipai*, *C. spinosa*, *Desmodium molliculum*, *Coutoubea ramosa*, *Gentianella bruenetotrica*, *Cuphea strigulosa*, *Solanum americanum* and *Verbena littoralis*, as well as introductions like *Foeniculum vulgare* (Fennel), and *Polygonum hydropiperoides*. Species used for the traditional treatment of colds and bronchitis, e.g. *Ambrosia peruviana*, *Flaveria bidentis*, *Oritrophium peruvianum*, *Senecio canescens*, *Gaultheria erecta*, *Myroxylum balsamum*, *Salvia discolor*, *Heisteria acuminata*, *Laccopetalum giganteum*, *Escobedia grandiflora*, *Caprania peruviana* and *Rubus robustus* were also effective against *S. aureus*. A third set of antibacterial species included plants traditionally used as «anti-inflammatory», especially *Oreopanax eriocephalus*,

Chuquiragua spinosa, *Tagetes elliptica*, *T. erecta*, *Taraxacum officinale* (Dandelion), *Dioscorea tambillensis*, *Geranium ayavacense*, *G. sessiliflorum*, *Pelargonium odoratissimum*, *Peumus boldus*, *Eugenia obtusifolia*, *Eucalyptus globulus*, *Passiflora ligularis*, *Tropaeolum minus* and *Pilea microphylla*.

Last, only few plants used traditionally for urinary infections and diarrhea showed inhibitory activity against *E. coli* (e.g. *Schkuhria pinnata*, *Phyllanthus niuriri*), while many species did not show activity.

A large number of plants used traditionally for the same purpose, e.g. *Nerium oleander*, *Cronquistiantus lavandulifolius*, *Eupatorium gayanum*, *Matricaria frigidum* and *M. recutita* (Chamomile), *Paranephelius uniflorus*, *Tesaria integrifolia* and many others, did not show any activity whatsoever. This indicates that a large part of the medicinal plants used as anti-bacterial might actually be inefficient, or at least inefficient if employed as sole remedy, and that indigenous use did by no means indicate effectiveness.

In contrast, a large number of the randomly tested «frequent use» species did show unexpected antibacterial activity. *Mandevilla trianae*, used traditionally against sorcery» was in fact very effective inhibitors of *E. coli*, while *Baccharis ciliaris*, *Loricaria ferruginea*, *Porophyllum ruderale*, *Pseudogymoxis cordifolia*, and *Nicotiana tabacum*, all also «magic» plants, inhibited *S. aureus*. *Ephedra americana*, traditionally used for external injuries and fractures, proved effective against both bacterial strains tested. *Cassia fistula*, *Origanum majorana*, *Cydonia oblonga*, and *Aloysia triphylla*, used traditionally for neurological disorders (e.g. Anxiety and Depression), as well as *Spartium junceum*, *Gentianella bicolor*, *Eucalyptus citrodora* (used as diabetes treatment) were also effective against *S. aureus*.

In some cases, species closely related to effective species (e.g. *Chuquiragua weberbaueri*) were found sold as replacements, because collecting the original species could not satisfy demand for these popular plants. Similarly, ineffective species similar in appearance to efficient species were sold as replacements under the same vernacular name (e.g. *Perezia pungens* as

replacement for *Senecio canescens*, *Senecio pseudotites* as replacement for *Arnica montana*). This indicates that high demand; over-harvesting and an uncontrolled herbal market lead to the possibly dangerous or fatal replacement of effective species with ineffective or even poisonous relatives.

Conclusions

A simple agar-diffusion method could be applied to successfully validate the antibacterial properties of plants used in traditional medicine.

While over 90% of the watery extracts and almost 60 % of the Ethanol extracts showed no antibacterial activity whatsoever. This seems to be an artifact caused by an incorrect «Western» understanding of traditional healing terminology, rather than traditional healers using «inefficient» plants: Most of the «ineffective» species in question were reported to be used against «internal inflammations» or «inflammation» in general. This suggested a possible antibacterial efficiency when tested in a Western setting. As the results indicate, many of these plants showed no antibacterial activity. It is possible that traditional healers employ these species as anti-inflammatory agents, which might in fact be efficient against intestinal inflammation and autoimmune disorders like arthritis of rheumatism. Traditional plant use appears to be very sophisticated, and that healers have an elaborate pharmacopoeia from which they carefully chose the most appropriate remedy for a condition.

While folk-medicinal uses were found to provide some leads for scientific trials, many plants traditionally used against infections did not show any antibacterial efficacy, while plants used for different purposes yielded substantial activity. This indicates that the traditional medicine in Northern Peru is still very much in an experimental phase, and that the stated properties of many single plants in the market cannot be relied on. To make the most of possible research leads, plant uses have to be very carefully documented. It has to be taken into account that most traditional

remedies are prepared as cocktails of different plants, where plant compounds possibly enhance and complement each other, and bioassays need to be extended to cover such compound preparations.

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Additional file 1 1. Overview on taxonomy and traditional use of plants selected for antibacterial bioassays

Family/Genus/Species	Indigenous names	Plant part used	Admin.	Use	Coll. #
ADIANTACEAE					
<i>Pellaea ternifolia</i> C. Chr.	Cuti Cuti, Cute Cute, Cuticuti, Cute-Cute Amarillo, Cuti Cuti Amarillo	Whole plant, fresh or dried	Oral	Diabetes, Liver	EHCHL46, RBU/PL319, RBU/PL258, TRUBH21
AMARANTHACEAE					
<i>Alternanthera brasiliana</i> (L.) Kuntze	Hierba del Oso, Veronica (Hembra), Moradilla de Cerro	Whole plant, fresh or dried	Oral	Twisted bones, Bronchitis, Asthma, Bruises, Fractures, Bumps	RBU/PL275, JULS11, EHCHL78, ISA83
<i>Alternanthera porrigens</i> (Jacquin) Kuntze	Sanguinaria, Moradilla, Lancetilla	Whole plant, fresh or dried	1.Oral 2.Topical	1. Blood circulation, Warts, Blood coldness, Allergies 2. Cleansing womb after childbirth, Fragrance, Luck in love and work, Bad Air / Mal Aire, Love, Business Relations, Protection, Good fortune, Good health	EHCHL142, ISA56, RBU/PL301, RBU/PL324, EHCHL93, GER117
AMARYLLIDACEAE					
<i>Eustephia coccinea</i> Cav.	Tumapara, Pomanpara, Puma Para, Para Para	1., 4. Bark, fresh or dried 2., 3. Bark, dried	1., 2., 4. Oral 3. Topical	1. Arthritis, Rheumatism 2. Inflammation of the stomach 3. Wounds 4. Inflammation, Hemorrhages, Inflammation of uterus, Ulcers, Cysts, Cancerous wounds	RBU/PL313, GER71, EHCHL68
ANACARDIACEAE					
<i>Mauria heterophylla</i> H.B.K.	Shimir, Tres Hojas, Trinidad, Chacur, Ahimir, Feregreco	Leaves, fresh	1.,3.Topical 2. Oral	1. Skin irritation 2. Inflammation, Liver, Kidneys, Wounds, Inflammation of uterus, Cleansing (external), Cleansing (internal), Ulcers (internal), Ulcers (external), Inflammation of the ovaries, Cysts, Fibroids 3. Vaginal cleansing	ISA24, JULS17, EHCHL83
<i>Schinus molle</i> L.	Molle, Moy	1., 2. Flowers, Leaves and Stems, fresh 3., 4. Bark and Latex, fresh	1.,4.Topical 2., 3.Oral	1., 2. Arthritis, Rheumatism, Bone pain, Bronchitis, Cough, Cold, Chills, Inflammation of the body 3. Cancer, Tuberculosis 4. Vaginal infection	EHCHL123, JULS196, GER13

APIACEAE						
<i>Arracacia xanthorrhiza</i>	Racacha, Racacha	Leaves and	Topical	Fright / Susto	JULS278	
Bancroft	Cimarrona	Stems, fresh	Oral			
<i>Foeniculum vulgare</i> P. Miller	Hinojo, Anis Criollo	1. Whole plant, fresh Gases, 2. Seeds, fresh		1., 2. Colic, After birth, Stomach pain, Stomachache, Nerves, Diarrhea	EHCHL23, JULS101, JULS166	
<i>Pimpinella anisum</i> L.	Anis Criollo, Anís	Seeds, dried	Oral	Gases, Stomach Pain, Colic	EHCHL137, TRUBH21, GER213	
APOCYNACEAE						
<i>Mandevilla cf. trianae</i> Woodson	Bejuco, Bejuco Negro (Grande), Bejuco Negro(Chico)	Leaves, fresh or dried	Topical	Daño de Brevaje, Fright / Susto, Sorcery	ISA14, ISA13	
<i>Nerium oleander</i> L.	Laurel, Laurel Rosa	Flowers, Leaves and Stems, fresh	Topical	Cleaning wounds, Itching, Sarna, Rashes, Skin mark, Herpes	JULS65, GER45	
<i>Thevetia peruviana</i> (Pers.) Schum.	Mailchin, Maichil, Camalonga, Cabalonga	1. Stems and Leaves, fresh 2., 3. Seeds, dried	1. Topical 2.,3. Oral	1. Bones, Rheumatism, Bad Air / Mal Aire, Arthritis, Cause bad luck / Cast a spell (Sorcery) 2. Bad Air / Mal Aire, Epilepsy, Nerves, Heart attacks 3. Menopause, Cancer	EHCHL162, TRUVan/Erica19, JULS187, EHCHL174, GER225	
<i>Vallesia glabra</i> (Cav.) Link.	Cuncuno, Cun Cun	Leaves, fresh	Oral	1. Snake bites, 2. Diabetes	GER26	
AQUIFOLIACEAE						
<i>Ilex guayusa</i> Loes	Guayusa, Agracejo, Citrodora	Leaves, dried	Oral	Diabetes, Intoxication of the blood	EHCHL130, JULS160	
ARALIACEAE						
<i>Oreopanax eriocephalus</i> Harms	Maque Maque, Mano de León	Leaves and Flowers, fresh	1. Oral 2. Topical	1., 2. Heart, Nerves, Inflammation, Fractures, Nervous system, Rheumatism	EHCHL36, JULS39, RBU/PL270, ISA71, GER221	
ARAUCARIACEAE						
<i>Araucaria heterophylla</i> (Salisb.) Franco	Pino	Resin, fresh or dried	Topical	Toothache, Extracting teeth	JULS229	
ASTERACEAE						
<i>Acanthoxanthium</i> <i>spinosa</i> (L.) Furreau	Juan Alonso, Espina de Perro, Corona de Cristo	Whole plant, fresh or dried and Leaves, dried	Oral	Detoxification of alcohol and drugs, Inflammation, Bronchitis, Haemorrhages	JULS176, EHCHL32	
<i>Achyrocline alata</i> (H.B.K.) DC.	Ishpinguillo, Ishpingo, Flor de Ishpingo		1., 2. Stems	1., 2. Topical 1. Arthritis, Bones 2. Arthritis, Bones	ISA85, ISA109	
<i>Ambrosia peruviana</i> Willd.	Altamisa, Marco, Artamisa, Manzanilla del Muerto, Marcos, Alta Misa, Ajenjo, Altamis, Llatama Negra Malera, Llatama Roja Malera	Leaves and Stems, fresh	1. Oral 2.,3. Topical	1. Heart, Nerves, Epilepsy, Liver, Bronchitis, Colds, Bad Air / Mal Aire, Burns 2. Fungus, Fright/Susto 3. After birth to reduce inflammation and prevent spasms in the woman's womb	JULS108, RUBH18, T RBU/PL370, TRUBH15, JULS90, GER9, GER110	

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<i>Arnica montana</i> L.	Arnica	Commercial tincture	Charm	Waking a person who has fainted, Keeping bad spirits away from the house	JULS106
<i>Baccharis ciliaris</i> (Retz.) Koeler	Pata de Gallina	Whole plant, fresh or dried	Seguro	Protection of job and house, Protection (general)	JULS220
<i>Baccharis genistelloides</i> (Lam.) Pers.	Simba Simba, Carceja, Karqueja, Cadillo	Whole plant, fresh	Oral	Diabetes, Blood, Burn fat, Cholesterol, Kidneys, Internal Inflammation, Liver, Gallbladder, Bad blood, Baldness	EHCHL101, TRUBH10, RBU/PL255, JULS34, VFCHL36, EHCHL92
<i>Baccharis glutinosa</i> Persoon	Chilco Macho	Leaves, fresh	Oral	Diabetes	JULS135, GER29, GER198
<i>Chuquiraga spinosa</i> sp huamanpinta C. Ezcurra	Chuquiragua, Huamanpinta	Leaves, dried	Oral	Inflammation, Kidneys, Prostate, Bladder, Prostate inflammation, Sexual impotence	EHCHL168, TRUBH9, JULS276, RBU/PL373
<i>Chuquiraga weberbaueri</i> Tovar	Amaro Amaro	Whole plant, fresh or dried	Oral	Cough, Bronchitis, Asthma, Liver, Air	JULS99, HCHL131
<i>Cronquistianthus lavandulifolius</i> DC	Clavelillo, Espino de hoja, Pulmonaria	Flowers, Leaves and Stems, fresh or dried	Oral	Cough, Bronchitis, Headache, Cold, Asthma, Pulmonary disease	ISA5, ULS233, GER163
<i>Eupatorium gayanum</i>	Asma Chilca, Wedd.	Leaves, fresh Asma (Chica)	1. Topical	1., 2. Cough, Bronchitis, 2. Oral Asthma	RBU/PL276, EHCHL164
<i>Flaveria bidentis</i> (L.) Kuntze	Mata Gusano	Flowers, Leaves and Stems, fresh or dried	Oral	Cough, Bronchitis	JULS68
<i>Gnaphalium americanum</i> Mill.	Lechuguilla	Whole plant, fresh or dried	Oral	Diabetes, Nerves	JULS179
<i>Loricaria ferruginea</i> (R. & P.) Wedd.	Palmerilla, Palmita, Pata de Gallina, Palmera, Trencilla, Palmilla, Patita de Gallo, Palmia Pina, Palmera Blan	Leaves and Stems, fresh	Topical	Spiritual Flowering / Florecimiento, Menstrual delay, Blood circulation	GER108, RBU/PL339, RUBH20, ISA136, TRU Van/ Erica23, TRU VanErica10, ISA 148(105a)
<i>Loricaria pauciflora</i> Cuatr.	Palmilla Ancha, Palmilla Verde, Palma Bendita	Whole plant, fresh	1. Seguro 2. Topical	1. Business 2. To cast away bad spirits	TRUVan/Erica18, EHCHL13
<i>Matricaria frigidum</i> (HBK) Kunth	Manzanilla	Whole plant, fresh or dried	1. Oral 2. Topical	1. Pain of love, Nerves, Insomnia, Inflammation of wounds, Colic, Stomach ache, Bronchitis 2. Inflammation, Colic, Inflammation of the vagina, Injuries, Wounds (open), Wounds (closed)	JULS22, EHCHL1, TRUBH7
<i>Matricaria recutita</i> L.	Manzanillon, Agua de la Banda, Manzanilla Blanca, Manzanilla Amarga, Manzanilla	Whole plant, fresh	1., 3. Topical 2. Oral	1. Fright / Susto, Infection of wounds, Vaginal cleansing 2. Blood purification, Menstrual colics 3. Infection of wounds	JULS192, RBU/PL306, ISA120, ISA76, GER145
<i>Monactis flaverioides</i> H.B.K.	Hierba del Susto (Amarillo), Malva, Mocura, Hierba del Susto, Hierba Susto	Stems and Leaves, fresh	1. Topical 2. Oral	1., 2. Prostate, Vaginal cleansing	EHCHL19, RBU/PL274, TRUVan/ Erica7, SA104, ISA72

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<i>Oritrophium peruvianum</i> (Lam.) Cuatrec.	Huamanripa, China Linda, Wiña Wiña, Vira Vira, Oronamo, Hierba del Sol, Hierba del Lucero,	Whole plant, fresh or dried	1. Oral	1. Asthma, Bronchitis, Pneumonia	JULS58, EHCHL126, TRUBH26, ISA96, TRUBH29, TRUVan/ Erica2, GER166
<i>Paranephelius uniflorus</i> Poepp. & Endl.	Pacha Rosa, Carapa de Chancho	Whole plant, fresh or dried		Oral Inflammation of the ovaries, Uterus, Inflammation (internal female parts), Stones, Inflammation	EHCHL133, JULS125
<i>Perezia multiflora</i> (H. & B.) Lessing	Corzonera, Escorcionera, Escorzonera	Whole plant, fresh or dried		Nerves, Cough, Bronchitis, Asthma, Sharp pain in the body	Oral RBU/PL323, JULS16, EHCHL52, GER160
<i>Perezia pungens</i> (H.B.K.) Cas.	Lengua de Vaca	Leaves, fresh	Topical	Infection of wounds, Prevents Peeling of skin after sunburn	ISA4
<i>Porophyllum ruderale</i> (Jacq.) Cas.	Hierba Gallinazo, Hierba del Gallinazo	Whole plant, dried	1. Incense 2. Topical	1. Clean the energy of the home 2. Daño, Fright / Susto	ISA73, GER89, JULS180
<i>Pseudogynoxis cordifolia</i> (Cass.) Cabr.	San Juan	Whole plant, fresh or dried	Topical	Fright / Susto, Bad Air / Mal Aire	JULS294
<i>Schkuhria pinnata</i> (Lam.) Kuntze	Canchalagua, Canchalagua (Chica)	Whole plant, fresh	Oral	Blood Cleansing, Liver, Blood purification, Gallbladder, Bad breath, Diabetes, Menstrual delay, Allergies, Menstruation, Blood irrigation, Inflammation of the urinary tract	RBU/PL266, JULS42, VFCHL27, GER228
<i>Senecio canescens</i> (H.B.K.) Cuatrecasas	Vira Vira, Oreja de Conejo	Whole plant, fresh	1. Oral 2. Topical	Bronchitis, Asthma, Cough, Nerves	TRUBH8, RBU/PL322, EHCHL104, TRUVan/Erica12, EHCHL24, ISA108, JULS14, GER158
<i>Senecio pseudotites</i> Grieseb.	Arnica	Leaves and Stems, fresh	Topical	Inflammation, Rheumatism, High fever	GER217
<i>Smallanthus sonchifolius</i> (Poepp. & Endl) H. Rob.	Hojas de Yacon, Llacon	Leaves, dried	Oral	Diabetes, Kidneys, Inflammation of the prostate, Cholesterol	EHCHL143
<i>Sonchus oleraceus</i> L.	Cerraja, Serraja, Zeraja	Whole plant, fresh	Oral	Cholera, High blood pressure	RBU/PL368, EHCHL54, JULS64, FCHL48, JULS248
<i>Tagetes elliptica</i> Sm.	Culantrillo Serrano	Whole plant, fresh or dried	Oral	Colds, Bronchitis, Congestion	GER184
<i>Tagetes erecta</i> L.	Flores del Muerto, Claveles Chino, Flor de Muerto	Flowers and Leaves, fresh	1. Topical 2. Oral	1. Colic of the stomach 2. Cough, Nerves, Inflammation (general)	EHCHL141, JULS156, GER112
<i>Taraxacum officinale</i> Wiggers	Diente de Leon, Amargon, Hierba del Leon	Whole plant, fresh	1. Topical 2. Oral	1., 2. Liver, Stomach, Inflammation (internal), Ovaries	RBU/PL252, JULS150, GER62, GER189

<i>Tesaria integrifolia</i> R. & P.	Pajaro Bobo	Flowers and Leaves, fresh	Oral	Liver, Kidneys, Gallbladder, Inflammation (general), Fever, Bad breath	JULS71, GER12
BALANOPHORACEAE					
<i>Corynaea crassa</i> Hook. F.	Huanarpo (hembra & macho)	Tuber/Root, fresh	Oral	Fertility, Sexual potency,	JULS171, VFCHL52
BETULACEAE					
<i>Alnus acuminata</i> H.B.K.	Aliso Blanco (Liso), Aliso Colorado (Arrugado)	Bark, fresh	1.,3. Topical	1. Sealing wounds, Rashes, Skin irritations, Arthritic pain 2. Arthritis, Cold, Colic of the stomach, Colic of the intestine 3. Bone pain, Arthritis	ISA18, ISA17, RBU/PL292
BORAGINACEAE					
<i>Borrago officinalis</i> L.	Borraja	Whole plant, fresh or dried	Oral	Bronchitis, Lungs, Blood problems, Burn fat, Lose weight, Anxiety, Depression, Heart, Nerves, Cough, Cold, Bruises, Insomnia	ISA112, JULS24, RBU/PL300, EHCHL58
<i>Cordia lutea</i> Lam.	Overo, Flor de Overo, Overal	Flowers, fresh or dried	Oral	Liver, Bladder, Hepatitis, Inflammation of the kidneys, Prostate inflammation.	ISA125, EHCHL77, JULS62, GER10
<i>Heliotropium curasavicum</i> L.	Alacran, Alacrancillo	Whole plant, fresh	Topical or dried	Spiritual Flowering	JULS305
BRASSICACEAE					
<i>Capsella bursa-pastoris</i> (L.) Medic	Bolsita del Pastor, Hierba del Pastor, Bolsa de Pastor	Whole plant, fresh or dried	Oral	Kidneys, Prostate, Inflammation, Inflammation (internal), Liver, Gallbladder, Stomach infection, Urinary tract	JULS7, VFCHL42, VFCHL12, RBU/PL257, EHCHL6
<i>Rorippa nasturtium-aquaticum</i> (L.) Hayek	Berros	Whole plant except root, fresh or dried	Oral	Liver, Urine retention, Bronchitis, Kidneys, Inflammation of the liver, Inflammation of the kidneys, Anemia	RBU/PL367, EHCHL25, JULS113
BROMELIACEAE					
<i>Puya hamata</i> L.B. Sm.	Hierba del Carnero, Hierba de Borrego	Hairy part of the Seeds, dried	1. Oral 2. Topical	Tumors, Infections	JULS162, GER95, EHCHL121
CAPPARIDACEAE					
<i>Capparis crotonoides</i> H.B.K.	Simuro, Bichayo, Simulo	1. Flowers, fresh Leaves, fresh	1. Oral 2.,3.,4. Topical	1. Bronchitis 2.Arthritis, 2., 3., 4. Rheumatism 3.Cold, General pain: muscular, bone, etc.4. Colds	GER4, JULS250
CAPRIFOLIAEAE					
<i>Lonicera japonica</i> Thunberg	Madre Selva	Whole plant, fresh or dried	Oral	Depression, Heart, Pain of love, Nerves, Epilepsy, Psychological pain 1. Swelling, Kidneys, Cough, Concussions, 2., 3.	JULS28
<i>Sambucus peruviana</i> H.B.K.	Sauco, Saucotillo	1.Leaves, Flowers and Leaves, fresh Stems, fresh or dried Leaves, fresh	1., 4. Oral 2., 3. Topical	Prostate, Fever, Bronchitis, 4. Flowers and Yellow Fever 2. Fever, Yellow Fever 3. Inflammation of the kidneys, Gastritis 4. Nerves, Cough, Cold, Fever, Insomnia	EHCHL140, RBU/PL291, VFCHL44, JULS246, EHCHL110

CHENOPODIACEAE					
<i>Chenopodium ambrosioides</i> L.	Paico	Leaves and Stems, fresh	Oral	1. Parasites (worms) 2. Cough	EHCHL112, RBU/PL280, EHCHL53, JULS206
CHLORANTHACEAE					
<i>Hedyosmum racemosum</i> (R. & P.) G. Don.	Masamoche, Asarcito, Asarquiro, Choleta, Asancito,	Bark, dried	Oral	Bronchitis, Cold, Cough, Asthma, Rheumatism, Bone pain, Nervous system	EHCHL147, RBU/PL377
CUCURBITACEAE					
<i>Sicana odorifera</i> (Vell.) Naud.	Secana	Whole plant, fresh	Charm	Jealousy	JULS247
CUPRESSACEAE					
<i>Cupressus lusitanica</i> Miller	Cipre, Cipres	Whole plant, fresh	1. Oral 2. Topical	1. Vaginal hemorrhage, Hemorrhage 2. Acne, Hair loss	RBU/PL288, JULS302
CYPERACEAE					
<i>Cyperus articulatus</i> L.	Baston de San Jose, Varita de San Jose, Pura pura	Whole plant, fresh	1. Seguro 2. Topical	1. Protection 2. Spiritual Flowering	JULS267
DIOSCOREACEAE					
<i>Dioscorea tambillensis</i> Kunth	Papa Semitona	Tuber, fresh	Oral	Inflammation of the kidneys, Inflammation of ovaries, Inflammation of the liver, Inflammation (internal)	JULS283, GER140
<i>Dioscorea trifida</i> L.f.	Papa Madre, Papa Pacta	Tuber, fresh	1. Oral 2. Topical	1. Inflammation, Renal disease, Uterus disease and discharge, Cysts, Internal Inflammation, Cancer of the Uterus, Inflammation of the ovaries, Vaginal discharge, Inflammation of the kidneys 2. Fungus, Vaginal cleansing, cancer of the Uterus, Washings (wounds).	JULS214, EHCHL40, JULS212, GER142, JULS213
DIPSACACEAE					
<i>Dipsacus jallonium</i> L.	Cardo Santo	Whole plant, fresh	Oral	Diabetes, Liver, Cholesterol	EHCHL90
EQUISETACEAE					
<i>Equisetum bogotense</i> (H.B.K.) Kunth of the	Cola de Caballo, Cola de Caballo (Hembra) ISA52, TRUVan/		Stems, dried 2. Topical	1. Oral kidneys, Wounds (cleansing), Stomach, Urinary tract, Kidneys, Kidneystones, Inflammation (gral)	1., 2. Inflammation Erica6, ISA107
EPHEDRACEAE					
<i>Ephedra americana</i> H. & B.	Diego Lopez, Suelda con Suelda	Whole plant, fresh or dried	1. Oral. 2 Topical	1., 2. Bruises, Fractures, Broken bones, External injuries	EHCHL150, JULS38, GER75
ERICACEAE					
<i>Bejaria aestuans</i> L.	Pullunrosa, Cadillo, Payama, Hierba de la Postema, Purenrosa, Hierba de la Postema	Flowers, Leaves and Stems, fresh or dried	Oral	Diabetes, Liver, Prostate, Allergies, Menstrual regulation, Inflammation of the	VFCHL22, JULS50, EHCHL39, ISA114, ISA43,

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	Rosada, Pulrosa, Hierba del buen querer			Inflammation of the Liver, Inflammation of the Bladder, kidneys, Inflammation of uterus, Cysts, Blood related illnesses, Inflammation of ovaries, Inflammation of the womb, Uterus, Complement blood pressure, Menstrual pain, Inflammation (gral) Bronchitis, Asthma	JULS234, GER121 JULS288, JULS198
<i>Gaultheria erecta</i> Vent.	Mullaca Mistura, Mullaca, Mullaca Real dried	Whole plant, fresh or Oral			
<i>Gaultheria reticulata</i> H.B.K.	Toromaique, Toro Maique,1., 3. Toromaike,Maique, fresh 2. Leaves, dried	Whole plant, 1.,3. Topical		1. Cold, Arthritis, Bronchitics, 2. Oral	EHCHL57, Rheumatic pain,
Bone pain,	JULS259, MaqueCandela, Toro Maique Amarillo, Toro Maique Verde, Gavilan Maique Amarillo, GER81, GER241, Gavilan Maique Verde			Hallucinogen, Bad Air / Mal Aire, Wounds, Ulcers, Sores, Anything else that bothers	RBU/PL293, EHCHL171, EHCHL51, the body 2.
Purgative				3. Wounds, Cysts	GER57
ERYTHROXYLACEAE					
<i>Erythroxylon coca</i> Lam.	Coca	Leaves, dried	Oral	Cold, Cough, Inflammation of the throat, Induce child birth, Strength for woman during childbirth, Helping delivery of newborn, Alertness, Ritual practices	JULS144, GER201
EUPHORBIACEAE					
<i>Alchornea castaneifolia</i> (Willd.) Juss.	Chilca Dulce	Leaves, dried	Oral	Liver Inflammation, Clean blood from toxins	RBU/PL294b
<i>Hura crepitans</i> L.	Habilla	Seeds, dried	Oral	Laxative, Removing laziness	JULS161, GER205
<i>Phyllanthus niuriri</i> L.	Chanca Piedra	Whole plant, fresh or dried	Oral	Liver Inflammation, Clean blood from toxins, Inflammation, Bladderstones, Liver, Kidneys, Blood, Inflammation of the gall bladder	GER152
<i>Phyllanthus urinaria</i> L.	Chanca Piedra	Whole plant, fresh or dried	Oral	Liver Inflammation, Clean blood from toxins, Inflammation, Bladderstones, Liver, Kidneys, Blood, Inflammation of the gall bladder	JULS133, EHCHL167
FABACEAE					
<i>Acacia macracantha</i> H. & B. ex Willd.	Faique, Espino, Huarango	Bark, dried	Topical	1. Wounds, Stops bleeding 2. Arthritis, Rheumatism	GER28, JULS172
<i>Caesalpinia paipai</i> R. & P.	Pay Pay	Fruits, fresh or dried	Topical	Killing lice, Wounds	GER40
<i>Caesalpinia spinosa</i> (Molina) Kuntze	Tara, Talla, Chanchalagua	Seeds pods, Whole plant, fresh or dried	1. Oral 2. Topical	1. Pharyngitis, Throat, Skin infection, Animal bites, Antibiotic, Inflammation of the tonsils 2. Fungus, Skin infection, Angina pectoris and similar conditions, Antibiotic, Wounds, Cleaning wounds, Boils, Animal bites, Amoeba infections, Inflammation of ovaries,Inflammation of uterus, Inflammation of the vagina	ISA55, EHCHL27, VFCHL21, JULS255, GER143
<i>Cajanus cajan</i> (L.) Millsp.	Chivato	Whole plant, fresh or dried	Topical	Bad Air / Mal Aire	JULS136

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<i>Cassia fistula</i> L.	Caña Fistula	Seeds, fresh or dried	Oral	Nervous system, Epilepsy	RBU/PL386
<i>Desmodium molliculum</i> (H.B.K.) DC.	Pie de Perro, Pata -Perro, Pata de Perro, Chancas de Comida, Muña, Manayupa	Whole plant, fresh or dried	1. Oral 2. Topical	1. Inflammation (internal), Inflammation (external), Inflammation of the kidneys, Diarrhea, Stomachache, Kidneys, Inflammation of the ovaries, Inflammation of the womb, Gastritis2. Wounds (cleansing), Scars	JULS41, RBU/PL268, GER135, JULS44, EHCHL109, RBU PL256
<i>Erythrina</i> spp.	Huailulo, Huairuro	Seeds, dried	Charm	Protection from evil	GER196
<i>Leucaena leucocephala</i> (Lam.) De Wit	Arabisca, Huaba Bruja	Bark, Flowers and Stems, fresh	Topical	Antiseptic, Clean wounds	JULS104
<i>Mimosa albida</i> H. & B.	Tapa Tapa	Leaves, Stems,	Oral	Hemorrhage, especially Flowers, fresh afterabortion	JULS
<i>Myroxylon balsamum</i> (L.) Harms.	Quina Quina, Kina Kina	Seeds, dried	1., 3. Oral 2. Topical	1. Nervous system, Bronchitis 2. Bronchitis, Headache 3. Cough, Bronchitis, Asthma	JULS287, RBU/PL382, EHCHL151, VFCHL46, GER91
<i>Otholobium glandulosum</i> (L.) Grimes	Culén, Culén	Stems, fresh or dried	Oral	Diarrhea, Cold of the stomach	EHCHL5, JULS40
<i>Senna monilifera</i> H.S. Irwin & Bowley	Hojas de Sen	Leaves, dried	Oral	Purgative, Constipation, Cleansing of the stomach	EHCHL34, EHCHL12
<i>Spartium junceum</i> L.	Retama	1. Flowers and or fresh 2. Whole plant, fresh	1. Oral 2. Topical	1. Hepatitis, Liver, High blood pressure, Diabetes 2. Arthritis, Good Luck, Bone pain, Sinusitis, Blood purification	EHCHL60, EHCHL 146, RBU/PL279, JULS239
<i>Trifolium repens</i> L.	Trebol, Trebol de agua	Flowers, Leaves and Stems, fresh or dried	Oral	Inflammation, Inflammation of the urinary tract, Stomach, Stomach Pain, Ulcer, Inflammation of the kidneys, Kidneys, Blood	ISA47, RBU/L330, EHCHL30
GENTIANACEAE					
<i>Coutoubea ramosa</i> Aublet	Genciana	Fruits, fresh	Topical	Wounds, Scars, Rashes, Cold sores	GER207
<i>Gentianella bicolor</i> (Wedd.) J. Pringle	Corpus Way, Corposhuar, Hornamo Leon	Whole plant, fresh or dried	Oral	Arthritis, Diabetes, Bone pain, Cholesterol, Gastritis, Liver, Blood, Rheumatism	EHCHL14, VFCHL5, RBU/PL304, JULS167
<i>Gentianella bruneotricha</i> (Gilg.) J.S. Pringle.	Anga Macha	Whole plant, fresh	Oral	Infection of the uterus, After giving birth	JULS282
<i>Gentianella crassicaulis</i> J.S. Pringle	Violeta Genciana	Whole plant, fresh or dried	Oral	Gastritis, Diabetes (special types), Dizziness	VFCHL7
GERANIACEAE					
<i>Geranium ayavacense</i> Willd ex H.B.K.	Puli Punchi, Pasuchaca, Pachuchaca, Miscamisca	Whole plant, fresh or dried	1., 2. Oral	1. Diabetes 2. Inflammation, Kidneys, Liver, Urinary tract, Inflammation of all kinds	JULS48, EHCHL63, VFCHL6
<i>Geranium sesiliflorum</i> Cavanilles	PuliPunchi, Pachuchaca, Miscamisca, Pasuchaca	Whole plant, fresh or dried	1., 2. Oral	1. Diabetes 2. Inflammation, Kidneys, Liver, Urinary tract, Inflammation of all kinds	JULS48, EHCHL63, VFCHL6
<i>Pelargonium odoratisimum</i> (L.) L'Herit.	Malva de Oro, Malva de Olor, Malva Olorosa	Whole plant, fresh or dried	Oral	Arthritis, Heart, Nerves, Blood, Mal de susto, Inflammation of the ovaries, Inflammation of the womb	TRUVan/Erica14, TRUBH6, EHCHL89, JULS188

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JUGLANDACEAE

<i>Juglans neotropica</i> Diels	Nogal	Leaves, fresh	1., 2., 5. Topical 3., 4. Oral	1. Hair loss 2. Sorcery, Daño, Arthritis, Wounds (cleansing), Fright / Susto 3. Cough, Bronchitis, Asthma 4. Diabetes 5. Arthritis, Wounds (cleansing)	RBU/PL273, ISA67, EHCHL4, ISA123
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LAMIACEAE

<i>Hyptis sidifolia</i> (L'Her.) Briq.	Pedorera, Pedrorera, Hierba de la Ventosidad, Pedorrera, Albaca Serrana	Whole plant, fresh or dried	Oral	Gases, Colic of the intestine, Gastritis, Cramps	EHCH L21, RBU/PL254, JULS222, JULS4, GER76
<i>Lepechinia meyenii</i> (Walpers) Epling	Salvia, Salvia Real	Whole plant, fresh or dried	1. Oral 2. Topical	1. Bronchitis, Heart, Nerves, Memory, Menstruation 2. Wounds, Hair loss	RBU/PL303, VFCHL17, ISA91
<i>Marrubium vulgare</i> L.	Cordon de Muerto, Chanca de Comida, Chancaz de Muerto	Whole plant, fresh or dried	Topical	Inflammation of the body	JULS132
<i>Melissa officinalis</i> L.	Toronjil, Melissa	Whole plant, fresh or dried	Oral	Nerves, Insomnia, Heart, Tachycardia	JULS26, EHCHL2, RBU/PL260, VFCHL14
<i>Mentha spicata</i> L.	Hierba Buena, Hierba Buena Silvestre, Menta	Whole plant, fresh 2. Topical	1. Oral	1. Parasites, Colic, Stomach ache, Gastritis, Indigestion, Colic of the stomach, Tapeworms, Intestinal worms, Headache, Aphrodisiac, Gases, Bad breath 2. Colic, Stomach ache	RBU/PL308, EHCHL74, RBU/PL267, JULS72, VFCHL3, JULS20, GER15, GER134, JULS20
<i>Origanum majorana</i> L.	Mejorana	Leaves and Stems, fresh	Oral	Colic, Heart, Nerves, Menstruation, Anxiety, Depression, Pain of love	EHCHL88, JULS19, RBU/PL317, GER165
<i>Origanum vulgare</i> L.	Oregano	Leaves and Stems, fresh or dried	Oral	Colic, Menstrual cramps, Menstruation, Stomach ache, Gases, Lower stomach cramps related to PMS	JULS205, GER114
<i>Salvia discolor</i> H.B.K.	Palmeras (Chica), Latama, Yatama	Stems, fresh	1., 2. Oral	1. Cough 2. Preventing infections related to birth	ISA93, ISA151(93a), ISA25
<i>Salvia rosmarinifolia</i> Hort. ex G. Don.	Romero del Campo, Romero Blanco, Romero Serrano	Whole plant, fresh	1., 2., 3. Topical	1., 2., 3. Inflammation, Sinusitis	JULS49, ISA118, ISA77, EHCHL108, GER111
<i>Satureja pulchella</i> (H.B.K.) Briquet	Panizara, Panisara	Leaves, fresh or dried	Oral	Bronchitis, Asthma, Liver disease, Infection (internal), Nerves, Menstrual delay, Providing vitamins	GER148, JULS43

LAURACEAE

<i>Persea americana</i> Mill.	Palta	1. Leaves, fresh or dried 3. Flowers, fresh 2. Seeds, fresh	1., 2., 3. Oral	1. Lose weight 2. Diarrhea, Kidneystones, Contraceptive, Sterilization for women only 3. Cough	JULS211, GER18
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LINACEAE

<i>Linum sativum</i> L.	Linaza	Seeds, dried	Oral	Inflammation of the kidneys, Liver, Inflammation, Inflammation of the prostate, Gallbladder stones, Kidneystones	EHCHL159, JULS185, GER139
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LOGANIACEAE

<i>Buddleja utilis</i> Kraenzl.	Flor Blanca	Flowers, fresh or dried	Oral	Menstruation, Inflammation of the womb, Ovarian cysts, Inflammation of uterus, Inflammation	RBU/PL333, EHCHL38, ISA60, JULS155, GER136
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LYTHRACEAE

<i>Cuphea strigulosa</i> H.B.K.	Lancetilla, Gacetilla, Sanguinaria, Gansetilla, Hierba del Toro	Leaves and Stems, fresh Fever, Blood purification, Intestinal infections, Heart, Nervous system, Blood, Liver, Discharges, Colic, Gases, Diarrhea, Inflammation of the stomach, Kidneys, Internal Inflammation, Strengthen the body, Anemia	Oral	Blood circulation,	GER104, EHCHL35, VFCHL34, JULS33, SA51, RBU/PL259, I EHCHL43, JULS59, ISA53, GER147
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MALVACEAE

<i>Alcea rosea</i> (L.) Cavanilles	Malva Blanca, Malva Morada	Whole plant except Stems, fresh	Oral	Inflammation, Cough, Hemorrhages	JULS78, JULS79
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MONIMIACEAE

<i>Peumus boldus</i> Molina	Boldo	Leaves, dried	Oral	Inflammation of the liver, Kidney Inflammation	JULS114, GER157
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MORACEAE

<i>Ficus carica</i> L.	Higo	Leaves and Stems, fresh or dried	Oral	Diabetes	JULS165
<i>Morus alba</i> L.	Morera	Leaves and Stems, fresh or dried	Oral	Diabetes	JULS197

MYRICACEAE

<i>Myrica pubescens</i> H. & B. ex Wild.	Laurel	Leaves and Stems, dried	Topical	Fright / Susto, Sorcery	ISA84, ISA128
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MYRTACEAE

<i>Eugenia obtusifolia</i> Cambes.	Unquia Real, Rumilanchi	Leaves and Stems, fresh or dried	Oral	Inflammation (general)	JULS32
<i>Eucalyptus citriodora</i> Hooker	Citrodora	Whole plant, fresh or dried	Oral	Diabetes	JULS60
<i>Eucalyptus globulus</i> Labill.	Alcanfor, Eucalipto Serrano, Eucalipto	1. Leaves, dried 2., 3. Leaves, fresh or dried	1., 2., 4.Oral 3. Topical	1., 2., 4. Bronchitis, Respiration, Cold, Cough, Sinusitis, Asthma 3. Cold, Rheumatism, Bone Pain, Congestion, Burn fat	ISA130, JULS61, VFCHL35, JULS153, GER14,
<i>Psidium guajava</i> L.	Hoja de Guanábana, Graviola	Leaves and Stems, fresh or dried	Oral	Cancer, Liver sicknes	EHCHL12 VFCHL24

OLACACEAE

<i>Heisteria acuminata</i> (H. & B.) Engler	Chuchuasi, Chuchuhuasi	Bark, fresh or dried	1., 2. Oral 3. Topical	1. Cold, Cough, Bones, Arthritis2. Fertility, Sexual potency 3. Arthritis, Muscle pain, Bone pains, Sprains, Colds, Burning fat, Burning cholesterol	RBU/PL287, JULS138, GER164
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ORCHIDACEAE

<i>Stelis</i> sp.	Huaima-Huaima, Cucharilla	Root, dried	Topical	Inflammation of ovaries, Inflammation of uterus	JULS169,RBU/PL296, EHCHL45, GER129
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PASSIFLORACEAE

<i>Passiflora caerulea</i> L.	Pasionara	Flowers, Leaves and Stems, fresh	Oral	Nerves, Insomnia, Anxiety	JULS217
<i>Passiflora ligularis</i> Jus.	Hoja de Granadilla, Granadilla	1. Leaves and new shoots, fresh 2. Peel of the Fruit, fresh	Oral	1. Liver, Blood circulation, Inflammation, Inflammation of the kidneys, Inflammation of the liver 2. Diarrhea	EHCHL47, JULS163
<i>Passiflora quadrangularis</i> L.	Hojas de Tumbo	Leaves, fresh	Oral	Liver, Menstrual pain, Stomachache	EHCHL135

PHYTOLACCACEAE

<i>Phytolacca bogotensis</i> H.B.K.	Laylambo, Ilambo	Flowers, Leaves and Stems, fresh	1., 2. Topical	1., 2. Malaria, Dengue, Yellow fever	ISA81, ISA111, JULS218
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PIPERACEAE

<i>Piper aduncum</i> L.	Yerba del Soldado, Tilonga, Matico, Mogo-Mogo	1. Leaves, fresh or dried 2. Leaves, fresh	1. Oral 2. Topical	1. Cold, Fungus, Cough, Wounds, Bronchitis, Chills, Tuberculosis, Stopping a hemorrhage 2. Wounds reluctant to heal, Immune System, Infection, Inflammation, Bronchitis, Colic (women), Wounds	VFCHL26, RBU/PL277, TRUVan/Erica24, JULS15, GER141, JULS199
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PLANTAGINACEAE

<i>Plantago linearis</i> H.B.K.	Llantén Serrano, Llantén de la Costa, Llantén	1., 2. Whole plant, fresh 3. Root, fresh	1. Topical 2., 3. Oral	1. Inflammation of wounds, Wounds (cleansing) 2. Liver, Inflammation of the kidneys, Wounds, Bladder 3. Cough, Bronchitis	JULS35, JULS86, GER133
<i>Plantago sericea</i> R. & P. var. <i>lanuginosa</i> Grieseb.	Pajilla Blanca	Whole plant, fresh or dried	Oral	Vaginal discharge	JULS207

POACEAE

<i>Cenchrus echinatus</i> L.	Abrojo, Cadillo	Whole plant, fresh	Oral	Sharp pain in any part of the body, Inflammation (general), Skin, Intestine, Liver disease, Gallbladder disease, Tumors, Urinary disease	JULS89
<i>Cymbopogon citratus</i> (DC.) Stapf.	Cedron, Hierba Luisa, Maria Luisa	Leaves, Roots and Stems, fresh or dried	Oral	Cold, Cough, Nerves, Flu, Varicose veins, Stomach Pain, Blood circulation, Cancer	EHCHL16, VFCHL30, JULS181, GER25
<i>Cynodon dactylon</i> (L.) Persoon	Gramma Dulce	Stems, dried	Oral	Cysts of the ovary, Cysts of the uterus, Inflammation of the kidneys, Inflammation (general), Uterus, Fibroids, Uterus prolapse	ISA61, JULS73, ISA106, GER151
<i>Triticum sativum</i> L.	Trigo	Seeds, dried	Topical	Vaginal infection, Vaginal discharge	GER182

POLYGALACEAE

<i>Polygala paniculata</i> L.	Canchalagua	Whole plant, fresh or dried	Oral	Blood circulation	EHCHL59
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POLYGONACEAE

<i>Polygonum hydropiperoides</i> Michaux	Pica Pica	Leaves, fresh		Infections	JULS223
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POLYPODIACEAE

<i>Polypodium crassifolium</i> L.	Lengua de Ciervo, Lengua de Servio, Calaguala, Lengua de Ciervo	Stems, fresh	Oral	Inflammation of the kidneys, Prostate, Bladder, Internal Inflammation, Inflammation, Liver, Kidneys, Ulcers	EHCHL71, TRUBH38, RBU/PL331, RBU/PL332, JULS52, JULS303
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RANUNCULACEAE

<i>Laccopetalum giganteum</i> (Wedd.) Ulbrich	Huamanripa, Pacra, Flor de Guamarya	1., 2. Leaves, fresh or dried 3. Whole plant, fresh	1., 2., 4. Oral 3. Topical	1. Cough, Bronchitis, Asthma, Flu, Cold 2. Fertilization (Heat Ovaries) 3. Rheumatism 4. Epilepsy, Heart disease, Palpitation	VFCHL53, RBU/PL321, EHCHL42, JULS284, GER162
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ROSACEAE

<i>Cydonia oblonga</i> Miller	Membrillo	1. Fruit Peel, fresh 2. Fruit pulp, fresh 3. Leaves, dresh	Oral	1., 3. Depression, Nerves, Insomnia, Heart problems 2. Vomiting, Nausea	JULS194
<i>Rubus robustus</i> C. Presl.	Zarzamora, Moyaca, Zarza, Zarza Parrilla, Mora, Cushai	Flowers and Leaves, fresh or dried	1. Topical 2., 3., 4. Oral	1. Pain of the body 2. Diabetes, Cough, Cholesterol (high), Bronchitis 3. Throat (dried), Cannot speak 4. Kidneystones, Inflammation of the kidneys, Inflammation of uterus, Arthritis	EHCHL132(a), ISA41, ISA48, JULS47, EHCHL132(b)
<i>Sanguisorba minor</i> Scop.	Pimpinela, Flor de Overa	Whole plant, fresh	Oral	Heart, Nervous system, Nerves, Insomnia, Depression, Heart, Pain of love, Anxiety, Menstrual regulation, Arthritis, Blood, Mal de susto	EHCHL117, TRUBH35, RBU/PL262, ISA57, JULS25, ISA147(103a), VFCHL20, ER170

RUBIACEAE

<i>Cinchona officinalis</i> L.	Cascarilla, Quinuagiro	1. Flowers and Leaves, dried 2., 4. Bark, dried 3. Root, fresh	1., 2., 3., 4. Oral	1. Cough 2. Fertility, Sexual potency 3. Cancer 4. Colds, Rheumatism	RBU/PL314, JULS127, ISA19, GER167, VFCHL11, RBU/
<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	Bronchitis, Kidneys, Asthma, AIDS, Allergies, Rheumatic infections, Cancer, Contraceptive, Ulcers, Prostate, Bladder, Arthritis, Bones, Blood circulation, Hemorrhages (internal), Wounds (internal), Kidney Inflammation	EHCHL103, JULS275, GER230

RUTACEAE

<i>Ruta graveolens</i> L.	Ruda, Ruda (Macho y Hembra), Hierba del Quinde	Whole plant, fresh	1., Oral2. Topical	1. Abortion, Strong colics, Good luck, Fright / Susto, Heart, Menstrual regulation, Depression, Bad Air / Mal Aire, Rheumatism, Nerves, Vomiting, Nausea2. Aphrodisiac	ISA152, JULS1, TRUVan/Erica20, EHCHL128, VFCHL16, ISA145(108a), GER24
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SALICACEAE

<i>Salix chilensis</i> Molina	Sauce	Leaves, fresh	1. Topical2. Oral	1., 2. Hangover fever, Fever, Malaria, Colds	TRUBH25, JULS82, GER39
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SAPOTACEAE

<i>Pouteria lucuma</i> (R. & P.) Kuntze.	Lucuma	Fruit, fresh	Oral	Promoting lactation on women after giving birth	JULS186
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SAXIFRAGACEAE

<i>Escallonia pendula</i> (R. & P.) Pers.	Chuque	1. Leaves, dried2. Leaves, fresh	1., 2. Topical	1., 2. Arthritis, Bone pain, Sorcery, Rheumatism, Susto of Death	ISA23, ISA63
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SCROPHULARIACEAE

<i>Caprania peruviana</i> Bentham	Flor Arenilla, Te de Indio	Whole plant, fresh or dried	Oral	Urine retention, Inflammation of the urinary tract, Colic, Kidney, Dissolving acids	RBU/PL374, EHCHL170
<i>Escobedia grandiflora</i> (L.f.) Kuntze	Azafran	Flowers, dried	Oral	Bronchitis, Pneumonia, Chills (general)	JULS110
<i>Galvesia fruticosa</i> J. Gmelin	Curil, Macacha	Flowers, Leaves and Stems, fresh or dried	1 Topical2. Oral	1. Arthritis, Rheumatism, Nerve pain2. Cold, Bronchitis, Asthma	VFCHL37, JULS289

SOLANACEAE

<i>Cestrum auriculatum</i> L'Herit	Hierba Santa, Agrasejo	Leaves, fresh or dried	1., 2., 3. Topical4. Oral	1. Wounds (cleansing)2. Fever3. Relaxant, Fright / Susto, Pain of the body, High blood pressure, Typhoid fever, Preventing spasms after giving birth, Warming women4. Cough, Fright / Susto, Bronchitis, Colic of the stomach, High blood pressure, Typhoid fever, Diabetes, Liver, Cholesterol	JULS166, RBU/PL281, EHCHL172, ISA122, GER174, EHCHL102
<i>Cestrum strigilatum</i> R. & P.	Santa María	Flowers, leaves and Stems, fresh or dried	Oral	Control and regulate menstrual cycle	JULS245, JULS131
<i>Datura ferox</i> L.	Chamico	Leaves, dried	Oral	Bewitching men, Lowering moral	
<i>Juanulloa ochracea</i> Cuatrecasas	Cuya Cuya	Seeds, dried	Toical	Bad Air / Mal Aire, Pain	EHCHL154
<i>Lycopersicon peruvianum</i> (L.) Mill.	Tomate de Monte	Whole plant, fresh	Oral	anywhere on the body Inflammation (internal), Urinary infections	GER237
<i>Nicotiana tabacum</i> L.	Tabaco	Leaves, dried	1. Oral2. Topical	1. Improving vision and insight during rituals, Suspend the patient (te voy levantando), Raise the energy of the patient2. Bone fractures	JULS251, GER92

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<i>Solanum americanum</i> Mill.	Hierba Mora, Hierba del Susto, Baja del Espanto, Semora	Whole plant, fresh	Topical	1. Sinusitis, Flu, Cold, Involuntary urination 2. Fever 3. Cold sores, Mouth blisters, Herpes	EHCHL125, JULS76, EHCHL87, GER85, GER159 JULS112
<i>Solanum melongena</i> L.	Berenjena	Whole Fruit, fresh	Oral	Burn fat, Lose weight	JULS112
STERCULIACEAE					
<i>Theobroma cacao</i> L.	Cacao	Fruit Peel, dried	Oral	Inflammation of the kidneys	JULS117
THELYPTERIDACEAE					
<i>Thelypteris cf. scalaris</i> (Christ.) Alton	Helecho Macho	Whole plant, fresh or dried	Oral	Contraceptive	JULS291
TROPAEOLACEAE					
<i>Tropaeolum minus</i> L.	Mastuerzo	1. Flowers, fresh 2. Whole plant, fresh	1. Topical	1. Sun spots 2. Inflammation 2. Oral	JULS81 of the stomach
TYPHACEAE					
<i>Typha angustifolia</i> L.	Chante	Stems, dried	Oral	Prostate	ISA45
URTICACEAE					
<i>Pilea microphylla</i> (L.) Lieberman	Contra Hierba	Whole plant, fresh	Oral	Bladderstones, Inflammation of the kidneys, Prostate, Cysts	RBU/PL282, EHCHL33
<i>Urtica magellanica</i> A. Jussieu ex Poirlet	Ortiga, Ortiga (Chica), Ortiga de Obeja, Ortiga Negra, Hortiga	Whole plant, fresh or dried	1. Oral 2. Topical	1., 2. Blood purification, Happiness, Fever, Rheumatism, Arthritis, Blood circulation, Hemorrhages, Hair loss, Asthma, Hemorrhoids, Inflammation (general)	RBU/PL251, ISA119, JULS11, EHCHL50, VFCHL9, GER161
VERBENACEAE					
<i>Aloysia triphylla</i> (L. Her.) Britt.	Cedron, Pepas de Cedron, Sidrón,	1. Whole plant, fresh 2., 3., 4. Seeds, fresh or dried	1., 3., 4. Oral 2. Topical	1. Depression, Nerves, Insomnia, Stomach 2., 3. Bad Air / Mal Aire 4. Sharp pain in the body	JULS130, RBU/PL384, EHCHL161, RBU/PL305, GER90
<i>Clerodendron</i> sp.	Brochamelia	Flowers, fresh or dried	Oral	Bronchitis, Asthma, Whooping cough	JULS115 RBU/PL369,
<i>Verbena littoralis</i> H.B.K.	Verbena, Berbena	Whole plant, fresh or dried	1., 2. Topical 3. Oral	1. Fever, Fungus 2. Hyperactivity, ADHD, Tranquility 3. Inflammation, Wounds (cleansing), Blood purification, Cholera, Lower strong character, Colic, Colds	JULS77, EHCHL69, VFCHL28, GER138
ZYGOPHYLLACEAE					
<i>Tribulus terrestris</i> L.	Abrojo, Cadillo	Whole plant, fresh	Oral	Sharp pain in any part of the body, Inflammation (general), Skin, Intestine, Liver disease, Gallbladder disease, Tumors, Urinary disease	GER137
LICHENES					
<i>Siphula</i> sp.	Palalio, Papelillo, Papelilla	Leaves, fresh	Oral	Liver	EHCHL115, JULS216

Additional file 2. Screened plants showing antibacterial activity against at least one bacterial strain tested

Scientific Name	Activity of water extract against <i>E. coli</i>	Activity of water extract against <i>S. aureus</i>	Activity of Ethanol extract against <i>E. coli</i>	Activity of Ethanol extract against <i>S. aureus</i>	Positive control
<i>Acacia macracantha</i> H. & B. ex Willd.				15mm	***
<i>Alchomea castaneifolia</i> (Willd.) Juss.		17mm		16mm	***
<i>Alnus acuminata</i> H.B.K.				14mm	***
<i>Aloysia triphylla</i> (L. Her.) Britt.				14mm	***
<i>Ambrosia peruviana</i> Willd.				12mm	***
<i>Baccharis ciliaris</i> (Retz.) Koeler				8mm	***
<i>Bejaria aestuans</i> L.				15mm	***
<i>Caesalpinia pajpai</i> R. & P.				17mm	***
<i>Caesalpinia spinosa</i> (Molina) Kuntze			10mm	24mm	***
<i>Caprania peruviana</i> Benth				11mm	***
<i>Cassia fistula</i> L.				12mm	***
<i>Cestrum strigilatum</i> R. & P.		12mm		19mm	***
<i>Chuquiragua spinosa</i> ssp. <i>huamanpinta</i> C. Ezcurra		13mm			***
<i>Clerodendron</i> sp.				8mm	***
<i>Coutoubea ramosa</i> Aublet				12mm	***
<i>Cuphea strigulosa</i> H.B.K.				12mm	***
<i>Cydonia oblonga</i> Miller				11mm	***
<i>Desmodium molliculum</i> (H.B.K.) DC.				8mm	***
<i>Dioscorea tambillensis</i> Kunth				9mm	***
<i>Dioscorea trifida</i> L.f.				8mm	***
<i>Dodonaea viscosa</i> L.				15mm	***
<i>Ephedra americana</i> H. & B.			8mm	22mm	***
<i>Escallonia pendula</i> (R. & P.) Pers.				18mm	***
<i>Escobedia grandiflora</i> (L.f.) Kuntze				22mm	***
<i>Eucalyptus citriodora</i> Hooker				21mm	***
<i>Eucalyptus globulus</i> Labill.				20mm	***
<i>Eugenia obtusifolia</i> Cambes.				15mm	***
<i>Eustephia coccinea</i> Cav.		8mm		7mm	***
<i>Flaveria bidentis</i> (L.) Kuntze		10mm		9mm	***
<i>Foeniculum vulgare</i> P. Miller				8mm	***
<i>Gaultheria erecta</i> Vent.				13mm	***
<i>Gentianella bicolor</i> (Wedd.) J. Pringle				18mm	***
<i>Gentianella bruneotricha</i> (Gilg.) J.S. Pringle.		9mm		***	***
<i>Geranium ayavacense</i> Willd. ex H.B.K.				12mm	***
<i>Geranium sessiliflorum</i> Cavanilles		8mm		18mm	***
<i>Gnaphalium americanum</i> Mill.				9mm	***
<i>Heisteria acuminata</i> (H. & B.) Engler				14mm	***
<i>Ilex guayusa</i> Loes		14mm		14mm	***
<i>Laccopetalum giganteum</i> (Wedd.) Ulbrich				9mm	***
<i>Leucaena leucocephala</i> (Lam.) De Wit			7mm		***
<i>Lonicera japonica</i> Thunberg				9mm	***
<i>Loricaria ferruginea</i> (R. & P.) Wedd.				15mm	***
<i>Mandevilla</i> cf. <i> trianae</i> Woodson			13mm	24mm	***
<i>Mauria heterophylla</i> H.B.K.			14mm	17mm	***
<i>Mentha spicata</i> L.				12mm	***

<i>Mimosa albida</i> H. & B.			12mm	***
<i>Myroxylon balsamum</i> (L.) Harms			12mm	***
<i>Nicotiana tabacum</i> L.			8mm	***
<i>Oreopanax eriocephalus</i> Harms			8mm	***
<i>Origanum majorana</i> L.			17mm	***
<i>Oritrophium peruvianum</i> (Lam.) Cuatrec.			14mm	***
<i>Otholobium glandulosum</i> (L.) Grimes			10mm	***
<i>Passiflora ligularis</i> Jus.	12mm		8mm	***
<i>Pelargonium odoratissimum</i> (L.) L'Herit			8mm	***
<i>Persea americana</i> Mill.			9mm	***
<i>Peumus boldus</i> Molina	13mm		15mm	***
<i>Phyllanthus niuriri</i> L.		9mm	12mm	***
<i>Phyllanthus urinaria</i> L.	15mm		14mm	***
<i>Phytolacca bogotensis</i> H.B.K.	17mm		7mm	***
<i>Pilea microphylla</i> (L.) Lieberman	10mm		8mm	***
<i>Piper aduncum</i> L.		12mm		***
<i>Plantago sericea</i> R. & P. var. <i>lanuginosa</i> Grieseb.			19mm	***
<i>Polygonum hydroperoides</i> Michaux			9mm	***
<i>Porophyllum ruderale</i> (Jacq.) Cas.			23mm	***
<i>Pseudogynoxis cordifolia</i> (Cass.) Cabr.			8mm	***
<i>Rorippa nasturtium-aquaticum</i> (L.) Hayek			7mm	***
<i>Rubus robustus</i> C. Presl			10mm	***
<i>Salvia discolor</i> H.B.K.			13mm	***
<i>Schinus molle</i> L.	12mm		14mm	***
<i>Schkuhria pinnata</i> (Lam.) Kuntze		12mm		***
<i>Senecio canescens</i> (H.B.K.) Cuatrec.			8mm	***
<i>Senna monilifera</i> H.S. Irwin & Bowley			10mm	***
<i>Siphula</i> sp.			10mm	***
<i>Solanum americanum</i> Mill.			16mm	***
<i>Spartium junceum</i> (L.) Harms			12mm	***
<i>Tagetes erecta</i> L.			20mm	***
<i>Tagetes elliptica</i> Sm.			13mm	***
<i>Taraxacum officinale</i> Wiggers			20mm	***
<i>Tropaeolum minus</i> L.			17mm	***
<i>Verbena littoralis</i> H.B.K.			12mm	***

*** positive control: at least 7mm inhibition ring against bacteria tested.