

# Antibacterial properties of common herbal remedies of the southwest

Christopher David Romero, Suzzette Fontenelle Chopin\*, Gregory Buck,  
Elvia Martinez, Michelle Garcia, Lisa Bixby

Texas A and M University-Corpus Christi, Physical and Life Sciences, 6300 Ocean Drive, CS 130D, Corpus Christi, TX 78412, USA

Received 26 August 2004; received in revised form 11 February 2005; accepted 17 February 2005

Available online 7 April 2005

## Abstract

Curanderismo, widely practiced in the southwest, is an alternative medical system that has been neglected by scientific research. This project analyzed the antibiotic properties of 23 common herbal remedies used in South Texas to treat wounds and infections. Ethanolic tinctures and aqueous extracts of each plant were prepared and applied to blank diffusion disks. These disks were desiccated and used in Kirby-Bauer disk diffusion susceptibility tests on three bacteria: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*. Control disks contained solvent only. The efficacy of the tinctures and aqueous extracts was compared to that of commercially prepared antibiotic diffusion disks. No inhibition was observed with the aqueous extracts. The various tincture-saturated disks produced zones of clearance ranging from 1 to 5 mm. Ten plants consistently inhibited bacterial growth of *Staphylococcus aureus*. None of the plants tested produced consistent inhibition of the two Gram-negative species, *Pseudomonas aeruginosa* and *Escherichia coli*. No zones of clearance were produced by the solvent-only control disks. The zones of clearance produced by commercial antibiotics were, on average, larger and more uniform than those produced by the tincture disks. Thus, it appears that some of the herbal remedies used in folk medicine are potentially effective antibacterial agents against *Staphylococcus aureus*.

© 2005 Elsevier Ireland Ltd. All rights reserved.

**Keywords:** Antibacterial activity; Herbal remedies; Curanderismo; Folk medicine

## 1. Introduction

The use of complementary and alternative medicine (CAM) has increased dramatically over the past 15 years. In 1990, an estimated 34% of Americans used some form of CAM, spending \$14 billion dollars out of pocket (Eisenberg et al., 1998). By 1997, this figure had jumped to 42% of the U.S. population using CAM, at a cost of \$34 billion dollars (Eisenberg et al., 1998). By 1998, visits to CAM providers had risen to 629 million (Neal, 2001). This trend is expected to increase within the United States. Reliable scientific information about the safety and efficacy of such treatments is lacking. One CAM modality that has received little attention is Curanderismo. This health care system has evolved within the Hispanic communities of North America since Spanish colonialism. It is a blend of indigenous beliefs and practices

with Spanish herbal lore and Catholicism. This vibrant system has roots in Moorish Spain, Grecian humoral medicine, and Aztec mythology. Curanderismo is not a static system; it has continued its evolution and now often incorporates allopathic pharmaceuticals (Trotter, 2001). The acceptance of Curanderismo in predominantly Hispanic communities throughout the United States is still very high (Trotter, 2001). A survey of Hispanic outpatients in Denver Colorado showed that 91.3% of them were familiar with Curanderismo, and 29.1% had been to a Curandero (Padilla et al., 2001). This is probably an under-representation of usage within the Hispanic community because for many individuals, Curanderismo is the primary and sole form of health care. Thus, this survey, which was taken in a clinic, missed the most devout and dependent users of Curanderismo. One of the main tools used for healing within Curanderismo is herbal remedy. Many of these remedies are used to treat conditions that commonly result from bacterial infections of the gastrointestinal and urinary tracts and in

\* Corresponding author. Tel.: +1 361 825 6022; fax: +1 361 825 3719.  
E-mail address: [schopin@falcon.tamucc.edu](mailto:schopin@falcon.tamucc.edu) (S.F. Chopin).

wound infections. The aim of this study was to determine if these treatments were efficacious through direct antibacterial actions. Aqueous and ethanolic plant extracts were evaluated using Kirby-Bauer disk diffusion susceptibility tests against three common bacteria: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*.

## 2. Materials and methods

### 2.1. Plant material

Herbs used in this study were selected based upon historical use, anecdotal evidence, and availability. Family members and local herbalists were consulted for their advice on plant selection. Leonardo Carillo, Ph.D., a professor of Mexican–American studies and an expert in Mexican–American folk medicine, provided initial guidance in plant selection. Frank Fregoso, a respected figure in the Hispanic community of Corpus Christi and herbal purveyor, also supplied direction. In addition, several texts (Moore, 1990; Gruenwald, 1998; Peirce, 1999; WHO, 1999, 2001) were used as references for determining the accepted traditional usage of the plants tested. All plants tested were reported as being anti-infectives.

The following plants were analyzed using fresh samples: *Artemisia ludoviciana* (Asteraceae), *Castela emoryi* (Simaroubaceae), *Chenopodium ambrosioides* (Chenopodiaceae), *Equisetum hyemale* (Equisetaceae), *Leucophyllum frutescens* (Scrophulariaceae), *Rosmarinus officinalis* (Lamiaceae), *Salvia farinacea* (Lamiaceae), *Salvia greggii* (Lamiaceae), *Salvia leucantha* (Lamiaceae), *Salvia officinalis* (Lamiaceae), *Salvia sinaloensis* (Lamiaceae), *Spilanthes acmella* (Asteraceae), *Tagetes lucida* (Asteraceae/Compositae).

The following plants were analyzed using desiccated samples: *Achillea millefolium* (Asteraceae), *Berberis vulgaris* (Berberidaceae), *Commiphora molmol* (Bursaraceae), *Echinacea purpurea* (Asteraceae/Compositae), *Galium aparine* (Rubiaceae), *Glycyrrhiza glabra* (Fabaceae), *Matricaria chamomilla* (Asteraceae), *Pimenta dioica* (Myrtaceae), *Uncaria tomentosa* (Rubiaceae), *Zea mays* (Poaceae).

The plant samples used in this experiment were obtained from a variety of sources. Some were purchased live from nurseries and maintained in the University's greenhouse. Plants obtained from commercial nurseries were reported to be pesticide free. Others were gathered from the Laguna Atascosa National Wildlife Refuge in South Texas with permission from the refuge. Some of the plant samples were purchased in whole, dried form at health food stores and folk healing shops in Corpus Christi. Tammy White, Texas A&M University-Corpus Christi's resident botanist, authenticated live plant specimens. The portions of the living plants used in this study were not desiccated prior to testing at the advice of folk healers within the community.

### 2.2. Tincture preparation

Tinctures of the 23 herbs were prepared for the disk diffusion test. The active portion of each plant sample was pulverized in 95% ethanol using a mortar and pestle. Bark samples were macerated in a coffee grinder before they were pulverized. The samples were then placed into individual jars and additional ethanol was added until the samples were fully saturated. The final volume of ethanol was recorded but varied among the samples due to variations in absorbance between the plant materials. The labelled jars were stored in the dark at room temperature for one week and agitated daily to facilitate extraction. Tinctures were not filtered prior to use to prevent the exclusion of any potentially active constituents.

### 2.3. Aqueous preparation

Aqueous extracts were made from the 10 plants that produced clearance in the ethanolic analysis. Two to three grams of plant material was placed in 100 ml of 100 °C sterile deionized water (DI H<sub>2</sub>O). The plant material was allowed to steep in the water for up to 10 min with the temperature maintained at 100 °C and then returned to room temperature. Aqueous extracts were stored at 3 °C and used within 24 h of preparation.

### 2.4. Disk preparation

Sterile blank diffusion disks were weighed and placed into labelled trays for each tincture or aqueous extract. Each disk was saturated with 25 µl of an individual ethanol tincture or aqueous extract. After the solvent had fully evaporated, the disks were re-weighed and the extract concentrations were calculated (Table 1). Control disks were prepared by saturating sterile blank disks in either ethanol or sterile DI H<sub>2</sub>O and allowing all the solvent to evaporate. Commercially available antibiotic diffusion disks were used as standards for comparison. Ten micrograms of ampicillin was used on *Escherichia coli*, 30 µg of cefotaxime was used against *Pseudomonas aeruginosa*, and 30 µg of vancomycin was used on *Staphylococcus aureus*.

### 2.5. Kirby-Bauer disk diffusion susceptibility testing

#### 2.5.1. Bacterial dilutions

Isolated colonies of the three bacteria were placed into individual tubes containing 10 ml of room temperature, sterile DI H<sub>2</sub>O. The tubes were then adjusted to a turbidity of 0.5 McFarland Units by the addition of isolate colonies or sterile DI H<sub>2</sub>O. Turbidity was verified through spectrophotometry comparison with a 0.5 McFarland Standard. The dilutions were used within 15 min of their preparation and were vortexed prior to each use.

Download English Version:

<https://daneshyari.com/en/article/9009750>

Download Persian Version:

<https://daneshyari.com/article/9009750>

[Daneshyari.com](https://daneshyari.com)